WESTBROOK BOARD OF EDUCATION
EDUCATE, CHALLENGE, & INSPIRE

WESTBROOK BOARD OF EDUCATION
Teaching and Learning Subcommittee Meeting
Wednesday, June 7, 2023 @ 5:00 p.m.
BOE Conference Room

AGENDA

I. Call to Order

II. Approval of Minutes of February 2, 2023

III. A. Curriculum Review
     1. Algebra II
     2. Social Studies - 9th Grade
     3. Social Studies – 8th Grade
     4. Health 1 – 9-10 Curriculum
     5. Basic Robotics and Design

IV. Adjourn

WESTBROOK BOARD OF EDUCATION
EDUCATE, CHALLENGE, & INSPIRE

WESTBROOK BOARD OF EDUCATION
Teaching and Learning Subcommittee Meeting
Thursday, February 2, 2023 @ 5:00 p.m.
BOE Conference Room

MINUTES

Members Present: Don Perreault, Christine Kuehlewind, Kim Walker
Also Present: Zack Hayden, Superintendent Kristina Martineau

I.   Call to Order: The Teaching and Learning Subcommittee meeting was called to order at 5:03 p.m. by D. Perreault, Chair.

II.   Committee Chair selection: MOTION by D. Perreault to nominate C. Kuehlewind as Chair - SECOND by K. Walker. Vote unanimous.

III. Approval of Minutes of December 8, 2022: MOTION by D. Perreault and SECOND by K. Walker to approve the minutes of December 8, 2022 Vote unanimous.

IV.   Review of Equity and Access Statement Draft - WPS Commitment to All Students: The Committee reviewed two drafts of the Equity Statement and reached a consensus on moving a draft forward (the document last revised by the PreK-12 Equity and Access Committee). Proposed changes:

- Update title to Westbrook's Commitment to ALL Children in Our Schools
- Replace "policy" with "practices"
- Remove the phrase "the following necessary"

Next Step Recommendations:

- Present to full BOE for vote on 2/14/2023
- Pending approval, work in PLC, faculty meetings, and with student involvement to make this a living document. Follow up in the spring with a survey to assess how students feel and professional development to support students so all students feel included and safe. Invite committee members to attend the meeting.

V.   Weekly time allotted to Daisy subjects: Math, Science, LA, Social Studies
      Art, Music, P.E., Spanish

      The Committee discussed instructional time scheduled at the elementary level grade by grade PreK-4 and supported balancing instructional time to ensure that both social studies and science time is increased to meet state and local curriculum requirements. The committee also emphasized the importance of making sure instructional time for art and music was balanced and scheduled enough moving forward for program and curriculum requirements.

VI.   Future Agenda Items for Future Meetings
      A. Completed Curriculum Revisions to Review and Move Forward to BOE
      B. Music Program
      C. Art Program
      D. New Courses for 2023-2024
      E. Welding Program and Electric Boat Partnership

Next Meeting Date: Thursday, April 20, 2023 at 5:30 p.m. or Wednesday, April 26, 2023 at an earlier time?

VII.   MOTION to adjourn at 5:58 p.m. Vote unanimous.

Respectful submitted,

Christine Kuehlewind, Board Secretary   Cecilia S. Lester, Board Recording Clerk

Westbrook Public Schools
Middle School
8th Grade, Social Studies Curriculum

Subject(s)	Social Studies
Grade/Course	8th Grade / Social Studies
Unit of Study	Unit 1: Colonies of North America
Pacing	6 Weeks

CT Social Studies Frameworks
What are the goals of this unit?

Priority/Focus Standards:

HIST 8.9 Explain multiple causes and effects of events and developments in the past.
CIV 8.1 Explain the origins, functions, and structure of government with reference to the U.S. Constitution, state constitutions, and selected other systems of government.
ECO 8.1 Explain how economic decisions affect the well-being of individuals, businesses, and society.
GEO 8.2 Analyze the combinations of cultural and environmental characteristics that make places both similar to and different from other places.
GEO 8.4 Explain how the relationship between the environmental characteristics of places and production of goods influences the spatial patterns of world trade.

Supporting Standards:

HIST 8.8 Evaluate the relevance and utility of a historical source based on information such as maker, date, place of origin, intended audience, and purpose.

ECO 8.6 Explain the benefits and the costs of trade policies to individuals, businesses, and society.

Inquiry Standards:

INQ 6–8.1 Explain how a question represents key ideas in the field.
INQ 6–8.2 Explain points of agreement experts have about interpretations and applications of disciplinary concepts and ideas associated with a compelling question.
INQ 6–8.3 Explain points of agreement experts have about interpretations and application of disciplinary concepts and ideas associated with a supporting question.
INQ 6–8.4 Explain how the relationship between supporting questions and compelling questions is mutually reinforcing.
INQ 6–8.6 Gather relevant information from multiple sources while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection**.**
INQ 6–8.7 Evaluate the credibility of a source by determining its relevance and intended use.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
- CCSS.ELA-LITERACY.RH.6-8.1
  Cite specific textual evidence to support analysis of primary and secondary sources.
- CCSS.ELA-LITERACY.RH.6-8.2
  Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- CCSS.ELA-LITERACY.RH.6-8.4
  Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- CCSS.ELA-LITERACY.RH.6-8.6
  Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).
- CCSS.ELA-LITERACY.RH.6-8.7

Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- CCSS.ELA-LITERACY.RH.6-8.9
Analyze the relationship between a primary and secondary source on the same topic.

Writing
- CCSS.ELA-LITERACY.WHST.6-8.1.B
Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- CCSS.ELA-LITERACY.WHST.6-8.7
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- CCSS.ELA-LITERACY.WHST.6-8.9
Draw evidence from informational texts to support analysis, reflection, and research.

Speaking and Listening
- CCSS.ELA-LITERACY.SL.8.1
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Explain multiple causes and effects of events and developments in the earliest days of European settlement of North America.	1. Causes and effects of European Settlement in North America: ● European mines were running out of silver and gold ● New inventions required raw materials ● Search for efficient and inexpensive trade routes

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- Portugal finds a sea route to Asia and led to the Atlantic slave trade
- Conflict among European nations led to new diplomacy (Treaty of Tordesillas)
- "Doctrine of Discovery" gave claims to discovered lands, negatively impacting native peoples
- Spain
  - financed Columbus to look for riches
  - spread Christianity
  - excluded Jews, Muslims, and any non-Christians from settling in New Spain
  - growing economy and food production created the need for more labor (encomienda system) and plantation farming
  - Protestant Reformation
    - Luther
    - fewer religious rules
    - led to conflict among Protestant, Catholic, and the new Church of England
- England enters North America
  - Roanoke, VA
  - Jamestown, VA
    - unstable relations with Powhatan
    - indentured servants
    - first African prisoner 1619
- France
  - Northern lands (Canada)
  - Driven from south by Spain
  - Stable relations with Natives, fur trade
  - Louisiana territory

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	- Dutch - Middle Colonies - main goal - trade - Dutch West India Co - Religious tolerance
2. Explain the origins, functions, and structure of government with reference to the U.S. Constitution, state constitutions, and selected other systems of government in the early colonial period of North America.	2. Origins of government: - monarchs are appointed by God and passed in heredity - monarchs can appoint leaders in the colonies (governors) - Iroquois Great Law of Peace - House of Burgesses - Mayflower Compact - Fundamental Orders of CT - Great Awakening - Jonathan Edwards - Enlightenment - John Locke - social contract functions of government - identify leaders; appointed or elected - make local decisions in the colonies - enforce European rule / law structure of government - Monarchs appoint leaders in the colonies to enforce rules/laws - Colonial courts - southern - county meetings - middle - county meetings and town meetings - New England

	○ Massachusetts Bay Charter, delegates, two house(bicameral) legislature, male church-members vote, United Colonies of New England; town meetings

3. Explain how economic decisions affect the well-being of individuals, businesses, and society	3. Economic decisions:
	● Mercantilism
	● Salutary neglect
	● Virginia Company issued a charter by King James I
	  ○ tobacco, rice plantations (cash crop)
	  ○ convicted debtors sent to Georgia
	● New England; trade, fishing, shipbuilding,
	● Middle; Dutch West India Company
	effects on individuals, business, society
	● smuggling
	● Southern
	  ○ Powhatan conflict
	  ○ indentured servants
	  ○ African trade, slaves outnumber white settlers
	  ○ Bacon's Rebellion
	● New England
	  ○ trade among colonies and overseas
	  ○ families work to support themselves
	● Middle
	  ○ Patroon system (lords)
	  ○ enslaved Africans to New Netherland 1626
	  ○ taken over by the English, seeking to control the east coast; NY Slave Revolt 1712

4. Analyze the combinations of cultural and	4. Cultural characteristics of colonial regions: ● Southern colonies

environmental characteristics that make places both similar to and different from other colonial regions.

- ○ both catholics and protestants settled in the south (conflict), slave codes
- Middle colonies
    - ○ religious tolerance
    - ○ free blacks and enslaved Africans
    - ○ Quakers
- New England colonies
    - ○ Puritans
        - ■ John Winthrop
    - ○ Pilgrims
    - ○ positive relations with Natives
    - ○ family labor - hard work valued
    - ○ views toward women (Salem Witch Trials)
        - ■ Anne Hutchinson
    - ○ importance of education

environmental characteristics of colonial regions
- Southern colonies
    - ○ marshes (disease), mild climate,
- Middle colonies
    - ○ good climate, rich land
- New England colonies
    - ○ cold winters, rocky land, lumber, waterways

5. Explain how the relationship between the environmental characteristics of places and production of goods influences the spatial patterns of world trade.

5. Production of goods
- sugar, cotton, tobacco

Influence on trade:
- Navigation Acts limit colonial trade to England
- Triangular Trade, Middle Passage

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. What role does religion play in forming and changing societies? 2. What are the effects when different cultures meet? 3. How does geography affect creating and maintaining societal norms? 4. Why do people migrate?	1. Religious beliefs create a hierarchy of classes in society; provide a basis for law-making; create unity as well as conflict. 2. When diverse cultures encounter each other, lack of understanding creates conflict; mutual benefits create symbiosis among cultures. 3. Geographic features may promote societal development by use of natural resources for building and for trade (or lack of). The movement of people and ideas brings views on laws and values. 4. People migrate based on push and pull factors including livable land, economic factors, human interaction, rules and ideas.

Resources
Student Technology Integration and Correspondence to ISTE Standards when Applicable: **Mayflower Compact Formative Assessment:**

Standard 7a: Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.

Informational Texts:
- **Informational Books:** *HMH Social Studies; US HISTORY Beginnings to 1877, 2018*

Media:
- **Interactive Maps** https://edsitement.neh.gov/student-activities/american-war-independence-interactive-map
- **Freedom:** *A History of Us - Text and DVD*
- **America:** *A History of Us DVDs*
- **The Revolution History Channel DVDs**
- *Inquiry-Based Lessons in U.S. History*, **Kirchner;** "How did 3 different colonies in North America lay the foundation for representative government?"; How did slaves experience the Middle Passage?"; 'How did the colonists experience the Great Awakening?"
- *The DBQ Project* **(Mini-Q), 2013:** What caused the Salem Witch Trial Hysteria of 1692?;
- **Atlas of United States History, Nystrom**

Online Resources / Websites:
- **Brainpop:** American Indians, British Empire, Building the 13 Colonies, Regions of the 13 Colonies, Salem Witch Trials
- **c3teachers.org**
- **CommonLit.org;** Colonies text set;
- **IXL:** Enlightenment**.** Exploration, Colonial America, Primary and Secondary sources; Map of Americas
- **Newsela:** Great Awakening, Primary Sources - views; Indian Uprising; https://drive.google.com/drive/folders/1QtB46RhCh8rGKBv0O3v4I8uJ1tadfmMr
- **SHEG Lessons** https://sheg.stanford.edu/history-lessons: Passenger Lists, Salem Witch Trials, Great Awakening, Middle Passage;
- **SHEG Historical Thinking Assessments** https://sheg.stanford.edu/history-assessments: Mayflower Compact (sourcing), Virginia Company (source and context), Portrait of an Iroquois,
- **Unit Guide/Lessons** https://scholarworks.bgsu.edu/cgi/viewcontent.cgi?article=1279&context=honorsprojects
- https://www.louisianabelieves.com/docs/default-source/scope-and-sequence/updated-social-studies-sample-scope-and-sequence-grade-7.pdf?sfvrsn=9f478f1f_19
- **CT Historical Society**   https://chs.org/education/online-learning/

- **Primary Source Collections by topic** https://www.masshist.org/revolution/teachers/lessons.php
- **Hexagon Activity** https://www.classtools.net/hexagon/201702-hNXha4
- **How-To Hexagon Video** https://www.youtube.com/watch?v=Xv_eJwo3efM (American Revolution)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Agrarian - farming at the center of the economy.

Catholic - Roman Catholic Christian faith.

Charter - a written grant by a country's legislative or sovereign power, by which a body such as a company, college, or city is founded and its rights and privileges defined.

Christianity - the religion based on the person and teachings of Jesus of Nazareth, or its beliefs and practices.

Colony - an area of settlement ruled and populated by another country, usually a distant one.

Encomienda System - a grant by the Spanish Crown to a colonist in America conferring the right to demand tribute and forced labor from the Indian inhabitants of an area.

Enlightenment - encouraged people to use reason, ask questions rather than rely on religious leaders (Scientific Revolution).

Fundamental Orders of CT - 1639, organize government in CT River towns.

Great Awakening - early 1700s inspired Protestant sermons (Jonathan Edwards MA and George Whitefield Britain).

House of Burgesses - 1619 Virginia's elected representative government.

Indentured Servant - man or woman who is contracted to work for a patron for a number of years in exchange for transport to N America.

Mayflower Compact - 1620 First governing document in Plymouth, MA.

Mercantilism - theory that trade generates wealth and should be encouraged by the government.

Monarchy - undivided rule by a single person.

Native - a person born and raised in a particular place.

Natural rights - (Locke) life, liberty, property, pursuit of happiness: humans are born free and equal and can only be governed with consent of the people.

Pilgrim - a traveler for religious reasons.

Plantation - an estate where crops are grown and tended by resident labor.

Protestant - a member or follower of any of the Western Christian churches that are separate from the Roman Catholic Church and follow the principles of the Reformation, including the Baptist, Presbyterian, and Lutheran churches.

Puritan - a member of a group of English Protestants of the late 16th and 17th centuries who regarded the Reformation of the Church of England under Elizabeth as incomplete and sought to simplify and regulate forms of worship.
Quakers - a member of the Religious Society of Friends, a Christian movement founded by George Fox *c.* 1650 and devoted to peaceful principles. Central to the Quakers' belief is the doctrine of the "Inner Light," or sense of Christ's direct working in the soul. This has led them to reject both formal ministry and all set forms of worship.
Revenue - income.
Salutary neglect - Early policy of the English government not strictly enforcing Britain's colonial policies.
Slave Codes - rules for slaves for masters to maintain control.
Sovereign - a supreme ruler (monarch) ; also independent of outside rule.
Triangular Trade - overseas trade between the lands on the Atlantic.

Academic Vocabulary

Argument - reasons that try to convince others.	**Context -** relevant information to surrounding circumstances of an event **Credibility** - trusted and believed.	**Perspective** - the lens through which the story is told. Point of view - an attitude or position in a matter.
Claims - a statement that is believed true to the writer.	**Evidence** - facts that support a claim.	**Questioning** - a process used to promote knowledge and interest.
Counterclaim - a statement believed true by the opposition (rebut/refute).	**Explanation** - a statement that makes something clear, usually clarifies evidence.	**Sources** - person (place or thing) of origin.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week One: Activate Prior Knowledge / Class Procedures and Materials
- Map Activities-Earliest settlements in the American Colonies - Nystrom online or texts.
- Brainpop options: Building the 13 Colonies; Christopher Colombus, Columbian Exchange, Regions of the 13 Colonies.
- Review Greek and Roman influences (text) - independent thinking and "republic" government.
- push pull factors of exploration.
- Spain / Portugal: Columbus, new lands found creates new conflict among nations "Doctrine of Discovery"; spread Christianity; ruled by Spanish royals.
- Sept 13 Primary Source introduction "Think Like a Historian- Who Was James Wolfe?" (American Revolution Institute).

Week Two: Southern
- SHEG pre-assessment The Virginia Company (sourcing).
- Daily Bellringer: Jamestown (Jamestown Brainpops available).
- Jamestown online adventure (if the district allows Adobe flash).
- miniQ - Primary source analysis "Why did so many in Jamestown die?"
- Government systems: House of Burgesses.

Week Three: Northern
- Overview
- Puritans (SHEG https://sheg.stanford.edu/history-lessons/puritans)
- Pilgrims (sourcing).
- Government systems: Mayflower Compact, Fundamental Orders of CT, Representative Democracy.
- Iroquois Great Law of Peace (with Constitution Day 9/17) League of Iroquois; Iroquois Confederacy Brainpop.
- Compare early arrivals Jamestown v Plymouth.

Week Four: Middle Colonies and Comparisons
- Basic geography, economics, and laws of the middle colonies.
- Make comparisons to southern and northern colonies:
  - religion
  - government
  - staple crops v cash crops v family farm
  - labor
  - relations with natives

○ enslaved Africans v free African Americans

Week Five: Trade / Middle Passage / Scientific Revolution
- [Daily Bellringer](): Beginnings of Slavery.
- [Middle Passage](). (build on previous knowledge from 7th grade curriculum)
- [Triangular Trade]().
- [Enlightenment]().
- [Great Awakening]().

Week Six: Review and Assess
- MiniQ "What Caused the Salem Witch Hysteria of 1692"
- [13 Colonies Escape Room]() (TpT)
- [Journey Through the 13 Colonies]() (TpT)
- 13 Colonies Bingo
- 🗎 Assessment #1 Sample Assessment

Interdisciplinary / Real World / Global Connections

- Examine the ways that exploration has changed over time. What factors cause exploration in modern day? What consequences are possible with new explorations? What would someone want to find? How are all of these alike and different from early exploration?

Differentiation

Advanced: Content can be pre-assessed by quizzes. Students with strong knowledge about the pre-Revolutionary time can move toward a more in-depth inquiry experience. Skills will be pre-assessed throughout the unit (reading, writing, listening, sourcing, contextualization, corroboration).
eg: Was George Washington a traitor? C3teachers.org inquiry

Struggling: Teacher support while gaining basic content knowledge not retained or not learned from grade five instruction.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Historical Thinking: Sourcing [Mayflower Compact](#);
- Context [Portrait of an Iroquois Leader](#);
- [Creating Columbus Day](#)
- Text Book (HMH) check-ins.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- [Journey Through the 13 Colonies](#) (TpT)
- RAFT writing (Role Audience Format Topic)

https://hsp.org/sites/default/files/happy_document_analysis.pdf (HAPPY acronym for sourcing)

Can also use SOAPSTONE (speaker, occasion, audience, purpose, subject, tone)

Possible questions
1. Explain the ways in which European exploration led to international trade.
2. How did relations with Native Americans help and hinder European settlements?
3. Compare and contrast the economies of the three colonial regions.
4. What influences did the physical geography of the 3 colonial regions have in settling and trade?
5. Explain the role of religion in the creation of new settlements in North America.
6. How did European governments and Native American governments influence early colonial government systems?
7. How did early government systems of the colonies allow for freedoms and also restrictions of the settlers?

Westbrook Public Schools
Middle School
8th Grade, Social Studies Curriculum

Subject(s)	Social Studies
Grade/Course	8th Grade / Social Studies
Unit of Study	Unit 2: Revolution (French and Indian War - Treaty of Paris 1783)
Pacing	8 Weeks

CT Social Studies Frameworks
What are the goals of this unit?

Priority/Focus Standards:

HIST 8.1 Analyze connections among events and developments in historical contexts.
HIST 8.3 Analyze multiple factors that influenced the perspectives of people during different historical eras.
HIST 8.5 Analyze how people's perspectives influenced what information is available in the historical sources they created.
HIST 8.8 Evaluate the relevance and utility of a historical source based on information such as maker, date, place of origin, intended audience, and purpose.
HIST 8.9 Explain multiple causes and effects of events and developments in the past.
CIV 8.3 Analyze the purposes, implementation, and consequences of public policies in multiple settings.
ECO 8.1 Explain how economic decisions affect the well-being of individuals, businesses, and society.

Supporting Standards:

HIST 8.2 Classify series of historical events and developments as examples of change and/or continuity.
HIST 8.4 Explain how and why perspectives of people have changed over time.

HIST 8.6 Detect possible limitations in the historical record based on evidence collected from different kinds of historical sources.
HIST 8.10 Organize applicable evidence into a coherent argument about the past.
ECO 8.6 Explain the benefits and the costs of trade policies to individuals, businesses, and society.
Civ 8.4 Compare historical and contemporary means of changing societies and promoting the common good.

Inquiry Standards:

INQ 8.5 Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration multiple points of view represented in the sources.
INQ 8.6 Gather relevant information from multiple sources while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection.
INQ 8.7 Evaluate the credibility of a source by determining its relevance and intended use.
INQ 8.10 Construct arguments using claims and evidence from multiple sources, while acknowledging the strengths and limitations of the arguments.
INQ 8.15 Draws on multiple disciplinary lenses to analyze how a specific problem can manifest itself at local, regional, and global levels over time, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
- CCSS.ELA-LITERACY.RH.6-8.1
  Cite specific textual evidence to support analysis of primary and secondary sources.
- CCSS.ELA-LITERACY.RH.6-8.2
  Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- CCSS.ELA-LITERACY.RH.6-8.4
  Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- CCSS.ELA-LITERACY.RH.6-8.6

Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).
- CCSS.ELA-LITERACY.RH.6-8.7
Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- CCSS.ELA-LITERACY.RH.6-8.8
Distinguish among fact, opinion, and reasoned judgment in a text.
- CCSS.ELA-LITERACY.RH.6-8.9
Analyze the relationship between a primary and secondary source on the same topic.

Writing
- CCSS.ELA-LITERACY.WHST.6-8.1.B
Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
- CCSS.ELA-LITERACY.WHST.6-8.7
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- CCSS.ELA-LITERACY.WHST.6-8.9
Draw evidence from informational texts to support analysis, reflection, and research.

Speaking and Listening
- CCSS.ELA-LITERACY.SL.8.1
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*

1. Analyze connections among (events and developments) in the colonies during the 1700s	1. Connections among events and developments in the colonies during the 1700s: ● increased tension between the Wampanoag and colonists over land leads to King Philip's War ● Land disputes between French and Britain lead to War ● French and Indian War leads to debt in Britain causing taxes on the colonies ● Worries over tyranny lead to colonists belief in strong local government and non-acceptance of Albany Plan ● Colonies are taxed without representation in government leading to protest in the colonies ● Settlement lines are established in North America by the King, leading to further rebellion in the colonies ● Conflict with Britain led to unification among the colonies, the signing of the Declaration of Independence, and creation of a Continental Army

2. Analyze multiple factors that influenced the perspectives of people (loyalists, patriots, merchants, shopkeepers, farmers, women, slaves, and freed blacks) during the 1700s	2. Multiple factors that influenced the perspectives of people during the 1700s:
	● Reforms in religion and scientific thought
	   ○ enlightenment ideas in the DoI
	   ○ Monarchs no longer seen as a direct line to God
	   ○ Thomas Paine's Common Sense
	● Economics
	   ○ boycotts and taxes put strain on colonist merchants and families
	   ○ lack of pay and supplies for the Continental soldiers
	   ○ economic/trade policies as a key factor in Loyalist vs Patriot alliances
	● Founding Fathers

	○ George Washington: British Officer to Continental Army Commander in Chief ○ Sons of Liberty: Paul Revere, Samuel Adams, John Adams, John Hancock ○ Benedict Arnold: Continental Officer to British Officer ○ Thomas Jefferson: Declaration of Independence ○ Ben Franklin: American delegate in France ● Native Americans ○ British promised aid to tribes in exchange for military assistance ○ colonists settling past the Proclamation line ● African Americans ○ Britain promised freedom to enslaved Africans who fought with them ○ Washington banned enslaved Africans from fighting; eventually allowed free blacks to join
3. Analyze how people's perspectives influenced what information is available in the historical sources they created.	3. People's perspectives influenced what information is available in the historical sources they created. ● Paul Revere etchings of Boston Massacre ● An oral history of the Boston Tea Party ● Leutze's Washington Crossing the Delaware ● *Midnight Ride of Paul Revere* Fact v Fiction
4. Evaluate the relevance and utility of a historical source based on information such as maker, date, place of origin, intended audience, and purpose	4. Relevance and utility of a historical source based on information such as maker, date, place of origin, intended audience, and purpose: ● What do we know about the maker? ● How close to the event in time was this created? ● How close to the event in location was this created?

	- Who was the intended audience? - What was the creator's purpose in making this? - What are the strengths and weaknesses of this source based on answers to the questions above?
5. Explain multiple causes and effects of events and developments in the past	5. Causes and effects of events and developments in the past: **Foreign Influence on the American Colonies** - Proclamation of 1763 - no settlement beyond the Appalachian Mountains angered colonists - Taxes on colonies passed by King George III and Parliament to help with British debt from the F/I War - Sugar Act (1764) "Taxation without representation" - boycott of British goods ensued - Stamp Act 1765 - Sons of Liberty - boycott of British paper goods led to repeal - Quartering Act 1765 - Declaratory Act 1766 following repeal of Stamp Act - Townshend Acts 1767 - led to increase of British soldiers - Boston Massacre 1770 - Tea Act 1773 - Britain's cheaper tea hurts colonists tea business - Boston Tea Party 1773 - Resulted in the Intolerable Acts 1774 **Colonial Unification Begins** - Committees of Correspondence - First and Second Continental Congress - Militias form - grievances with Britain led to creation and signing of the DoI

	- Olive Branch Petition (July 5) - Conditions creating defeat and success in major battles during the Revolutionary War - Contributions of Native Americans, African Americans, and women - Attitudes toward Britain shaped the Articles of the Confederation(1781) America's foreign relations - colony - delegates: Ben Franklin and John Adams - Contempt for the King - Alliance with France
6. Analyze the purposes, implementation, and consequences of public policy in multiple settings	6. Purposes, implementation, and consequences of public policy in the colonies and in the colony regions public policies: - Salutary neglect - religious declarations - acts involving taxes - boycotts - representation in government (or lack of) - treatment of African Americans - Consideration of slavery in the Declaration of Independence
7. Explain how economic decisions affect the well-being of individuals, businesses, and society	7. Explain how economic decisions affect the well-being of individuals, businesses, and society: - farmers near Valley Forge - inability to pay the Continental Army - Hessians join Britain as paid mercenaries

	- effects of boycotts against Britain - smuggling - Policies of the Foreign Slave Trade vs Enslavement in the South

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How did the development and unification of the colonies lead to rebellion?	1. Major differences developed between the English and their colonial subjects. Colonists developed separate cultural traits because of the geographic separation. Colonists were used to having some semblance of representative democracy within their colonial governments.
2. Why were colonists divided over the issue of independence?	2. Economic factors, apprehension of being labeled a traitor, and ties to colonial governments led to division. Loyalists wanted to remain part of England. Patriots wanted freedom from England.
3. How did the Declaration of Independence set a precedent for American governance?	3. The Declaration of Independence laid out specific demands that all American citizens would have protection of life, liberty and the pursuit of happiness.
4. In what ways is conflict effectively resolved?	4. Conflict resolution takes many forms; violence, compromise, protest, establishing rules.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Boston Massacre Analysis:
Standard 4c: Students develop, test and refine prototypes as part of a cyclical design process.

Informational Texts:
- **Informational Books:** HMH textbook

Media:
- **Interactive Maps** https://edsitement.neh.gov/student-activities/american-war-independence-interactive-map
- **Freedom:** *A History of Us - Text and DVD*
- **Supplement to PBS** http://www.pbs.org/ktca/liberty/tguide_1.html
- **America:** *A History of Us DVDs*
- **The Revolution History Channel DVDs**
- ***Inquiry-Based Lessons in U.S. History*, Kirchner;** "How did 3 different colonies in North America lay the foundation for representative government?"; "How did 18th century political cartoons reflect tensions between colonists and Great Britain?"; "What are the main points in Thomas Paine's *Common Sense*?"
- ***The DBQ Project* (Mini-Q), 2013:** Valley Forge: Would you have Quit?;
- **Atlas of United States History, Nystrom**

Online Resources / Websites:
- **Brainpop:** American Revolution, American Indians, Articles of Confederation, Benjamin Franklin, British Empire, Causes of the American Revolution, Declaration of Independence, French and Indian War, George Washington, John Adams,
- **c3teachers.org** http://www.c3teachers.org/inquiries/boston-tea-party/ ; http://www.c3teachers.org/inquiries/american-revolution/
- **CommonLit.org;** Colonies text set; American Revolution text set
- **Daily Bellringer Videos** https://www.dailybellringer.com/
- **IXL:** American Revolution;
- **Newsela: King George III Biography**

- **SHEG Lessons** https://sheg.stanford.edu/history-lessons: Boston Massacre, Loyalists, Stamp Act, Battle of Lexington, Declaration of Independence,
- **SHEG Historical Thinking Assessments** https://sheg.stanford.edu/history-assessments **:** Washington Crosses the Delaware; Seven Years War, Declaration of Independence
- **Schoolhouse Rock "No More Kings"** https://www.youtube.com/watch?v=cAZ8QJgFHOg
- **Ben Franklin "Mother Country"** http://www.classzone.com/books/am_05_shared/pdf/psource/TAS03_4_96_PS.pdf
- **Unit Guide/Lessons** https://scholarworks.bgsu.edu/cgi/viewcontent.cgi?article=1279&context=honorsprojects
- https://www.louisianabelieves.com/docs/default-source/scope-and-sequence/updated-social-studies-sample-scope-and-sequence-grade-7.pdf?sfvrsn=9f478f1f_19
- **CT Historical Society** https://chs.org/education/online-learning/
- **Primary Source Collections by topic** https://www.masshist.org/revolution/teachers/lessons.php
- **American Revolution Master Teacher Plans** https://www.americanrevolutioninstitute.org/lesson-plans/master-teacher-lesson-plans/
- **Emergence of American Identity** https://civics.sites.unc.edu/files/2012/05/EmergenceoftheAmericanIdentity10-111.pdf
- **Voices of the American Revolution** https://edsitement.neh.gov/lesson-plans/voices-american-revolution
- **Native Americans in the Revolution** https://edsitement.neh.gov/lesson-plans/native-americans-role-american-revolution-choosing-sides
- https://www.nps.gov/revwar/about_the_revolution/american_indians.html
- **African American Perspective**
- **"An Incomplete Revolution" text and charts** file:///C:/Users/lrenaud/Downloads/4m3b.1l7.pdf
- https://www.nps.gov/teachers/classrooms/african-americans-in-the-american-revolution.htm
- https://www.umbc.edu/che/tahlessons/lessondisplay.php?lesson=23
- https://www.digitalhistory.uh.edu/active_learning/explorations/revolution/revolution_slavery.cfm
- **Making Choices (African American and Native)** https://www.digitalhistory.uh.edu/active_learning/explorations/revolution/lesson_3.pdf
- **Women** https://www.khanacademy.org/humanities/us-history/road-to-revolution/the-american-revolution/a/women-in-the-american-revolution
- **Loyalists in the Revolution** https://hti.osu.edu/history-lesson-plans/united-states-history/loyalists
- **Paul Revere and other riders** https://edsitement.neh.gov/lesson-plans/not-only-paul-revere-other-riders-american-revolution
- https://edsitement.neh.gov/lesson-plans/why-do-we-remember-revere-paul-reveres-ride-history-and-literature

- **CT in the Revolution** https://www.dar.org/sites/default/files/lesson-plan/Chatham_Lesson%20Plan.pdf
- **East Haven Salt Works** https://connecticuthistory.org/east-havens-revolutionary-salt-works/?fbclid=IwAR28eRLV0go4WZ3qX8k0f7wqjZhQP_eXEwX9RFZOQOLdrbZhZuEWG-IPk60
- **Spies** https://www.dar.org/sites/default/files/lesson-plan/DARLessonPlan-WashingtonsSpies_0.pdf
- https://www.fairfieldhistory.org/wp-content/uploads/CulperSpyRing-1.pdf
- https://historytech.files.wordpress.com/2014/04/revolutionary-spies-instructional-support-materials1.pdf
- **Animated Map of the Revolutionary War** https://www.battlefields.org/learn/maps/revolutionary-war-animated-map
- **Olive Branch Petition** https://study.com/academy/lesson/olive-branch-petition-definition-summary.html
- **Multiple Causes Activities** https://mrnussbaum.com/history/revolutionary-war-causes
- **Boston Massacre Crime Scene** https://hsi.wm.edu/cases/boston/boston_preview.html
- **Declaration of Independence** https://www.courts.ca.gov/documents/CVCS-Lesson-Gallagher-all.pdf
- **Hexagon Activity** https://www.classtools.net/hexagon/201702-hNXha4
- **How-To Hexagon Video** https://www.youtube.com/watch?v=Xv_eJwo3efM (American Revolution)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:
Alliance - nations who join together for a common effort (such as war).
Articles of Confederation - first written plan of government in the United States.
Confederation - a group of states that work together for a common purpose.
Boycott - form of protest that involves refusing to purchase goods or services.
Committee of Correspondence - - Provided ways of communicating between colonies.
Continentals - Army of American/Patriot soldiers.
Declaration - a formal announcement.
Delegate - a person sent / authorized to represent others, most often elected.
Grievances - objections.
Hessians - German soldiers hired by Britain.
Loyalist -colonists who supported Britain (Tory).
Mercenary - a professional soldier hired to serve a foreign army.
Militia - local citizens joined to fight; state armies.

Minutemen - militia said to be able to be ready to fight in a minute.
Patriot - supported the rights of the colonies to rule themselves.
Popular Sovereignty - people who live in a region should choose how that place should be governed.
Quartering - the housing and feeding of foreign soldiers.
Repeal - recall or cancel.
Representation - persons elected to speak for a group.
Revolution - an uprising in opposition to the leaders.
Salutary neglect - Early policy of the English government not strictly enforcing Britain's colonial policies.
Siege - a military operation in which enemy forces surround a town or building, cutting off essential supplies, with the aim of compelling the surrender of those inside.
Tariff - Taxes on import/export goods, paid by the countries (Duty is paid by the consumer mostly on imports).
Tyranny - unjust rule by an absolute ruler.
Unalienable rights - rights that can not be taken away from a person.

Academic Vocabulary

Argument - reasons that try to convince others	**Context -** relevant information to surrounding circumstances of an event **Credibility** - trusted and believed	**Perspective** - the lens through which the story is told Point of view - an attitude or position in a matter
Claims - a statement that is believed true to the writer	**Evidence** - facts that support a claim	**Questioning** - a process used to promote knowledge and interest
Counterclaim - a statement believed true by the opposition (rebut/refute)	**Explanation** - a statement that makes something clear, usually clarifies evidence	**Sources** - person (place or thing) of origin

Learning Plan

Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One: ● 📘 Colonial America: French and Indian War overview ([King Philip's War](#)) ● 📘 Join or die Analyze Ben Franklin's Albany Plan ● Sugar and Stamp Acts / Sons of Liberty ● [Loyalists](#) v Patriots
Week Two: ● [Townshend Acts](#) ● [Analysis](#) of Boston Massacre [Documents](#) and [slides](#) ● Response to "What happened in Boston in March 1770?" ● Watch *John Adams* episode of the trial
Week Three: ● [Summary chart](#) of events on the Road to Revolution ● [Boston Tea Party](#) analysis ● [Taxation](#) [Simulation](#) ● Spies and Traitors - Culper Ring, Benedict Arnold
Week Four: ● [Lexington and Concord](#) ● Analyze *[Paul Revere's Ride](#)* by Longfellow as a historian (sourcing, contextualization) ● [Battle of Bunker Hill](#) ● [Common Sense](#)
Week Five: ● [Declaration](#) of Independence - [the break up](#) parts 1 and [2](#) ● [DoI](#) [Scavenger Hunt](#) ● [Olive Branch Petition Presentation](#)

Week Six: Battles in NY
- [Crossing the Delaware analysis](#)
- Battles in NY
- Help From Europe
- 🗒 Copy of "Right Hand Man" *Hamilton:* Introduction of George Washington

Week Seven:
- [Valley](#) [Forge](#) - Would you have quit?
- Other perspectives during the War - Women, African Americans, Native Americans

Week Eight: Review and Assess
- Battle of [Yorktown](#) - students will use document analysis skills learned in this unit to create an account of the events of Yorktown from multiple sources.
- Treaty of Paris 1783 - terms of peace

Interdisciplinary / Real World / Global Connections
- Crossover of American Revolution history with current social context - *[Hamilton](#)*, the musical.   - No taxation without representation - Washington D.C. and Puerto Rico.

Differentiation
Advanced: Content can be pre-assessed by quizzes. Students with strong knowledge about the pre-Revolutionary time can move toward a more in-depth inquiry experience. Skills will be pre-assessed throughout the unit (reading, writing, listening, sourcing, contextualization, corroboration) Options: - Was George Washington a traitor? C3teachers.org inquiry   - American Revolution [Digital Escape Room](#)   - Play [Be Washington](#)

Struggling: Teacher support while gaining basic content knowledge not retained or not learned from grade five instruction.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Analyze Ben Franklin's words about "old mother" (metaphor of Mother Country and Teens)
- [What caused King Philip's War](#)?
- SHEG HATs
  - [7 Years War](#)(Context, source, evidence)
  - [Declaration of Independence](#)(sourcing)
- Hexagon Thinking activities [Generator](#)

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
Road to Revolution 🗒 Road to Revolution One Pager
RAFT writing
- [Boston Massacre Analysis](#)
- [Washington Crosses the Delaware](#) (sourcing)

- Why do countries declare independence? C3 inquiry
  https://hsp.org/sites/default/files/happy_document_analysis.pdf (HAPPY acronym for sourcing)

  Can also use SOAPSTONE (speaker, occasion, audience, purpose, subject, tone)
- [Was the Revolutionary War virtuous or not](#)?

Possible questions:
1. Which economic factors were most influential in creating conflict between Britain and the colonies? Which economic factors created tension among the colonies?
2. How did the earliest styles of government create both opportunity and hardships for people during the Revolutionary era?
3. What benefits and limitations do historical sources provide as representations of historical events and attitudes?

4. How did women, Native Americans, African Americans help to support independence or demonstrate attitudes against independence from Britain?
5. Explain the motto, "No taxation without representation" and how it rallied Patriots in the colonies.
6. In what ways did the colonies attempt to maintain sovereignty while at the same time, unify for victory in the War?

Westbrook Public Schools
Middle School
8th Grade, Social Studies Curriculum

Subject(s)	Social Studies
Grade/Course	8th Grade / Social Studies
Unit of Study	Unit 3: The United States Constitution
Pacing	5 Weeks

CT Social Studies Frameworks   *What are the goals of this unit?*
Priority/Focus Standards: **CIV 8.1** Explain the origins, functions, and structure of government with reference to the U.S. Constitution, state constitutions, and selected other systems of government.   **CIV 8.2** Analyze ideas and principles contained in the founding documents of the United States, and explain how they influence the social and political system.   **CIV 8.3** Analyze the purposes, implementation, and consequences of public policies in multiple settings   **CIV 8.4** Compare historical and contemporary means of changing societies, and promoting the common good.   **Supporting Standards:**   **HIST 8.1** Analyze connections among events and developments in historical contexts.   **HIST 8.2** Classify series of historical events and developments as examples of change and/or continuity.   **HIST 8.4** Explain how and why perspectives of people have changed over time (e.g., American Revolution, slavery, labor, the role of women).

ECO 8.1 Explain how economic decisions affect the well-being of individuals, businesses, and society.

Inquiry Standards:

INQ 6–8.8 Identify evidence that draws information from multiple sources to support claims, noting evidentiary limitations.
INQ 6–8.9 Develop claims and counterclaims while pointing out the strengths and limitations of both.
INQ 6–8.15 Draw on multiple disciplinary lenses to analyze how a specific problem can manifest itself at local, regional, and global levels over time, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
- CCSS.ELA-LITERACY.RH.6-8.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- CCSS.ELA-LITERACY.RH.6-8.3 Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).
- CCSS.ELA-LITERACY.RH.6-8.8 Distinguish among fact, opinion, and reasoned judgment in a text.
- CCSS.ELA-LITERACY.RH.6-8.9 Analyze the relationship between a primary and secondary source on the same topic.
- CCSS.ELA-LITERACY.RH.6-8.10 By the end of grade 8, read and comprehend history/social studies texts in the grades 6-8 text complexity band independently and proficiently.

Writing
- CCSS.ELA-LITERACY.WHST.6-8.1 A-E Write arguments focused on *discipline-specific content*.
- CCSS.ELA-LITERACY.WHST.6-8.2 A-F Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- CCSS.ELA-LITERACY.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

- CCSS.ELA-LITERACY.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- CCSS.ELA-LITERACY.WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- CCSS.ELA-LITERACY.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.

Speaking and Listening
- CCSS.ELA-LITERACY.SL.8.1 A-D Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- CCSS.ELA-LITERACY.SL.8.2 Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- CCSS.ELA-LITERACY.SL.8.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- CCSS.ELA-LITERACY.SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Explain the origins, functions, and structure of government with reference to the U.S. Constitution, state constitutions, and selected other systems of government.	1. Origins of the U.S. Government. • Weaknesses of the AoC • Virginia Plan - James Madison, 3 branches of gov't, number of delegates is population based

	- New Jersey Plan - William Paterson, 3 branches, every state equal
	- Great Compromise
	- Three-fifths Compromise
	
	functions, and structure of government
	- Legislative Branch - Congress - make laws
	   ○ Senate
	      ■ 6 year term
	      ■ 2 per state
	      ■ 30 yrs old and citizens for 9 years
	   ○ House of Representatives
	      ■ 2 year terms
	      ■ number based on population
	      ■ 25 yrs old and citizen for 7 years
	      ■ can propose new taxes
	
	- Executive Branch - Pres, VP, and Cabinet
	   ○ Carries out laws
	   ○ 4 year term
	   ○ born in the US, 35 yrs old
	   ○ appoints officials
	   ○ divided into departments
	
	- Judicial Branch
	   ○ Federal Courts - district/appellate
	   ○ Supreme Court - Life

2. Analyze ideas and principles contained in the founding documents of the United States, and explain how they influence the social and political systems.	2. Ideas and principles contained in the founding documents of the United States. - equality

	- unalienable rights - republicanism - limited government - leaders require consent of the governed - popular sovereignty - form a more perfect union - insure domestic tranquility - provide for a common defense influence on social systems - Interpretation varies (strict v loose) - lack of statements on the rights of African Americans, Indigenous peoples, and women - Ordinances of 1785 and 1787 included provisions for schools reinforcing the Founders' belief that the success of government relies on educated people influence on political systems - Checks and Balances - Separation of powers - Electoral College - Representation in Government - disagreements create factions
3. Analyze the purposes, implementation, and consequences of public policies in multiple settings.	3. Purposes, implementation, and consequences of public policies in multiple settings. - ratification - sovereign states - Taxes 3/5ths Compromise

	• British rule helped shape Bill of Rights • Veterans' benefits past v present • Terrorism past v present • Declaration of holidays past v present
4. Compare historical and contemporary means of changing societies, and promoting the common good.	4. Historical and contemporary means of changing societies, and promoting the common good • Amendments • Debate • Bill of Rights • Protests • Elections

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. How did the development of the U.S. Constitution and its amendments reflect societal change that furthered the common good?	1. As a result of sovereignty from Britain and limits of the Articles of Confederation, the Constitution serves to find balance in the power of government and the people. From its inception, the Constitution is a living document, interpreted in different ways, with a process put in place to amend as determined by citizens and lawmakers.
2. How does the Constitution prevent tyranny?	2. The Constitution is a result of Federalists and Anti-Federalists viewpoints and a series of compromises that create a balance of state and federal governments, separation of powers, and a system of checks and balances.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Bellringers:
Standard 6c. Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.
Standard 6d. Students publish or present content that customizes the message and medium for their intended audiences.

Informational Texts:
- HMH Social Studies Text
- TCI *History Alive! The United States Through Industrialism*, 2017 (Primary Sources 178-179; 220-223)

Media:
- ***Inquiry-Based Lessons in U.S. History*, Kirchner; "**How does the preamble of the United States Constitution lay the foundation for purposes of the U.S. government?"; "How does the Bill of Rights help guarantee freedoms?";
- ***The DBQ Project* (Mini-Q), 2013:** How did the Constitution guard against Tyranny?
- **Atlas of United States History, Nystrom**

Online Resources / Websites:
- **Brainpop:** Alexander Hamilton, Articles of Confederation, Bill of Rights, Branches of Government, Constitutional Convention, Court System, Democracy, How a Bill Becomes a Law, Magna Carta, Presidential Power, U.S. Constitution
- **c3teachers.org** http://www.c3teachers.org/inquiries/great-compromise/
- **CommonLit.org**
- **IXL** The Government, The Constitution
- **Newsela**
- **Origins of the Constitution** (HMH Text pp 156/157)
- **SHEG Lessons** https://sheg.stanford.edu/history-lessons: Federalists v AntiFederalists, Shay's Rebellion, Slavery in the Constitution
- **Teaching 6 Big Ideas of the Constitution** https://www.archives.gov/legislative/resources/education/constitution
- https://www.uen.org/lessonplan/view/501
- **The Constitution: Continuity and Change** http://www.loc.gov/teachers/classroommaterials/lessons/continuity-change/

- **Constitutional Convention Simulation**
  http://ssecamoreperfectunion.com/PDFs/Constitutional_Convention_Lesson_Plan_Web_Version_by_Pavao.pdf
- **Articles of Confederation vs Constitution**
  https://hti.osu.edu/history-lesson-plans/united-states-history/constitution-compared-with-articles-confed
- **Inquiry: "Is Compromise Always Fair?** http://www.c3teachers.org/inquiries/great-compromise/
- **"I'm Just a Bill" Schoolhouse Rock** https://www.youtube.com/watch?v=tyeJ55o3El0
- **Hexagon Thinking U.S. Constitution** https://www.classtools.net/hexagon/201903-6T4EZD

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Amendment - official change, correction, or addition to a law or constitution.
Anti-Federalist - people who opposed a strong central government and opposed the Constitution.
Articles of Confederation - first written plan of government in the United States.
Bill of Rights - the first 10 amendments to the Constitution.
Checks and Balances - a system established by the Constitution that prevents any branch of government from becoming too powerful.
Constitution - a set of basic principles that determines the powers and duties of a government.
Constitutional Convention - a meeting held in Philadelphia at which delegates wrote the Constitution (1787).
Democracy - a government in which the people rule themselves.
Domestic - home (home country).
Executive Branch - branch of government that includes the president and the executive members of the cabinet - enforces laws.
Federalist - one who believes in the power of a strong central government.
Great Compromise - an agreement that determines the representation of state governments in the House and Senate at the federal level.
Impeach - to bring charges to a government official.
Judicial - the division of the government that interprets laws and settles disputes between states.
Legislative - law making body of the national government.
Loose Construction - the Constitution is open to interpretation; a federalist view.
Ratify - official approval.

Republic - representative government.
Strict Construction - the idea that the Constitution is not open to interpretation and is to be followed literally.
Three Fifths Compromise - population compromise for representation in Congress; Enslaved Africans would count as ⅗ of a person.
New Academic vocabulary: Change and Continuity examine historical evidence for new ideas as well as similarities to other ideas and perspectives.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One: <u>Planning for Democracy</u>   - <u>Post War Overview</u> - What comes next?   - Articles of Confederation: https://docs.google.com/forms/d/1IOly1whhEN97uqxMtt_HLTa4RVeQBm7B80mZwJe7ECE/edit   - Federalists v Anti Federalists: <u>Hamilton v Jefferson</u>   - <u>Whiskey Rebellion</u> (also on: www.bewashington.org)   - <u>Shay's Rebellion</u>
Week Two: Building the Constitution   - <u>Virginia Plan v New Jersey Plan</u> The Great Compromise   - Three-Fifths Compromise   - Strict v Loose Construction
Week Three: Understanding the Constitution   - <u>Anatomy of the Constitution</u> (icivics Peardeck)   - <u>Big Ideas</u>   - Executive Branch   - Legislative Branch   - Judicial Branch

Week Four: Change and Continuity
- Amendments and the Bill of Rights
- The Federalist Papers (excerpts)
- [Change and Continuity in the Constitution](#)

Week Five: Living the Constitution Review and Assess
- Students will evaluate scenarios that test the Constitution via icivics games
- [Debate](#)
- [Constitution Escape Room](#) (TpT)

Interdisciplinary / Real World / Global Connections

- Throughout the unit, students will understand the development of the founding documents, and apply the documents to issues of the time. (ex. How does the 1st Amendment apply to the Black Lives Matter movement?
- Compare the Federal response to Covid-19 to states' responses. How is this an example of states' rights? How would Federalists view actions taken during this time?)

Differentiation

Advanced: Students will be encouraged to identify an issue, preferably local, and create action within the guidelines and process outlined by the Constitution to solve the problem.

- [Constitution Scavenger Hunt](#)
- Analyze related [political cartoons](#)

Struggling: Support with text, breaking tasks into smaller pieces, use of graphic organizers to pinpoint information.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Ongoing formative assessments/feedback including:
- questions from HMH text 📄 Text 164-169 Compromises.pdf
- exit tickets
- bellringers (from previous lessons) ▢ Articles of Confederation bellringer
- 📄 AoC IXL Questions and other IXLs

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- MiniQ DBQ 📄 constitution_dbq.pdf How did the Constitution Guard Against Tyranny?

Other possible assessment questions:
1. Explain why ratification was a necessary process in creating the new government.
2. What checks and balances exist among the branches of government? Why are these important?
3. In what ways does the Bill of Rights protect individuals from government power?
4. What civic responsibilities are outlined in the document? Why are these important to democracy?

Westbrook Public Schools
Middle School
8th Grade, Social Studies Curriculum

Subject(s)	Social Studies
Grade/Course	8th Grade / Social Studies
Unit of Study	Unit 4: Building a National Identity
Pacing	9 Weeks

CT Social Studies Frameworks *What are the goals of this unit?*
Priority/Focus Standards: **HIST 8.3** Analyze multiple factors that influenced the perspectives of people during different historical eras. **HIST 8.4** Explain how and why perspectives of people have changed over time (e.g., American Revolution, slavery, labor, the role of women). **CIV 8.3** Analyze the purposes, implementation, and consequences of public policies in multiple settings. **ECO 8.1** Explain how economic decisions affect the well-being of individuals, businesses, and society. **ECO 8.6** Explain the benefits and the costs of trade policies to individuals, businesses, and society. **GEO 8.3** Explain how changes in transportation and communication technology influence the spatial connections among human settlements and affect the diffusion of ideas and cultural practices. **Supporting Standards:** **HIST 8.2** Classify series of historical events and developments as examples of change and/or continuity. **HIST 8.5** Analyze how people's perspectives influenced what information is available in the historical sources they created.

HIST 8.9 Explain multiple causes and effects of events and developments in the past.
ECO 8.2 Describe the role of competition in the determination of prices and wages in a market economy.
ECO 8.3 Analyze the role of innovation and entrepreneurship in a market economy.
GEO 8.1 Construct maps to represent and explain the spatial patterns of cultural and environmental characteristics.
GEO 8.4 Explain how the relationship between the environmental characteristics of places and production of goods influences the spatial patterns of world trade.

Inquiry Standards:

INQ 8.8 Identify evidence that draws information from multiple sources to support claims, noting evidentiary limitations.
INQ 8.9 Develop claims and counterclaims while pointing out the strengths and limitations of both.
INQ 8.10 Construct arguments using claims and evidence from multiple sources, while acknowledging the strengths and limitations of the arguments.
INQ 8.11 Construct explanations using reasoning, correct sequences, examples, and details with relevant information and data, while acknowledging the strengths and weaknesses of the explanations.
INQ 8.12 Present adaptations of arguments and explanations on topics of interest to others to reach audiences and venues outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, reports, and maps) and digital technologies (e.g., Internet, social media, and digital documentary).
INQ 8.13 Critique arguments for credibility.
INQ 8.14 Critique the structure of explanations.
INQ 8.15 Draw on multiple disciplinary lenses to analyze how a specific problem can manifest itself at local, regional, and global levels over time, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
- CCSS.ELA-LITERACY.RH.6-8.1 Cite specific textual evidence to support analysis of primary and secondary sources.
- CCSS.ELA-LITERACY.RH.6-8.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.

- CCSS.ELA-LITERACY.RH.6-8.3 Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).
- CCSS.ELA-LITERACY.RH.6-8.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.
- CCSS.ELA-LITERACY.RH.6-8.6 Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).
- CCSS.ELA-LITERACY.RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- CCSS.ELA-LITERACY.RH.6-8.8 Distinguish among fact, opinion, and reasoned judgment in a text.
- CCSS.ELA-LITERACY.RH.6-8.9 Analyze the relationship between a primary and secondary source on the same topic.
- CCSS.ELA-LITERACY.RH.6-8.10 By the end of grade 8, read and comprehend history/social studies texts in the grades 6-8 text complexity band independently and proficiently.

Writing
- CCSS.ELA-LITERACY.WHST.6-8.1a-e Write arguments focused on *discipline-specific content*.
- CCSS.ELA-LITERACY.WHST.6-8.2a-f Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- CCSS.ELA-LITERACY.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.WHST.6-8.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
- CCSS.ELA-LITERACY.WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
- CCSS.ELA-LITERACY.WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
- CCSS.ELA-LITERACY.WHST.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- CCSS.ELA-LITERACY.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.
- CCSS.ELA-LITERACY.WHST.6-8.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening
- CCSS.ELA-LITERACY.SL.8.1.a-d Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- CCSS.ELA-LITERACY.SL.8.2 Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- CCSS.ELA-LITERACY.SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-LITERACY.SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1, Analyze multiple factors that influenced the perspectives of people during the early development of a national identity.	1. Factors that influenced the perspectives of people. • Leadership ○ Washington, Hamilton, Jefferson, Adams, Tecumseh, Jackson • Economy ○ Post-War debt; trade; production; national bank; tax laws • Foreign Relations ○ XYZ Affair; Nationalism; Embargo Act; Monroe Doctrine; Neutrality • Religion

	○ Manifest Destiny; Christianity; Naturalism; Mormon ● Geography 　○ sectionalism; regional culture; national culture; transportation; natural resources
2. Explain how and why perspectives of people have changed during the time between the Revolutionary War and Civil War.	2. Perspectives have changed over time. ● Precedents 　○ monarchy v election/resignation 　○ neutrality v involvement in foreign affairs ● Political Parties 　○ Democratic-Republicans 　○ Whigs 　○ Democrats ● Washington's Farewell Address 　○ neutrality, public debt, dangers of political parties ● Missouri Compromise 　○ set boundaries for slavery, adjusting regional culture ● Alien and Sedition Acts 　○ views on immigration change and addressing grievances to the government
3. Analyze the purposes, implementation, and consequences of public policies in multiple settings.	3. Public policies. ● Manifest Destiny 　○ nationalistic (American exceptionalism) 　○ Philosophically justified U.S. military action and displacement of Natives 　○ Louisiana Purchase 1803 　○ Florida invasion 1818

	○ Texas Revolution 1836, annexed 1845
	○ Mexican-American War 1845
	○ California statehood 1850
	○ Lewis and Clark expedition
	● Impact on Indigenous people
	○ Assimilation
	○ Indian Removal Act 1830
	○ Only federal government has authority over Native Americans, not states
	○ Trail of Tears
	○ Reservations established
	● Women on the plains
	○ cooking, caring for children, washing
	○ established schools, churches, libraries
	○ Wyoming territory suffrage 1869
	○ All land and belongings became community property between husband and wife
	● British Impressment
	● Monroe Doctrine
	● Clay's American System
	● Jacksonian Democracy
4. Explain how economic decisions affect the well-being of individuals, businesses, and society.	4. Economic decisions affect individuals, businesses, and society.
	● Louisiana Purchase
	● Embargo Act 1807
	● War of 1812
	● Homestead Act
	● Gadsden Purchase
	5. Trade policies.

5. Explain the benefits and the costs of trade policies to individuals, businesses, and society.	- Tariffs - Pinckney's Treaty - settled border and trade disputes with Spain - XYZ Affair - bribes, loans, calls for war with France - Embargo Act 1804 - devastated American merchants, hurt Jefferson's popularity - eventually boosted manufacturing due to loss of trade - Fishing rights off the coast of Newfoundland to be shared - American System - meant to create a financially independent America - Tariff of Abominations - southerners outraged due to cost of materials(wool) - northerners want high tariffs
6. Explain how changes in transportation and communication technology influence the spatial connections among human settlements and affect the diffusion of ideas and cultural practices.	6. Movement and settlement patterns. - Oregon Trail - Donner Party - Gold Rush, boomtowns - Transcontinental RR - Asian Immigrants - California - Standard Time - Mexican population - Texas and southwestern states, - Northern European settlers, Plains

	- Mormons in Utah - Enslaved Africans escaped to free lands - Buffalo Soldiers Technological Changes - transportation, - Erie Canal - Transcontinental Railroad - standard time - steam power boats/engines - growing need for coal/mining

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How did challenges and disagreements help shape the new nation?	1. The nation was founded on disagreements with Britain's rule and the desire for independence. The U.S. Constitution is the result of philosophical debate; and interpretation of the Constitution is also heavily debated. Systems were developed to expand democracy and national independence, and these systems were tried heavily in the early years.
2. Why did America's national identity change in the early 1800s?	2. Nationalism brought a sense of superiority in gaining land and developing trade. As territories developed, people's needs and wants also changed. Expansion of

	territory and interactions with other nations helped America find new footing in the world. Diminished trade during the War of 1812 caused an increase in American manufacturing.
3. How did expansion affect different groups in society?	3. Expansion was beneficial to those who were able to settle land, open trade, and find freedom. Expansion was not favorable to those who already lived in the territories and it created further debate on the powers of levels of government.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: **Pear Deck Presentations** **Standard 2b -** Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
Informational Texts: ● ***HMH Social Studies**; US HISTORY Beginnings to 1877, 2018* ● ***Atlas of United States History**, Nystrom* ● ***Inquiry-Based Lessons in U.S. History**, Kirchner:* "What were the purposes of Lewis and Clark's expedition?"; "How did 19th century art reflect Americans' vision of the West?"; "What viewpoints about Westward expansion were portrayed in American art?"; "How are competing viewpoints reflected in the arguments for and against the Indian Removal Act?" **Media:** ● ***The West**, Ken Burns Documentary* **Online Resources / Websites:**

- **Brainpop:** Gold Rush, Lewis and Clark, Mexican-American War, Napoleon Bonaparte, Origins of Political Parties; Tecumseh, Texas Revolution, Time Zones, Trail of Tears, Transcontinental Railroad, Westward Expansion, Wounded Knee Massacre
- **c3teachers.org** http://www.c3teachers.org/inquiries/westward-migration/
- **CommonLit.org**
- **IXL:** Banks; Early Republic; Jacksonian Period
- **Newsela**
- **SHEG Lessons:** Manifest Destiny, Lewis and Clark, Louisiana Purchase, Gold Rush, Irish in 19th Century America, Texas Revolution
- **SHEG Historical Assessments of Thinking:** Traders in the West, Immigration, Transcontinental Railroad; Clay's American System
- **National Gallery of Art** https://www.nga.gov/education/teachers/lessons-activities/uncovering-america/manifest-destiny-west.html
- **Manifest Destiny and Westward Expansion lesson including diary entries** https://hti.osu.edu/history-lesson-plans/united-states-history/manifest-destiny-westward-expansion
- **Lewis and Clark re-creation** https://www.smithsonianmag.com/smart-news/how-reconstruct-lewis-and-clark-journey-follow-mercury-laden-latrine-pits-180956518/?fbclid=IwAR3j1g2cZ1iU6q-Mu454JuDM11EUQTq_nM3m8B7K5PA-0aR_fqdcdCaxXDM
- **Louisiana Purchase** https://www.ducksters.com/history/westward_expansion/louisiana_purchase.php
- **Louisiana Purchase video and lesson** https://ed.ted.com/lessons/the-audacity-behind-the-louisiana-purchase-judy-walton
- **Louisiana Purchase Power point** https://drive.google.com/drive/folders/1NrcwOfysHErR2fudF-x-AIJByMngzNXf
- **Louisiana Purchase activity** https://www.pbslearningmedia.org/resource/great-states-north-dakota-2.1/activity/
- **Hexagon Example** https://www.classtools.net/hexagon/201610-mN6VT3
- **Comprehensive Unit** https://www.cuny.edu/wp-content/uploads/sites/4/media-assets/SS-Lesson-6-Unit-3.pdf

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Agrarian - economy based on farming.
Alien - a person from another country.

American System (Clay) - measures designed to create U.S. economic independence.
Assimilation - cultural adaptation by an individual or group to regional culture.
Buffalo Soldiers - African Americans serving in the military on the frontier.
Democratic-Republicans - want less central power in government (aka anti-federalists).
Embargo - the banning of trade.
Homestead Act - 160 acres of land given, with the promise to farm for 5 years.
Impressment - Britain's policy of kidnapping and forcing people to work for their military.
Jacksonian Democracy - expanding the ideas, influences, and practice of democracy.
Judicial Review - the ability to declare the constitutionality of acts in the U. S. Congress.
Missouri Compromise - allowed statehood in MI and ME drawing the boundary for slave states at 36/30.
Monroe Doctrine - a policy to prohibit further European colonization within North and South Americas.
Neutrality - to remain uninvolved.
Manifest Destiny - obvious fate to settle to the Pacific Ocean to spread American ideals.
Nullification - the idea that states can reject a federal law that it deems unconstitutional.
Precedent - a standard that was set previously.
Sedition - speaking out against one's government.
Spoils System - trading government jobs to political supporters.
Standard Time - common time based on zoning in the nation.
Suffrage - voting rights.
Tariff - tax on imported goods.
Trail of Tears - 800 mile forced march to remove Cherokee from Georgia.
Whig Party - favored a strong Congress and weaker presidential power.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One: Washington ● Washington's Presidency ● 📄 Worksheet - Constitutionality of the National Bank : [Hamilton v Jefferson](#)

- [Cabinet Battle #1](#)

Week Two: Washington
- Neutrality in International Affairs
- [Cabinet Battle #2](#)
- Whiskey Rebellion establishes Central Government - Play [Be Washington](#)
- Washington's Farewell Address - [One Last Time](#)

Week Three: Adams
- Relations with Spain and France
- XYZ Affair
- Alien and Sedition Acts

Week Four: Jefferson
- [Louisiana Purchase](#)
- [Lewis and Clark](#)
- Marbury v Madison: Judicial Review

Week Five: Madison
- [War of 1812](#)
- Causes: Impressment; embargo (Neutrality violation)
- Britain helps Tecumseh: Newsela.com "Tecumseh, Military Leader" and Brainpop. Was he a hero?
- Battle of New Orleans
- Hartford Convention

Week Six: Monroe
- Era of Good Feelings / Monroe Doctrine
- Clay's American System
- New Transportation: National Road / Erie Canal
- [Missouri Compromise](#) [1820](#)
  https://docs.google.com/forms/d/1DBftoJLbeC8_Ga9md3k_z-Chrg6Ba6IcB0GNTKVQ-N0/edit

Week Seven: Jackson
- Jacksonian Democracy - Democratic Party
- Sectionalism: North, South, West
- State's Rights v Federal
- Forming the Whig party

Week Eight: The Frontier
- Relations with Native Americans: Removal; Trail of Tears
- Homestead Act
- Women on the Frontier
- Manifest Destiny Gallery
- CA Gold Rush

Week Nine: Reforms
- Seneca Falls Convention
- Temperance Movement
- Education
- Review Change and Continuity

Interdisciplinary / Real World / Global Connections

- Indigenous People in Canada.
- United States History literacy about democracy, sectionalism, nationalism, expansionism, and foreign affairs, as many historical topics are discussed in this unit.
- Civics literacy as many governmental topics - past and present - about religion, reform, the division between church and state, the antislavery movement, the women's movement, and manifest - are discussed in this unit.
- Socio-cultural awareness has several diversity examples about women, Native Americans and African Americans and are discussed in this unit.

Differentiation
Advanced: Culture - Art - How are American ideals shown in artistic creations during the time? (Washington Irving; James Fenimore Cooper; Hudson River School Artists)
Struggling: Break down tasks; support in reading; small group work

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Entrance / Exit Tickets
- 🟨 War of 1812 slides and PearDeck (if available)
- 📄 The Coming of War 282 - 287.pdf and other HMH Text sections
- Hexagonal thinking - Manifest Destiny

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Create a One Pager (War of 1812; Elements of Westward Expansion; Jacksonian Era)
- Tecumseh Hero or Villain?
- Jackson DBQ
- 📄 End of Mod 7 Assessment Launching a New Nation.pdf

Possible assessment questions:
1. Which precedents set in the early years of the nation were most important to support American ideals?
2. Explain the ways American nationalism contributed to the expansion of the nation.
3. How did regional differences support the growing nation as well as hinder the growing nation?
4. Many historians call the War of 1812 the "Second War for Independence". Why or why not is this an accurate nickname?
5. In what ways did President Jackson promote the expansion of democracy?
6. Explain the effects of Westward expansion on Indigenous people.

7. What effects did new methods of transportation have on local, regional, and national economies?
8. What actions / policies were put in place to encourage Westward movement? To what extent were these effective?

Westbrook Public Schools
Middle School
8th Grade, Social Studies Curriculum

Subject(s)	Social Studies
Grade/Course	8th Grade / Social Studies
Unit of Study	Unit 5: Civil War and Reconstruction
Pacing	9 Weeks

CT Social Studies Frameworks *What are the goals of this unit?*
Priority/Focus Standards: **HIST 8.2** Classify series of historical events and developments as examples of change and/or continuity. **HIST 8.6** Detect possible limitations in the historical record based on evidence collected from different kinds of historical sources. **CIV 8.2** Analyze ideas and principles contained in the founding documents of the United States, and explain how they influence the social and political system. **ECO 8.5** Explain why standards of living increase as productivity improves. **GEO 8.2** Analyze the combinations of cultural and environmental characteristics that make places both similar to and different from other places. **Supporting Standards:** **HIST 8.7** Use questions generated about multiple historical sources to identify further areas of inquiry and additional sources. **HIST 8.10** Organize applicable evidence into a coherent argument about the past. **CIV 8.3** Analyze the purposes, implementation, and consequences of public policies in multiple settings.

CIV 8.4 Compare historical and contemporary means of changing societies, and promoting the common good.
ECO 8.4 Explain how inflation, deflation, and unemployment affect different groups.

Inquiry Standards:

INQ 8.6 Gather relevant information from multiple sources while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection.
INQ 8.10 Construct arguments using claims and evidence from multiple sources, while acknowledging the strengths and limitations of the arguments.
INQ 8.11 Construct explanations using reasoning, correct sequences, examples, and details with relevant information and data, while acknowledging the strengths and weaknesses of the explanations.
INQ 8.12 Present adaptations of arguments and explanations on topics of interest to others to reach audiences and venues outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, reports, and maps) and digital technologies (e.g., Internet, social media, and digital documentary).
INQ 8.13 Critique arguments for credibility.
INQ 8.14 Critique the structure of explanations.
INQ 8.15 Draw on multiple disciplinary lenses to analyze how a specific problem can manifest itself at local, regional, and global levels over time, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
- CCSS.ELA-LITERACY.RH.6-8.1 Cite specific textual evidence to support analysis of primary and secondary sources.
- CCSS.ELA-LITERACY.RH.6-8.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.
- CCSS.ELA-LITERACY.RH.6-8.3 Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).
- CCSS.ELA-LITERACY.RH.6-8.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.

- CCSS.ELA-LITERACY.RH.6-8.5 Describe how a text presents information (e.g., sequentially, comparatively, causally).
- CCSS.ELA-LITERACY.RH.6-8.6 Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).
- CCSS.ELA-LITERACY.RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.
- CCSS.ELA-LITERACY.RH.6-8.8 Distinguish among fact, opinion, and reasoned judgment in a text.
- CCSS.ELA-LITERACY.RH.6-8.9 Analyze the relationship between a primary and secondary source on the same topic.
- CCSS.ELA-LITERACY.RH.6-8.10 By the end of grade 8, read and comprehend history/social studies texts in the grades 6-8 text complexity band independently and proficiently.

Writing
- CCSS.ELA-LITERACY.WHST.6-8.1a-e Write arguments focused on *discipline-specific content*.
- CCSS.ELA-LITERACY.WHST.6-8.2a-f Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- CCSS.ELA-LITERACY.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.WHST.6-8.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well the purpose and audience have been addressed.
- CCSS.ELA-LITERACY.WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
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- CCSS.ELA-LITERACY.WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.
- CCSS.ELA-LITERACY.WHST.6-8.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening

- CCSS.ELA-LITERACY.SL.8.1a-d Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- CCSS.ELA-LITERACY.SL.8.2 Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
- CCSS.ELA-LITERACY.SL.8.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- CCSS.ELA-LITERACY.SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-LITERACY.SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
- CCSS.ELA-LITERACY.SL.8.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Classify series of historical events and developments as examples of change and/or continuity.	1. Historical events and developments as continuity. • poor working conditions / labor rights • women have limited rights • blacks have no rights / limited rights • conflict between north and south • debate over federal government's responsibility to protect individuals • agrarian southern economy

	Historical events and developments have changed. ● 13, 14, 15 Amendments ● early child labor laws ● states secede in the South ● post Civil War unification ● industrial growth in the north ● urbanization
2. Detect possible limitations in the historical record based on evidence collected from different kinds of historical sources.	2. Possible limitations. ● language difficulties / barriers ● perspective bias ● narrow scope ● government censorship ● purpose for creation (sell, inform, persuade, etc) ● inaccuracies Different kinds of historical sources ● letters, diaries, memoir (slave narratives) ● poems, novels (Uncle Tom's Cabin) ● drawing, painting, cartoon (Thomas Nast) ● photo, film (Matthew Brady photo) ● newspaper ● statistics ● government record ● oral history
3. Analyze ideas and principles contained in the founding documents of the United States, and explain how they influence the social and political system.	3. Influence on social and political systems. ● legal rights of blacks in the north v south ● citizen and voting rights for women, indigenous peoples and African Americans ● transcendentalism

	- education of women and blacks
	- state politics (free v slave; boundary lines, population)
	   ○ Kansas-Nebraska Act
	   ○ Compromise 1850
	- Dred Scot decision (Freeport Doctrine)
	- Emancipation Proclamation
	- 13, 14, 15th Amendments

4. Explain why standards of living increase as productivity improves.	4. Productivity improves.
	- North
	   ○ manufacturing increase after War 1812
	   ○ more workers
	   ○ urbanization offers more convenience
	   ○ immigration increases
	   ○ labor reforms begin
	- increased need for transportation of goods, people and ideas
	   ○ railroads
	   ○ steamboats
	   ○ telegraph
	- South
	   ○ increased cotton production
	   ○ greater need for slaves
	   ○ growth of southern port cities

5. Analyze the combinations of cultural and environmental characteristics that make places both similar to and different from other places.	5. Cultural and environmental characteristics.
	- North
	   ○ New England work ethic
	   ○ manufacturing - paid labor
	   ○ more opportunities for women and blacks
	      ■ republican party more prevalent

- ○ transportation opportunities
    - ■ railroad
    - ■ canals
    - ■ ports
- ● South
    - ○ mostly agrarian
    - ○ natural resources (cotton; cash crops)
    - ○ slave labor
    - ○ white supremacy - southern democrats
    - ○ transportation
        - ■ ports
        - ■ fewer railroads
        - ■ ports
- ● West
    - ○ homesteads
    - ○ unstable laws - "wild" west freedom
    - ○ increased number of railroads
    - ○ women valued for their contributions
    - ○ plentiful resources

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. How did slavery shape life in the United States?	1. Going back to Jamestown 1619, the economic system of slave labor has divided the country. Slavery increased wealth to plantation owners in the south; enforced false beliefs that some humans are more deserving than others; and eventually encouraged laws protecting the rights of all people.

2. In what ways did events leading to the Civil War deepen the divide between North and South?	2. Sectionalism affected the Northern elite, workers, Southern plantation owners, enslaved Africans, and Western settlers due to differing views on economics, politics, and morality. Arguments over free states vs slave states, politicians, rights of African Americans all fueled the argument over the rights of states and the rights of humans.
3. How did the outcomes of the Civil War attempt to unify the country?	3. The United States became unified under one government; national currency was issued; the complete railroad system allowed for movement of goods and people, leading to a stronger economy and development of the Union from coast to coast. Three new amendments attempted to provide rights to all.
4. Is it part of human nature to find ways to fight oppression and find ways to overcome obstacles to the natural rights of life, liberty, property, and the pursuit of happiness?	4. African Americans encountered many obstacles during Reconstruction through Black Codes and Jim Crow Laws. Blacks were not allowed to gather in groups, own weapons, and must work or be put to work. During enslavement, it was illegal to be educated as an African American in the South, resulting in another obstacle of the inability to communicate. Secret strategies were used to find ways to combat isolation and illiteracy.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Slave Narratives:
Standard 5c: Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

Informational Texts:
- HMH Beginnings to 1877 Text
- *Inquiry-Based Lessons in U.S. History*, Kirchner

Media:
- *Lincoln* (2012) Movie
- Atlas of United States History, Nystrom
- *Good Lord Bird* series
- *Grant* mini series

Online Resources / Websites:
- **Brainpop:** Civil War; Civil War Causes; Fredrick Douglass; Jim Crow; Juneteenth; Reconstruction; Slavery; Underground Railroad;
- **c3teachers.org** http://www.c3teachers.org/inquiries/historical-preservation/ ; http://www.c3teachers.org/inquiries/utc/
- **CommonLit.org**
- **Daily Bellringer:** https://www.dailybellringer.com/videos
- **IXL:** Antebellum Period; Civil War
- **Newsela:** General Grant; General Lee
- **SHEG Lessons:** Slavery Narratives; Freedom's Journal; John Brown; Radical Reconstruction
- **SHEG Historical Assessments of Thinking:** Traders in the West; John Brown; Perspectives on Slavery; Antebellum South; Defender of Slavery; John Brown's Legacy; Slave Quarters; Attack on Fort Sumter; Morale After Fredericksburg; Gardner's Civil War Photographs; Post Civil War South; KKK in the 1870s; Reconstruction Riots
- **Uncle Tom's Cabin and Slavery** https://hti.osu.edu/history-lesson-plans/united-states-history/antebellum-slavery

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Abolition/Abolitionist - an end to slavery; one who supports abolition.
Antebellum - before the war.
Black Codes - laws passed in the southern states during Reconstruction that limited the freedoms and rights of African Americans.
Confederacy - the nation formed by southern states' secession from the Union.
Continuity - consistency over a period of time.

Copperheads - a group of northern democrats who opposed abolition and sympathized with the South during the Civil War.
Emancipation - freeing of the slaves.
Fugitive - one who escapes the law and/or captivity (Fugitive Slave Act 1850).
Ironclads - a warship that is heavily armored with iron.
Jim Crow - a law that enforced segregation in the southern states (separate but equal).
Radical Republicans- members of congress who believed the southern states needed to make great social changes before readmission to the Union.
Reconstruction - the period of time following the Civil War in which the government worked to reunite the Union following the war.
Secede - to formally withdraw from the Union.
Segregation - the forced separation of people in public places.
Union - all the states in the United States of America; also the army of Northern states fighting to unite all states.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One: Northern / Southern Industry   ● Comparing Perspectives: Northern, Southern, Western workers; northern elite, enslaved - Jigsaw Activity   ● Slavery Overview   ● Second Middle Passage
Week Two: Slavery / Revolts   ● Nat Turner (Claim / Evidence)   ● Slave Narratives   ● Freedom's Journal
Week Three: 1850s   ● Compromise of 1850   ● Fugitive Slave Act

- Bleeding Kansas
- [Kansas Nebraska Act](#)
- Dred Scott Decision
- Westward Expansion effect on Slavery - [Primary Sources](#)

Week Four: Abolition
- Harriet Tubman - First 45 minutes of 2019 movie, *Harriet* (hook)
- [Underground Railroad](#)
- [John Brown](#) (What did he hope to accomplish?)
- Clips from *The Good Lord Bird* series

Week Five: Leadership
- Lincoln - Douglas Debates
- The [Election](#) of [1860](#)
- [Grant and Lee](#)

Week Six: Civil War
- [Union v Confederacy](#); preparation for war
- [Who's Who of the Civil War?](#) ([centers](#))
- Overview of [Battles](#) ([centers](#))
- [Emancipation Proclamation](#)

Week Seven:
- [Gettysburg Address](#)
- Surrender at Appomattox
- Reconstruction Begins - [Nast Cartoons](#)
- 13, 14, 15th Amendments

Week Eight:
- [Radical Reconstruction](#)
- Plessy v Fergusen
- Jim Crow Laws

Week Nine:
- Were African Americans truly free during Reconstruction (Structured Academic Controversy)

Interdisciplinary / Real World / Global Connections
- United States History literacy about the divisive politics of slavery, the birth of the republican party, slavery, secession, the civil war, and reconstruction, as many historical topics are discussed in this unit.   - Civics literacy as many governmental topics about the antislavery movement, the politics of war and reconstructing society are discussed in this unit.   - Socio-cultural awareness has several diverse examples about the culture of the north, the south and African Americans and are discussed in this unit.

Differentiation
Advanced: Fort Sumter; Civil War Photography
Struggling: Graphic organizers; word wall; annotated text; video aids

Assessments
Include an overview of authentic assessments
Formative Assessments and Corresponding Rubrics/Checklists when Applicable: • **Reflections, Content Videos and Responses**
Summative Assessments and Corresponding Rubrics/Checklists when Applicable: • **Civil War Study Guide and Unit Assessment; DBQ: John Brown; Continuity and Change Over Time**

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 1: Americans, Citizenship, and Governments
Pacing	5 Weeks

CT State Standards *What are the goals of this unit?*
Priority/Focus Standards: CIV 9–12.2 Analyze the role of citizens in the U.S. political system, with attention to various theories of democracy, changes in Americans' participation over time, and alternative models from other countries, past and present. **Supporting Standards:** INQ 9–12.6 Gather relevant information from multiple sources representing a wide range of views while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection. INQ 9–12.7 Evaluate the credibility of a source by examining how experts value the sources.

[Correspondence to CT Core Standards](#) *What are the goals of this unit?*
Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

CCSS.ELA-LITERACY.RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

CCSS.ELA-LITERACY.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Identify countries from which immigrants have come to the U.S., explain what it is to be an American, and describe the relationship between American values and American institutions. 2. Describe who is a citizen, identify and explain the steps in the naturalization process, compare and contrast rights of legal aliens and citizens, discuss views on immigration and citizenship.	1. The diversity of Americans and what they value and the shared values and social institutions in American life. 2. How a person becomes a citizen of the U.S., how a person may lose citizenship, the rights of aliens, digital citizenship, and the validity of websites. 3. The duties and responsibilities of citizens and the role of volunteerism in citizenship. 4. The purpose of government and the various types of government.

3. Identify and describe the duties and responsibilities of Americans and the value of volunteering. 4. Describe what governments do and why they are necessary and identify, compare and contrast the various forms of government.	

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How are Americans diverse? 2. What do Americans value? 3. What does it mean to be a citizen? 4. What are the functions and types of governments?	1. Students will understand that America is a diverse county in many ways including in terms of geographic location, ethnic and cultural background, religion, and status of citizenship. 2. Americans value freedom, equality, opportunity, justice, democracy, unity, respect for one another, and diversity. These are the values that help unite a diverse America. 3. To be a citizen it means giving loyalty to your government as well as performing certain duties and responsibilities such as paying taxes, jury duty, and defending your nation. 4. The function of government is to keep order and provide security. There are many types of governments such as democratic and authoritarian forms of government.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: 1.1 Empowered Learner 1.6 Creative Communicator

Informational Text:

- **Informational Books:** Building Citizenship Civics and Economics McGraw Hill 2018
- **Media: Networks** (part of the textbook's online edition and resources- each student gets a login)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 1, Lesson 1:
Immigrant - an individual who moves permanently to a new country.
Ethnic Group - a group of people who share a common national, cultural, or racial background.
Values - the general principles or beliefs people use to make judgements and decisions.
Institution - a key practice, relationship, or organization in a society.
Popular Sovereignty - the idea that the government receives its power from the people.

Chapter 1, Lesson 2:
Citizen - a member of the community of people who owe loyalty to a government and, in turn, are entitled to its protection.
Civics - the study of rights and duties of citizens.
Citizenship - the rights and duties of citizenship.
Government - the ruling authority in a community.
Naturalization - a legal process to obtain citizenship.
Alien - a foreign born resident of the US who has not been naturalized.
Refugee - a person who has left their home to escape danger such as persecution by the government, war, or natural disaster.

Chapter 1, Lesson 3:
responsibility- an obligation that we meet of our own free will.
duty- an action we are required to perform.
tolerance- respecting and accepting others, regardless of their beliefs, practices, or differences.
welfare- the health, prosperity, and happiness of the members of a community.
volunteerism- the practice of offering your time and services to others without receiving payment.

Chapter 1, Lesson 4:
Public Policy- the decisions and actions a government takes to solve problems in the community.
Representative Democracy- a government which citizens choose a smaller group to govern on their behalf.
Constitutional Monarchy- monarchy in which the power of the hereditary ruler is limited by the country's constitution and laws.
Majority Rule- political principle providing that a majority of the members of a community has the power to make laws binding upon all the people.
Authoritarian Regime- a government in which one leader or group of people holds absolute power.
Totalitarian- describes a system in which government control extends to almost all aspects of people's lives.
Ideology- a body of ideas about life and society.
Socialism- a system in which society, either directly or indirectly through the government, controls all aspects of the economy.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One: This is generally a short week as it is the first week of school. I will start off with some getting to know you activities such as 2 truths and 1 lie and students will create a collage about their past, present, future, and goals for the course. Students will also take the citizenship test (or a portion of it) to see where they stand with their knowledge of government, civics, and history of our country. The goal is to use this test again at the end of the school year so they can see their growth. Students will be given the Is the US a Democracy or a Republic? worksheet to get a sense of student analysis of primary sources and writing. Students will be introduced to the Community Service, Town Meeting, and Civic Action Plan that is a required portion of this course.
Week Two: Getting to know the textbook- there is a physical textbook as well as an online textbook. I will set them up with online accounts for the textbook as well as iCivics. Students will do a quick scavenger hunt of the textbook (on page 0). Students work on This Land is Your Land from iCivics: This Land is Your Land Lesson Plan	iCivics. Students will also work on taking notes on Chapter 1 Lesson 1 Being an American and will prepare for a quiz after the reading notes are due. We will discuss different ways of taking notes or using graphic organizers.

Week Three: Students will start working on reading and taking notes on lesson 2 and 3 and in the textbook. In class, we will do the Immigration and Citizenship webquest: Immigration & Citizenship - WebQuest usually by setting up stations and working with a partner and rotating around the stations. Next there will be a discussion or short writing on the idea of the American Dream and whether or not it still exists and is important today. Students will start working on the Characteristics of Citizenship Activity by working in small groups, with a partner, or by themselves ▤ Characteristics of Citizenship Activity Part A and B This will allow for discussion as well AS written work.

Week Four: Start work on Characteristics of Citizenship Part C
▤ Characteristics of Citizenship Part C Who Are America's Greatest Citizens? and allow time for students to work on this in class- at least two class periods. Depending on class size, presentations can take one or two class periods (if on a block schedule)

Week Five: Depending on progress from week 4, students may still be presenting Part C. Once presentations are complete, reading notes on Lesson 2 and 3 will be checked off and a quiz will be given (Students will have prior notice of this). Students will then start working on Lesson 4 notes and will be given a study guide and date of the upcoming test. To introduce different forms of government students will read through Who Rules from iCivics: Who Rules? | Forms of Government | Types of Government | iCivics. Students will then work in small groups to research forms of government and put together a small visual to showcase their learnings ▤ 1.4 Forms of Government Group Research Activity . Once this is complete some time will be devoted to studying for the Chapter 1 test

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…

☐ Reading a wide range of texts effectively

☒ Writing effectively for a variety of purposes

☒ Presenting ideas accurately with the support of engaging media

☒ Thinking critically to solve problems and reach well reasoned judgments

☐ Working responsibly and collaboratively

Differentiation
Advanced: addressing particular needs by implementing more choice
Struggling: group based learning or more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 📄 Characteristics of Citizenship Part C Who Are America's Greatest Citizens?

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Chapter 1 Test.

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 2: The American Colonies and their Government
Pacing	4 weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
CIV 9–12.8 Evaluate social and political systems in different contexts, times, and places that promote civic virtues and enact democratic principles.

Supporting Standards:
INQ 9–12.5 Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration multiple points of view represented in the sources, the types of sources available, and the potential uses of the sources.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

CCSS.ELA-LITERACY.RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

CCSS.ELA-LITERACY.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. paraphrase primary sources, including excerpts from the Magna Carta, English Bill of Rights, and the Mayflower compact. 2. Determine cause and effect of influences on colonial governments 3. Understand cumulative patterns of events that led colonists to write the Declaration of Independence	1. What ideas influenced early colonial governments and how they developed 2. that discontent grew between the colonists and the British government and led to the writing of the Declaration of Independence 3. Describe events, laws, taxes, lack of representation, etc that led to the writing of the Declaration of Independence essentially in timeline form (see Chapter 2 timeline in learning plan)

Essential Questions	**Corresponding Big Ideas**
What essential questions will be considered?	*What understandings are desired?*
1. What ancient principles, traditions, and events have shaped the system of government we have today? 2. Why did people settle in England's colonies in America? 3. What events and movements affected colonial attitudes which led to the Declaration of Independence?	1. Our government has been shaped by Athens, the Magna Carta, English Bill of Rights, and ideas and philosophies of enlightenment thinkers as shown in Jamestown and the Mayflower Compact. 2. People settled in colonies in America for economic opportunity and religious freedom. Life varied in the colonies and the distance from England allowed them to develop strong local governments. 3. Social and political changes such as the French and Indian war, new laws and taxes, and actions taken during the First and Second Continental Congress led to the creation of the Declaration of Independence.

Resources

Student Technology Integration and Correspondence to ISTE Standards when Applicable:
1.1 Empowered Learner

Informational Texts:
- **Informational Books:** Textbook and the Declaration of Independence.

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 2, Lesson 1:
Democracy- a government in which citizens hold the power to rule.
Direct Democracy- a form of democracy in which the people vote firsthand.
Representative Democracy- a government in which citizens choose a smaller group to govern on their behalf.
Republic- a representative democracy where citizens choose their lawmakers.
Limited Government- the principle that a ruler or government is not all-powerful.
Legislature- a group of people that makes the laws.
Social contract- an agreement among people in society with their government.
Natural Right- a freedom people possess relating to life, liberty, and property.

Chapter 2, Lesson 2:
Indentured Servant- a worker who contracted with American colonists for food and shelter in return for his/her labor.
Dissenter- one who opposes official or commonly held views.
Economy- a system for making choices about ways to use scarce resources to make and distribute goods and services to fulfill people's needs and wants.
Cash Crop- a crop produced mainly for sale.
Plantation- a large estate.

Chapter 2, Lesson 3:
Liberty- the quality or state of being free.
Proclamation- an official, formal public announcement.
Boycott- to refuse to purchase certain goods or services.
Repeal- to cancel a law.
Duty- a tax on imported goods.
Smuggling- the act of importing or exporting secretly, in violation of law and especially without paying duty on goods.
Delegate- a representative to a meeting.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week 1- Assign textbook reading early as this is a shorter unit or simply have the students read the chapter while working on the Chapter 2 timeline in week 2 (this is a refresher from 8th grade US History). In class work on reading quickly Lesson From Antiquity from iCivics: [Lessons from Antiquity | Athens Democracy Lesson Plan | iCivics](). Review some prior learning about Ancient Greece as well as the Enlightenment. It is essential that students understand the Enlightenment thinkers. Students will work on reading and slide activity ▣ Enlightenment Thinkers US Gov and Civics . Once students finish the slides, they will then work on the Constitutional Influencers Webquest either in groups, with partners, or even as a class https://www.icivics.org/web-quests/constitutional-influencers

Week 2- Students will work on ▤ Chapter 2 timeline . Students will be given at least 1 full class period to work on the timeline. Students will also listen to the civics 101 podcast about the Declaration of Independence [Founding Documents: Declaration of Independence — Civics 101: A Podcast]().

Week 3- It is essential that students read the Declaration of Independence. Students will read their textbook p. 65-68, which is the Declaration of Independence. Students will then analyze the document, lessons from the Bill of Rights Institute [The Declaration of Independence - Bill of Rights Institute]() and [The Declaration of Independence - Docs of Freedom - Bill of Rights Institute]() and [Lesson 1: The Declaration of Independence and the Promise of Liberty and Equality for All: Founding Principles and the Problem of Slavery - Bill of Rights Institute](). This will help the students do a deep dive into the Declaration of Independence. Depending on timing, students may also discuss the idea of 'all men are created equal' [The Declaration of Independence: Created Equal? | Classroom Materials at the Library of Congress]().

Week 4- Students will use information learned from the previous lessons to work on a DBQ Essay [The Ideals of the Declaration, which is most important? from the DBQ Project.]() This essay will be the formative assessment for the unit. The option is there to assess with a traditional test.

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
☐ Reading a wide range of texts effectively
☒ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well reasoned judgments
☐ Working responsibly and collaboratively

Differentiation

Advanced: in depth reading of foundational documents

Struggling: group based learning or more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Reading Quizzes.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- [The Ideals of the Declaration, which is most important? from the DBQ Project](#)

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 3: The Constitution
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:

CIV 9–12.4 Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested.

Supporting Standards:

 INQ 9–12.10 Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

CCSS.ELA-LITERACY.RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

CCSS.ELA-LITERACY.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Work in groups to identify problems of and solutions to the government structure provided by the Articles of Confederation. 2. Determine how the Constitution solved problems created by the Articles of Confederation 3. use an outline to organize the purpose of each of the articles within the Constitution 4. Organize information about the principles of government	1. how weaknesses of the Articles of Confederation led to the formation of a new plan of federal government, the Constitution. 2. How the Constitution limits the powers of government. 3. How the federal government is organized. 4. How the amendment process works. 5. What the principles of the government as established by the Constitution are. 6. How power is shared under federalism.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How did the Articles of Confederation create problems for the United States? 2. How did Federalist and Anti-Federalist viewpoints differ? 3. How does the US Constitution organize the government? 4. What are the principles of the Constitution?	1. Weaknesses of the Articles of Confederation such as lack of power and money, lack of central power, and rules too rigid. Also understanding the role Shay's Rebellion played in making the weaknesses more visible. 2. Federalists such as Hamilton, Madison, and Jay and their views on supporting the Constitution versus the Anti-Federalists who believed the Constitution went against the liberties they fought for in the Revolution. 3. Organization of the Constitution- Preamble, Seven Articles and what each one is about, the Amendments and steps to amending the Constitution, and important clauses such as the 'necessary and proper' clause. 4. Major principles of the Constitution such as popular sovereignty, limited government, rule of law, separation of powers, checks and balances, federalism, enumerated powers, reserved powers, concurrent powers, and the supremacy clause.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: 1.3 Knowledge Constructor 1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 3, Lesson 1:
Constitution - a detailed, written plan for government.
Bicameral - a legislature consisting of two parts, or houses.
Confederation - a group of individuals or state governments.
Articles of Confederation - the first constitution of the United States.
Ratify - to vote approval of.
Ordinance - a law, usually of a city or country.
Ordinance of 1785 - a law that set up a plan for surveying western lands.
Northwest Ordinance - 1787 law that set up a government for the Northwest Territory and a plan for admitting a new state to the Union.
Shays' Rebellion - an uprising of Massachusetts farmers who did not want to lose their farms because of debt caused by heavy state taxes after the American Revolution.

Chapter 3 Lesson 2:
Constitutional Convention - meetings of state delegates in 1787 leading to adoption of the new Constitution.
Great Compromise - agreement providing a dual system of congressional representation.
Three-Fifths Compromise - agreement providing that enslaved persons would count as three-fifths of other persons in determining representation in Congress.
Electoral College - a group of people named by each state legislature to select the president and vice president.
Federalist - a supporter of the Constitution.
Federalism - a form of government in which power is divided between the federal, or national, government and the states.
The Federalist Papers - a series of essays written to defend the Constitution.
Anti-Federalist - a person who opposed ratification of the Constitution.

Chapter 3, Lesson 3:
Preamble - the opening section of the Constitution.
Article - one of several main parts of the Constitution.
Amendment - any change in the Constitution.

Legislative Branch - the lawmaking branch of the Constitution.
Executive Branch - the branch of government that carries out laws.
Judicial Branch - the branch of government that interprets laws.

Chapter 3, Lesson 4:
Popular Sovereignty - the idea that power lies with the people.
Limited Government - a government that can do only what the people allow it to do.
Rule of Law - the principle that the law applies to everyone, even those who govern.
Separation of Powers - the split of authority among the legislative, executive, and judicial branches.
Checks and Balances - a system in which each branch of government is able to check, or restrain, the power of the others.
Enumerated Powers - powers directly granted to the national government by the Constitution.
Reserved Powers - powers the Constitution does not give to the federal government; powers set aside for the states.
Concurrent Powers - powers shared by the state and federal governments.
Supremacy Clause - a clause stating that the Constitution and other laws and treaties made by the national government are "the Supreme Law of the Land."

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week 1 and 2- Assign readings for the unit and provide students with dates when readings are due and quizzes. There is an option to provide students with Chapter 3 journaling activity from the textbook. Students will analyze the Articles of Confederation doing a station activity where students look at strengths and weaknesses. This should take one class period. If time allows in this class period, students can brush up on Shay's rebellion using this website [Shays' Rebellion - Artifacts & Documents Search](#), but students at this point have already learned about the rebellion in 8th grade so it may not be necessary to go in depth.   The lesson following the Articles of Confederation will be about the Constitutional Convention and compromises made. Annenberg Learner website has great resources- students will watch part of this video (first 20 min) [Key Constitutional Concepts – Annenberg Classroom](#) and corresponding lesson plan with handouts [Key Constitutional Concepts: Creating a Constitution – Annenberg Classroom](#) The Framers of the Constitution from Civiced is a good overview of the framers- can be assigned as homework or looked at in class individually to learn more about the framers [The Framers of the Constitution - civiced.org](#). If time allows or for more advanced

readers, students can look at the original and final drafts of the Constitution and compare/contrast the changes in the Preamble We the People | DocsTeach. Another website allowing for comparison on the drafts is from the National Constitution Center The Constitutional Convention worksheets could be created so that students can individually or in groups analyze the different versions. These websites are great for looking at primary sources. Students will work on Benjamin Franklin's Closing Speech at the Constitutional Convention and complete a cyber sandwich 🟨 Benjamin Franklin's Closing Speech at the Constitutional Convent…

Week 3- Depending on timing, students may still be looking at the Constitutional Convention and drafting the constitution from the previous week. Students will have a quick lesson the Federalists and Anti-federalists using the SHEG Reading Like A Historian lesson (this can also be skipped in the interest of time) Federalists and Anti-Federalists | Stanford History Education Group. Students will take part of (or a full) class period to play the Race to Ratify game on iCivics .Play Race to Ratify - Constitution Ratification Game | iCivics. Another activity to start in class and have the students finish for homework is about the founding documents and is a choice board- it links the declaration and the Constitution
🟨 C-SPAN Classroom Choice Board - Our Founding Documents . Once students have completed this, they will then look at the structure and organization of the Constitution (this may also be skipped if running short on time). There is a foldable activity
🟦 Structure of the Constitution where they have to define and summarize each section. Students will also review the chart in the text on the steps to amending the constitution- discussion about amendments will occur in the next unit.

Week 4- this week will be spent looking at the principles within the Constitution. In particular, part 3 of the lesson from the National ArchivesTeaching Six Big Ideas in the Constitution | National Archives in which students are assigned a principle and they have to pick out parts of the constitution that align with the principle. A way to wrap up learning of the Constitution and its principles would be to complete the DBQuest from iCivics about Washington's letters The Constitution's Cover Letter | iCivics. This would take a class period at most. Another option is the constitutional inquiry 'Did the Constitution develop a just government?' Constitution - C3 Teachers. This would take more than a class period but does allow for student creativity. Either the DBQuest or the Inquiry from C3 teachers would be the assessment for the unit. The option is there to assess with a traditional test.

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

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☒ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced: Students can view the original and final drafts of the Constitution and discuss the differences.

Struggling: small group and/or more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Reading quizzes.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- DBQuest from iCivics or the Inquiry from C3 teachers as listed in the learning plan.

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 4: Bill of Rights
Pacing	6 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
CIV 9–12.4 Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested.
CIV 9–12.5 Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national, and/or international level.

Supporting Standards:
CIV 9–12.3 Analyze the impact and the appropriate roles of personal interests and perspectives on the application of civic virtues, democratic principles, constitutional rights, and human rights.
CIV 9–12.10 Analyze the impact and the appropriate roles of personal interests and perspectives on the application of civic virtues, democratic principles, constitutional rights, and human rights.
CIV 9–12.14 Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

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CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

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CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

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CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Describe the Bill of Rights and other amendments. 2. Communicate ideas and opinions through discussion and in written form, while also defending a viewpoint.	1. Which civil liberties are protected by the First Amendment of the Bill of Rights. 2. Why there must be some limits on individual rights. 3. Which civil liberties are protected by the Bill of Rights,

3. Think critically about the effects amendments have on citizens. 4. Explain why particular amendments were added to the Constitution.	particularly by the Second through Tenth Amendments. 4. How the Bill of Rights places limits on the power of government. 5. What the reasons for the Thirteenth, Fourteenth, and Fifteenth Amendments are. 6. How several twentieth-century amendments extended voting rights and changed the election process. 7. Why the civil rights movement occurred and what impact it had on society and the law.

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. What individual rights are being protected by the First Amendment? 2. How does the Bill of Rights protect the rights of the accused? 3. What other protections does the Bill of Rights offer? 4. How were civil rights extended following the Civil War? 5. In what ways have twentieth-century amendments affected voting rights and changed elections? 6. Why did the civil rights movement occur? 7. What other groups of citizens have struggles to win civil rights?	1. Freedom of religion, speech, press, assembly, and petition are guaranteed in the First Amendment. 2. Specifically the Fourth, Fifth, Sixth, and Eighth amendments offer protections to the rights of the accused. Students will be able to describe these rights. 3. Other protections offered are through the Second, Third, Seventh, Ninth, and Tenth amendment. Students will be able to define these amendments. 4. Civil rights were extended specifically through the Thirteenth, Fourteenth, and Fifteenth amendments. Students will be able to explain these amendments. 5. The Seventeenth, Nineteenth, Twenty-third, Twenty-fourth, and Twenty-sixth amendment have changed voting rights and elections. Students will be able to describe these amendments. 6. The civil rights movement stemmed from Jim Crow Laws, discrimination, and segregation. Brown versus the Board of Education was a pivotal point in the movement

| | as well as the Civil Rights Act of 1964 and the Voting Rights Act of 1965. |
| | 7. Affirmative action has played a role in civil rights for minorities and women. Native Americans and disabled Americans (to name a few) have also sought civil rights protections. |

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.1 Empowered Learner
1.3 Knowledge Constructor
1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 4 Lesson 1:
Civil Liberty - the freedom to think and act without government interference or fear of unfair legal treatment.
Free Speech - the right to say our opinions, in public or in private, without fear of being stopped or punished by the government for those ideas.
Censorship - the banning of printed materials or films due to alarming or offensive ideas they contain.
Petition - a formal request for government action.
Slander - spoken untruths that are harmful to someone's reputation.
Libel - written untruths that are harmful to someone's reputation.
Tinker v. Des Moines School District - students wearing armbands protesting the Vietnam war in school are protected by the First Amendment.

Chapter 4 Lesson 2:
Accused - a person officially charged with a crime.
Probable Cause - a strong reason to think that a person or property was involved in a crime.
Search Warrant - a court order allowing police to search property and seize evidence.
Indictment - a document issued by a grand jury to charge someone with a crime.
Double Jeopardy - putting someone on trial for a crime of which he/she was previously found innocent.
Self Incrimination - giving evidence about yourself that could lead to you being found guilty of a crime.
Due Process - following established legal procedures.
Eminent Domain - the right of the government to take private property- usually land- for public use.
Bail - a sum of money used as a security deposit to ensure that an accused person who is released from jail returns to his/her trial.

Chapter 4 Lesson 3:
Black Codes - laws from after the Civil War that kept African Americans from holding certain jobs, gave them few property rights, and limited their rights in other ways.
Suffrage - the right to vote.
Poll Tax - a sum of money required of voters before they are permitted to cast a ballot.

Chapter 4 Lesson 4:
Discrimination - unfair treatment based on prejudice against a certain group.
Segregation - the social separation of the races.
Jim Crow Law - Southern segregation law.
Civil Rights - the rights of full citizenship and equality under the law.
Nonviolent Resistance - peaceful protest against laws believed to be unfair.
Sit-in - the act of occupying seats or sitting down on the floor of an establishment as a form of organized protest.
Hate Crime - a violent act against a person because of his or her race, color, national origin, gender, or disability.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week One - Introduce the Bill of Rights using this 3 minute video ▶ A 3-minute guide to the Bill of Rights - Belinda Stutzman and using this worksheet where students rewrite the amendments in their own words BILL OF RIGHTS. Next watch Constitution USA episode It's a Free Country Watch CONSTITUTION USA with Peter Sagal | PBS. This will give the students a good overview of the Bill of Rights. Students will do a deep dive into the First Amendment using activities and packets from the National Constitution Center https://constitutioncenter.org/education/constitution-101-curriculum module 5, 10, and 11. We will start of looking at Tinker v. DesMoines Supreme Court case using documents from https://billofrightsinstitute.org/lessons/tinker-v-des-moines-1969 There will be discussion throughout all of the activities and there will be a culminating assignment to assess knowledge of the First Amendment: 🔲 First Amendment Infographic/Collage/Poster .

Week Two - students will continue working on Tinker v. DesMoines and First Amendment activities. There will be discussion throughout all of the activities and there will be a culminating assignment to assess knowledge of the First Amendment: 🔲 First Amendment Infographic/Collage/Poster .

Week Three - students may still be wrapping up the First Amendment infographic. The next topic will be to look at the Fourth Amendment https://constitutioncenter.org/education/constitution-101-curriculum/11-the-fourth-amendment

Week Four - The next activity will be reviewing the remaining amendments in the Bill of Rights- each student or group will research an amendment 🔲 Amendment Activity and/or may use the Bill of Rights choice board from CSPAN The Bill of Rights Choice Board | C-SPAN Classroom. Annenberg Classroom's That's Your Right is a game that can be played to assess understanding of the Bill of Rights. Alternatively iCivics has a game that can be the Bill of Rights or all of the amendments Play Do I Have a Right? | Constitutional Rights Game | iCivics

Week Five - Watch Constitution USA Episode 3 Watch CONSTITUTION USA with Peter Sagal | PBS created equal or crash course equal protection Equal Protection: Crash Course Government #29 | Episode 29 | PBS for an overview on the 14th amendment. Students will work on 🔲 14th Amendment's Equal Protection Clause Reading Assignment.docx . Next, Students will be able to describe and interpret the Reconstruction Amendments using this lesson from the Bill of Rights Institute The End of Slavery and the Reconstruction Amendments - Bill of Rights Institute. Depending on student background, it may be important to read about Jim Crow Laws and Plessy v Ferguson What is Jim Crow Lesson Plan | iCivics this can be done as homework. Students will then read about voting rights amendment Voting Rights Lesson Plan & Voting Rights History | iCivics.

Week Six - Students will continue with civil rights and voting rights by looking at Brown v. Board of Ed from Bill of Rights Institute Brown v. Board of Education (1954) - Bill of Rights Institute this will take at least a class period. The next class will focus

on the Nashville sit-ins by using the DBQuest from iCivics https://www.icivics.org/dbquest/nashville-sit-ins. Students will then watch a crash course video on affirmative action Affirmative Action: Crash Course Government #32 | Episode 32 | PBS.

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- [ ] Reading a wide range of texts effectively
- [x] Writing effectively for a variety of purposes
- [ ] Presenting ideas accurately with the support of engaging media
- [x] Thinking critically to solve problems and reach well reasoned judgments
- [x] Working responsibly and collaboratively

Differentiation

Advanced: addressing learning needs by incorporating more student choice and doing a deep dive into supreme court cases and the amendments over time

Struggling: group based learning and more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 14th Amendment Reading
  - W 14th Amendment's Equal Protection Clause Reading Assignment.docx

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- First Amendment Infographic.
  - First Amendment Infographic/Collage/Poster

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 5: Legislative Branch
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
CIV 9–12.11 Evaluate multiple procedures for making governmental decisions at the local, state, national, and international levels in terms of the civic purposes achieved.
CIV 9–12.4 Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested.

Supporting Standards:
INQ 9–12.8 Identify evidence that draws information directly and substantially from multiple sources to detect inconsistencies in evidence in order to revise or strengthen claims.
INQ 9–12.15 Use disciplinary and interdisciplinary lenses to understand the characteristics and causes of local, regional, and global problems; instances of such problems in multiple contexts; and challenges and opportunities faced by those trying to address these problems over time and place.

Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

CCSS.ELA-LITERACY.RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

CCSS.ELA-LITERACY.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Compare and contrast the House of Representatives and the Senate. 2. Organize information about expressed and implied powers.	1. Congress is the lawmaking branch of the federal government. 2. Congress's expressed and implied powers are set by the Constitution.

3. Organize information about the qualifications needed to become a member of Congress.
4. Chart the responsibilities given to members of Congress.
5. Sequence steps in getting legislation passed.
6. Collaborate and participate in a mock Congress

3. Qualifications for becoming a member of Congress.
4. Very little legislation that is brought before Congress becomes law.

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. Why is Congress composed of a House of Representative and a Senate? 2. Why are members of Congress assigned to work on committees? 3. What kinds of lawmaking powers were given to Congress by the Constitution? 4. What are the qualifications for becoming a member of Congress? 5. How do members of Congress exercise their responsibilities? 6. How does a bill become a law?	1. Congress is bicameral to balance the problem of representation for small and larger states stemming from the Great Compromise. Both the Senate and the House of Representatives have their own special rules and procedures. 2. Congress has standing, select, and joint committees to help aid in considering the large number of bills Congress sees each session. 3. Congress has expressed/enumerated powers, implied powers, and nonlegislative powers. 4. To become a Senator you must be at least 30 years old, live in the state you wish to represent, and have been a citizen for at least 9 years before being elected. To become a member of the House of Representatives you must be at least 25 years old, live in the state you wish to represent, and have been a citizen for at least 7 years. 5. Congress exercises responsibilities each session through making laws, doing casework, and helping the district or state. Congress exercises oversight as one part of the system of checks and balances to make sure that the executive branch stays within its proper constitutional powers.

	6. Ideas from bills come from private citizens, the president, or special interest groups. A bill is only introduced by a member of Congress. It is then sent to committee, from there it goes to debate then brought to a vote. (This is a brief version, students will know more details)

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 5, Lesson 1:
Senate - the upper house of Congress, consisting of two representatives from each state.
House of Representatives - the lower house of Congress, consisting of a different number of representatives from each state, depending on population.
Census - a population count taken by the Census Bureau.
Constituent - a person from a legislator's district.
Gerrymander - an oddly shaped election district designed to increase the voting strength of a particular group.
Majority Party - in both the House of Representatives and the Senate, the political party to which more than half the members belong.
Minority Party - in both the House of Representatives and the Senate, the political party to which fewer than half the members belong.
Seniority - years of service, which is used as a consideration for assigning committee members.

Chapter 5, Lesson 2:

Expressed Power - power that Congress has that is specifically listed in the Constitution.
Enumerated Power - another name for expressed power.
Implied Power - power that Congress has that is not stated explicitly in the Constitution.
Elastic Clause - clause in Article 1, Section 8 of the Constitution that gives Congress the right to make all laws "necessary and proper" to carry out its expressed powers.
Non Legislative Power - duty Congress holds besides lawmaking.
Impeach - to accuse government officials of misconduct in office.

Chapter 5, Lesson 3:
Franking Privilege - the right of senators and representatives to send job-related mail without paying postage.
Lobbyist - representative of an interest group who contacts lawmakers or other government officials directly to influence their policy making.
Casework - the work that a lawmaker does to help constituents with a problem.
Pork-Barrel Project - government project grant that primarily benefits a congressperson's home district or state.

Chapter 5, Lesson 4:
Joint Resolution - a resolution that is passed by both houses of Congress.
Special-Interest Group - an organization of people with some common interest who try to influence government decisions.
Rider - a completely unrelated amendment added to a bill.
Filibuster - a tactic for defeating a bill in the Senate by talking until the bill's sponsor withdraws it.
Cloture - a procedure used in the Senate to limit debate on a bill.
Voice Vote - a voting method in which those in favor say "Aye" and those against say "No".
Standing Vote - In Congress, when members stand to be counted for a vote on a bill.
Roll-Call Vote - a voting method in the Senate in which members voice their votes in turn.
Pocket Veto - president's power to kill a bill, if Congress is not in session, by not signing it for 10 days.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week One - Students will listen to the Civics 101 podcast about the legislative branch https://www.civics101podcast.org/civics-101-episodes/legislativebranch?rq=congress an alternative could be the podcast and project looking at the differences between House and Senate House v Senate — Civics 101: A Podcast. Next students will work on an Introduction to Congress worksheet and they will do a breakdown of the 118th congress or whatever congress is currently in session. Graphic organizers will be used to look at leadership and key people within this Congress. Students will work on a worksheet looking at the various committees in Congress. Crash course government videos: Bicameral Congress: Crash Course Government #2 | Episode 2 | PBS Congressional Committees: Crash Course Government #7 | Episode 7 | PBS Congressional Leadership: Crash Course Government #8 | Episode 8 | PBS are good for overviews as well. The constitution center also has some readings about Article 1 Article I | The National Constitution Center.

Week Two - students will learn about gerrymandering and work on the lesson by the Choices Program Gerrymandering: One Person, One Vote? - Choices Program . Next, students will learn about the powers of Congress using some worksheets and the lesson from C-SPAN Enumerated and Implied Powers of Congress | C-SPAN Classroom or The Powers of Congress | C-SPAN Classroom. Then they will go through a hypothetical budget using 📄 Civics Budget Activity

Week Three - Students will continue discussion about the budget and play People's Pie from iCivics People's Pie | iCivics Next students will work on learning the steps of how a bill becomes a law through graphic organizers or a timeline/sequencing worksheet. Students will take a class period to play Lawcraft from iCivics Play LawCraft | Congress Simulation Game | iCivics and will complete the follow up steps

Week Four - Students will watch the movie Mr. Smith Goes to Washington and write a reaction 📄 Mr. Smith Goes to Washington Reflection Questions . Students will then look at the inquiry from C3 teachers asking Does the Senate represent the United States? United States Senate - C3 Teachers.

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

Westbrook High School Learning Expectations
The Westbrook High School student will meet expectations by… ☐ Reading a wide range of texts effectively ☒ Writing effectively for a variety of purposes ☒ Presenting ideas accurately with the support of engaging media ☒ Thinking critically to solve problems and reach well reasoned judgments ☒ Working responsibly and collaboratively

Differentiation
Advanced: addressing particular needs by implementing more choice
Struggling: group based learning and more direct instruction

Assessments *Include an overview of authentic assessments*
Formative Assessments and Corresponding Rubrics/Checklists when Applicable: ● 🗐 Mr. Smith Goes to Washington Reflection Questions
Summative Assessments and Corresponding Rubrics/Checklists when Applicable: ● United States Senate - C3 Teachers

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Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 6: Executive Branch
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
CIV 9–12.13 Evaluate public policies in terms of intended and unintended outcomes, and related consequences
CIV 9–12.4 Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested.

Supporting Standards:
INQ 9–12.10 Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.
INQ 9–12.11 Construct explanations using sound reasoning, correct sequence (linear or nonlinear), examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation given its purpose (e.g., cause and effect, chronological, procedural, technical).

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading:

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Speaking and Listening:

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CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Describe the Electoral College. 2. Explain the roles and powers of the President. 3. Understand the president's role in foreign policy. 4. Evaluate past presidents.	1. The requirements for becoming president and how the president is selected. 2. The functions and roles of the President. 3. The United States has many methods to carry out foreign

	policy.
	4. Many groups, like the cabinet, help the president carry out major duties.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How does a citizen become President? 2. What happens if the president must step down from office? 3. What are the duties and powers of the president? 4. What are the goals of foreign policy? 5. What offices make up the Executive Office of the President? 6. What are two main roles the president's cabinet plays in the government? 7. What is the federal bureaucracy?	1. Qualifications for and process of electing a president; especially the Electoral College 2. The Presidential Succession Act and the Twenty-fifth Amendment. 3. The President's main job is to carry out laws passed by Congress. Other powers include the veto, calling Congress into session, serving as commander in chief, receiving leaders of foreign countries, making treaties with foreign countries to name a few. The president may also issue executive orders. 4. The main goal of foreign policy is national security. Other goals include building trade with other nations, promoting world peace, and advocating for democracy around the world. 5. The president's Chief of Staff oversees the Executive Office of the President. The heart of the Executive Office of the President is the White House Office. The Office of Management and Budget prepares the federal budget and the National Security Council advises the president on matters of national security. 6. There are fifteen large units (Department of State, Department of Education,etc) and the heads of these departments form the group of presidential advisors known as the cabinet.

	7. The federal bureaucracy included hundreds of agencies that deal with everything from running the space program to deciding what can be used in making hot dogs. Agencies write the rules that put laws passed by Congress into practice. Departments and agencies carry out the day to day activities of the federal government. Federal agencies oversee certain activities such as deciding if products are safe to use, etc.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.1 Empowered Learner
1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:
Chapter 6, Lesson 1:
Elector- person appointed to vote in presidential elections for president or vice president.
Presidential Succession Act- In 1947, Congress passed the Presidential Succession Act. It lists the line of succession after the vice president.
Twenty-Fifth Amendment- makes it clear that if the president dies or leaves office, the vice president becomes president. It also states that this new president should choose a new vice president with the help of Congress.

Chapter 6, Lesson 2:
Executive Order- a rule or command the president gives out that has the force of law.
Pardon- a declaration of forgiveness and freedom from punishment.
Reprieve- an order to delay a person's punishment until a higher court can hear the case.

Amnesty- a pardon to a group of people.
Ambassador- an official representative of a country's government.

Chapter 6, Lesson 3:
Foreign Policy- a nation's overall plan for dealing with other nations.
National Security- the ability to keep the country safe from attack or harm.
Treaty- a formal agreement between the governments of two or more countries.
Executive Agreement- an agreement between the president and the leader of another country.
Trade Sanction- an effort to punish another nation by imposing trade barriers.
Embargo- an agreement among a group of nations that prohibits them all from trading with a target nation.

Chapter 6, Lesson 4:
Cabinet- a group of advisors to the president that include the heads of fifteen top level executive departments.
Federal Bureaucracy- agencies and the employees of the executive branch of government.
Executive Agency- independent agency that deals with certain specific areas within the government.
Government Corporation- a business owned and operated by the federal government.
Regulatory Commission- independent agency created by Congress that can make rules concerning certain activities and bring violators to court.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week One - Students will start off learning about the electoral college. It is a good way to connect learning from the legislative branch to the executive branch. Students will work on the 🗎 electoral_college_dbq.pdf . Students will listen to the civics 101 podcast about the executive branch Starter Kit: Executive Branch — Civics 101: A Podcast. Next students will work on the stations set up about the executive branch in which students read part of the constitution to answer questions about the president. Students will also read For The President, All In A Day's Work | iCivics. Next students will then explore the powers and roles of the president in a lesson in which students create a help wanted ad for POTUS, discuss formal and expressed powers, look at executive orders,

and analyze presidential decisions 🗋 Presidential Powers and 6 scenarios.pdf . Students will create Presidential Powered Superheros to demonstrate their understanding of the powers.

Week Two - The next lesson will focus on United States v Nixon in which students will explore the question 'Was the Constitution's separation of powers intended to create an absolute executive privilege? United States v. Nixon (1974) - Bill of Rights Institute. Students will further explore the role of president by playing the Executive command game from iCivicsPlay Executive Command - President Simulation Game | iCivics. The role of the president and foreign policy will be the next lesson. Students will read some background on the U.S.' role in foreign policy and they will role play/debate 4 options the US can take in terms of foreign policy in preparation for writing their own recommendations for foreign policyThe U.S. Role in a Changing World - Choices Program. Another option is to play the new game about Foreign Policy from iCivics Teaching Convene the Council | Foreign Policy Game | iCivics.

Week Three - Students will look at primary sources about key presidential decisions Documenting Key Presidential Decisions | DocsTeach and they will read about bureaucracy A Very Big Branch | iCivics. The next lesson will allow the students to explore the question ``Does the president have too much power?" 🗋 does the president have too much power debate.pdf . Students will look at documents and sources that can be used to support a yes or no response. Students will either write out their response or discuss their responses in class depending on time.

Week Four - Students will work on the Roller Coaster of the Presidency project 🗎 Roller Coaster of the Presidency Project **.**

Interdisciplinary / Real World / Global Connections

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- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

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Differentiation
Advanced: addressing particular needs by implementing more choice
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Assessments
Include an overview of authentic assessments
Formative Assessments and Corresponding Rubrics/Checklists when Applicable: ● 📄 electoral_college_dbq.pdf ● 📄 Presidential Powers and 6 scenarios.pdf
Summative Assessments and Corresponding Rubrics/Checklists when Applicable: ● 📄 Roller Coaster of the Presidency Project

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 7: Judicial Branch
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
CIV 9–12.14 Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.
CIV 9–12.4 Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested.

Supporting Standards:
INQ 9–12.10 Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.

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Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

CCSS.ELA-LITERACY.SL.9-10.4 Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Organize information on the federal court organization. 2. Classify types of cases federal courts handle. 3. Analyze a diagram of the relationship and responsibilities of the district and appeals courts. 4. Identify the main types of cases heard by the Supreme Court. 5. Summarize facts about the Supreme Court.	1. The federal courts make up the judicial branch of the U.S. Government. 2. The federal court system is made up of the Supreme Court, district courts, and appeals courts. 3. How federal judges are selected. 4. The powers and limits placed on the Supreme Court. 5. The decisions made by the Supreme Court can have a big impact on society. 6. The jurisdictional limits and organization of the federal

	and state courts.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. What is the role of the federal courts? 2. What kinds of cases are heard in federal courts? 3. How are the federal courts organized? 4. What is the selection process for federal judges? 5. What is the jurisdiction of the Supreme Court? 6. What are the duties and qualifications of Supreme Court Justices? 7. What is judicial review? 8. What kinds of cases does the Supreme Court decide to hear?	1. Origins of the federal courts, the dual court system, and rights guaranteed under the Constitution. 2. Cases heard in federal courts deal with violations of constitutional rights, disputes between states or parties from different states, admiralty and maritime laws, the federal governments and cases with foreign governments and U.S. diplomats. 3. Federal courts are organized as follows- U.S. District courts, U.S. Courts of appeals/circuit courts of appeals, U.S. Supreme Court. 4. The president appoints federal judges only with the approval of the Senate. Presidents often follow a practice called senatorial courtesy. 5. The Supreme Court has original jurisdiction in cases that involve disputes between two or more states and in cases that involve diplomats from foreign countries. 6. Supreme Court Justice duties included hearing and ruling on cases. The Constitution does not name any qualifications for justices. Although the Constitution establishes the Supreme Court, it permits Congress to decide how to organize it. 7. Judicial review means that the Court can review any federal, state, or local law or action to see whether it goes against the Constitution. 8. Nearly all cases come to the Supreme Court on appeal from a lower court. The Supreme Court carefully

	chooses the cases it will hear. If four of the nine Justices feel the case has value, they will issue a writ of certiorari.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

- 1.3 Knowledge Constructor
- 1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 7, Lesson 1:
Dual Court System- a court system made up of both federal and state courts.
Jurisdiction- a court's authority to hear and decide cases.
Exclusive Jurisdiction- authority of only federal courts to hear and decide cases.
Concurrent Jurisdiction- authority of both state and federal courts to hear and decide cases.

Chapter 7, Lesson 2:
Original Jurisdiction- authority of a court to hear cases for the first time.
Appellate Jurisdiction- authority of a court to hear a case appealed from a lower court.
Ruling- an official decision by a judge or a court that settles a case and may also establish the meaning of law.
Opinion- a detailed explanation of the legal thinking behind a court's decision in a case.
Precedent- a ruling that is used as the basis for a judicial decision in a later, similar case.
Litigant- one of the parties involved in a lawsuit.

Chapter 7, Lesson 3:

Judicial Review- the power of the Supreme Court to say whether any federal, state, or local law or government action goes against the Constitution.
Constitutional- in accordance with that Constitution.
Nullify- to cancel legally.

Chapter 7, Lesson 4:
Writ of Certiorari- an order a higher court issues to a lower court to obtain the records of the lower court in a particular case.
Docket- a court's calendar, showing the schedule of cases it is to hear.
Caseload- a judge's or court's workload of cases in a period of time.
Brief- a written document explaining the position of one side or the other in a case.
Stare Decisis- the practice of using earlier judicial rulings as a basis for deciding cases.
Concurring Opinion- a statement written by a justice who votes with the majority, but for different reasons than others.
Dissenting Opinion- a statement written by a justice who disagrees with the majority opinion, presenting his or her own opinion.
Unanimous Opinion- a Supreme Court ruling on a case in which all justices agree on the ruling.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)
Week One - Students will start by learning how a case travels through the court system by using Katz v. US [Federal Court Structure	C-SPAN Classroom](#), 🟨 Katz v United States Assignment , an 🔷 Graphic Organizer: Federal Court System . Next they will learn about Article III using a video from the National Constitution Center 🟨 Copy of Article III Slides 🔷 Article III Handout - Introductory Video 35 min , and ▶️ Article III: Supreme Court in Review (Introductory Level) . Another class period will be spent in groups at stations (or jigsaw type of grouping) reading articles from iCivics about the judicial branch. The readings are as follows- 1. [Double Take: The Dual Court System	iCivics](#) 2. [Let's Take It Up Lesson Plan	Purpose of the Appellate Court	iCivics](#) 3. [Judicial Branch in a Flash! Lesson Plan](#) 4. [Interpreting the Constitution	iCivics](#)
Week Two - Students will explore the requisite skills necessary to become a judge (in general and for the Supreme Court): [Judge Chat Lesson Plan](#). Students will play either the [Play Court Quest - Judicial System Game	iCivics](#) or [Teaching Argument Wars - Supreme Court Simulation	iCivics](#). Depending on timing, students may simulate the courts in this activity (#4) [Oyez! Oyez! Oyez!: Simulating the Supreme Court	NEH-Edsitement](#) or [You Be the Judge (Simulation)	What Does a Supreme Court Justice Do?	iCivics](#).
Week Three - Students will learn about judicial review in Marbury v. Madison [Marbury v. Madison (1803) - Bill of Rights Institute](#). Next students will being work on their Supreme Court Justice Google Site 🔷 Supreme Court Justices Google Site [Current Members](#), [Justices	Oyez](#), [2021-2022 Term	Oyez](#), [2021 Annual Supreme Court Review	The National Constitution Center](#), [2022 Annual Supreme Court Review	The National Constitution Center](#)
Week Four - Students may still be working on the Supreme Court Justices Google Sites. Students will then have a Chapter 7 test, depending on time as a Google Site assignment will be an assessment as well. Option to sum up the 3 branches- look at DBQ Project how does constitution guard against tyranny and the 3 branches activities (letscultivategreatness.com)

Interdisciplinary / Real World / Global Connections
● Political science literacy as many socio-political topics are discussed in this unit.

- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- ☐ Reading a wide range of texts effectively
- ☐ Writing effectively for a variety of purposes
- ☒ Presenting ideas accurately with the support of engaging media
- ☒ Thinking critically to solve problems and reach well reasoned judgments
- ☒ Working responsibly and collaboratively

Differentiation

Advanced: addressing particular needs by implementing more choice

Struggling: group based learning and more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 📄 Graphic Organizer: Federal Court System

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 📄 Supreme Court Justices Google Site

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 8: Federalism and State and Local Government
Pacing	2 Weeks

CT State Standards *What are the goals of this unit?*
Priority/Focus Standards: CIV 9–12.1 Distinguish the powers and responsibilities of local, state, tribal, national, and international civic and political institutions. **Supporting Standards:** CIV 9–12.11 Evaluate multiple procedures for making governmental decisions at the local, state, national, and international levels in terms of the civic purposes achieved. CIV 9–12.12 Analyze how people use and challenge local, state, national, and international laws to address a variety of public issues.

[**Correspondence to CT Core Standards**](#) *What are the goals of this unit?*
Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

CCSS.ELA-LITERACY.RH.9-10.4 Determine the meaning of words and phrases as they are used in a text, including vocabulary describing political, social, or economic aspects of history/social science.

CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

CCSS.ELA-LITERACY.RH.9-10.7 Integrate quantitative or technical analysis (e.g., charts, research data) with qualitative analysis in print or digital text.

CCSS.ELA-LITERACY.RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.

CCSS.ELA-LITERACY.RH.9-10.9 Compare and contrast treatments of the same topic in several primary and secondary sources.

Writing:

CCSS.ELA-LITERACY.WHST.9-10.1 Write arguments focused on discipline-specific content.

CCSS.ELA-LITERACY.WHST.9-10.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

CCSS.ELA-LITERACY.WHST.9-10.9 Draw evidence from informational texts to support analysis, reflection, and research.

CCSS.ELA-LITERACY.WHST.9-10.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening:

CCSS.ELA-LITERACY.SL.9-10.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.2 Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.

CCSS.ELA-LITERACY.SL.9-10.3 Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.

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CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Compare the organization of the state government to that of the federal government. 2. List the powers the federal government shares with the states and those that are exclusive to each. 3. Compare the function of state legislatures to that of the US Congress. 4. Analyze various roles and duties of a governor. 5. Describe the organization of state courts. 6. Analyze a city or town government website.	1. The relationship between the state governments and the federal government. 2. How state legislatures are organized and how they create laws. 3. The roles and duties of governors and the state executive branch. 4. How state courts are organized. 5. That the powers and responsibilities of local governments are set by state constitutions.

7. Compare the organizations of the state government to that of a town or city government.	6. How local governments are structured. 7. That the New England town-hall style of government is an example of direct democracy.

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. How does the federal system allow the national government and state governments to share power? 2. What are the functions of state legislatures? 3. What are the powers and duties of a governor? 4. How is the state's judicial system organized? 5. How are local governments created, funded, and organized? 6. How and why did town governments and meetings develop?	1. The key to federalism is the way the Constitution assigns powers ie- expressed, implied, inherent and reserved, and concurrent powers. 2. State legislatures are similar to the US Congress and their chief job is to make laws. 3. A governor has many roles such as heading the executive branch of government, filling state office vacancies, writing an annual budget, and delivering a state of the state address. 4. The state has lower and higher courts and a state supreme court. 5. Local governments are created from the state constitution, are funded by grants and local taxes, and are organized in various ways depending on what state/county/city/town you are in. 6. Town governments and meetings developed to handle the running of and issues within the town.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: 1.3 Knowledge Constructor

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 11, Lesson 1:
Reserved Powers- powers that the Constitution does not give to the national government and that are kept by the states.
Concurrent Powers- powers shared by the state and federal governments.
Supremacy Clause- the clause in Article VI of the Constitution that makes federal laws prevail over state laws when there is a conflict.

Chapter 11, Lesson 2:
Redistricting- the process of redrawing legislative districts.
Malapportionment- unequal representation in state legislatures.
Session- a meeting of a legislative body or judicial body to conduct business.
Special Session- a legislative meeting called for a specific purpose.
Legislative Referendum- a vote called by a legislature to seek voter approval of a law.
Popular Referendum- a question placed on a ballot by a citizen petition to decide if a law should be replaced.

Chapter 11, Lesson 3:
Line-Item Veto- to veto only a specific part of a bill.
Commute- to reduce a criminal's sentence.

Chapter 11, Lesson 4:
Trial Court- a type of court in which a judge or a jury listens to the evidence and reaches a verdict, or decision, in favor of one party or another in the case.
Misdemeanor- the least serious type of crime.
Civil Case- court case in which one party in dispute claims to have been harmed in some way by the other.
Plaintiff- the person in a civil case who claims to have been harmed.
Defendant- the person in a civil case who is said to have caused the harm.

Appellate Court- type of court in which a part who lost a case in a lower court asks judges to review that decision and reverse it.
Felony- type of crime more serious than a misdemeanor.

Chapter 12, Lesson 1:
Incorporate- to receive a state charter officially recognizing the government of a locality.
City- Charter- a document granting power to a local government.
Ordinance- a law, usually of a city or county.
Metropolitan Area- a large city and its suburbs.
Suburb- a community that is near a larger city.

Chapter 12, Lesson 2:
County- normally the largest territorial and political subdivision of a state.

Chapter 12, Lesson 3:
Town- a political unit that is larger than a village and smaller than a city.
Township- a subdivision of a county that has its own government.
Town Meeting- a gathering of local citizens to discuss and vote on important issues.
Village- smallest unit of local government.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week One - assign notes for Chapter 11 and 12 ahead of time. The option is there to have students read each section and take notes, or assign the Reading Essentials and Study Guide packets for each chapter. Students will watch Constitution USA A More Perfect Union and answer questions as they watch. Students will then read state federal tug of war from iCivics State-Federal Tug-of-War (HS) | State vs. Federal Lesson Plan | iCivics. The next class period will focus on CT history and the makeup of the state government. There will be discussion about important documents including the fundamental orders of CT and the constitution of 1965. The State Library has links to the important documents Connecticut Constitutional History - LibGuides Home at Connecticut

State Library, Division of Library Development. Students will then read 📄 connecticut_-_a_guide_to_state_government.pdf and take notes about the important information on how our government is organized.

Week Two - Students will read about municipal and local government by reading Municipal Government (HS) | iCivics. Students will then work on 🟨 State and Local Government and will be given a class period or two to work on this. If timing allows with the First Selectman, set up a time for a classroom visit. This will give students the opportunity to ask questions about the town government as well as what it is like to run for office.

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.

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The Westbrook High School student will meet expectations by…
☐ Reading a wide range of texts effectively
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☒ Presenting ideas accurately with the support of engaging media
☐ Thinking critically to solve problems and reach well reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced: addressing particular needs by implementing more choice

Struggling: group based learning or more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- [Constitution USA Review Questions](#)

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 🟨 State and Local Government

Westbrook Public Schools
Social Studies Curriculum
U.S. Government, Civics, and Economics, Grade 9

Subject(s)	Social Studies
Grade/Course	9th Grade / U.S. Government, Civics, and Economics
Unit of Study	Unit 9: Introduction to Economics
Pacing	6 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
ECO 9–12.1 Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups.

Supporting Standards:
ECO 9–12.2 Generate possible explanations for a government role in markets when market inefficiencies exist.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading:

CCSS.ELA-LITERACY.RH.9-10.1 Cite specific textual evidence to support analysis of primary and secondary sources, attending to such features as the date and origin of the information.

CCSS.ELA-LITERACY.RH.9-10.2 Determine the central ideas or information of a primary or secondary source; provide an accurate summary of how key events or ideas develop over the course of the text.

CCSS.ELA-LITERACY.RH.9-10.3 Analyze in detail a series of events described in a text; determine whether earlier events caused later ones or simply preceded them.

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CCSS.ELA-LITERACY.RH.9-10.5 Analyze how a text uses structure to emphasize key points or advance an explanation or analysis.

CCSS.ELA-LITERACY.RH.9-10.6 Compare the point of view of two or more authors for how they treat the same or similar topics, including which details they include and emphasize in their respective accounts.

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CCSS.ELA-LITERACY.WHST.9-10.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.WHST.9-10.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

CCSS.ELA-LITERACY.WHST.9-10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.

CCSS.ELA-LITERACY.WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

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Speaking and Listening:

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CCSS.ELA-LITERACY.SL.9-10.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9-10 Language standards 1 and 3 here for specific expectations.)

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Define wants in terms of economics. 2. Explain the concept of scarcity and how it affects economic decisions. 3. Explain the effects of supply and demand on a product, either visually or in writing. 4. Explain how Gross Domestic Product is calculated. 5. Describe the process for preparing the federal budget.	1. Why we must make economic choices. 2. The three basic economic questions. 3. The effects of supply and demand on an economic market. 4. How Gross Domestic Product serves as an indicator of a country's economy. 5. Governments use fiscal policy to maintain a stable economy. 6. Why governments create budgets.

6. Identify the national debt and explain its significance. 7. Explain the process for balancing the federal budget.	7. The sources of revenues and forms of expenditures for local, state, and federal governments. 8. Governments budgets are generally not balanced, leading to deficit and debt.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. What is scarcity, and what role does it play in economics? 2. What are three basic economic questions? 3. How do demand and supply affect prices? 4. Why is Gross Domestic Product important to a nation? 5. What is the federal budget process? 6. How do state and local revenues and expenditures differ from those of the federal budget? 7. What is fiscal policy and why is it important?	1. Scarcity occurs whenever we do not have enough resources to produce all of the things we would like to have. Because of this, scarcity is the basic economic problem. 2. Three basic economic questions are: What goods and services will be produced? How will they be produced? Who will consume, or use, them? 3. Demand and supply can make prices increase or decrease. 4. Gross Domestic Product is a way to measure the nation's income and is a signal of the nation's health. 5. The federal budget process includes the President and Congress and is a complex process. 6. State and local expenditures depend on different factors such as intergovernmental revenue, sales tax, and property tax. 7. Fiscal policy is the use of government spending and taxation to influence the economy. Governments typically use fiscal policy to promote strong and sustainable growth and reduce poverty

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.3 Knowledge Constructor
1.6 Creative Communicator

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Chapter 16, Lesson 1:
Want- desire individuals and nations have that can be met by getting a good or a service.
Economics- the study of how individuals and nations make choices about ways to use scarce resources to fulfill their needs and wants.
Resource- a thing that can be used-natural resources, labor, capital- to make goods or services.
Scarcity- the situation of not having enough resources to satisfy all one's wants.
Economic System- a nation's way of producing things its people want and need.
Traditional Economy- an economic system in which the decisions of what, how, and for whom to produce are based on custom or habit.
Market Economy- an economic system in which individuals and businesses own all the resources and make economic decisions on the basis of price.
Command Economy- an economic system in which the government makes the major economic decisions.

Chapter 16, Lesson 3:
Consumer- a person who buys goods and services.
Producer- a person or business that provides goods and services.
Demand- the amount of a good or service that consumers are willing and able to buy over a range of prices.
Supply- the amount of a good or service that producers are willing and able to sell over a range of prices.
Market- the location or an arrangement that allows buyers and sellers to get together and buy or sell a certain product.
Competition- efforts by different businesses to sell the same good or service.
Equilibrium Price- the price set for a good or service in the marketplace, where demand and supply are perfectly balanced.

Surplus- situation in which the amount of a good or service supplied by producers is greater than the amount demanded by consumers.
Shortage- situation in which the supply of the good or service available is less than the demand for it.

Chapter 17, Lesson 1:
Product- anything that is produced; goods and services.
Gross Domestic Product (GDP)- total market value of all final goods and services produced in a country during a single year.
Entrepreneur- a risk-taking person who starts a new business, introduces a new product, or improves a management technique.
GDP Per Capita- Gross Domestic Product on a per-person basis; GDP divided by population.
Standard Of Living- the material well-being of an individual, a group, or a nation as measured by how well its needs and wants are satisfied.

Chapter 22, Lesson 1:
Fiscal Year- any 12 month period chosen for keeping accounts.
Mandatory Spending- the federal spending required by law that continues without the need for congressional approval each year.
Discretionary Spending- the spending for federal programs that must receive approval each year.
Appropriations Bill- the legislation that sets spending on particular programs for the coming year.
Intergovernmental Revenue- the funds that one level of government receives from another level of government.
Sales Tax- a tax paid by consumers at the time they buy goods or services.
Entitlement Program- a government program that makes payments to people who must meet certain requirements in order to help them meet minimum health, nutrition, and income needs.
Subsidize- to aid or support a person, business, institution, or undertaking with money or tax breaks.
Property Tax- a tax on the value of land and property that people own.

Chapter 22, Lesson 2:
Balanced Budget- an annual budget in which expenditures equal revenues
Budget Surplus- a situation that occurs when a government collects more revenues than it spends.
Budget Deficit- a situation that occurs when a government spends more than it collects in revenue.
Debt- money borrowed and not yet paid back.
Fiscal Policy- how the government uses taxes and spending to reach economic goals.
Automatic Stabilizer- any economic feature that works to increase or preserve income without additional government action.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week One and Two- Introduce concepts of economics by having students work in groups on Island Project 📄 Island Project- Setting Up and Economy . Students will need at least one class period to create their islands before they can go through the Island Project Scenarios/Problems 🟧 Island Project Scenarios . Students will then present their islands and we will discuss some of the key economic factors from their projects. Next, students will start learning about demand and supply. The demand powerpoint 🅿 Demand.ppt will be presented and students will work on 📄 Demand_Lecture_Activity.pdf and 📄 Demand_Notes.pdf . Supply will also be presented 🅿 Supply.ppt 📄 Supply_Lecture_Activity.pdf and 📄 Supply_Notes.pdf These lessons may continue into week two.

Week Two and Three- Demand and Supply lessons will continue and students should watch the following videos either in class or as homework (depending on time) The Demand Curve | Microeconomics, Change in Demand vs. Change in Quantity Demanded | Marginal Revolution University, The Supply Curve | Microeconomics Videos, The Supply Curve Shifts | Microeconomics Videos.

Disclosure: MRU that has google docs and activities- in order to access it you have to prove you are a teacher because they do not want answers publicly available. Marginal Revolution University is where to start to gain access.

Next students will learn about GDP. As a class or in groups students will go through the lesson on GDP and Pizza from Econ Lowdown GDP and Pizza (or GDP and Pizza: Economics for Life Online Module for Teachers and Students) - this will take about a class period. Lesson 1: "Gross Domestic Product" - Economics on Demand has a good prezi to show the students, and videos from MRU are also helpful What Is Gross Domestic Product (GDP)? | Marginal Revolution University, Splitting GDP | Marginal Revolution University, Nominal vs. Real GDP | Marginal Revolution University. If time allows, students can do a GDP comparison with other countries 📄 GDP Comparison . There is also an option to do a Mini DBQ on GDP 📄 GDP_DBQ.pdf

Week Four- Students will be looking at the budget and fiscal policy. Students will look at fiscal policy by playing the Fiscal Ship Game Federal Budget: The Fiscal Ship Game which contains some student handouts for the game The Fiscal Ship. There is an option to do the Chapter 22 project 📄 Chapter 22 project.pdf if time allows.

Week Five and six - We will be wrapping up the school year and students will be working on
📄 9th Grade Gov Final Choice Board

Interdisciplinary / Real World / Global Connections

- Political science literacy as many socio-political topics are discussed in this unit.
- United States history literacy as many key events in chronological order are discussed in this unit.
- Global awareness as several current events are used as discussion prompts and homework assignments in this unit.
- Economic literacy as many socio-economic topics are discussed in this unit

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…

☐ Reading a wide range of texts effectively
☐ Writing effectively for a variety of purposes
☒ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced: addressing particular needs by implementing more choice

Struggling: group based learning and more direct instruction

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- 📄 Chapter 22 project.pdf

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- 📄 9th Grade Gov Final Choice Board

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 1: Linear & Piecewise Functions, Absolute Value Functions, & Transformations of Parent Graphs
Pacing	5 Weeks

[CT Core Standards](#)
What are the goals of this unit?

Priority/Focus Standards:

CCSS.MATH.CONTENT.HSF.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

Supporting Standards:

CC.9-12.F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Write linear equations given two points, a slope and a point, x- and y-intercepts.	- Dependent variable - Independent variable - Intercepts - Linear equation - Point-slope form - Slope - Slope-intercept form - Standard form
2. Graph linear equations given any form of a linear equation, two points, a slope and a point, x- and y-intercepts.	- Dependent variable - Independent variable - Function - Linear equation - Parallel lines - Perpendicular lines - Point-slope form - Slope - Slope-intercept form - Standard form - x-intercept - y-intercept

3. Write and interpret direct variation equations based on real-world situations, tables, and problems.	- Constant of variation - Dependent variable - Direct variation - Independent variable
4. State domain and range using interval notation and determine if a relation or graph is a function.	- Dependent variable - Domain - Independent variable - Interval notation - Function - Range - Vertical line test
5. Write and graph linear piecewise-defined functions.	- Function notation - Linear equation - Piecewise-defined function - Restriction line
6. Write equations given transformations of a parent graph and write transformations given a transformed equation.	- Compression - Parent graph - Reflection - Stretch - Transformation - Translation
7. Graph absolute value functions, find the domain and range, and state transformations to the graph.	- Absolute value function - Axis of symmetry - Compression - Domain - Interval notation - Parent graph

	- Range - Reflection - Stretch - Transformation - Translation - Vertex

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. Does it matter which form of a linear equation you use?	1. A single quantity may be represented by many different expressions with some being easier to represent and others being more difficult. The facts about a quantity may be expressed by many different equations (or inequalities).
2. How do you use transformations to help graph absolute value functions?	2. A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable. Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Some important families of functions are developed through transformations of the simplest function.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: 1. A coach is trying to decide how many new uniforms to purchase for a softball team. If the coach orders more than 10 uniforms , the cost for the extra uniforms is .75 times the normal cost per uniform of $120. Write a piecewise-defined

function that gives the cost C, in dollars, in terms of the number of uniforms the coach purchases. Graph the equation and determine how many the coach will pay for 18 uniforms.

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. Students:
Standard 1.5.a. formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapter 1: pages 4-30 & supplemental materials)

- **Media:**
  - TI-nspire CX CAS graphing calculator
  - Trigonometry Workbook Resources
  - SMART Board
  - SMART Math Tools

Online Resources / Websites:

  - https://www.khanacademy.org/
  - https://www.youtube.com/
  - https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Absolute value function: a function of the form $y = a|x - h| + k$ where (h, k) is the vertex.
Axis of symmetry: a line that divides a figure into two parts that are mirror images.

Compression: a transformation that decreases the distance between the points of a graph and a given line by the same factor.

Constant of variation: given an inverse or direct variation equation such as y = kx, the ratio of all output-input pairs equals the constant k.

Dependent variable: f(x) or y that represents the output of the function.

Direct variation: a function such as y = kx or $\frac{y}{x} = k$ where $k \neq 0$ that shows the ratio of all output-input pairs equals the constant k.

Domain: the set of inputs, also called x-coordinates, of the relation or function.

Function notation: another way to write a function rule, or an equation that represents an output value in terms of an input value.

Function rule: an equation that represents an output value in terms of an input value.

Linear equation/function: an equation that forms a line when it is graphed.

Independent variable: x represents the input of the function.

Interval notation: a set of real numbers by the pair of values that are its left or lower (minimum) and right or upper (maximum) boundaries.

Parent graph: the simplest form of a function.

Parallel lines: lines that never intersect and parallel lines have equal slopes.

Perpendicular lines: lines that intersect at a right angle and perpendicular lines have opposite reciprocal slopes.

Piecewise-defined function: a function that has different rules for different parts of its domain.

Point-slope form: the equation of a line through point (x_1, y_1) with slope m: $y - y_1 = m(x - x_1)$

Slope/rate of change: a ratio that describes on average, how much one quantity changes with respect to a change in another quantity. The equation for slope of a non-vertical line is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

Slope-intercept form: one form of the equation of a line is y = mx + b, where m is the slope and b is the y-intercept.

Standard form: a linear equation written in the form Ax + By = C, where A, B, and C are integers and A is positive.

Stretch: a transformation that increases the distance between the points of a graph and a given line by the same factor.

Range: the set of outputs, also called y-coordinates, of the relation or function.

Reflection: a transformation that maps each point to a new point across a given line, called the line of reflection. The line of reflection is the perpendicular bisector of the segment between the point and the image.

Transformation: maps each point of a graph to a new location which can include reflection, translation, stretch, and compression.

Translation: a transformation that shifts each point on the graph the same distance and direction.

Vertex: a point where the function reaches a maximum or minimum value.

Vertical line test: states that if a vertical line passes through a graph at more than one point, there is more than one value in the range that corresponds to one value in the domain.

X-intercept: the x-coordinate of the point at which the graph of an equation crosses the x-axis.

Y-intercept: the y-coordinate of the point at which the graph of an equation crosses the y-axis.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week 1:

Lesson 1.1: Relations and Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will represent a relation, find domain and range in various representations including using interval notation, identify functions and justify their reasoning, use function notation, and write and evaluate a function.

Examples:

1. When skydivers jump out of an airplane, they experience free fall. The photos below show various heights of a skydiver at different times during free fall, ignoring air resistance. How can you represent this data in four different ways?

2. State the domain and range and determine if it is a function or not. Justify your reasoning.

a.

Domain → Range
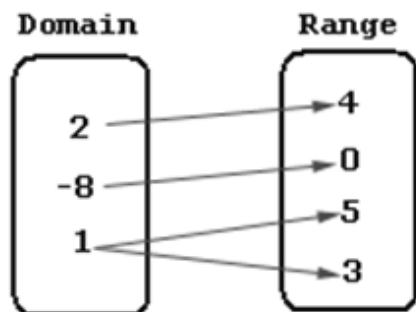
b.
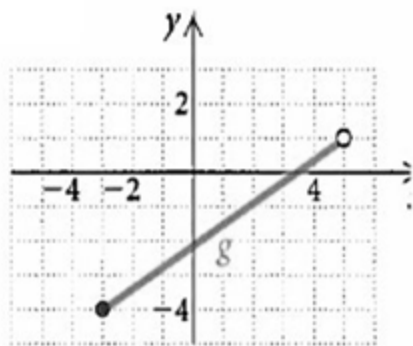
3. For

4. $f(x) =- 4x^2 - x + 3$, what is the output for the given input?

    a. $f(- 1)$

    b. $f(2)$

    c. $f(0)$

5. Tickets to a concert are available online for $225 plus a handling fee of $11.75. The total cost is a function of the number of tickets bought. What function rule models the cost of the concert ticket? Evaluate the function for 5 tickets.
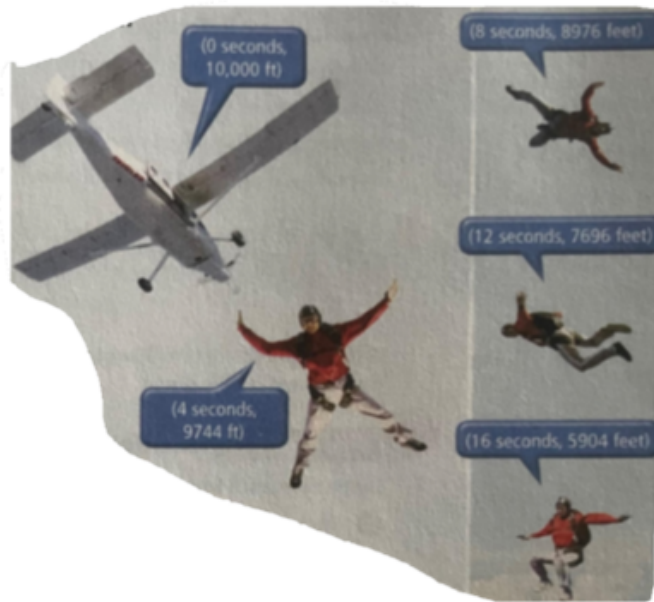
Lesson 1.2: Direct Variation

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify direct variation from tables, identify direct variation from equations, use a proportion to solve a direct variation, use direct variation to solve word problems, and graph direct variation equations.

Examples:
1. For each function, determine whether y varies directly with x. If so, what is the constant of variation and the function rule?

a.

x	y
1	2
3	6
4	8

b.

x	y
1	4
2	8
3	11

2. For each function, determine whether y varies directly with x. If so, what is the constant of variation?
   a. $3y = 7x$
   b. $7y = 14x + 7$
3. Suppose y varies directly with x, and y = 15 when x = 3. What is y when x = 12?
4. A salesperson's commission varies directly with sales. For $1000 in sales, the commission is $85. What is the commission for $2300 in sales?

5. What is the graph of each direct variation equation?
   a. $y = -\frac{7}{3}x$
   b. $y = 3x$

Weeks 2 - 3

Lesson 1.3: Linear Functions and Slope-Intercept Form

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find slope algebraically and from a graph, write linear equations, write equations in slope-intercept form, graph a linear equation.

Examples:
1. What is the slope of the line that passes through the given points?
   a. (-3, 7) and (-2, 4)
   b. (3, 1) and (-4, 1)
2. What is the equation of each line?
   a. $m = \frac{1}{4}$ and the y-intercept is $(0, -2)$
   b. $m = 0$ and the y-intercept is $(0, 8)$
3. Write the equation in slope-intercept form. What are the slopes and the y-intercept?
   a. $5x - 4y = 16$
   b. $-\frac{3}{4}x + \frac{1}{2}y = -1$
4. Graph the following equations.
   a. $-2x + y = 1$
   b. $4x - 7y = 14$

Lesson 1.4: More About Linear Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will write an equation given a point and the slope, write an equation given two points, write an equation in standard form, graph an equation using intercepts, draw and interpret a linear graph, write equations of parallel and perpendicular lines.

Examples:

1. A line passes through $(-5, 2)$ with a slope of $\frac{3}{5}$. What is the equation of the line?

2. A line passes through $(2, 3)$ and $(5, 8)$. What is an equation of the line in point-slope form?

3. What is an equation of the line $y = \frac{3}{4}x - 5$ in standard form? Use integer coefficients.

4. What are the intercepts of $3x + 5y = 15$?

5. The number of times a cricket chirps depends on the temperature. The number of chirps in 2 seconds for two temperatures are shown below.
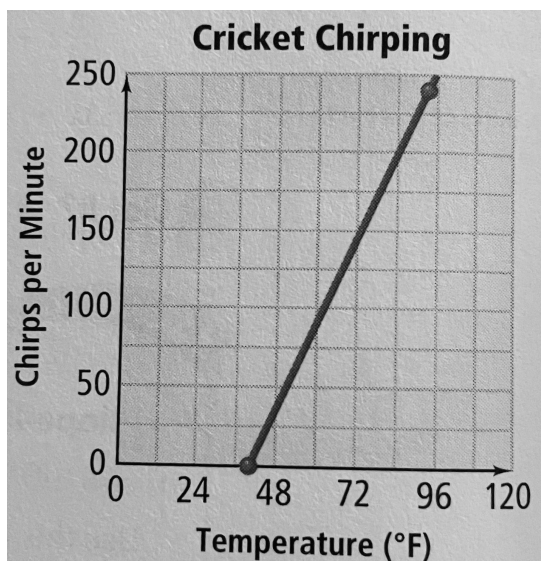
Cricket Chirping

a. What graph models the situation?
b. What is an equation of the line in standard form?
c. If the temperature is
d. 70°F, how many times would a cricket be expected to chirp in one minute?

6. What is the equation of each line in slope-intercept form?
   a. the line parallel to $y = 6x - 2$ through $(1, -3)$
   b. the line perpendicular to $y = -4x + \frac{2}{3}$ through $(8, 5)$

Weeks 4 - 5

* Lesson 1.5: Piecewise Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will model with a piecewise-defined function, graph a piecewise-defined function, write a piecewise-defined function from a graph, and evaluate function notation from a piecewise-defined function and graph.

Examples:
1. Alani has a summer job as a lifeguard. She makes $12 an hour for up to 40 hours each week. If she works more than 40 fours, she makes 1.5 times her hourly pay. How could you make a graph and write a function that shows Alani's weekly earnings based on the number of hours she worked?
2. Graph the piecewise-defined function and state the domain and range.

$$f(x) = \begin{cases} x - 4, & -6 \leq x < -2 \\ 3, & -2 \leq x \leq 1 \\ -x + 5, & 1 < x \leq 4 \end{cases}$$

3. Determine the piecewise-defined function that describes the graph shown below.

$$f(x) = \begin{cases} 3x - 7, & x > 3 \\ 2x^2 + 4, & x \le 3 \end{cases}$$

4. Evaluate the following for   .
   a. $f(7)$
   b. $f(3)$
   c. $f(-2)$

Lesson 1.6: Absolute Values

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will graph an absolute value function, find the domain, range, axis of symmetry and vertex from a graph and from an equation, write an absolute value function.

Examples:
1. Graph $y = 2|x - 3| + 4$

2. Without graphing, find the domain, range, axis of symmetry and vertex of $y = -3|x + 6| + 12$.
3. What is the equation of the absolute value function shown below?
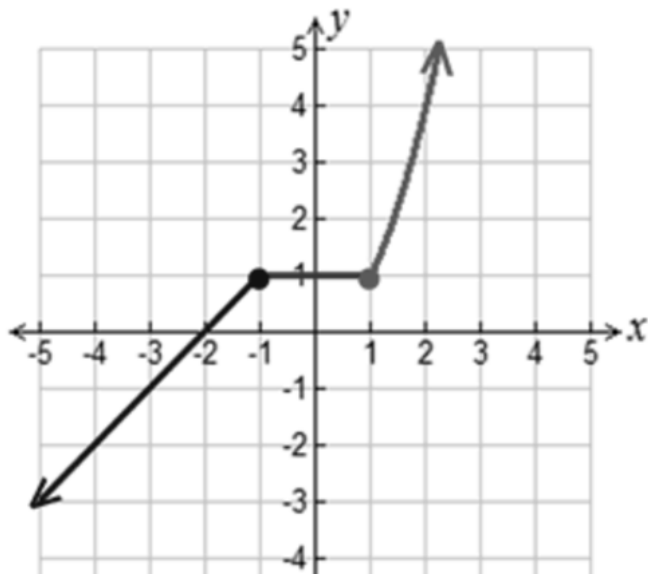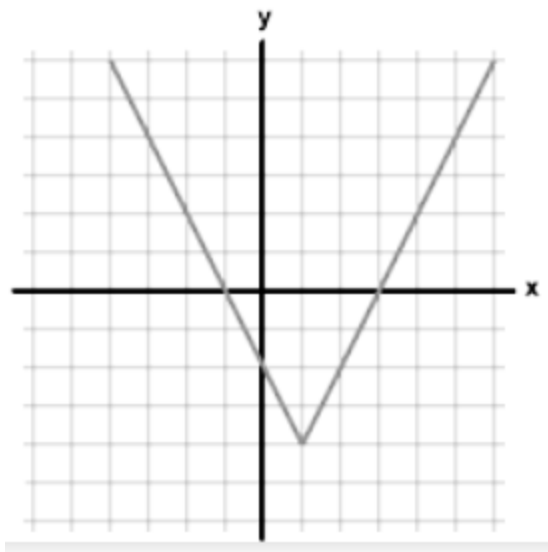

Lesson 1.7: Transformations of Parent Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will describe transformations necessary to transform the parent graph to the transformed graph and transform a given function as described and write the resulting function as an equation.

Examples:
   1. Describe the transformations necessary to transform the graph of f(x) into that of g(x).
       a. $f(x) = x^3$
           $g(x) = -\frac{1}{3}(x + 1)^3 - 5$
       b. $f(x) = \sqrt{x}$
           $g(x) = 4\sqrt{-x - 3} + 8$

2. Transform the given function f(x) as described and write the resulting function as an equation.

   a. $f(x) = \frac{1}{x}$ stretch by a factor of 3, reflect over the x-axis, translated to the right 4 and translated down 7

   b. $f(x) = x^2$ compression by a factor of $\frac{1}{4}$, reflect over the y-axis, translated to the left 6, and translated up 3

Interdisciplinary / Real World / Global Connections

1. A phone company offers a monthly cellular phone plan for $25. The plan includes 250 minutes and then $0.20 per minute above 250 minutes. Write a piecewise-defined function for C(x), the cost for using x minutes in a month.

2. The Louvre Pyramid in Paris is shown on the coordinate grid below, where x and y are measured in meters and the ground is represented by the x-axis.
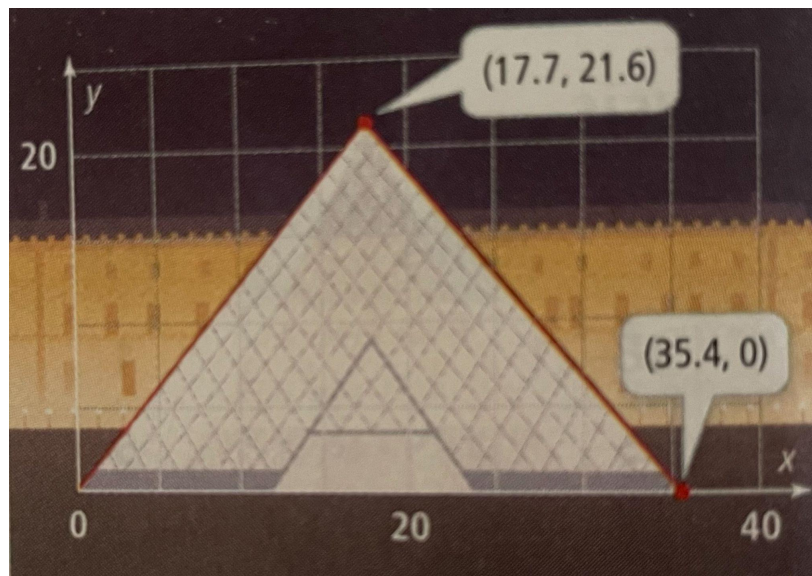
   a. Write a function g to model the outline of the Pyramid.
   b. What is the domain and range of the function that models the outline of the Pyramid? What do the domain and range represent?

Answer the following multiple choice questions based on the following scenario: Benito embroiders and sells t-shirts. The graph shows his profit as a function of the number of shirts sold. After selling a certain number of shirts, Benito uses some earnings to buy more materials and then increases the price of the shirts.

Profit (dollars) vs. Number of shirts sold
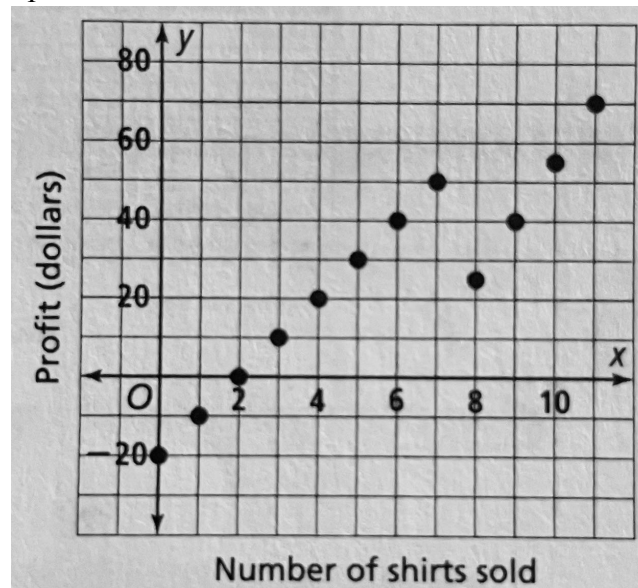
3. Which of the following is true?
   a. Benito increases the price after selling 50 shirts.
   b. The y-intercept represents the cost of one t-shirt.
   c. The x-intercept represents the shirts he has to sell before making a profit.
   d. The domain of the function is $[0, \infty)$
4. Which of the following is true for the average rates of change for the function over the intervals $[0, 7]$ and $[8, 11]$?
   a. Benito's profit is $10 per shirt for the first 11 shirts sold.
   b. Benito's profit is $10 per shirt for the first 50 shirts sold.
   c. The price of one shirt increases from $10 to $15.
   d. Benito's profit per shirt increases from $10 to $15.
5. A New Haven parking garage charges a flat rate of $10.00 for parking 2 hours or less, and $1.00 per hour for each additional hour. Write a linear model that gives the total charge in terms of additional hours parked.

Differentiation

Advanced:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify process, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips
- Bell work example
    - Graph the piecewise-defined function. What are the domain and range?

$$f(x) = \begin{cases} x + 4, & x > 2 \\ 2x - 3, & x \le 2 \end{cases}$$

    - Graph the linear function $y = -2x + 5$

- Exit slip example
    - State the parent graph and describe the transformations. $y = -2(x + 3)^2 - 6$
    - Write the line perpendicular line to $3x + 4y = 6$ that passes through $(-2, 3)$.
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 2: Quadratic Functions and Equations
Pacing	5 Weeks

[CT Core Standards](#)
What are the goals of this unit?

Priority/Focus Standards:

CCSS.MATH.CONTENT.HSA.REI.B.4.B Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
CCSS.MATH.CONTENT.HSA.SSE.B.3.A Factor a quadratic expression to reveal the zeros of the function it defines.

Supporting Standards:

CC.9-12.F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

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☐ Presenting ideas accurately with the support of engaging media

☒ Thinking critically to solve problems and reach well-reasoned judgments
☐ Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Identify key features of a quadratic function in vertex form.	- Axis of symmetry - Maximum value - Minimum value - Parabola - Translation - Vertex form of a quadratic equation - Vertex - X-intercept - Y-intercept
2. Write and graph quadratic functions in standard form.	- Axis of symmetry - Maximum value - Minimum value - Parabola - Quadratic regression - Standard form of a quadratic equation - Translation - Vertex - X-intercept - Y-intercept
3. Find the zeros of quadratic functions by factoring.	Difference of two squares

	● Factoring ● Greatest common factor ● Negative regions of a graph ● Positive regions of a graph ● Quadratic function/equation ● Standard form of a quadratic equation ● Zero of a function ● Zero-product property
4. Solve problems with complex numbers and simplify expressions with complex numbers.	● Complex conjugate ● Complex number ● Complex number plane ● Factoring ● Imaginary number ● Imaginary unit ● Pure imaginary number ● Quadratic function/equation ● Sum of squares
5. Solve quadratic equations by completing the square.	● Completing the square ● Factoring ● Greatest common factor ● Perfect square trinomial ● Quadratic function/equation ● Standard form of a quadratic equation ● Zero of a function
6. Find the discriminant and state the nature of the solutions of the quadratic equation and solve quadratic equations using the Quadratic Formula.	● Discriminant ● Imaginary number ● Imaginary unit

	• Quadratic formula • Standard form of a quadratic equation • Zero of a function
7. Solve linear-quadratic systems.	• Completing the square • Factoring • Greatest common factor • Linear equation • Perfect square trinomial • Quadratic function/equation • Solution to a system of equations • Standard form of a quadratic equation • Zero of a function

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. What are the advantages of a quadratic function in vertex form? In standard form?	1. A single quantity may be represented by many different expressions. The facts about a quantity may be expressed by many different equations (or inequalities) and for some forms, the desired results may
2. How is any quadratic function related to the parent quadratic function $y = x^2$?	2. A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable. Functions can be represented in different ways, such as graphs, tables, equations, or words. Each representation is particularly useful in certain situations. Some important families of functions are developed through transformations of the simplest form of the function.

3. How are the real solutions of a quadratic equation related to the graph of the related quadratic function?	3. Solving an equation is the process of rewriting the equation to make what it says about its variable(s) as simple as possible. Properties of numbers and equality can be used to transform an equation (or inequality) into equivalent, simpler equations (or inequalities) in order to find solutions. Useful information about equations and inequalities (including solutions) can be found by analyzing graphs or tables.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:
1. A fan threw a souvenir football into the air from the top of the bleachers toward the bottom of the bleachers. The table below shows the height of the football, in feet, above the ground at various times, in seconds. If the football was not touched by anyone on its way to the ground, how long did it take the football to reach the ground after it was thrown?

Time (s)	0	0.2	0.4	0.6	0.8	1
Height (ft)	10	11.76	12.24	11.44	9.36	6.0

2. What is the equation of a parabola that passes through the points $(2, -12)$, $(-1, -15)$, and $(-4, -90)$?

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. Students:
Standard 1.5.a. formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapter 2: pages 71-127)

- **Media:**
  - TI-nspire CX CAS graphing calculator
  - Trigonometry Workbook Resources
  - SMART Board
  - SMART Math Tools

Online Resources / Websites:

- https://www.khanacademy.org/
- https://www.youtube.com/
- https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Absolute value of a complex number: the distance of the complex number to the origin on a complex number plane. In general, $|a + bi| = \sqrt{a^2 + b^2}$.

Axis of symmetry: a line that divides a figure into two parts that are mirror images.

Completing the square: the process of finding the constant to add to $x^2 + bx$ to create a perfect square trinomial.

Complex conjugate: number pairs of the form a + bi and a - bi.

Complex number: the real numbers and imaginary numbers.

Complex number plane: identical to the coordinate plane except each ordered pair (a, b) represents the complex number a + bi. The horizontal axis is the real axis while the vertical axis is the imaginary axis.

Difference of two squares: an expression of the form $a^2 - b^2$ which can be factored as $(a + b)(a - b)$.

Discriminant: a quadratic equation in the form $ax^2 + bx + c = 0$ is the value of the expression $b^2 - 4ac$ and shows how many and what type (imaginary or real) of solutions a quadratic equation has.

Factoring: rewriting an expression as the product of its factors.

Greatest common factor: also known as GCF, is the common factor of each term of the expression that has the greatest coefficient and greatest exponent.

Imaginary number: any number of the form a + bi, where a and b are real numbers and $b \neq 0$.

Imaginary unit: the i is the complex number whose square is -1.

Maximum value: the greatest y-value of a function y = f(x). This is the y-coordinate of the highest point on the graph of f.

Minimum value: the least y-value of a function y = f(x). This is the y-coordinate of the lowest point on the graph of f.

Parabola: the graph of a quadratic function. This is the set of all points P in a plane that are the same distance from a fixed point F, the focus, as they are from a line d, the directrix.

Perfect square trinomial: a trinomial that is the square of a binomial.

Pure imaginary number: if $a = 0$ and $b \neq 0$, the number a + bi is a pure imaginary number.

Quadratic formula: gives the solutions to the quadratic equation as $ax^2 + bx + c = 0$ and is given by the equation $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Solution to a system: an ordered pair that produces a true statement in all the equations of the system. In the graph, the solutions are the coordinates of the intersection points.

Standard form of a quadratic equation: is given by $y = ax^2 + bx + c$ with $a \neq 0$.

Sum of squares: an expression of the form $a^2 + b^2$ which can be factored as $(a + bi)(a - bi)$.

Negative regions of a function: the intervals where the function is below the x-axis. It is where the y-values are negative (not zero).

Positive regions of a function: the intervals where the function is above the x-axis. It is where the y-values are positive (not zero).

Quadratic function/equation: can be written in the standard form $ax^2 + bx + c = 0$ where $a \neq 0$.

Quadratic regression: finding the best fit equation for a set of data shaped like a parabola.

Vertex of a parabola: the point where the function for the parabola reaches a maximum or a minimum value. The parabola intersects its axis of symmetry at the vertex.

Zero of a function: any x value of the function f(x) for which f(x) = 0.

Zero product property: if the product of two or more factors is zero, then one of the factors must be zero.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 1.5:

Lesson 2.1: Vertex Form of a Quadratic Function

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will transform quadratic functions, determine key features of a quadratic function, write an equation of a parabola, write an equation of a parabola given the graph, write an equation of a transformed function, and write quadratic equations in vertex form.

Examples:

1. Describe the transformations of the parent function $y = x^2$. Then graph the function.

   a. $g(x) = -(x + 2)^2$

   b. $g(x) = (x - 1)^2 + 2$

2. What are the key features of the quadratic function $f(x) = 2(x = 3)^2 + 2$?

3. What is the equation of a quadratic function with vertex $(-2, 3)$ and y-intercept -1?

4. The graph below shows the height of a flying disk with respect to time. What is the equation of the function? Write the equation in vertex form then write the equation in standard form.

5. The function g is a translation of the parent graph 1 unit left and 3 units up. What is the equation of g? Write the quadratic equation in vertex form and in standard form.
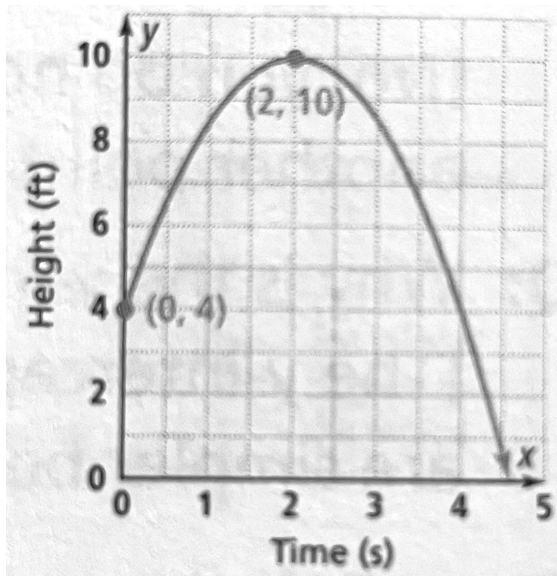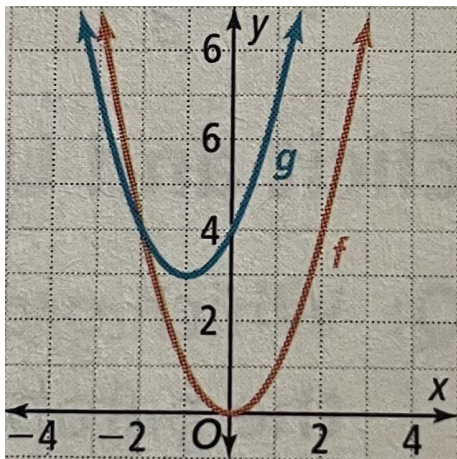
Lesson 2.2: Standard Form of a Quadratic Function

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find the vertex of a quadratic function in standard form, graph a quadratic function in standard form, interpret the graph of a quadratic function, write the equation of a parabola given three points, and use quadratic regression.

Examples:

1. What is the vertex of the graph of the function $f(x) = x^2 - 8x + 5$?

2. Use the key features to graph $f(x) = x^2 - 4x + 8$.

3. The graph of the function $f(x) = -10x^2 + 700x - 6000$ shows the profit a company earns for selling headphones at different prices. What is the maximum profit the company can expect to earn?

4. What is the equation of a parabola that passes through the points $(-2, 23)$, $(1, 5)$ and $(3, 17)$?

5. Esteban is training for the discus throw. His coach recorded the horizontal distance and height of one of Esteban's discus throws. The graph below shows the horizontal distance the discus traveled, in meters, and the height of the discus, in meters. What will be the height of the discus when it has traveled 15 meters from Esteban?

Weeks 1.5 - 4

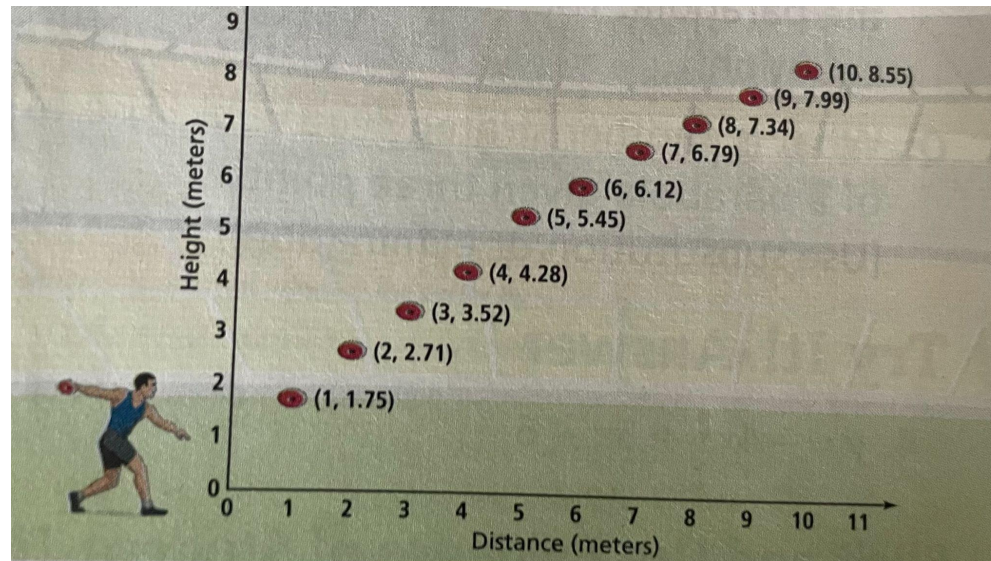*Lesson 2.3 Factored Form of a Quadratic Function*
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will factor a quadratic expression, relate factors to zeros a function, solve quadratic equations by factoring, find the zeros of a quadratic function, determine positive or negative intervals, and write the equation of a parabola in factored form.

Examples:

1. Factor the following expressions.

    a. $x^2 + 7x + 12$

    b. $2x^2 - 5x - 3$

    c. $x^2 - 9$

2. Find the zeros of $y = x^2 + 2x - 8$ and create a sign chart to determine positive and negative intervals. State your answer using interval notation.

3. Solve the following equations.

    a. $x^2 + x = 42$

    b. $2x^2 = -9x + 5$

    c. $x^2 + 8x = 20$

4. A multilevel driving range has three levels. Marco hits hold balls from the second level which is 32 feet high. The height of a ball x seconds after Marco hits it is modeled by the function $h(x) = -16x^2 + 16x + 32$. When does the ball hit the ground?

5. Identify the intervals on which the function $y = x^2 - 2x - 3$ is positive.

6. Write an equation of a parabola with x-intercepts $(-2, 0)$ and $(-1, 0)$ and which passes through the point $(-3, 20)$.

Lesson 2.4: Complex Numbers and Operations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve a quadratic equation using square roots, add and subtract complex numbers, multiply complex numbers, simplify a quotient with complex numbers, factor a sum of squares, and solve a quadratic equation with complex solutions.

Examples:

1. Use square roots to solve each equation. Write your solutions using the imaginary unit, i.

    a. $x^2 + 5 = 0$

    b. $x^2 + 72 = 0$

2. Find the sum or difference. Write your answer in the standard form of an imaginary number.
   a. $(4 - 7i) + (-11 + 9i)$
   b. $(6 + 8i) - (2 - 5i)$
3. Find the product. Write your answer in the standard form of an imaginary number.
   a. $-3(8 + 9i)$
   b. $\left(\frac{1}{2} + 2i\right)\left(\frac{2}{3} - 3i\right)$
4. Write each quotient in the standard form of an imaginary number.
   a. $\frac{30}{2+i}$
   b. $\frac{2-3i}{4-i}$
5. Factor each expression.
   a. $4x^2 + 25$
   b. $8y^2 + 18$
6. Find the solutions of each equation by factoring.
   a. $x^2 + 16 = 0$
   b. $x^2 + 100 = 0$

Lesson 2.5: Completing the Square

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will use square roots to solve quadratic equations, solve quadratic equations by completing the square, complete the square to solve real-world problems, and write a quadratic equation in vertex form by completing the square.

Examples:
1. Find the solutions to the following equations.
   a. $25 = x^2 + 14x + 49$
   b. $81 = x^2 + 12x + 36$

2. Write the following equations in the form $(x - p)^2 = q$.

    a. $x^2 + 8x + 5 = 0$

    b. $x^2 - 6x - 11 = 0$

3. Solve the following equations by completing the square.

    a. $x^2 + 4x + 8 = 0$

    b. $x^2 - 8x = -17$

4. Libby plans to create a rectangular pasturing enclosure. She has 340 meters of fencing available for the enclosure's perimeter and wants it to have an area of $6000 \ m^2$. What dimensions should Libby use?

5. Write the equation $y = -2x^2 + 10x + 1$ in vertex form by completing the square. Then graph the equation and state the maximum or minimum value of the graph.

Week 5

Lesson 2.6: The Quadratic Formula

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve quadratic equations, choose a solution method to solve quadratic equations, identify the number of real-number solutions, interpret the discriminant, and use the discriminant to find a particular equation.

Examples:

1. Solve using the Quadratic Formula.

    a. $2x^2 + 6x + 3 = 0$

    b. $3x^2 - 2x + 7 = 0$

2. Solve the following equations using two different methods. Which do you prefer and why?

    a. $6x^2 - 7x - 20 = 0$

    b. $15 = 6x^2 + x$

3. Describe the nature of the solutions for each equation.

    a. $16x^2 + 8x + 1 = 0$

    b. $2x^2 - 5x + 6 = 0$

4. Rachel is about to serve and tosses a tennis ball straight up into the air. The height, h, of the ball, in meters, at time t, in seconds is given by $h(t) = - 5t^2 + 5t + 2$. Will the ball reach a height of 4 meters?

5. What values of b will cause $2x^2 + bx + 18 = 0$ to have one real solution?

Lesson 2.7: Linear-Quadratic Systems

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will determine the number of solutions, solve a linear-quadratic system using substitution, and apply a linear-quadratic system to real-world situations.

Examples:

1. Determine the number of real solutions of the system.

$$\begin{cases} y = 3x^2 \\ y = 3x - 2 \end{cases}$$

2. Solve each system by substitution.

    a.

    $$\begin{cases} y = 2x^2 - 6x - 8 \\ 2x - y = 16 \end{cases}$$

    b.

    $$\begin{cases} y = -3x^2 + x + 4 \\ 4x - y = 2 \end{cases}$$

3. Andrew kicks a ball up a hill for his dog, Laika, to chase. The hill is modeled by a line through the origin. The path of the ball is modeled by the quadratic function shown below. How far does the ball travel horizontally? How far must Laika run up the hill to catch it?

The graph shows $y = -0.5x^2 + 6x$ for the ball's path and $y = 0.5x$ for the hill. Vertical axis: Height (ft), horizontal axis: Horizontal Distance (ft).
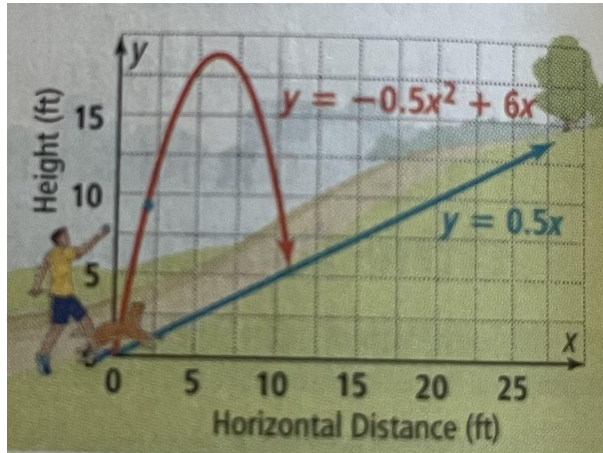
Interdisciplinary / Real World / Global Connections

1. The height of a thrown ball is a quadratic function of the time it has been in the air. The graph of the quadratic function is the parabolic path of the ball. The vertex of the graph is $(1, 20)$ and the path of the ball includes the point $(0, 4)$. What is an expression that defines this function? Write the quadratic equation in vertex form and standard form.

2. The Bluebird Bakery sells more cookies when it lowers its prices, but this also changes profits. The profit function for the cookies is $f(x) = -500(x - 0.45)^2 + 400$. This function represents the profit earned when the price of a cookie is x dollars. The bakery wants to maximize their profits.

    a. What is the domain of the function?
    b. Find the daily profits for selling cookies for $0.40 each and for $0.75 each.
    c. What price should the bakery charge to maximize their profits from selling cookies?
    d. What is the maximum profit?

3. A water balloon was thrown from a window. The height of the water balloon over time can be modeled by the function $y = -16x^2 + 160x + 50$. What was the maximum height of the water balloon after it was thrown?

4. The relationship between the time since a ball was thrown and its height can be modeled by the equation $h = -32t - 16t^2 + 4$, where h is the height of the ball after t seconds. Complete the square to find how long it will take the ball to reach a height of 20 feet.

5. The first astronaut on Mars tosses a rock straight up. The height, h, measures in feet after t seconds, is given by the function $h(t) = -6t^2 + 24t + 6$.

    a. After how many seconds will the rock be 30 feet from the surface?
    b. After how many seconds will the rock be 10 feet from the surface?
    c. After how many seconds will it take for the rock to return to the surface?
    d. The same action on Earth is modeled by the equation $g(t) = -16t^2 + 24t + 6$. On Earth, how many seconds would it take for the rock to hit the ground?

Differentiation

Advanced:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify process, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:

To modify process, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:

Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips
- Bell work example
  - Write each quotient in the standard form of an imaginary number.
    - $\frac{-3}{6+2i}$
    - $\frac{2+2i}{-4+6i}$
  - Identify the interval(s) on which the quadratic function is positive. Write your answer in interval notation.

  $y = x^2 + 9x + 18$

- Exit slip example
  - Solve the following equations by factoring.
    - $x^2 - 5x = 14$
    - $6x^2 = 5x + 6$
  - Solve the following quadratic equations by completing the square.
    - $x^2 + 8x + 60 = 0$
    - $-2x^2 - 12x + 18 = 0$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 3: Polynomial Functions
Pacing	5 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.F.IF.7: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- CC.9-12.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior

Supporting Standards:
- CC.9-12.N.CN.9 (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials..
- CC.9-12.A.APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by $x - a$ is $P(a)$, so $P(a) = 0$ if and only if $(x - a)$ is a factor of $P(x)$.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes

☐ Presenting ideas accurately with the support of engaging media	
☒ Thinking critically to solve problems and reach well-reasoned judgments	
☐ Working responsibly and collaboratively	

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Predict the behavior of polynomial functions	● Degree of a polynomial ● End behavior ● Leading coefficient ● Polynomial function ● Relative maximum ● Relative minimum ● Standard form of a polynomial ● Turning point
2. Add, subtract, multiply, and divide polynomials	● Add ● Divide ● Multiply ● Subtract
3. Prove and use polynomial identities and expand the power of a binomial.	● Binomial Theorem ● Difference of cubes ● Difference of squares ● Identity ● Pascal's Triangle ● Square of a sum ● Sum of cubes

4. Divide polynomials and apply the Factor Theorem.	● Factor Theorem ● Long division ● Remainder Theorem ● Synthetic division
5. Factor, create a sign chart for positive and negative intervals, find real and complex zeros, and find the multiplicity of zeros.	● Multiplicity of a zero
6. Use roots of a polynomial equation to find other roots.	● Fundamental Theorem of Algebra ● Rational Root Theorem
7. Identify symmetry in and transform polynomial functions.	● Even function ● Odd function

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. What does the degree of a polynomial tell you about its related polynomial function?	1. A polynomial has distinguishing "behaviors". You can look at its algebraic form and know something about the graph and vice versa. Knowing the zeros of a polynomial can help understand the behavior of the graph. The degree of the polynomial states how many zeros the equation has and helps to determine end behavior.
2. For a polynomial function, how are factors, zeros, and x-intercepts related?	2. The linear factors of a polynomial are connected to the zeros of the related polynomial function. By applying the Zero Product Property, each linear factor is set equal to zero and solved to obtain the zeros. The Factor

	Theorem makes the connection explicit, stating that $x - a$ is a linear factor when the value of a is a zero of the related polynomial function. Thus,m the zeros of a polynomial function identify the linear factors of the polynomial, the x-intercepts of the function's graph, and the solutions to $P(x) = 0$.

Resources

Student Technology Integration and <u>Correspondence to ISTE Standards</u> when Applicable:
1. Venetta opened several deli sandwich franchises in 2000. The profit P (in hundreds of dollars) of the franchises in t years (since the franchises opened) can be modeled by the function
2. $P(t) = t^3 + t^2 - 6t$.
   a. Use a graphing calculator to sketch a graph of the function.
   b. Based on the model during what years did Venetta not make a profit?
   c. If the model is appropriate, predict the amount of profit Venetta will receive from her franchises in 2020.
3. A storage unit in the shape of a rectangular prism measures $2x$ feet long, $x + 8$ feet wise, and $x + 9$ feet tall. What are the dimensions of the storage unit, in feet, if its volume is $792 \: ft^3$?

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Standard 1.5.a. Students formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapter 3: pages 129-189)
- **Media:**
- TI-nspire CX CAS graphing calculator

- ○   Trigonometry Workbook Resources
- ○   SMART Board
- ○   SMART Math Tools

Online Resources / Websites:
- ○   https://www.khanacademy.org/
- ○   https://www.youtube.com/
- ○   https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Binomial Theorem: for every positive integer n, $(a + b)^n = P_0 a^n + P_1 a^{n-1} b + P_2 a^{n-2} b^2 + ... + P_{n-1} ab^{n-1} + P_n b^n$ where $P_0, P_1, ... P_n$ are the numbers in the rows of Pascal's Triangle that has n as its second number.

Degree of polynomial: the greatest degree of any of the terms.

Difference of squares: $a^2 - b^2 = (a + b)(a - b)$

Difference of cubes: $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

End behavior: describes what happens to the function values as x approaches positive and negative infinity.

Even function: a polynomial function that is symmetric about the y-axis.

Factor Theorem: states that the expression $x - a$ is a factor of polynomial $P(x)$ if and only if $P(a) = 0$

Fundamental Theorem of Algebra: if $P(x)$ is a polynomial of degree $n \geq 1$, then $P(x) = 0$ has exactly n solutions in the set of complex numbers. If $P(x)$ has any factor of multiplicity

Identity: if one side can be transformed into the otherwise using mathematical operations.

Leading coefficient: refers to the non-zero factor that is multiplied by the greatest power of x.

Long division: is an algorithm for dividing a polynomial by another polynomial of the same or a lower degree. The long division of polynomials also consists of the divisor, quotient, dividend, and the remainder as in the long division method of numbers.

Multiplicity of a zero: a polynomial function is the number of times its related factor appears in the factored form of the polynomial.

Odd function: a polynomial that is symmetric about the origin.

Pascal's Triangle: the triangular pattern of numbers where each number is the sum of the two numbers diagonally above it. This determines the coefficient of each term when applying the Binomial Theorem.

Polynomial function: a function whose rule is a polynomial.

Rational Root Theorem: let

$P(x) = a_n x^n + a_{n-1} x^{n-1} + ... + a_1 x + a_0$ be a polynomial with integer coefficients. Then there are a limited number of possible roots of P(x) = 0: integer roots must be factors of a_0; rational roots must have reduced form of $\frac{p}{q}$ where p is an integer factor of a_0 and q is an integer factor of a_n.

Relative maximum: a point where the function has the greatest value over an interval.

Relative minimum: a point where the function has the least value over an interval.

Remainder Theorem: if a polynomial P(x) is divided by $x - a$, the remainder is $P(a)$

Square of a sum: $(a + b)^2 = a^2 + 2ab + b^2$

Standard form of a polynomial: shows any like terms combined and the terms by degree in descending numerical order.

Sum of cubes: $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

Synthetic division: a method used to divide a polynomial by a linear expression in the form $x - a$

Turning points: points where the function values change from increasing to decreasing or vice-versa.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 1.5:

Lesson 3.1 Graphing Polynomial Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will classify polynomials, understand end behavior of polynomial functions, graph polynomial functions, sketch graphs from verbal descriptions, and interpret polynomial models.

Examples:

1. What is each polynomial in standard form and what are the leading coefficient, the degree, and the number of terms of each?
   a. $2x - 3x^4 + 6 - 5x^3$
   b. $x^5 + 3x^6 - 3x^4 - 8x + 4x^3$
2. Use the leading coefficient and degree of the polynomial function to determine the end behavior of each graph.
   a. $g(x) = 2x^8 - 5x^5 + 6x^4 - x^3 + 4x^2 - x + 1$
   b. $f(x) = -5x^3 + 8x + 4$
3. Consider the polynomial function $f(x) = x^5 + 18x^2 + 10x + 1$.
   a. Make a table of values to identify key features and sketch a graph of the function.
   b. Find the average rate of change over the interval $[0, 2]$.
4. Use the information below to sketch a graph of the polynomial function $y = f(x)$.
   - $f(x)$ is positive on the intervals $(-2, -1) \cup (1, 2)$
   - $f(x)$ is negative on the intervals $(-\infty, -2) \cup (-1, 1) \cup (2, \infty)$
   - $f(x)$ is increasing on the interval $(-\infty, -1.5) \cup (0, 1.5)$
   - $f(x)$ is decreasing on the interval $(-1.5, 0) \cup (1.5, \infty)$

5. Danielle is engineering a new brand of shoes. For x shoes sold, in thousands, a profit of
$p(x) = -3x^4 + 4x^3 - 2x^2 + 5x + 10$ dollars, in ten thousands, will be earned.
   a. How much will be earned in profit for selling 1000 shoes?
   b. What do the x- and y-intercepts of the graph mean in this context? Do those values make sense?

Lesson 3.2: Adding, Subtracting, and Multiplying Polynomials

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will add and subtract polynomials, multiply polynomials, understand closure, write a polynomial function, and compare two polynomial functions.

Examples:
1. Add or subtract the polynomials.
   a. $(4a^4 - 6a^4 - 3a^2 + a + 1) + (5a^3 + 7a^2 + 2a - 2)$
   b. $(2a^2b^2 + 3ab^2 - 5a^2b) - (3a^2b^2 - 9a^2b + 7ab^2)$
2. Multiply the polynomials.
   a. $(2m + 5)(3m^2 - 4m + 2)$
   b. $(mn + 1)(m^2n - 1)(mn^2 + 2)$
3. Is the set of monomials closed under multiplication? Explain.
4. Carolina makes wind chimes to sell at the local street market. As Carolina produces a great number of wind chimes, she can lower the price per unit. The function $v(x) = 48 - 2x$ relates the price v to the number produced x. The cost c of making x wind chimes can be represented with the function $c(x) = 12x + 64$. How many wind chimes should Carolina sell each week to maximize her profit P?

5. Carolina's profit function $y = P(x)$ is represented by the graph. Kiyo's profit from selling x flowerports can be modeled by the function shown below.

Carolina's Wind Chimes

Profit ($) vs Number of Items

$(0, -64)$

Kiyo's Flower Pots

$r(x) = x(x - 3)(10 - x)$

a. Find the y-intercept of each function. Who would lose more money if neither person sold any items?
b. Interpret the end behavior of the function.

Lesson 3.3: Polynomial Identities

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will prove polynomial identities, use polynomial identities to multiply, use polynomial identities to factor and simplify, expand a power of a binomial, and apply the Binomial Theorem.

Examples:
1. Prove the Difference of Cubes Identity.
2. Use polynomial identities to multiply the expressions.
   a. $(3x^2 + 5y^3)(3x^2 - 5y^3)$
   b. $(12 + 15)^2$

3. Use polynomial identities to factor each polynomial.

    a. $m^8 - 9n^{10}$

    b. $27x^9 - 343y^6$

    c. $12^3 + 2^3$

4. Use Pascal's Triangle to expand $(x + y)^6$.

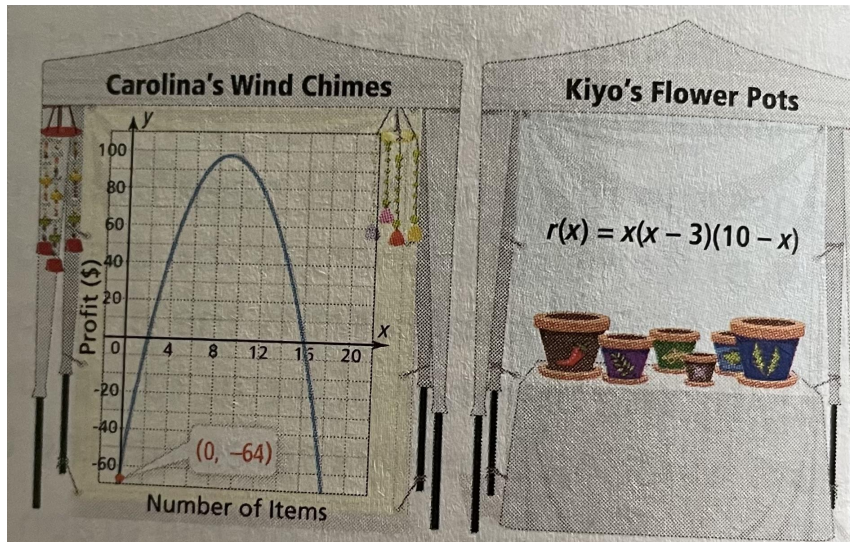5. Use the Binomial Theorem to expand each expression.

    a. $(x - 1)^6$

    b. $(2c + d)^6$

Lesson 3.4: Dividing Polynomials

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will use long division to divide polynomials, use synthetic division to divide by $x - a$, relate $P(x)$ to the remainder of $P(x) \div (x - a)$, use the Remainder Theorem to evaluate polynomials, and check whether $x - a$ is a factor of $P(x)$.

Examples:

1. Use long division to divide the polynomials. Then write the dividend in terms of the quotient and remainder.

    a. $(x^3 - 6x^2 + 11x - 6) \div (x^2 - 4x + 3)$

    b. $(16x^4 - 85) \div (4x^2 + 9)$

2. Use synthetic division to divide the polynomials.

    a. $(3x^3 - 5x + 10) \div (x - 1)$

    b. $(2x^3 - 7x^2 - 4) \div (x - 3)$

3. Use synthetic division to show that the remainder of $f(x) = x^3 + 8x^2 + 12x + 5$ divided by $x + 2$ is equal to $f(-2)$.

4. A technology company uses the function $R(x) = -x^3 + 12x^2 + 6x + 80$ to model the expected annual revenue, in thousands of collars, for a new product, where x is the number of years after the product is released. Use the Remainder Theorem to estimate the revenue in year 5.

5. Use the Remainder Theorem and Factor Theorem to determine whether the given binomial is a factor of $P(x)$.

    a. $P(x) = x^3 - 10x^2 + 28x - 16$; binomial $x - 4$

    b. $P(x) = 2x^4 + 10x^2 + 28x - 16$; binomial $x - 4$

Weeks 4 - 5

Lesson 3.5: Zeros of Polynomial Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will use zeros to graph polynomial functions, understand how multiple zeros can affect graphs, find real and complex zeros, interpret the zeros of a function, solve polynomial equations, and solve polynomial inequalities by graphing.

Examples:

1. Factor each function. Then use the zeros to sketch its graph.

    a. $f(x) = 4x^3 + 4x^2 - 24x$

    b. $g(x) = x^4 - 81$

2. Describe the behavior of the graph of the function at each of its zeros.

    a. $f(x) = x(x + 4)(x - 1)^4$

    b. $f(x) = \left(x^2 + 9\right)(x - 1)^5(x + 2)^2$

3. Use the graphing calculator to graph the following equations. What are all of the real and complex zeros of the polynomial functions?

    a. $f(x) = 2x^3 - 8x^2 + 9x - 9$

    b. $f(x) = x^4 - 3x^2 - 4$

4. Acme Innovations makes and sells lamps. Their profit, P, in hundreds of dollars earned, is a function of the number of lamps sold x, in thousands. From historical data, they know that their company's profit is modeled by the function

    $P(x) = -x^3 + 11x^2 - 4x - 60$. What do the zeros of the function tell you about the number of lamps that Acme Innovations should produce?

5. What are the solutions of the equation?
   a. $x^3 - 7x + 6 = x^3 + 5x^2 - 2x - 24$
   b. $x^4 + 2x^2 = -x^3 - 2x$
6. What are the solutions of the inequality?
   a. $2x^3 + 12x^2 + 12x < 0$
   b. $(x^2 - 1)(x^2 - x - 6) > 0$

Lesson 3.6: Theorems about Roots of Polynomial Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify possible rational solutions, use the Rational Root Theorem, find all complex roots, determine how the types of zeros of a polynomial function are related to its coefficients, and write polynomial functions using conjugates.

Examples:
1. List all possible rational solutions for each equation.
   b. $4x^4 + 13x^3 - 124x^2 + 212x - 8 = 0$
   c. $7x^4 + 13x^3 - 124x^2 + 212x - 45 = 0$
2. A jewelry box measures $2x + 1$ inches long, $2x - 6$ inches wide, and x inches tall. The volume of the box is given by the function $v(x) = 4x^3 - 10x^2 - 6x$. What is the height of the box, in inches, if its volume is 28 in^3?
3. What are all of the complex roots of the equation $x^3 - 2x^2 - 5x - 10 = 0$?
4. Suppose a quadratic polynomial function f has two complex zeros which are a conjugate pair, $a - bi$ and $a + bi$ (where a and b are real numbers). Are all the coefficients of f real?
5.
   a. What is a quadratic function in standard form with rational coefficients that has a root of $5 + 4i$?
   b. What is a polynomial function Q of degree 4 with rational coefficients such that $Q(x) = 0$ has roots $2 - \sqrt{3}$ and $5i$?

Lesson 3.7: Transformations of Polynomial Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify even and odd functions from their graph, identify even and odd functions from their equations, graph transformations of cubic and quartic parent functions, identify transformations, and apply transformations of a cubic function.

Examples:
1. Classify the polynomial functions as even or odd based on the graphs.
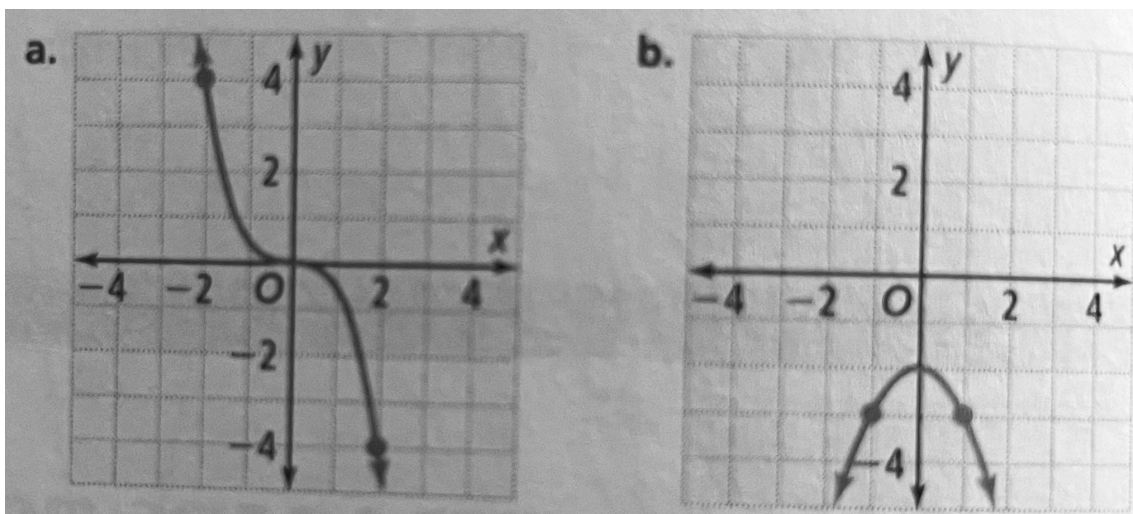
2. Is the function odd, even, or neither?
   a. $f(x) = 7x^5 - 2x^2 + 4$
   b. $f(x) = x^6 - 2$
3. How does the graph of the function $g(x) = 2x^3 - 5$ differ from the graph of its parent graph?

4. Determine the equation of each graph as it relates to its parent cubic function or quartic function.

a.

b.
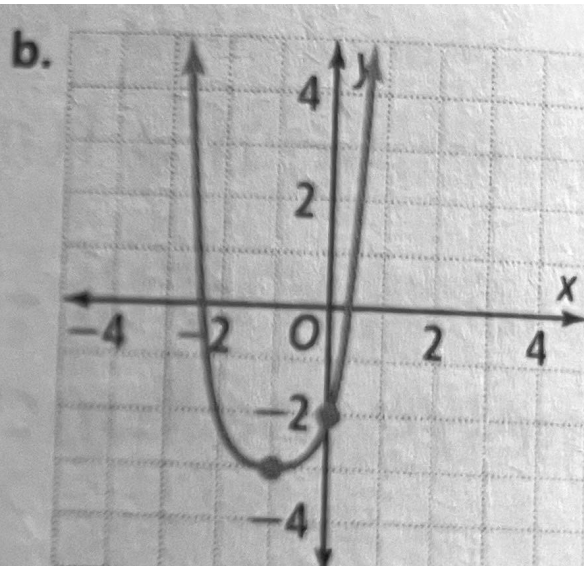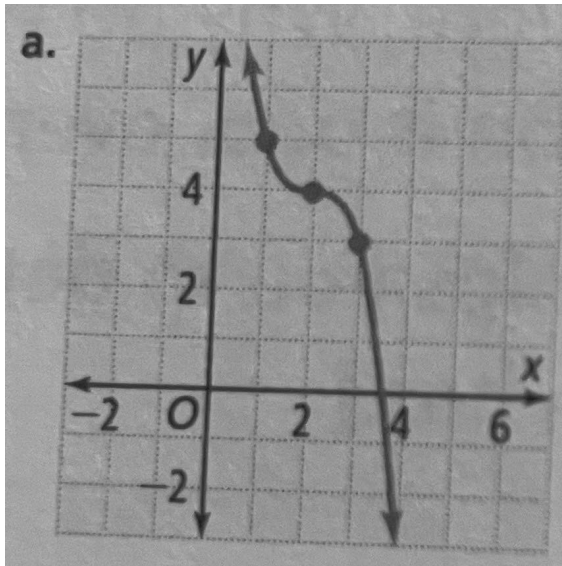
5. A storage unit is in the shape of a rectangular prism. The volume of the storage unit is given by

6. $V(x) = x^3 - x^2$, where x is measured in feet. A potential customer wants to compare the volume of this storage unit with that of another storage unit that is 1 foot longer in every dimension. Write a function for the volume of this larger unit.

Interdisciplinary / Real World / Global Connections

1. A storage company is designing a new storage unit. Based on the dimensions shown, the volume of a container is modeled by the polynomial $v(x) = 2x^3 - 7x^2 = 6x$, where x is the width in feet. What are the dimensions of the container in feet if the volume of the unit is $154\ ft^2$?
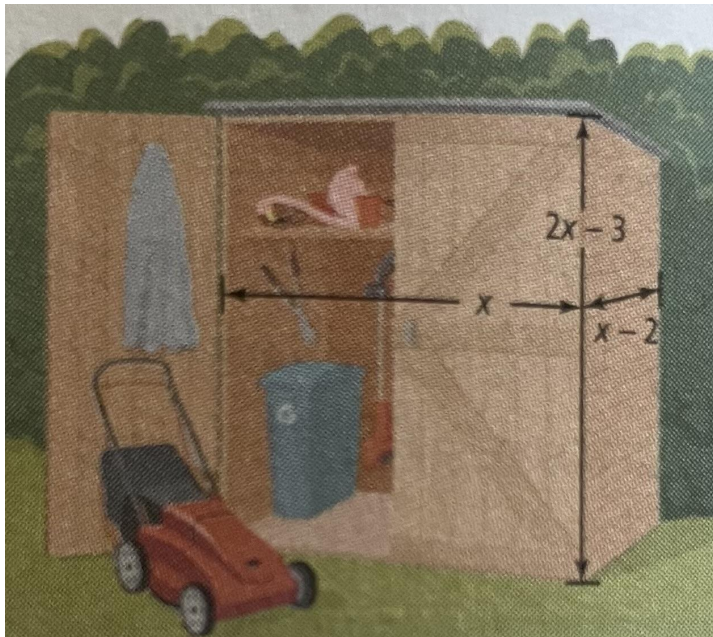
2. A terrarium is in the shape of a rectangular prism. The volume of the tank is given by $V(x) = 2x^3 + 10x^2$, where x is measured in inches. The manufacturer wants to compare the volume of this tank with one that has a width of 3 inches shorter but maintains the relationship between the width and the other dimensions. Write a new function for the volume of this smaller tank.

Differentiation

Advanced:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex

concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify process, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify process, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips

- Bell work example
  - Graph the polynomial function. Estimate the zeros and the turning points of the graph.

    $$f(x) = x^5 + 2x^4 - 10x^3 - 20x^2 + 9x + 18$$
  - Multiply the polynomials. $(9x - 1)(x + 5)(7x + 2)$
- Exit slip example
  - Sketch a graph of the function. $f(x) = x^3 - x^2 - 20x$
  - Use long division to divide $(x^4 + 5x^3 + 7x^2 - 2x + 17) \div (x + 2)$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 4: Rational Functions
Pacing	4 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
- CC.9-12.F.IF.7: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

Supporting Standards:
- CC.9-12.F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior

Learning Expectations - The Westbrook high school student will meet expectations by...

- ☐ Reading a wide variety of texts effectively
- ☐ Writing effectively for a variety of purposes
- ☐ Presenting ideas accurately with the support of engaging media
- ☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Use inverse variation and graph translations or the reciprocal function.	• Asymptote • Constant of variation • Inverse variation • Multiplicative inverse • Reciprocal • Reciprocal function
2. Graph rational functions.	• Continuous graph • Discontinuous graph • Horizontal asymptote • Long division • Non-removable point of discontinuity • Rational expression • Rational function • Rational number • Removable point of discontinuity • Vertical asymptote
3. Find the product and the quotient of rational expressions.	• Greatest common factor • Rational expression • Rational number • Simplified form of a rational expression

4. Find the sum or difference of rational expressions.	- Algebraic fraction - Compound fraction - Least common multiple - Numeric fraction - Rational expression
5. Solve rational equations and identify extraneous solutions.	- Algebraic fraction - Extraneous solution - Least common multiple - Numeric fraction - Rational equation - Rational expression

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. Are two quantities inversely proportional if an increase in one corresponds to a decrease in the other?	1. Two quantities are proportional if they have the same ratio in each instance where they are measured together. Two quantities are inversely proportional if they have the same product in each instance where they are measured together.
2. What kinds of asymptotes are possible for a rational function?	2. Asymptotes are lines that the graph approaches as x or y increases in absolute value. Vertical asymptotes occur at $x = a$ if this is a non-removable discontinuity. A graph of a rational function can have no more than one horizontal asymptote.

3. Are a rational expression and its simplified form equivalent?	3. A single quantity can be represented in many different expressions. The facts about a quantity may be expressed by many different equations or expressions.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1. A chemist needs an alcohol solution in the correct concentration for her experiment. She adds a 6% alcohol solution to 50 gallons of solution that is 2% alcohol. The function that represents the perfect of alcohol in the resulting solution is $f(x) = \frac{50(0.02) + x(0.06)}{50 + x}$. where x is the amount of 6% solution added.
   a. How much 6% solution should be added to create a solution that is 5% alcohol?
   b. Explain the steps you could take to use your graphing calculator to verify the correctness of your answer to part a.
2. Ashton drove a car, flew an airplane, and was a passenger on a train to travel from his home in Missouri to his destination in New York. The total distance of the trip was 1,022 miles. He traveled 874 miles at an average speed that was 500 mph faster than the average speed of the car he drove.
   a. Use the formula time $= \frac{distance}{time}$ to write an equation for the total trip of time he spent traveling.
   b. If he drove at an average rate of 62 mph, how long did the trip take? Round your answer to the nearest hundredth.
   c. On his return trip, he took a smaller airplane and his average speed was only 530 mph. Assuming that all of the differences in rates stayed the same, how long was his return trip?
   d. Ashton is reimbursed $25 dollars per hour by his employer for his travel time. How much will he receive after the round trip?

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Standard 1.5.a. Students formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
● **Informational Books:**

- ○ enVision Algebra 2 by Savvas Learning Company (Chapter 4: pages 129-191)
- ● **Media:**
- ○ TI-nspire CX CAS graphing calculator
- ○ Trigonometry Workbook Resources
- ○ SMART Board
- ○ SMART Math Tools

Online Resources / Websites:
- ○ https://www.khanacademy.org/
- ○ https://www.youtube.com/
- ○ https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Asymptote: a line that a graph approaches but never touches or crosses. Asymptotes guide the end behavior of a function.

Compound fraction: the form of a fraction and has one or more fractions in the numerator and/or denominator.

Constant of variation: the number that relates the two variables in an inverse variation.

Continuous graph: a graph that has no holes, jumps, or breaks.

Discontinuous graph: a graph that has a hole, jump, or break.

Extraneous solution: a solution of an equation derived from an original equation, but is not a solution of the original equation.

Inverse variation: a relation between two variables such that as one variable increases, the other decreases proportionally. The relation is defined by an equation of the form $y = \frac{k}{x}$, $xy = k$, $or \ x = \frac{k}{y}$, where $k \neq 0$.

Non-removable discontinuity: a point of discontinuity that is not removable. It represents a break in the graph of f where you cannot redefine f to make the graph continuous.

Point of discontinuity: the x-coordinate of a point where the graph of f(x) is not continuous.

Rational equation: an equation that contains a rational expression.

Rational expression: an expression that can be expressed as the ratio of two polynomials, such as $\frac{P(x)}{Q(x)}$, where the value of $Q(x) \neq 0$.

Rational function: any function defined by a rational expression, such as $R(x) = \frac{P(x)}{Q(x)}$. The domain of $R(x)$ is all values of x for which $Q(x) \neq 0$.

Reciprocal function: belongs to the family whose parent function is $f(x) = \frac{1}{x}$ where $x \neq 0$. You can write a reciprocal function in the form $f(x) = \left(\frac{a}{x} - k\right) + k$, where $a \neq 0$ and $x \neq h$.

Removable discontinuity: a point of discontinuity a, of function f that you can remove by redefining f at x=a. Doing so fills in a hole in the graph of f with the point (a, f(a)).

Simplified form of a rational expression: if the numerator and denominator are polynomials that have no common divisor other than one.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 1.5:

Lesson 4.1: Inverse Variation and the Reciprocal Function

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify inverse variation, use inverse variation, use an inverse variation model, graph the reciprocal function, and graph translations of the reciprocal function.

Examples:

1. Determine if each table of values represents an inverse variation. If so, write the inverse variation equation.

    a.

x	1	2	3	5	6	15
y	25.5	12.75	8.5	5.1	4.25	1.7

b.

x	6.6	5.5	4.4	3.3	2.2	1.1
y	3	5	7	9	11	13

2. In an inverse variation, $x = 6$ and $y = \frac{1}{2}$.

    a. What is the equation that represents the inverse variation?
    b. What is the value of y when $x = 15$?

3. The amount of time it takes for an ice cube to melt varies inversely to the air temperature, in degrees. At $20°$ Celsuis, the ice will melt in 20 minutes. How long will it take the ice to melt if the temperature is $30°$ Celsuis?

4. Graph the function $y = \frac{10}{x}$. What are the domain, range, and asymptotes of the function?

5. Graph $y = \frac{1}{x+2} - 4$. What are the domain, range, and asymptotes of the function?

Lesson 4.2: Graphing Rational Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will rewrite a rational function to identify asymptotes, find asymptotes of a rational function, graph a function of the form $\frac{ax+b}{cx+d}$, use a rational function model, and graph a rational function.

Examples:

1. Use long division to rewrite each rational function. FInd the asymptotes of f and sketch the graph.

    a. $f(x) = \frac{6x}{2x+1}$

    b. $f(x) = \frac{x}{x-6}$

2. What are the vertical and horizontal asymptotes of the graph of each function?

    a. $g(x) = \frac{2x^2+x-9}{x^2-2x-8}$

    b. $f(x) = \frac{x^2+5x+4}{3x^2-12}$

3. Graph each function.

    a. $f(x) = \frac{4x-3}{x+8}$

    b. $f(x) = \frac{3x+2}{x-1}$

4. The cost of removing a pollutant is modeled by the given function $f(p) = \frac{8.7p}{100=p}$, where *f(p)* is the cost, in millions of dollars, of removing p percent of the pollutant. What percent of the pollutant can be removed for $78.3 million?

5. Identify the asymptotes and sketch a graph of the following functions.

    a. $f(x) = \frac{4x^2-9}{x^2+2x-15}$

    b. $f(x) = \frac{x^2-5x+6}{2x^2-10}$

Weeks 1.5 - 4

Lesson 4.3: Multiplying and Dividing Rational Expressions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will write equivalent rational expressions, simplify a rational expression, multiply rational expressions, multiply a rational expression by a polynomial, and divide rational expressions.

Examples:

1. Write an equivalent expression to each of the following expressions. Remember to give the domain for your expression.

    a. $\frac{3x^5-18x^4-21x^3}{2x^6-98x^4}$

    b. $\frac{x^3-5x^2-24x}{x^3+x^2-72x}$

2. Simplify each expression and state the domain.

    a. $\frac{x^2+2x+1}{x^3-2x^2-3x}$

    b. $\frac{x^3+4x^2-x-4}{x^2+3x-4}$

3. Find the simplified form of each product and give the domain.

    a. $\dfrac{x^2-16}{9-x} \cdot \dfrac{x^2+x-90}{x^2+14x+40}$

    b. $\dfrac{x+3}{4x} \cdot \dfrac{3x-18}{6x+18} \cdot \dfrac{x^2}{4x+12}$

4. Find the simplified form of each product and the domain.

    a. $\dfrac{x^3-4x}{6x^2-13x-5} \cdot \left(2x^3 - 3x^2 - 5x\right)$

    b. $\dfrac{3x^2+6x}{x^2-49} \cdot \left(x^2 + 9x + 14\right)$

5. Find the simplified quotient and the domain of each expression.

    a. $\dfrac{1}{x^2+9x} \div \dfrac{6-x}{3x^2-18x}$

    b. $\dfrac{2x^2-12x}{x+5} \div \dfrac{x-6}{x+5}$

Lesson 4.4: Adding and Subtracting Rational Expressions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will add rational expressions with like denominators, identify the least common multiple of polynomials, add rational expressions with unlike denominator, subtract rational expressions, find a rate, and

Examples:

1. Find the sum.

    a. $\dfrac{10x-5}{2x+3} + \dfrac{8-4x}{2x+3}$

    b. $\dfrac{x-5}{x+5} + \dfrac{3x-21}{x+5}$

2. Find the least common multiple (LCM) for each set of expressions.

    a. $x^3 + 9x^2 + 27x + 27,\ x^2 - 4x - 21$

    b. $10x^2 - 10y^2,\ 15x^2 - 30xy + 15y^2,\ x^2 + 3xy + 2y^2$

3. Find the sum.

   a. $\dfrac{x+6}{x^2-4} + \dfrac{2}{x^2-5x+6}$

   b. $\dfrac{2x}{3x+4} + \dfrac{4x^2-11x-12}{6+5x-4}$

4. Simplify.

   a. $\dfrac{1}{3x} + \dfrac{1}{6x} - \dfrac{1}{x^2}$

   b. $\dfrac{3x-5}{x^2-25} - \dfrac{2}{x+5}$

5. Leah drives her car to the mechanic, then she takes the commuter rail train back to her neighborhood. The average speed for the 10-mile trip is 15 miles per hour faster on the train. Find an expression for Leah's total travel time. If she drove 30 mph, how long did this take?

Lesson 4.5: Solving Rational Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve a rational equation, solve a work-rate problem, identify an extraneous solution, solve problems with extraneous solutions, and solve a rate problem.

Examples:

1. What is the solution to each equation?

   a. $\dfrac{2}{x+5} = 4$

   b. $\dfrac{1}{x-7} = 2$

2. Arthur and Cheyenne can paint a wall in 6 hours when working together. Cheyenne works twice as fast as Arthur. How long would it take Cheyenne to paint the wall if she were working alone?

3. Find the solution(s) to each equation.

   a. $\dfrac{1}{x+2} + \dfrac{1}{x-2} = \dfrac{4}{x^2-4}$

   b. $\dfrac{1}{x-5} + \dfrac{x}{x-3} = \dfrac{2}{x^2-8x+15}$

4. What are the solutions to the following equations?

   a. $x + \dfrac{6}{x-3} = \dfrac{2x}{x-3}$

   b. $\dfrac{x^2}{x+5} = \dfrac{25}{x+5}$

5. Paddling with the current in a river, Jake traveled 16 miles downstream. Even though he paddled upstream for an hour longer than the amount of time he paddled downstream. Jake could only travel 6 miles against the current. In still water, Jake paddles at a rate of 5 mph. What is the speed of the current in the river?

Interdisciplinary / Real World / Global Connections

1. On a guitar, the string length, s, varies inversely with the frequency, f, of its vibrations. The frequency of a 26-inch E-string is 329.63 cycles per second. What is the frequency when the string length is 13 inches?
2. On the way to work, Joan carpools with a fellow co-worker, then takes the city bus back home in the evening. The average speed of the 20-mile trip is 5 miles per hour, faster in the carpool. Write an expression that represents Juan's total time.
3. It takes 12 hours to fill a pool with two pipes, where the water in one pipe flows three times as fast as the other pipe. How long will it take the slower pipe to fill the pool by itself?
4. Three people are planting tomatoes in a community garden. Marta takes 50 minutes to plant the garden alone, Benito takes x minutes and Tyler takes $x + 15$ minutes. If the three of them take 20 minutes to finish the garden , how long would it have taken Tyler alone?

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips
- Bell work example
  - In an inverse variation, $x = 2$ when $y = -4,$ What is the value of y when $x = 16$?

- ○ Graph $y = \frac{1}{x-3} + 2$. What are the domain, range, and asymptotes of the function?
- Exit slip example
  - ○ What are the vertical and horizontal asymptotes for the graph $f(x) = \frac{3x-2}{x^2+7x+12}$?
  - ○ Simplify $\frac{2+\frac{2}{x}}{\frac{4}{x}-\frac{5}{y}}$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 5: Rational Exponents and Radical Functions
Pacing	4 Weeks

[CT Core Standards](#)
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
- CCSS.MATH.CONTENT.HSF.IF.C.7.B Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Supporting Standards:
- CCSS.MATH.CONTENT.HSF.BF.B.4.A Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Relate roots and rational exponents and use them to simplify expressions and solve equations.	- Complex conjugate - Exponent - Index - nth root - Radical symbol - Radicand
2. Use properties of exponents and radicals to simplify radical expressions.	- Binomial - Like radicals - Index - Properties of exponents - Radicals - Reduced radical form
3. Graph and transform radial functions.	- Cube root function - Radical function - Radical function model - Transformations
4. Solve radical equations and inequalities.	- Extraneous solution - Radical equation - Radical inequality

5. Perform operations on functions to answer real-world questions.	- Composite function - Composition of functions - Domain - Function rule - Substitution
6. Represent the inverse of a relation using tables, graphs, and equations.	- Dependent variable - Independent variable - Inverse functions - Inverse operations - Inverse relation - Inverse variation - Relation

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. To simplify the nth root of an expression, what must be true about the expression?	1. Corresponding to every power, there is a root. For example, just as there are squares (second powers), just as there are cubes (third powers), there are cube roots, and so on. You can use a radical sign to indicate a root. Depending on the sign of the radicand, the root corresponding to every real power is not necessarily a real number.
2. When you square each side of an equation, is the resulting equation equivalent to the original?	2. Solving a square root equation may require squaring each side of the equation. This can introduce extraneous solutions. Squaring both sides of an equation does not always produce an equivalent equation. The extraneous solutions that may be introduced are solutions to the

	transformed equation but are not solutions to the original equation.
3. How are a function and its inverse function related?	3. Be careful to differentiate between inverse functions and the inverse of a function. The inverse of a function may not be a function. The inverse of a function will only be a function if the function is one-to-one. The graphs of a relation and its inverse are the reflections of each other in the line $y = x$. If you describe a relation or function by an equation in x and y, you can switch x and y to get an equation for the inverse.

Resources

Student Technology Integration and Correspondence to ISTE Standards when Applicable:
1. The suspension cables from the Golden Gate Bridge's towers are farther above the roadway near the towers and closer to the roadway near the middle of the bridge. You can figure out your distance from the middle of the bridge, x, in feet, and the height of the suspension cable, y, in feet at your position by using the equation $x = \frac{\sqrt{y-220}}{0.010583}$. How far is the cable from the roadway when you are 200 feet from the middle of the bridge?

2. Big Ben's pendulum takes 4 seconds to swing back and forth. The formula $t = 2\pi\sqrt{\frac{L}{32}}$ gives the swing time, t, in seconds based on the length of the pendulum, L, in feet. What is the minimum length necessary to build a clock with a pendulum that takes longer than Big Ben's pendulum to swing back and forth?

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
Standard 1.5.a. Students formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapter 5: pages 237-293)
- **Media:**
  - TI-nspire CX CAS graphing calculator
  - Trigonometry Workbook Resources
  - SMART Board
  - SMART Math Tools

Online Resources / Websites:
  - https://www.khanacademy.org/
  - https://www.youtube.com/
  - https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Composite function: a combination of two functions such that the output from the first function becomes the output for the second function.

Composition of functions: the operation that forms composite functions.

Extraneous solution: a solution of an equation derived from an original equation, but it is not a solution to the original equation.

Index: with a radical sign, the index indicates the degree of the root.

Inverse function: if function f pairs a value b with a, then its inverse, denoted f^{-1}, pairs the value a with b. If f^{-1} is also a function, then f and f^{-1} are inverse functions.

Like radicals: radical expressions that have the same index and same radicand.

nth root: for any real numbers, a and b, and any positive integer n, if $a^n = b$, then a is an nth root of b.

Radical function: a function that can be written in the form $f(x) = a\sqrt[n]{x - h} + k$, where $a \neq 0$. For even values of n, the domain of a radical function is the real numbers $x \geq h$.

Radical symbol: the symbols denoting a root.
Radicand: the number under a radical sign.
Reduced radical form: the form of an expression for which ann nth roots of a perfect nth powers in the radicand have been simplified and no radicals remain in the denominator.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 1.5:

Lesson 5.1: nth Roots, Radicals, and Rational Exponents
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find all real nth roots, understand rational exponents, evaluate expressions with rational exponents, simplify nth roots, use nth roots to solve equations, and use nth roots to solve problems.

Examples:
1. Find the specified roots of each number.
    a. Real fourth roots of 81
    b. Real cube roots of 64
2. Explain what each fractional exponent means, then evaluate.
    a. $25^{\frac{1}{2}}$
    b. $32^{\frac{2}{5}}$
3. What is the value of each expression? Round to the nearest hundredth if necessary.
    a. $-\left(16^{\frac{3}{4}}\right)$
    b. $\sqrt[5]{3.5^4}$

4. Simplify each expression.

   a. $\sqrt[5]{32m^{15}}$

   b. $\sqrt[4]{x^{20}y^8}$

5. Solve the following equations.

   a. $5x^3 = 320$

   b. $2p^4 = 162$

6. One cube has an edge length 3 centimeters shorter than the edge length of a second cube. The volume of the smaller cube is $200\ cm^3$. What is the volume of the larger cube?

Lesson 5.2: Properties of Exponents and Radicals

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will use properties of exponents, use properties of exponents to rewrite radicals, rewrite the product or quotient of a radical, add and subtract radical expressions, multiply binomial radical expressions, and rationalize a binomial denominator.

Examples:

1. Rewrite each expression using the properties of exponents.

   a. $\left(\dfrac{3x}{32^{\frac{2}{5}}y^6}\right)^{\frac{1}{2}}$

   b. $2a^{\frac{1}{2}}\left(ab^{\frac{1}{2}}\right)^{\frac{2}{3}}$

2. Rewrite each expression.

   a. $\sqrt[4]{81a^8b^5}$

   b. $\sqrt[3]{\dfrac{x^4y^2}{125x}}$

3. What is the reduced radical form of each expression?

   a. $\sqrt[5]{\dfrac{7}{16x^3}}$

   b. $\sqrt[4]{27x^2} \cdot \sqrt{3x}$

4. How can you rewrite each expression in simpler form?

   a. $\sqrt[3]{2000} + \sqrt{2} + \sqrt[3]{128}$

   b. $\sqrt{20} - \sqrt{600} - \sqrt{125}$

5. Multiply.

   a. $\left(x - \sqrt{10}\right)\left(x + \sqrt{10}\right)$

   b. $\sqrt{6}\left(5 + \sqrt{3}\right)$

6. What is the reduced radical form of each expression?

   a. $\dfrac{5 - \sqrt{2}}{2 - \sqrt{3}}$

   b. $\dfrac{-4x}{1 - \sqrt{x}}$

Weeks 1.5 - 4

Lesson 5.3: Graphing Radical Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will graph square root and cube root functions, graph a transformation of a radical function, rewrite radical functions to identify transformations, write an equation of a transformation, and interpret a radical function model.

Examples:

1. Graph the following functions. What is the domain and range of each function? Is the function increasing or decreasing?

   a. $f(x) = \sqrt{3x}$

   b. $y = \sqrt[3]{2x}$

2. Graph the following functions. What is the domain and range of each function? Is the function increasing or decreasing?

    a. $f(x) = 2\sqrt{x + 3} - 4$

    b. $y = -\sqrt{x - 1} + 2$

3. What transformations of the parent graph of $f(x) = \sqrt{x}$ produce the graphs of the following functions?

    a. $m(x) = \sqrt{7x - 3.5} - 10$

    b. $j(x) = -2\sqrt{12x} + 4$

4. What radial function is represented in each graph below?

    a.

    b.
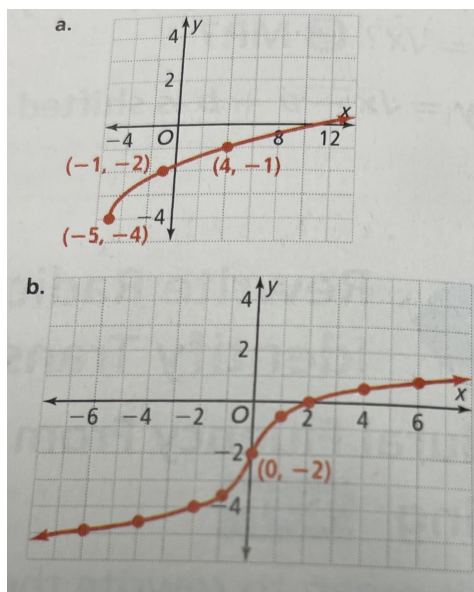
5. Looking out to the sea, the visibility in miles from a certain spot on a cliff can be calculator using the function

    $d(x) = \sqrt{1.5x}$, where x is the height in feet above sea level. Sasha walks through elevations ranging from 5 feet to 40 feet above sea level. What are the minimum and maximum distances that she can see?

Lesson 5.4: Solving Radical Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve an equation with one radical, rewrite a formula, identify an extraneous solution, solve equations with rational exponents, solve an equation with two radicals, and solve a radical inequality.

Examples:

1. Solve each radical equation.

   a. $\sqrt{x-2} + 3 = 5$

   b. $\sqrt[3]{x-1} = 2$

2. The speed, v, of a vehicle in relation to its stopping distance, d, is represented by the equation $v = 3.57\sqrt{d}$. What is the equation for the stopping distance in terms of the vehicle's speed?

3. Solve each radical equation. Identify any extraneous solutions.

   a. $x = \sqrt{7x+8}$

   b. $x + 2 = \sqrt{x+2}$

4. Solve each equation.

   a. $\left(x^2 - 3x - 6\right)^{\frac{3}{2}} - 14 = -6$

   b. $(x+8)^2 = (x-10)^{\frac{5}{2}}$

5. Solve each radical equation. Check for extraneous solutions.

   a. $\sqrt{x+4} - \sqrt{3x} = -2$

   b. $\sqrt{15-x} - \sqrt{6x} = -3$

6. The body surface area (BSA) of a human being is used to determine doses of medication. The formula for finding BSA is $BSA = \sqrt{\frac{H \cdot M}{3600}}$ where H is the height in centimeters and M is the mass in kilograms. A doctor calculates a particular dose of medication for a patient whose BSA is less than 1.9. If the patient is 160 cm tall, what must the mass of the person be for the dose to be appropriate?

Lesson 5.5: Function Operations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will add and subtract functions, multiply functions, divide functions, compose functions, write a rule for a composite function, and use a composite function model.

Examples:

1. Let $f(x) = 2x^2 + 7x - 1$ and $g(x) = 3 - 2x$. Identify the rules for the following functions.
   a. $f + g$
   b. $f - g$

2. Suppose demand, d, for a company's product at cost, x, is predicted by the function $d(x) = -0.25x^2 + 1000$, and the price, p, that the company can charge for the product is given by $p(x) = x + 16$. FInd the company's revenue function.

3. Identify the rule and domain for $\frac{f}{g}$ for each pair of functions.

   a. $f(x) = x^2 - 3x - 18$, $g(x) = x + 3$
   b. $f(x) = x - 3$, $g(x) = x^2 - x - 6$

4. Let $f(x) = 2x - 1$ and $g(x) = 3x$. Identify the rule for the following functions.
   a. $f(g(2))$
   b. $f(g(x))$

5. Identify the rules for $f \circ g$ and $g \circ f$.
   a. $f(x) = x^3$, $g(x) = x + 1$
   b. $f(x) = x^2 + 1$, $g(x) = x - 5$

6. Clothes U Wear posts discounts on social media. The store allows customers to use multiple discounts. They simply need to tell the cashier in which order they would like the discounts to be applied. On your next trip to Clothes U Wear, in which order should you ask for the discounts between the following two options? $5 off your next purchase and 10% off your next purchase.

Lesson 5.6: Inverse Relations and Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will represent the inverse of a relation, restrict a domain to produce an inverse function, find an equation of an inverse function, use composition to verify inverse functions, and rewrite a formula.

Examples:

1. What is the inverse of the relation represented in the table?

   a.

x	-2	-1	0	1
y	1	4	3	1

   b.

x	-4	4	9	2
y	0	-3	-2	1

2. Let $f(x) = 2x + 1$.

   a. Write an equation to represent the inverse of f.

   b. How can you use the graph of f to determine if the inverse of f is a function? Explain your answer.

3. Find the inverse of each function by identifying an appropriate restriction of its domain.

   a. $f(x) = x^2 + 8x + 16$

   b. $f(x) = x^2 - 9$

4. Let $f(x) = 2 - \sqrt[3]{x + 1}$.

   a. Sketch a graph of f.

   b. Verify that the inverse will be a function and write an equation $f^{-1}(x)$.

5. Use composition to determine whether f and g are inverse functions.

   a. $f(x) = \frac{1}{4}x + 7$, $g(x) = 4x - 7$

   b. $f(x) = \sqrt[3]{x} - 1$, $g(x) = x^3 + 1$

6. A sculpture artist is making an ice sculpture of Earth for a display. He created a mold that can hold 3.5 liters of ice. What will the radius of the ice sculpture be if he fills the mold all the way?

Interdisciplinary / Real World / Global Connections

1. One cube-shaped container has an edge length 2 centimeters longer than the edge length of a second cube. The volume of the larger cube is $729 \ cm^3$. When the larger cube empties into the smaller cube, how much water will spill?

2. The hull speed, y, measured in knots, of a sailboat can be estimated by the function $y = 1.34\sqrt{x}$, where x is the waterline length of a sailboat, in feet. Luis works at a sailboat rental business with boats that have a waterline length between 25 feet and 64 feet.
   a. Graph the relationship between the hull speed of a sailboat and its waterline length.
   b. What are the minimum and maximum hull speeds of the sailboats at the rental business?

3. The body surface area (BSA) of a human being is used to determine doses of medication. The formula for finding BSA is $BSA = \sqrt{\frac{H \cdot M}{3600}}$ where H is the height in centimeters and M is the mass in kilograms. A sports medicine specialist determines that a hot-weather training strategy is appropriate for a 165 cm tall individual whose BSA is less than 2.0. To the nearest hundredth, what can the mass of the individual be for the training strategy to be appropriate?

4. As a member of the Games Shop rewards program, you get a 20% off discount on purchases. All sales are subject to a 6% sales tax. Write functions to model the discount and the sales tax, then identify the rule for the composition of the function that calculates the final price you would pay at Games Shop.

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active

exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips
- Bell work example
  - Simplify each expression.
    - $\sqrt[3]{8a^3b^9}$

- - - $\sqrt[4]{256x^{12}y^{24}}$
  - ○ What are the transformations of the graph of $f(x) = \sqrt{x}$ produce the graph of $g(x) = \frac{1}{2}\sqrt{x-1} - 3$? WHat is the effect of the transformations on the domain and range of g?
- Exit slip example
  - ○ Rewrite each expression.
    - ■ $\sqrt[3]{16x^5y^6z^{14}}$
  - ○ How can you rewrite each expression in simpler form?
    - ■ $4\sqrt[3]{81} - 2\sqrt[3]{72} - \sqrt[3]{24}$
    - ■ $\sqrt{20} - \sqrt[3]{16} + \sqrt[3]{250} - \sqrt{5}$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 6: Exponential and Logarithmic Functions
Pacing	5 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.F.IF.8b Use the properties of exponents to interpret expressions for exponential functions.
- CC.9-12.F.LE.4 For exponential models, express as a logarithm the solution to $ab^{(ct)} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.

Supporting Standards:
- CC.9-12.A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions
- CC.9-12.F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Recognize key features of exponential functions	● Decay factor ● Domain ● Exponential decay factor ● Exponential function ● Exponential growth function ● Growth factor ● Range
2. Write exponential models in different ways to solve problems.	● Compound interest ● Compound interest formula ● Continuously compounded interest formula ● Exponential function ● Exponential model ● Natural base e ● Regression
3. Evaluate and simplify logarithms.	● Base ● Common logarithm ● Exponential form ● Exponent ● Logarithm ● Logarithmic form ● Logarithmic function

	● Natural logarithm
4. Graph logarithmic functions and find equations of the inverses of exponential and logarithmic functions.	● Asymptote ● Domain ● End behavior ● Exponential function ● Intercept ● Inverse ● Logarithmic function ● Range ● Reflection
5. Use properties of logarithms to rewrite expressions.	● Change of base formula ● Exponents ● Logarithm ● Logarithmic function ● Power property of logarithms ● Product property of logarithms ● Properties of logarithms ● Quotient property of logarithms
6. Solve logarithmic and exponential equations.	● Common base ● Exponential equation ● Exponents ● Extraneous solutions ● Logarithms ● Logarithmic equation ● Power property of logarithms ● Product property of logarithms ● Properties of logarithms

	● Quotient property of logarithms

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How do you model a quantity that changes regularly over time by the same percentage?	1. You can represent repeated multiplication with a function in the form of $y = ab^x$ where b is a positive number other than 1.
2. How are exponents and logarithms related?	2. Logarithms and exponents have corresponding properties and you can use logarithms to solve exponential equations and vice versa. Exponential equations can be solved by taking the logarithm of each side. Although logarithms to any base can be used, common logs and natural logs are generally used.
3. How are exponential and logarithmic functions related?	3. The exponential function $y = b^x$ is one-to-one, so the its inverse $x = b^y$ is a function. To express "y as a function of x" for the inverse, write $y = log_b x$. The fact that exponential and logarithmic functions are inverses can be used to find values of logarithms.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable: 1.   A surveyor determined the value of an area of land over a period of several years since 1950. THe land was worth $31,000 in 1954 and $35,000 in 1955. The land was worth $31,000 in 1954 and $35,000 in 1955. Use the data to determine an exponential model that describes the value of the land.

2. Selena took pizza out of the oven and it started to cool to room temperature (68°). She will serve the pizza when it reaches 150°. She took the pizza out of the oven at 5:00 pm. When can she serve it?

Time (min)	Temperature (°F)
5	310
8	264
10	238
15	202
20	186
25	175

3. A rabbit farm had 200 rabbits in 2015. The number of rabbits increases by 30% every year. How many rabbits are on the farm in 2031?

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
Standard 1.5.a. Students formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
● **Informational Books:**
○ enVision Algebra 2 by Savvas Learning Company (Chapter 6: pages 296-339, 349-352)

● **Media:**
○ TI-nspire CX CAS graphing calculator
○ Trigonometry Workbook Resources
○ SMART Board

○ SMART Math Tools

Online Resources / Websites:

○ https://www.khanacademy.org/
○ https://www.youtube.com/
○ https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Asymptote: a line that a graph approaches and guides the end behavior of a function.

Change of base formula: this formula allows logarithms with a base other than 10 and e to be evaluated. $log_b m = \frac{log\, m}{log\, b}$, where m, b, and a are positive numbers, and $b \neq 1$ and $a \neq 1$.

Common logarithm: the base 10 logarithm and is written as log x with the base of 10 implied.

Compound interest: the interest you earn on interest.

Compound interest formula: an exponential model that is used to calculate the value of an investment when interest is compounded.

Continuously compounded interest formula: $A = Pe^{rt}$ where P is the initial principal invested, e is the natural base, r is the annual interest rate written as a decimal, and A is the value of the account after t years.

Decay factor: equal to b, and is the ratio of decrease between two consecutive y-values.

End behavior: describes the direction of a graph as you move to the left and to the right, away from the origin.

Exponential decay function: function that model quantities that decrease by a fixed percent during each time period. Given an initial amount a and the rate of decrease, r, the amount $A(t)$ after t time periods is given by $A(t) = a(1 - r)^t$ such that $a > 0$, $0 < b < 1$, $b = 1 - r$.

Exponential equation: an equation that contains variables in the exponents.

Exponential form: shows that a base raised to an exponent equals the result $a^b = c$.

Exponential function: any function of the form $y = a \cdot b^x$ where a and b are constants with $a \neq 0$ and $b > 0$, $b \neq 1$.

Exponential growth function: function that model quantities that increase by a fixed percent during each time period. Given an initial amount a and the rate of increase, r, the amount $A(t)$ after t time periods is given by

$A(t) = a(1 + r)^t$ such that $a > 0$, $0 < b < 1$, $b = 1 + r$.

Growth factor: equal to b, and is the ratio of increase between two consecutive y-values.

Logarithm: base b of x is defined as follows: $log_b x = y$ if and only if $b^y = x$, for $b > 0$, $b \neq 1$, and $x > 0$.

Logarithmic equation: contains one of more logarithms of variable expressions.

Logarithmic form: shows that the log of the result with the given base equals the exponent. $log_a c = b$

Logarithmic function: $y = log_b x$ is the inverse of the exponential function $y = b^x$.

Natural base e: defined as the value that the expression $\left(1 + \frac{1}{x}\right)^x$ approaches as $x \to \infty$. $e \approx 2.718281828...$

Natural logarithm: the base e logarithm and is written as $ln\ x$.

Power property of logarithms: for positive numbers b, m, and n, with $b \neq 1$, $log_b m^n = n\ log_b m$

Product property of logarithms: for positive numbers b, m, and n, with $b \neq 1$, $log_b mn = log_b m + log_b n$

Quotient property of logarithms: for positive numbers b, m, and n, with $b \neq 1$, $log_b \frac{m}{n} = log_b m - log_b$

Reflection: flips the graph of a function across a line, such as the x- or y-axis. Each point on the graph of the reflected function is the same distance from the line of a reflection as is the corresponding point on the graph of the original function.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

| **Learning Tasks Per Week (Including Instructional Strategies)** |
| :--- |

Weeks 1 - 1.5:

Lesson 6.1: Key Features of Exponential Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify key features of exponential functions, graph transformations of exponential functions, model with exponential functions, interpret an exponential function, and compare two exponential functions.

Examples:

1. Graph $y = 4(0.5)^x$. What are the domain, range, intercepts, asymptotes, and the end behavior of this function?

2. How do the asymptote and intercept of the given function compare to the asymptote and intercept of the function $y = 5^x$?

   a. $g(x) = 5^{x+3}$

   b. $h(x) = 5^{-x}$

3. A factory purchased a 3D printer in 2010. The value of the printer is modeled by the function $f(x) = 30(0.93)^x$, where x is the number of years since 2010.

   a. What is the value of the printer after 10 years?

   b. Does the printer lose more of its value in the first 10 years or in the second 10 years after it was purchased?

4. A car was purchased for $24,000. The function $y = 24(0.8)^x$ can be used to model the value of the car (in thousands of dollars) x years after it was purchased.

   a. Does the function represent exponential growth or decay?

   b. What is the rate of decay of this function? What does it mean?

   c. Graph the function on a reasonable domain. What do the y-intercept and asymptote represent? When will the value of the car be about $5,000?

5. A museum purchased a painting and a sculpture in the same year. Their changing values are modeled as shown. Find the average rate of change of the value of each artwork over the 5-year period. Which art work's value is increasing more quickly?
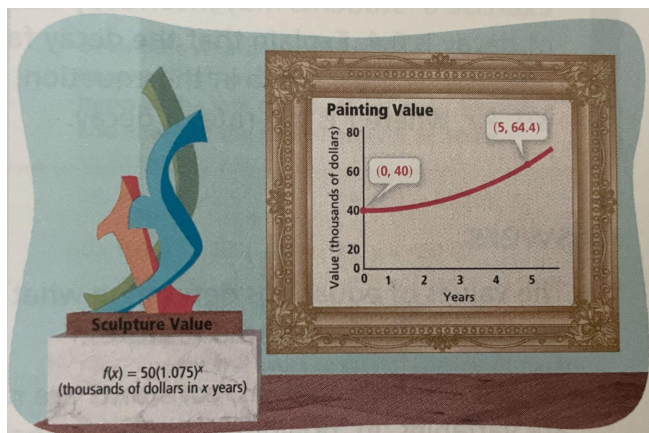
Lesson 6.2: Exponential Models

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will rewrite an exponential function to identify a rate, understand compound interest, understand continuously compounded interest, find continuously compounded interest, use two points to find exponential models, and use regression to find an exponential model.

Examples:
1. In 2015, the population of a small town was 8000. The population is increasing at a rate of 2.5% per year. Rewrite an exponential growth function to find the monthly growth rate.
2. Tamira invests $5000 in an account that pays 4% annual interest. How much will there be in the account after 3 years if the interest is compounded annually, semi-annually, quarterly, or monthly?
3. Consider an investment of $1 in an account that pays a 100% annual interest rate for one year. The equation
$A = 1\left(1 + \frac{1}{n}\right)^{n(1)} = \left(1 + \frac{1}{n}\right)^{n}$ gives the amount in the account after one year for the number of compounding periods n.
FInd the value of the account for the number of periods given in the table.

Number of Periods, n	Value of $\left(1 + \frac{1}{n}\right)^{n}$
1	
10	
100	
1000	
10000	
100000	

4. Regina invests $12,600 in an account that earns 3.2% annual interest, compounded continuously. What is the value of the account after 12 years? Round your answer in terms of dollars.

5. Tia knew that the number of emails she sent was growing exponentially. She generated a record of the number of emails she sent each year since 2009. What is an exponential model that describes the data? In 2016 she sent 1,400 emails and in 2015 she sent 1,000 emails.

6. Randy is making soup. The soup reaches the boiling point and then, as shown by the data below, begins to cool off. Randy wants to serve the soup when it is about $80°$, or about 10 degrees above room temperature $68°F$.
   a. Explain why the temperature might follow an exponential decay curve as it approaches room temperature.
   b. Find an exponential model for the data. Use your model to determine when Randy should serve the soup.

x, time (min)	y, Temperature °F
00:00	212°F
02:00	185°F
03:30	170°F
05:00	162°F
07:30	145°F
10:00	138°F
15:00	125°F
20:00	117°F
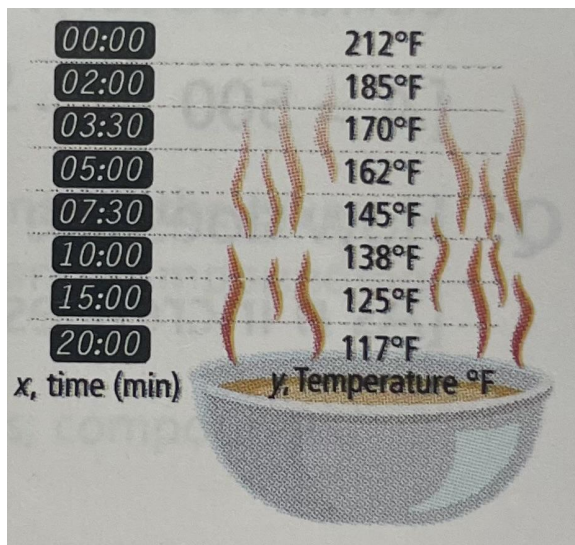
Weeks 1.5 - 3

Lesson 6.3: Logarithms
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will understand logarithms, convert between exponential and logarithmic forms, evaluate logarithms, evaluate common and natural logarithms, solve equations with logarithms, and use logarithms to solve problems.
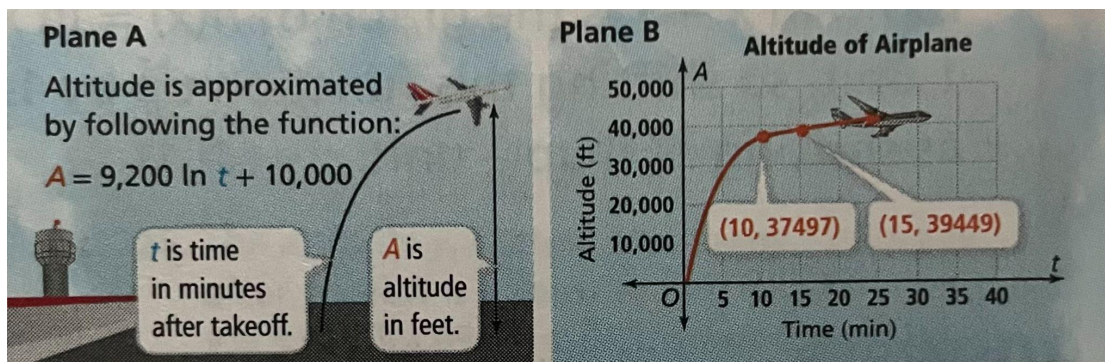
Examples:

1. Write the logarithmic form of $y = 8^x$.

2. What is the logarithmic form of $7^3 = 343$?

   a. What is the exponential form of $log_4 16 = 2$

3. What is the value of each logarithmic expression?

   a. $log_3\left(\frac{1}{81}\right)$

   b. $log_7(-7)$

   c. $log_5 5^9$

4. What is the value of each logarithmic expression to the nearest ten-thousandths?

   a. $log\ 321$

   b. $ln(1,215)$

   c. $log\ 0.17$

5. Solve each equation. Round to the nearest ten-thousandth.

   a. $log(3x - 2) = 2$

   b. $e^{x+2} = 8$

6. The seismic energy, x, in joules can be estimated based on the magnitude, m, of an earthquake by the formula $x = 10^{1.5m+12}$. What is the magnitude of an earthquake with a seismic energy of 2.4×10^{20} joules?

Lesson 6.4: Logarithmic Functions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify key features of logarithmic functions, graph transformations of logarithmic functions, inverses of exponential and logarithmic functions, interpret the inverse of a formula involving logarithms, and compare two logarithmic functions.

Examples:

1. Graph each function and identify the domain and range. List any intercepts or asymptotes. Describe end behavior.

   a. $y = \ln x$

   b. $y = \log_{\frac{1}{2}} x$

2. Describe how each graph compares to the graph of $f(x) = \ln x$.

   a. $g(x) = \ln(x + 4)$

   b. $h(x) = 5 \ln x$

3. Find the inverse of each function.

   a. $f(x) = 3^{x+2}$

   b. $g(x) = \log_7(x - 2)$

4. A company uses this function to relate sales revenue, $\mathcal{R}$, and advertising costs, a: $\mathcal{R} = 12 \log(a + 1) + 25$. What is the equation of the inverse of the formula? Which equation would be easier to use to find a value of a for a particular value of $\mathcal{R}$?

5. Logarithmic functions can approximate the altitude of a plan over time. Which plane's altitude shows the greater rate of change over the interval $10 \leq t \leq 15$?

   Plane A

   Altitude is approximated by following the function:

   $A = 9{,}200 \ln t + 10{,}000$

   t is time in minutes after takeoff.

   A is altitude in feet.

   Plane B   Altitude of Airplane

   (10, 37497)   (15, 39449)

   Altitude (ft): 50,000 40,000 30,000 20,000 10,000

   Time (min): 5 10 15 20 25 30 35 40

Weeks 3 - 5

Lesson 6.5: Properties of Logarithms
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will prove a property of logarithms, expand logarithmic expressions, write expressions as single logarithms, apply properties of logarithms, evaluate logarithmic expressions by changing the base, and use the change of base formula.

Examples:
1. How can you prove the Product Property of Logarithms?
2. Use the properties of logarithms to expand each expression.
    a. $log_7\left(\frac{r^3t^4}{v}\right)$
    b. $ln\left(\frac{7}{225}\right)$
3. Write each expression as a single logarithm.
    a. $5log_2c - 7log_2n$
    b. $2\ ln\ 7 + ln\ 2$

4. The pH of a solution is a measure of its concentration of hydrogen ions. This concentration (measured in moles per liter) is written $[H^+]$ and is given by the formula $pH = log\left(\frac{1}{[H^+]}\right)$. WHat is the concentration of hydrogen ions in the acid rainfall?

pH OF A SOLUTION

Orange juice pH = 3   Acid rain pH = 4.5   Clear rain pH = 5.6   Healthy lake pH = 6.5
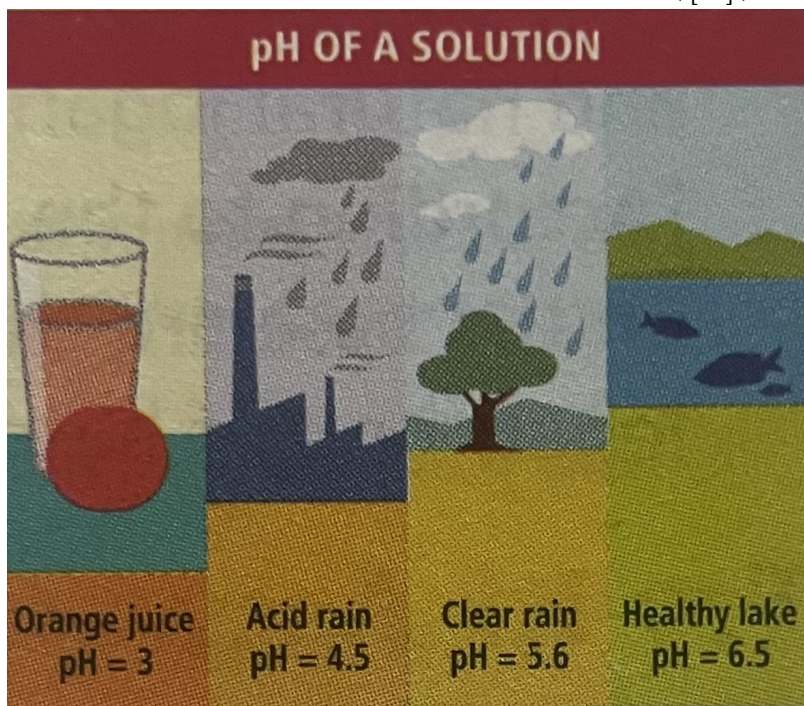
5. Estimate the value of each logarithm. Then use a calculator to find the value of each logarithm to the nearest thousandth.
   a. $log_2 7$
   b. $log_5 3$

6. What is the solution to the equation $3^x = 15$? Express the solution as a logarithm, make an estimate, and then evaluate. Round to the nearest thousandth.

Lesson 6.6: Exponential and Logarithmic Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve exponential equations using a common base, rewrite exponential equations using logarithms, solve exponential equations using logarithms, use an exponential model, solve logarithmic equations, and solve logarithmic and exponential equations by graphing.

Examples:

1. Solve each equation using a common base.

   a. $25^{3x} = 125^{x+2}$

   b. $0.001 = 10^{6x}$

2. Rewrite the following equations.

   a. $17 = 4^x$

   b. $5^x = 12$

3. Find the solutions to the following equations.

   a. $3^{x+1} = 5^x$

   b. $2^{3x} = 7^{x+1}$

4. The diagram shows how a forest fire grows over time. The fire department can contain a 160-acre fire without needing additional resources.
   a. How many minutes does it take for a fire to become too big for the fire department to contain without additional resources? Round to the nearest minute.
   b. How many minutes does it take the fire to spread to cover 100 acres?

4 acres, $t = 0$ min
7.2 acres, $t = 1$ min
12.96 acres, $t = 2$ min
23.3 acres, $t = 3$ min
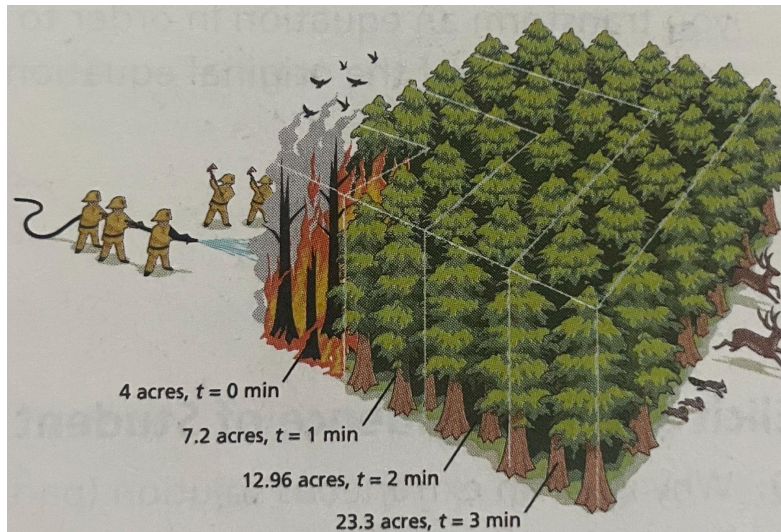
5. Solve each equation.
   a. $log_5(x^2 - 45) = log_5(4x)$
   b. $ln(- 4x - 1) = ln(4x^2)$
6. Solve each equation by graphing. Round to the nearest thousandth.
   a. $3(2)^{x+2} - 1 = 3 - x$
   b. $ln(3x - 1) = x - 5$

Interdisciplinary / Real World / Global Connections

1. The population of a large city was about 4.6 million in the year 2010 and grew at a rate of 1.3% for the next four years.
   a. What exponential function models the population of the city over that 4-year period?

b. If the population continues to grow at the same rate, what will the population be in 2040?

2. Two-hundred twenty hawks were released into a region on January 2, 2016. The function $f(x) = 220(1.05)^x$ can be used to model the number of hawks in the region x years after 2016.
    a. Is the population increasing or decreasing? Explain.
    b. In what year will the number of hawks reach 280?

3. $3000 is invested in an account that earns 3% annual interest, compounded monthly.
    a. What is the value of the account after 10 years?
    b. What is the value of the account after 100 years?

4. If you invest $125,000 in an account that earns 4.75% annual interest, compounded continuously.
    a. What is the value of the account after 15 years?
    b. What is the value of the account after 30 years?

5. The number of milligrams of medicine in a person's system after t hours is given by the function $A = 20e^{-0.40t}$. Thomas set $A = 0$ to find the number of hours it takes for all of the medicine to be removed from a person's system. What mistake did Thomas make? Explain.

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
● Bell Work and Exit Slips

Bell work example:
  ○ Write each equation in exponential form.
    ■ $log_8 64 = 2$
    ■ $log \frac{1}{100} - 2$
  ○ Use the properties of logarithms to expand each expression.

- - $log_5\left(a^2 b^7\right)$
  - $ln\left(\frac{25x}{3}\right)$
  - ○ Find all solutions to the following equations. Round your answers to the nearest thousandth.
    - $3^{2-3x} = 3^{5x-6}$
    - $4^{3x-1} = \left(\frac{1}{2}\right)^{x+5}$
- Exit slip example
  - ○ Solve each equation. Round answers to the nearest ten-thousandth.
    - $log(7x + 6) = 3$
    - $10^{x+1} = 50$
  - ○ Find the equation of the inverse of each function.
    - $f(x) = 5^{x-3}$
    - $f(x) = 4log_2(x - 3) + 2$
  - ○ Find all solutions to the following equations. Round your answers to the nearest thousandth.
    - $2\,ln\,(3x - 2) = ln\,(5x + 6)$
    - $log_6(x^2 - 2x) = log_6(2x - 3) + log_6(x + 1)$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 7: Sequences and Series
Pacing	3 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.F-BF.2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
- CC.9-12.EE.F-BF.2. Determine an arithmetic sequence with whole numbers when provided a recursive rule.

Supporting Standards:
- CC.9-12.EE.A-SSE.4. Determine the successive term in a geometric sequence given the common ratio.
- CC.9-12.A-SSE.4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Identify mathematical patterns found in a sequence and use formulas to find the nth term of a sequence.	● Explicit formula ● Recursive formula ● Sequence ● Term of a sequence
1. Define, identify, and apply arithmetic sequences.	● Arithmetic mean ● Arithmetic sequence ● Common difference ● Explicit formula ● Recursive formula ● Sequence ● Term of a sequence
2. Define, identify, and apply geometric sequences.	● Common ratio ● Explicit formula ● Geometric mean ● Geometric sequence ● Recursive formula ● Sequence ● Term of a sequence
3. Define arithmetic series and find their sums.	● Arithmetic sequence ● Arithmetic series ● Common difference

	- Explicit formula - Sequence - Series - Sum of a finite arithmetic series - Term of a sequence
4. Define geometric series and find their sums.	- Common ratio - Explicit formula - Geometric sequence - Sequence - Series - Sum of a finite geometric series - Sum of an infinite geometric series - Term of a sequence

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How can you represent the terms of a sequence explicitly? How can you represent them recursively?	1. If the numbers in a list follow a pattern, you are able to relate each number in the list to its numerical position in the list with a rule. A sequence can be defined explicitly by describing its nth term with a formula using n or recursively by stating its first term and a formula for its nth term using the $(n - 1)$ term.
2. What are equivalent explicit and recursive definitions for an arithmetic sequence?	2. In an arithmetic sequence, the difference between any two consecutive terms is always the same number. You can build an arithmetic sequence by adding the same number to each term. A sequence can be defined explicitly by describing its nth term with a formula using

	n or recursively by stating its first term and a formula for its nth term using the $(n - 1)$ term.
3. How can you model a geometric sequence? How can you model its sum?	3. In a geometric sequence, the ratio of any term (after the first) to its preceding term is a constant value, no matter what two terms are compared. A geometric sequence can be built by multiplying each term by that constant. The sum of a finite geometric series can be found using a formula. It is necessary to know the first term, the number of terms, and the common ratio and. The sum of an infinite series is the number that the sequence of partial sums approaches. The sum of a finite series is always a real number. The sum of an infinite series may be a real number; the series must converge. If the series diverges, there is no sum.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:
1. Generate the first ten terms of the Fibonacci sequence.
   a. Find the sum of the first ten terms of the Fibonacci sequence. Divide the sum by 11. What do you notice?
   b. Choose two numbers other than 1 and 1. Generate a Fibonacci-like sequence from them. Write the first ten terms of your sequence, find the sum and divide by 11. What do you notice?
   c. What is the sum of the first ten terms of any Fibonacci-like sequence?

Standard 1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Standard 1.5.a. Students formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
    - enVision Algebra 2 by Savvas Learning Company (Chapters 1 & 6: pages 30-39, 340-348 & supplemental materials)

- **Media:**
    - TI-nspire CX CAS graphing calculator
    - Trigonometry Workbook Resources
    - SMART Board
    - SMART Math Tools

Online Resources / Websites:

- https://www.khanacademy.org/
- https://www.youtube.com/
- https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Arithmetic mean: the average of two numbers or terms in an arithmetic sequence of x and y is $\frac{x+y}{2}$.

Arithmetic sequence: a sequence where the difference between consecutive terms is constant.

Arithmetic series: a series whose terms form an arithmetic sequence.

Common difference: the difference that is the same between each term in an arithmetic sequence.

Common ratio: the ratio of consecutive terms in a geometric sequence.

Explicit formula: an equation that describes the nth term of a sequence using the number n.

Finite series: a series with a countable number of terms.

Geometric mean: of any two positive numbers is the positive square root of the product of two numbers, x and y, is given by $\sqrt{xy}$.

Geometric sequence: a sequence with a common ratio between consecutive terms.

Infinite series: the sum of an infinite geometric sequence where the series would have no last term.

Recursive formula: contains two parts, the initial condition (the value of the first term written as $a_1 =$) and the formula that relates each term after the first term to the one before it written as $a_n = a_{n-1}$

Sequence: an ordered list of numbers.

Series: the sum of the terms of a sequence.

Term of a sequence: each number in a sequence.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 -1.5:

Lesson 7.1: Mathematical Patterns and General Sequences

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will generate a sequence using an explicit formula, write a recursive definition for a sequence, write an explicit formula for a sequence, and use formulas to find terms of a sequence.

Examples:

1. A sequence has an explicit formula $a_n = 3n - 2$. What are the first ten terms of the sequence?

2. What is the recursive definition for each sequence?
    a. 1, 2, 6, 24, 120, 720, ...
    b. 1, 5, 14, 30, 55, ...

3. What is the explicit formula for the sequence 0, 3, 8, 15, 24, ...? What is the 20th term?
    a. Why is using an explicit formula often more efficient than using a recursive one?

4. You walk 1 mile the first day of your training, 1.2 miles on the second day, 1.6 miles the third day, 2.4 miles the fourth day. If you continue this pattern, how many miles do you walk on the seventh day?

Lesson 7.2: Arithmetic Sequences

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify arithmetic sequences, analyze arithmetic sequences, use arithmetic mean, and use an explicit formula for an arithmetic sequence.

Examples:

1. Is the sequence an arithmetic sequence? If so, identify the common difference.
    b. 2, 4, 8, 16, ...
    c. 1, 5, 9, 13, 17, ...
2.   a. What is the 46th term of the arithmetic sequence that begins 3, 5, 7, ...?
    b.   What are the second and third terms of this arithmetic sequence? 80, ☐, ☐, 125
3. What is the missing term of the sequence ..., 15, ☐, 59, ...?
4. The numbers of seats in the first 13 rows in a second of an arena form an arithmetic sequence. Rows 1 & 2 are shown in the diagram below.   How many seats are in Row 13?

Row 2: 16 seats

Row 1: 14 seats
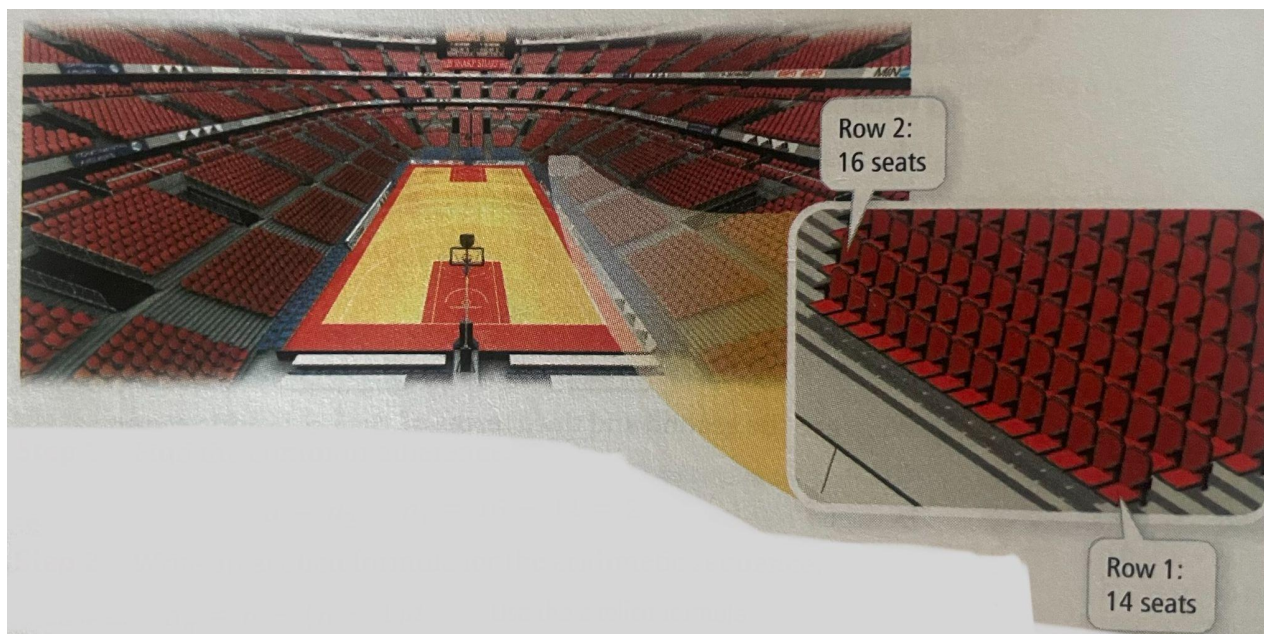
Lesson 7.3: Geometric Sequences

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will identify geometric sequences, analyze geometric sequences, use geometric sequences, and use geometric mean.

Examples:

1. Is the sequence geometric? If so, what are a_1 and r?

    a. 2, 4, 8, 16, ...

    b. 1, 5, 9, 13, 17, ...

    c. 2^3, 2^7, 2^{11}, 2^{15}, ...

2. What is the second term of the geometric sequence 3, ☐, 12, ...?

3. When a ball bounces, the heights of consecutive bounces form a geometric sequence. What are the heights of the 4th and 5th bounces?

4. The ninth and eleventh terms of a geometric sequence are 45 and 80. What are the possible values for the 10th term?

Weeks 1.5 - 3

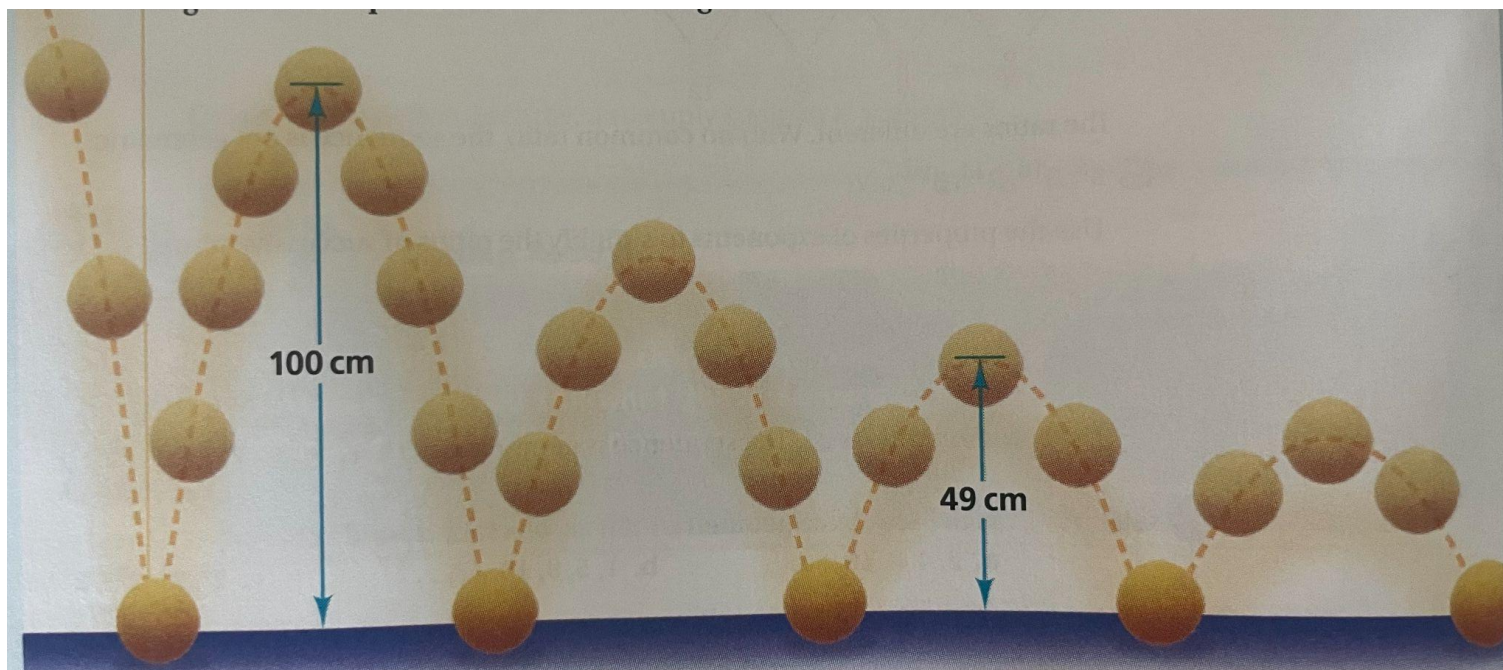*Lesson 7.4: Arithmetic Series*
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find the sum of a finite arithmetic series, use the sum of a finite arithmetic series, and find the sum of a series.

Examples:
1. What is the sum of the even integers from 2 to 100?
2. A company pays a $10,000 bonus to salesperson at the end of their first 50 weeks if they make 10 sales in their first week, and then improve their sales numbers by two each week thereafter. One salesperson qualified for the bonus with the minimum possible number of sales. How many sales did the salesperson make in week 50? In all 50 weeks?
3. What is the sum of the series?
   a. $105 + 97 + 89 + ... + (-71)$
   b. $-3 - 6 - 9 - ... - 30$

Lesson 7.5: Geometric Series
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find the sums of finite geometric series, use the geometric series formula, and analyze geometric series.

Examples:
1. What is the sum of the finite geometric series?
   a. $-15 + 30 - 60 + 120 - 240 + 480$
   b. $3 + 6 + 12 + 24 + ... + 3072$
2. To save money for a vacation, you set aside $100. For each month thereafter, you plan to set aside 10% more than the previous month. How much money will you save in 12 months?
3. Does the infinite sum converge or diverge? If it converges, what is the sum?
   a. $\frac{1}{2} + \frac{3}{4} + \frac{9}{8} + ...$
   b. $\frac{1}{3} - \frac{1}{9} + \frac{1}{27} - \frac{1}{81} + ...$

Interdisciplinary / Real World / Global Connections

1. Pierre began the year with an unpaid balance of $300 on his credit card. Because he had not read the credit card agreement, he did not realize that the company charged 1.8% interest each month on his unpaid balance, in addition to a $29 penalty in any month he might fail to make a minimum payment. Pierre ignored his credit card bill for 4 consecutive months before finally deciding to pay off the balance.
    a. What did he owe after 4 months of non-payment?
    b. If the credit card company were to allow Pierre to continue making no payments, after how many months would his balance exceed $1000?
2. A student deposits the same amount of money into her bank account each week. At the end of the second week she has $30 in her account. At the end of the third week she has $45 in her account. How much will she have in her bank account at the end of the ninth week?
3. Because of friction and air resistance, each swing of a pendulum is a little shorter than the previous one. The lengths of the swings form a geometric sequence. Suppose the first swing of a pendulum has a length of 100 cm and the return swing is 99 cm.
    a. On which swing will the air first have a length less than 50 cm?
    b. What is the total distance traveled by the pendulum when it comes to rest?

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Bell Work and Exit Slips
- Bell work example
    - Write the explicit and recursive formulas for the following sequences.
        - $10, 20, 30, 40, ...$
        - $-21, -18, -15, -12, ...$
    - Find the sum of the series $16, 8, 4, 2, ...$
- Exit slip example
    - Find the eighth term of the sequence $2, 1, -2, -7, -14, ...$

- ○ Find the sum of $3 + 5 + 7 + 9 + ... n = 15$
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 8: Probability and Statistics
Pacing	3 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.S-ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).
- S-CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

Supporting Standards:
- CC.9-12.S-ID.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Use relationships among events to find probabilities.	● Event ● Fundamental Counting Principle ● Outcome ● Probability ● Sample space
2. Find the probability of independent and dependent events and use permutations and combinations to find the number of outcomes in a probability experiment.	● Combination ● Dependent events ● Experimental probability ● Factorial ● Fundamental Counting Principle ● Independent events ● Outcome ● Permutation ● Probability ● Sample space ● Theoretical probability
3. Evaluate data distributions.	● Box-and-whisker plot ● Interquartile range ● Five number summary ● Mean ● Median

	- Mode - Quartiles - Skewed distribution - Standard deviation
4. Use a normal distribution.	- Normal curve - Normal distribution - Skewed distribution - Standard deviation - Symmetrical distribution

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. What is the difference between a permutation and a combination?	1. A permutation is an arrangement of items in a particular order; order is important. An arrangement in which order does not matter is a combination.
2. What is the difference between experimental and theoretical probability?	2. Probability expresses the likelihood that a particular event will occur. Data can be used to calculate an experimental probability, and mathematical properties can be used to determine theoretical probability. Either experimental or theoretical probability can be used to make predictions or decisions about future events. Various counting methods can be used to develop theoretical probabilities.
3. How are measures of central tendency different from standard deviation?	3. You can describe and compare sets of data using various statistical measures, depending on what characteristics you want to study. Standard deviation is a measure of how far the numbers in a data set deviate from the mean.

	Measures of central tendency indicate the "middle" of a data set and can include mean, median, and mode.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:
1. Find the mean, median, and mode of the set of values.

Age (years)	13	14	15	16	17	18	19
Frequency	7	12	18	9	5	4	2

2. For each situation, determine whether you should use a permutation or a combination. Then find the answer to each question.
   a. A chemistry teacher divides his class into either group. Each group submits one drawing of the molecular structure of water. He will select four of the drawings to display. In how many different ways can he select the drawings?
   b. You will draw winners from a total of 25 tickets in a raffle. The first ticket wins $100, the second ticket wins $50, and the third ticket wins $10. In how many different ways can you draw the three winning tickets?

1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

1.5.a. formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapters 11 & 12: pages 565-580, 603-612, 621, 627)

- **Media:**
- TI-nspire CX CAS graphing calculator
- Trigonometry Workbook Resources

- ○ SMART Board
- ○ SMART Math Tools

Online Resources / Websites:

- ○ https://www.khanacademy.org/
- ○ https://www.youtube.com/
- ○ https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Box-and whisker plot: a graphical method of displaying variation in a set of data using a five number summary including the maximum, minimum, and the first, second and third quartiles.

Combination: any unordered selection of r objects from a set of n objects is a combination. The number of combinations of n objects taken r at a time is $_nC_r = \frac{n!}{r!(n-r)!}$ for $0 \leq r \leq n$.

Dependent events: when the outcome of one event affects the probability of a second event, the events are dependent.

Experimental probability: the ratio of the number of times an event actually happens to the number of times the event is done. $P(event) = \frac{number\ of\ times\ an\ event\ happens}{number\ of\ times\ the\ experiment\ is\ done}$

Independent events: when the outcome of one event does not affect the probability of a second event, the two events are independent.

Interquartile range: the difference between the third and first quartiles.

Factorial: the factorial of a positive integer n is the product of all positive integers less than or equal to n and is written n!.

Five number summary: the descriptive statistics that include the minimum, first quartile, second quartile, third quartile, and maximum.

Fundamental Counting Principle: if there are m ways to make the first selection and n ways to make the second selection, then there are $m \cdot n$ ways to make the two selections.

Mean: the sum of the data values divided by the number of data values. This is also known as the average.

Median: the middle value in a data set when numerically ordered. If the data set contains an even number of values, the median is the mean of the two middle values.

Mode: the number(s) that occur most often in a data set.

Normal curve: a bell-shaped curve showing a particular distribution of probability over the values of a random variable.

Normal distribution: can be modeled in a particular bell-shaped curve that is symmetric about the mean.

Outcome: the result of a single trial in a probability experiment.

Permutation: an arrangement of some or all of a set of objects in a specific order. You can use the notation $_nP_r$ to express the number of permutations, where *n* equals the number of objects available and *r* equals the number of selections to make.

Probability: the likelihood that an event will occur, written formally as P(event).

Quartiles: values that separate a finite data set into four equal parts. The second quartile $\left(Q_2\right)$ is the median of the data. The first and third quartiles $\left(Q_1 \, and \, Q_3\right)$ are the medians of the lower half and upper half of the data, respectively.

Sample space: the set of all possible outcomes of a situation or experiment.

Skewed distribution: a curve with a shape that is stretched out in either the positive or negative direction.

Standard deviation: a measure of how much the values in a data set vary, or deviate, from the mean.

Symmetrical distribution: a curve with a shape that, when reflected across the mean, the display is roughly the same.

Theoretical probability: the ratio of the number of favorable outcomes to the number of possible outcomes.

| Learning Plan |
|---|
| *Overview and Key Learning Events and Instruction Per Week* |
| **Learning Tasks Per Week (Including Instructional Strategies)** |
| **Weeks 1 - 1.5:**
 Lesson 8.1: Probability Events
 Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find probabilities of mutually exclusive events, find probabilities of non-mutually exclusive events, identify independent events, find probabilities of independent events, and determine if events are mutually exclusive and find their probabilities. |

Examples:

1. You roll a standard number cube once. Let E represent the event "roll an even number." Let T represent the event "roll a 3 or a 5.
    a. What is the probability that you roll an even number or roll a 3 or 5?
    b. You roll a standard number cube once. What is the probability that you roll an even number and a 3 or a 5?
    c. You roll a standard number cube once. What is the probability that you do not roll an even number?

2. A student-made target includes two overlapping squares. Assure that a sticky ball is thrown at the target is equally likely to land anywhere on the target. What is the probability that the ball lands inside one or both of the squares?
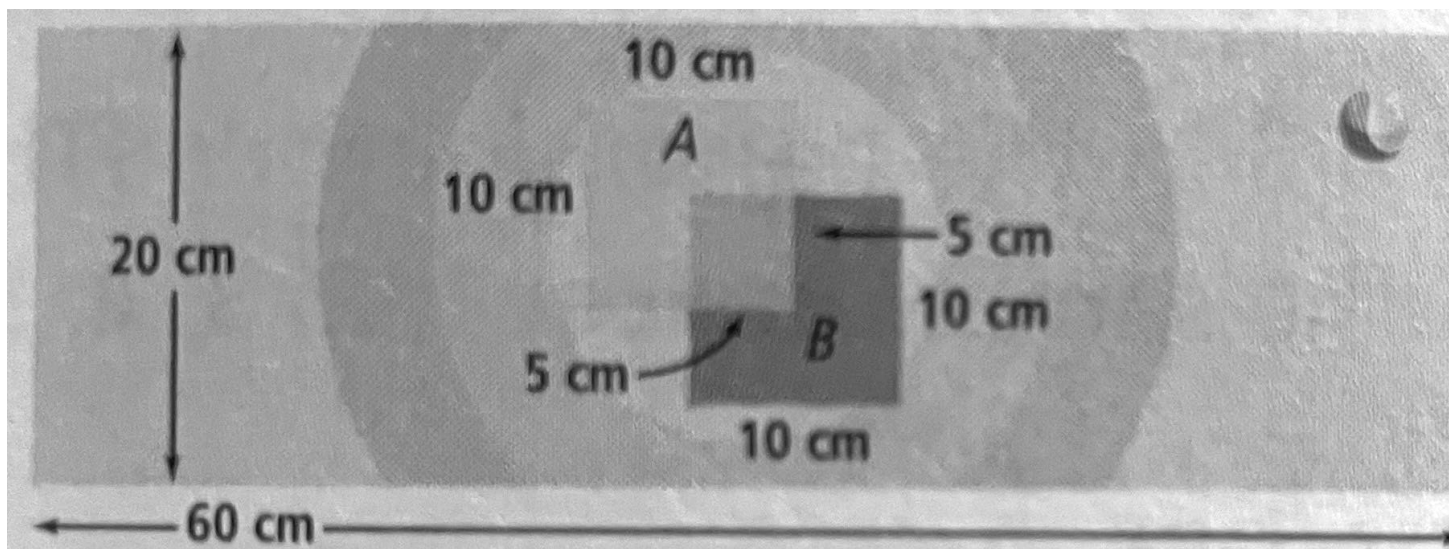
3. A jar contains 12 green marbles and 8 violet marbles.
    a. A marble is chosen at random from the jar and replaced. Another marble is chosen at random from the jar. Does the color of the first marble chosen affect the possible outcomes for the second marble chosen?
    b. A marble is chosen at random from the jar and not replaced. Another marble is chosen at random from the jar. Does the color of the first marble chosen affect the possible outcomes for the second marble chosen?

4. Alex cannot decide which shirt to wear today, so she chooses one at random. The probability of rain today is 40%.

   a. What is the probability that Alex chooses a yellow shirt and it does not rain today?
   b. What is the probability that Alex chooses a yellow shirt and it does not rain today or that Alex chooses a green shirt and it rains today?
5. About 30% of the US population is under 20 years old. About 17% of the population is over 60. What is the probability that a person chosen at random is under 20 or over 50? Are these events mutually exclusive? Explain your reasoning.
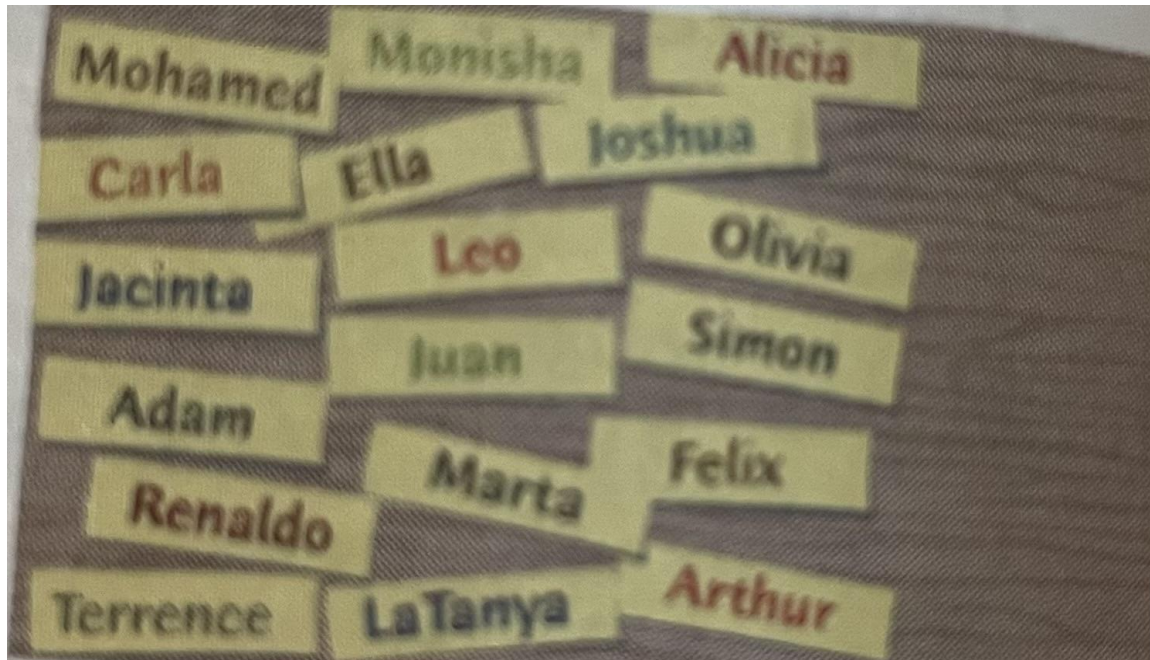
Lesson 8.2: Permutations and Combinations
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find probabilities of dependent and independent events, use the Fundamental Counting Principle, find the number of permutations, find the number of combinations, and use permutations and combinations to find probabilities.

Examples:
1. Students randomly generate two digits from 0 to 9 to create a number between 0 and 99. Are the events "first digit 5" and "second digit 6" independent or dependent in each case? What is P(56) in each experiment?
   a. The digits may not be repeated.
   b. The digits may be repeated.
2. The car that Ms. Garcia is buying comes with a choice of 3 trim lines (standard, sport, or luxury), 2 types of transmission (automatic or manual), and 8 colors. How many different option packages does Ms. Garcia have to choose from? Explain.
3. Gabriella is making a playlist with her 3 favorite songs.
   a. How many possible orders are there for the songs?

b. Gabriella wants to make another playlist using 5 of the 8 songs from her favorite artist's latest album. How many playlists are possible?

4. Marisol is planning to be a counselor at summer camp. She can choose 3 activities for her sessions from the options of archery, arts and crafts, canoeing, climbing, cooking, fishing, horseback riding, volleyball, painting, and sailing.
   a. How many different combinations of 3 activities are possible?
   b. How many ways can a camper choose 5 activities from the 10 available activities at the summer camp?

5. A teacher chooses 5 students at random from the names below to work together on a group project.
   a. What is the probability that the 5 students' names begin with a consonant?
   b. What is the probability that the 5 students' names begin with a vowel?

Lesson 8.3: Data Distributions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find measures of central tendency and spread, draw box-and-whisker plots by identifying the five number summary, and identify outliers.

Examples:

1. What are the mean, median, and mode of the following data set?
   4, 12, 15, 9, 14, 16, 13, 6, 7, 6, 25, 3, 13, 17, 22, 4
2. Draw a box-and-whisker plot of the following data sets.
   a. 9, 15, 17, 21, 23, 31, 33, 39, 46, 50
   b. 35, 12, 25, 33, 27, 48, 30, 34, 35, 41, 14
3. Identify the outlier of each set of values.
   a. 17 21 19 10 15 19 14 0 11 16
   b. 17 15 16 9 18 16

Weeks 1.5 - 3

Lesson 8.4 Normal Distributions

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will sketch a normal curve and analyze a normal distribution.

Examples:

1. For a population of male European eels, the mean body length and one positive and one negative standard deviation is shown below. Sketch a normal curve showing the eel lengths at one, two, and three standard deviations from the mean.
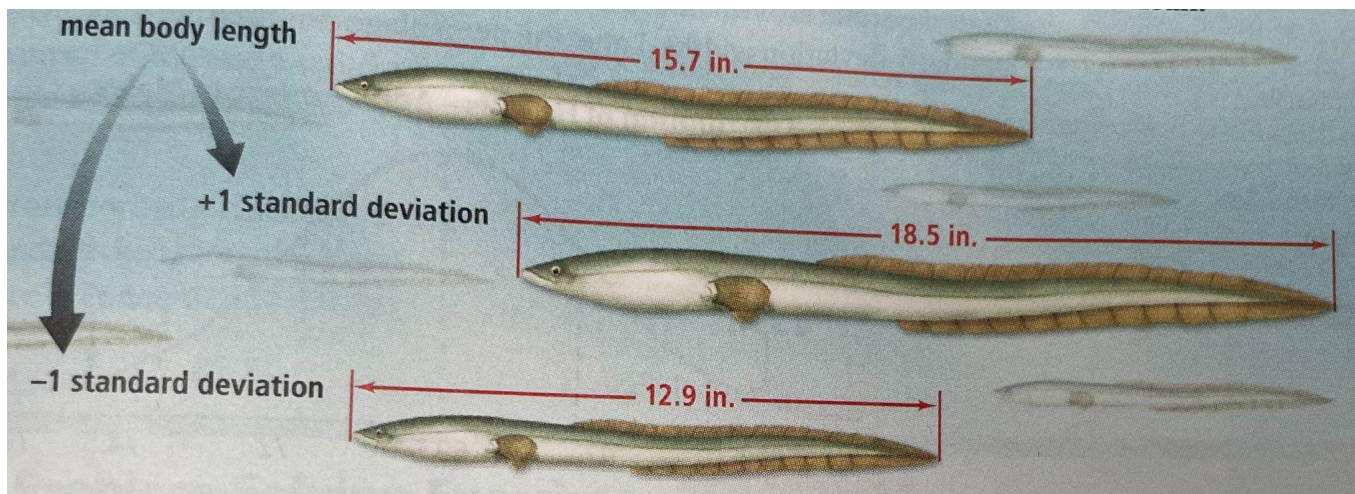
2. A set of data has a normal distribution with a mean of 50 and a standard deviation of 8. Find the percent of data within each interval.

   a. from 42 to 58
   b. less than 50

Interdisciplinary / Real World / Global Connections

1. Students will be chosen at random for school spirit awards. There are 6 athletes and 8 non-athletes who are eligible for 2 possible prizes. What is each probability?

   a. $P(both\ prizes\ are\ awarded\ to\ athletes)$
   b. $P(both\ prizes\ are\ awarded\ to\ non-athletes)$
   c. $P(no\ prize\ is\ awarded\ to\ an\ athlete)$
   d. $P(no\ prize\ is\ awarded\ to\ a\ non-athlete)$

2. State if the possible arrangements represent permutations or combinations, then state the number of possible arrangements.

a. A food truck has a lunch special on tacos. Customers choose a shell, three toppings, and two sides for one price. The choices are as follows:

Shell: hard, soft, wheat

Toppings: ground beef, chicken, steak, cheese, lettuce, tomato, sour cream

Sides: fountain drink, rice, beans, fruit

b. At the end of the season, 10 soccer teams are ranked by the state.

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Bell Work and Exit Slips
- Bell work example
  - A bag contains 24 green marbles, 22 blue marbles, 14 yellow marbles, and 12 red marbles. Suppose you pick one marble at random. What is each probability?
    - P(yellow)
    - P(not blue)
    - P(green or red)
  - The frequency table shows the number of trees in the yard of each house on one street. What are the mean, median, and mode for the trees per yard?

Trees	3	4	5	6	7	8
Yards	1	5	7	4	1	2

- Exit slip example
  - Two fair number cubes are rolled. State whether the events are mutually exclusive. Explain your reasoning.
    - The sum is a prime number; the sum is less than 4.
    - The numbers are equal; the sum is odd.
    - The product is greater than 20; the product is a multiple of 3.
  - The heights of adult American males are approximately normally distributed with a mean of 69.5 inches and a standard deviation of 2.5 inches.
    - What percent of adult American males are between 67 inches and 74.5 inches tall?
    - In a group of 2000 adult American males, how many would you expect to be taller than 6 feet (or 72 inches)?
- Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 9: Matrices
Pacing	3 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:
- CC.9-12.N-VM 6 Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
- CC.9-12.N-VM 9 Understand that, unlike multiplication of numbers, matrix multiplication. For square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

Supporting Standards:
- CC.9-12.N-VM 7 Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
- CC.9-12.N-VM 8 Add, subtract, and multiply matrices of appropriate dimensions.

Learning Expectations - The Westbrook high school student will meet expectations by...

- [ ] Reading a wide variety of texts effectively
- [ ] Writing effectively for a variety of purposes
- [ ] Presenting ideas accurately with the support of engaging media
- [x] Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Interpret the parts of a matrix and use matrices for addition, subtraction, and scalar multiplication.	● Corresponding elements ● Equal matrices ● Matrix ● Matrix element ● Matrix equation ● Scalar ● Scalar multiplication ● Zero matrix
2. Find the product of matrices or explain why the product does not exist.	● Identify matrix ● Matrix ● Matrix equation ● Scalar ● Square matrix
3. Find and use the inverse of a matrix.	● Determinant of a 2x2 matrix ● Inverse matrix ● Matrix ● Matrix Equation ● Square matrix
4. Use matrices to represent and solve systems of equations.	● Constant matrix ● Determinant ● Inverse matrix

	• Matrix • Matrix Equation • Reduced row echelon form • Variable matrix

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. How can you use a matrix to organize data?	1. You can organize data in a matrix in exactly the same way that you organize data in a rectangular table. They are square or rectangular arrays containing values organized as rows and columns. You can think of them as a spreadsheet or Google Sheets.
2. How can you use a matrix equation to model a real-world solution?	2. If you model a real situation with a system of equations, you can represent the system with a matrix equation. Systems of linear equations can be used to solve resource allocation problems in business and economics. Such systems can involve many equations in many variables, so you could use matrices and matrix operations to develop procedures that are suitable for solving linear systems of any size.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1. The matrix
$$\begin{bmatrix} 30 & 15 & 106 & 63 & 33 & 121 \\ 18 & 120 & 80 & 102 & 102 & 164 \\ 101 & 24 & 154 & 43 & 111 & 162 \end{bmatrix}$$
was encoded using the matrix

$$A = \begin{bmatrix} -1 & 3 & 2 \\ 4 & 6 & -2 \\ 0 & 1 & 5 \end{bmatrix}$$
. What is the message?

2. Two students visited the school store to buy supplies for the school year. One student purchased 8 holders and 6 notebooks for a total price of $38. The other student purchased 2 folders and 9 notebooks for a total of $47. If each folder is the same price and each notebook is the same price, how much does each folder and each notebook cost?

1.5. Computational Thinker Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. Students:

1.5.a. formulate problem definitions suited for technology assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.

Informational Texts:
- **Informational Books:**
  ○ enVision Algebra 2 by Savvas Learning Company (Chapter 10: pages 503-517, 528-547)

- **Media:**
  ○ TI-nspire CX CAS graphing calculator
  ○ Trigonometry Workbook Resources
  ○ SMART Board
  ○ SMART Math Tools

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Constant matrix: when representing a system of equations with a matrix equation, the matrix containing the constraints of the system in the constant matrix.

Corresponding elements: elements , in the same position in each matrix.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

Determinant of a 2x2 matrix: for the matrix , the value $ad - bc$ is the determinant.

Equal matrices: two or more matrices that have the same dimensions and the corresponding elements are equal.

Inverse matrix: a matrix such that its product with another matrix yields the identity matrix.

Matrix: a rectangular array or number written within a bracket.

Matrix element: each number in a matrix. For example, an element that is in the second row and third column could be labeled as element a_{23}.

Matrix equation: an equation in which the variable is a matrix.

Reduced row echelon form (RREF): a matrix that represents the solution of a system is in reduced row echelon form. The leading 1 in each row has 0's elsewhere in its column.

Scalar: the single real number being multiplied into each element of a matrix.

Scalar multiplication: the multiplication of each element in a matrix by a single real number.

Variable matrix: a one column matrix that represents all the variables in the system of equations.

Zero matrix: the zero matrix, O or $O_{m\,x\,n}$ is the $m\,x\,n$ matrix whose elements are all zeros. It is the additive identity matrix for the set of all $m\,x\,n$ matrices.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week 1:

Lesson 9.1: Operations with Matrices

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will represent data with a matrix, apply scalar multiplication, add and subtract matrices, and understand matrix addition and subtraction.

Examples:
1. Use the following matrices to answer each question.
    a. What could the data values in the matrix represent?

    $$\begin{bmatrix} 5 & 3 & 0 \\ 2 & 1 & 4 \end{bmatrix}$$

    b. How can you refer to an entire matrix or to elements of the matrix?

    $$A = \begin{bmatrix} 7 & 5 \\ -2 & 0 \\ 4 & 8 \end{bmatrix}$$

c. What are the values of the variables in the matrix equation?

$$\begin{bmatrix} 12 & 0 \\ 2x & 10 \end{bmatrix} = \begin{bmatrix} 12 & y \\ 14 & 10 \end{bmatrix}$$

2. Cool Threads, a clothing store, uses a matrix C to represent the prices of women's clothes.

$$\begin{bmatrix} 320 & 210 & 160 \\ 240 & 110 & 65 \end{bmatrix} = C$$

The columns represent the brands Vintage, Casual, and Distressed, and the rows represent jeans and jackets. If the sales tax rate is 5%, how can you use a matrix equation to find the amount of sales tax on each item?

3. Cool Treads uses matrices to keep track of monthly sales. In matrices A and B, Row 1 represents the sale of jeans and Row 2 represents the sale of jackets, with the columns representing the brands Vintage, Casual, and Distressed, respectively, during the two consecutive months.

a. What is the sales total for the two months?
b. What is the difference in the number of items sold each month?

4. Consider the matrices below. How can you add and subtract those matrices?

$$A = \begin{bmatrix} 5 & -7 & 3 \\ 4 & 8 & -2 \end{bmatrix}, B = \begin{bmatrix} 6 & 5 \\ -2 & 0 \\ 3 & -4 \end{bmatrix}, C = \begin{bmatrix} 12 & 0 & 0 \\ 0 & 15 & -9 \end{bmatrix}, D = \begin{bmatrix} -5 & 7 & -3 \\ -4 & -8 & 2 \end{bmatrix}$$

a. Which matrices can be combined using addition or subtraction?

b. How can you interpret a matrix of zeros?

c. What is the additive inverse of matrix B?

d. What does $A + C$ relate to $C + A$?

Lesson 9.2: Matrix Multiplication

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will understand matrix multiplication, examine multiplication of square matrices, and understand identity matrices.

Examples:

1. A teacher assigns final grades based on a weighted system. Students are graded on unit assessments, a semester project, and the final exam, each with a different weight. The matrices given below represent the weights for each kind of work and the grades for the two students Oscar and Reagan.

$$W = \begin{array}{ccc} unit & project & final \\ [0.50 & 0.30 & 0.20] \end{array}$$

$$G = \begin{array}{c} \\ unit \\ project \\ final \end{array} \begin{array}{cc} O & R \\ \begin{bmatrix} 90 & 80 \\ 95 & 70 \\ 75 & 85 \end{bmatrix} \end{array}$$

What are the final grades for each student?

2. Below are square matrices A and B. Determine if the given equations are true for A and B. What conclusions can we make about the Commutative and Distributive Properties for multiplying square matrices?

$$A = \begin{bmatrix} -2 & 1 \\ -1 & 0 \end{bmatrix} \quad B = \begin{bmatrix} -1 & -5 \\ 0 & 4 \end{bmatrix}$$

   a. Is $AB = BA$?
   b. Is $A(A + B) = AA + AB$?

3. Find the following products.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

   a.

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & -3 & 2 \\ -4 & 5 & -6 \\ 9 & -7 & 8 \end{bmatrix}$$

   b.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$$

   c.

Week 2-3

* Lesson 9.3: Inverses and Determinants

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will explore inverses 2x2 matrices, find inverses of square matrices, and use a matrix inverse.

Examples:

1. Find the following inverses of each matrix.

   a. $\begin{bmatrix} 2 & 1 \\ 3 & 0 \end{bmatrix}$

   b. $\begin{bmatrix} 1 & 5 \\ 1 & 3 \end{bmatrix}$

2. What are the following inverses?

   a. $A = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$

   b. $B = \begin{bmatrix} 6 & 8 \\ 3 & 4 \end{bmatrix}$

   c. $C = \begin{bmatrix} 1 & 2 & 1 \\ 0 & -1 & 0 \\ 2 & 1 & 4 \end{bmatrix}$

3. Use matrices to encode and decode the message WE COME IN PEACE.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week 1:

Lesson 9.1: Operations with Matrices

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will represent data with a matrix, apply scalar multiplication, add and subtract matrices, and understand matrix addition and subtraction.

Examples:

1. Use the following matrices to answer each question.
   a. What could the data values in the matrix represent?

   $$\begin{bmatrix} 5 & 3 & 0 \\ 2 & 1 & 4 \end{bmatrix}$$

   b. How can you refer to an entire matrix or to elements of the matrix?

   $$A = \begin{bmatrix} 7 & 5 \\ -2 & 0 \\ 4 & 8 \end{bmatrix}$$

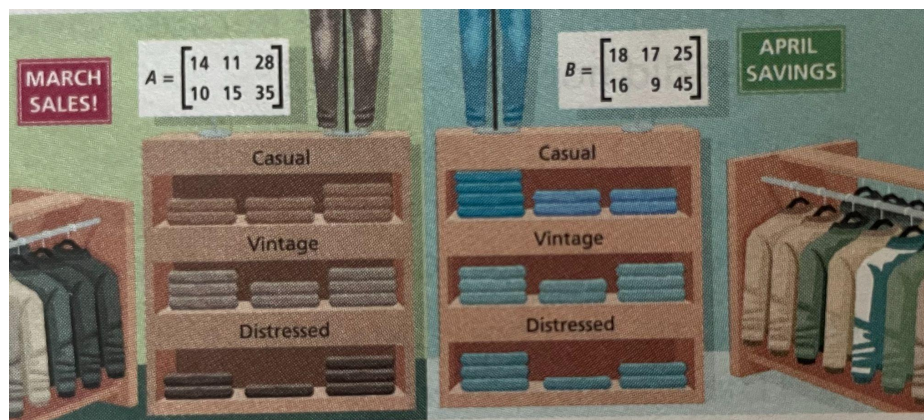   c. What are the values of the variables in the matrix equation?

   $$\begin{bmatrix} 12 & 0 \\ 2x & 10 \end{bmatrix} = \begin{bmatrix} 12 & y \\ 14 & 10 \end{bmatrix}$$

2. Cool Threads, a clothing store, uses a matrix C to represent the prices of women's clothes.

$$\begin{bmatrix} 320 & 210 & 160 \\ 240 & 110 & 65 \end{bmatrix} = C$$

The columns represent the brands Vintage, Casual, and Distressed, and the rows represent jeans and jackets. If the sales tax rate is 5%, how can you use a matrix equation to find the amount of sales tax on each item?

3. Cool Treads uses matrices to keep track of monthly sales. In matrices A and B, Row 1 represents the sale of jeans and Row 2 represents the sale of jackets, with the columns representing the brands Vintage, Casual, and Distressed, respectively, during the two consecutive months.

MARCH SALES!
$$A = \begin{bmatrix} 14 & 11 & 28 \\ 10 & 15 & 35 \end{bmatrix}$$

$$B = \begin{bmatrix} 18 & 17 & 25 \\ 16 & 9 & 45 \end{bmatrix}$$
APRIL SAVINGS

a. What is the sales total for the two months?
b. What is the difference in the number of items sold each month?

4. Consider the matrices below. How can you add and subtract those matrices?

$$A = \begin{bmatrix} 5 & -7 & 3 \\ 4 & 8 & -2 \end{bmatrix}, B = \begin{bmatrix} 6 & 5 \\ -2 & 0 \\ 3 & -4 \end{bmatrix}, C = \begin{bmatrix} 12 & 0 & 0 \\ 0 & 15 & -9 \end{bmatrix}, D = \begin{bmatrix} -5 & 7 & -3 \\ -4 & -8 & 2 \end{bmatrix}$$

a. Which matrices can be combined using addition or subtraction?
b. How can you interpret a matrix of zeros?
c. What is the additive inverse of matrix B?

d. What does $A + C$ relate to $C + A$?

Lesson 9.2: Matrix Multiplication

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will understand matrix multiplication, examine multiplication of square matrices, and understand identity matrices.

Examples:
1. A teacher assigns final grades based on a weighted system. Students are graded on unit assessments, a semester project, and the final exam, each with a different weight. The matrices given below represent the weights for each kind of work and the grades for the two students Oscar and Reagan.

$$W = \begin{matrix} unit & project & final \\ [0.50 & 0.30 & 0.20] \end{matrix}$$

$$G = \begin{matrix} & O & R \\ unit & \begin{bmatrix} 90 & 80 \\ project & 95 & 70 \\ final & 75 & 85 \end{bmatrix} \end{matrix}$$

What are the final grades for each student?
2. Below are square matrices A and B. Determine if the given equations are true for A and B. What conclusions can we make about the Commutative and Distributive Properties for multiplying square matrices?

$$A = \begin{bmatrix} -2 & 1 \\ -1 & 0 \end{bmatrix} \quad B = \begin{bmatrix} -1 & -5 \\ 0 & 4 \end{bmatrix}$$

a. Is $AB = BA$?
b. Is $A(A + B) = AA + AB$?

3. Find the following products.

   a.
   $$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

   b.
   $$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & -3 & 2 \\ -4 & 5 & -6 \\ 9 & -7 & 8 \end{bmatrix}$$

   c.
   $$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$$

Week 2

* Lesson 9.3: Inverses and Determinants

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will explore inverses 2x2 matrices, find inverses of square matrices, and use a matrix inverse.

Examples:
   1. Find the following inverses of each matrix.

   a.
   $$\begin{bmatrix} 2 & 1 \\ 3 & 0 \end{bmatrix}$$

   b.
   $$\begin{bmatrix} 1 & 5 \\ 1 & 3 \end{bmatrix}$$

2. What are the following inverses?

   a. $A = \begin{bmatrix} 4 & 1 \\ -1 & 2 \end{bmatrix}$

   b. $B = \begin{bmatrix} 6 & 8 \\ 3 & 4 \end{bmatrix}$

   c. $C = \begin{bmatrix} 1 & 2 & 1 \\ 0 & -1 & 0 \\ 2 & 1 & 4 \end{bmatrix}$

3. Use matrices to encode and decode the message WE COME IN PEACE.

Lesson 9.4: Inverse Matrices and Systems of Equations

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will solve a matrix equation using inverses *, write a system of linear equations as a matrix equation, solve a system of linear equations using an inverse matrix *, solve a system of linear equations using a reduced row echelon form, and solve a real-world system of equations.

Examples:

$$\begin{bmatrix} 2 & -1 \\ 0 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ 8 \end{bmatrix}$$

1. How can you solve the matrix equation using inverses   ?
2. How can each system of linear equations be represented as a matrix equation?

   a. $\begin{cases} 3x - 5y = 7 \\ 2x + y = 4 \end{cases}$

$$\begin{cases} x - 2y + 4z = 9 \\ 2x - 8z = -24 \\ 3x + y - 2z = -1 \end{cases}$$

b.

3. How can you use inverses to solve the following systems of linear equations?

$$\begin{cases} -3x + z = -9 \\ -x + 2z = 2 \\ 2x - y = 10 \end{cases}$$

a.

$$\begin{cases} -3x + 4y = -4 \\ \dfrac{1}{2}x - 3y = -11 \end{cases}$$

b.

4. Solve each equation using reduced row echelon form.

$$\begin{bmatrix} 8 & -7 \\ -6 & 4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ -12 \end{bmatrix}$$

a.

$$\begin{bmatrix} 2 & 8 & 4 \\ 1 & -1 & -3 \\ -3 & 2 & -9 \end{bmatrix} X = \begin{bmatrix} 26 \\ -2 \\ 37 \end{bmatrix}$$

b.

5. A company makes men's and women's sneakers. Last week, the company spent $340 on labor and $420 on materials. How many sneakers of each type did the company produce?

WOMEN'S SNEAKERS	MEN'S SNEAKERS
Labor: $10	Labor: $14
Materials: $12	Materials: $18

Interdisciplinary / Real World / Global Connections

1. In the price matrix P, the rows represent prices for sweatshirts and sweatpants. The columns represent the color scheme of the items: white, red, and tie-dye. If the sales tax rate is 7%, find the sales tax of each item.

$$P = \begin{bmatrix} 30 & 40 & 50 \\ 25 & 35 & 55 \end{bmatrix}$$

2. Steve wants to mix three different types of cereal to create a mixture with 3,400 calories, 90 grams of protein, and 90 grams of fiber. The boxes of cereal show the number of calories, grams of protein, and grams of fiber in one serving of cereal A, B, and C. Write a matrix equation to represent this situation. How many servings of each type of cereal does Steve need to include in the mixture?

Cereal A
Calories: 300
Protein: 11g
Fiber: 8g

Cereal B
Calories: 300
Protein: 7g
Fiber: 6g

Cereal C
Calories: 320
Protein: 8g
Fiber: 10g

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Struggling:
Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through deceleration, compacting, variety, reorganization, flexible pacing, and the use of more appropriately challenging concepts, and materials. Students that are still struggling within a unit will be provided additional instruction and practice.

Modifying Process:
To modify processes, activities and learning will be restructured to be appropriately demanding. For example, students that require extra instruction or practice will be re-taught one-on-one or in a group setting. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in various ways, and by connecting them to real world situations.

Modifying Product Expectations and Student Response:
Teachers will encourage students to demonstrate what they have learned in a wide variety of forms that reflect both knowledge and the ability to manipulate ideas.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Bell Work and Exit Slips
- Bell work example

○ Perform the following operations.

■
$$\begin{bmatrix} -1 & 4 \\ 2 & 7 \end{bmatrix} + \begin{bmatrix} 6 & 5 \\ -8 & 0 \end{bmatrix}$$

■
$$\begin{bmatrix} 1 & -3 & -7 \\ 9 & 11 & 5 \end{bmatrix} - \begin{bmatrix} 2 & -4 & 9 \\ 14 & 17 & 3 \end{bmatrix}$$

○ Given matrices $C = \begin{bmatrix} 9 & -5 \\ 3 & 6 \end{bmatrix}$ and $D = \begin{bmatrix} -7 & 1 \\ 8 & 2 \end{bmatrix}$, calculate each of the following.

■ $D - C$

■ $5D$

● Exit slip example

○ Solve the matrix equation using RREF.

$$\begin{bmatrix} -1 & 4 & -2 \\ 2 & -1 & 0 \\ -1 & -4 & 2 \end{bmatrix} X = \begin{bmatrix} 6 \\ 8 \\ 2 \end{bmatrix}$$

○ Find the determinant of the matrix.

$$\begin{bmatrix} 12 & -6 \\ 8 & -3 \end{bmatrix}$$

● Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

● Unit Test

Westbrook Public Schools
High School Math Curriculum
Algebra 2, 10th, 11th or 12th Grade

Subject(s)	Math
Grade/Course	10th, 11th, or 12th Grade / Algebra 2
Unit of Study	Unit 10: Trigonometric Functions
Pacing	3 Weeks

CT Core Standards
What are the goals of this unit?

Priority/Focus Standards:

CC.9-12.F TF 1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

CC.9-12.F TF 6 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

Supporting Standards:

CC.9-12.F TF 2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Learning Expectations - The Westbrook high school student will meet expectations by...

☐ Reading a wide variety of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments

Working responsibly and collaboratively

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Use trigonometric functions.	- Cofunction - Cofunction identities - Cosecant - Cosine - Cotangent - Reciprocal trigonometric functions - Secant - Sine - Tangent
2. Understand angles in standard position from the unit circle.	- Cosecant - Cosine - Cotangent - Radian - Radian measure - Secant - Sine - Standard position - Tangent - Unit circle
3. Create and use graphs of sine and cosine functions.	- Amplitude - Cosine

	● Frequency ● Midline ● Period ● Periodic function ● Sine
4. Create and use graphs of tangent functions.	● Amplitude ● Asymptote ● Period ● Radian ● Tangent ● Transformation ● Unit circle

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. How can you model periodic behavior?	1. A period function repeats a pattern of y-values at regular intervals. One complete pattern is called a cycle. A cycle may begin at any point on the graph. The period of a function is the length of one cycle. The midline is the line located midway between the maximum and the minimum values of the function. The amplitude of a periodic function is half the difference between its maximum and minimum values. The rotation of a Ferris wheel, the beating of a heart, and the movement of sound waves are all examples of real-world events that generate periodic data.

2. What function has as its graph a sine curve with amplitude 4, period π, and a minimum at the origin?	2. The sine function, $y = sin\ \theta$ matches the measure θ of an angle in standard position with the y-coordinate of a point on the unit circle. This point is where the terminal side of the angle intersects the unit circle. As the terminal side of an angle rotates about the origin (beginning at 0), its sine value on the unit circle increases from 0 to 1, decreases from 1 to -1, and then increases back to 0.
3. If you know the value of $sin\ \theta$, how can you find $cos\ \theta,\ tan\ \theta,\ csc\ \theta,\ sec\ \theta,$ and $cot\ \theta$?	3. For an angle θ in standard position whose terminal side intersects the unit circle at (x, y), the sine of θ is the y-coordinate of the point at which the terminal side of the angle intersects the unit circle. The cosine of θ is the x-coordinate. Tangent of θ is defined at the ratio $\frac{y}{x}$, $csc\ \theta = \frac{1}{sin\ \theta},\ sec\ \theta = \frac{1}{cos\ \theta},\ cot\ \theta = \frac{1}{tan\ \theta}$

Resources

1. A center-pivot circular irrigator has sprayers that follow concentric circular paths as the irrigator rotates. The radius of the innermost path is 20 m and the outermost path is 420 m more.
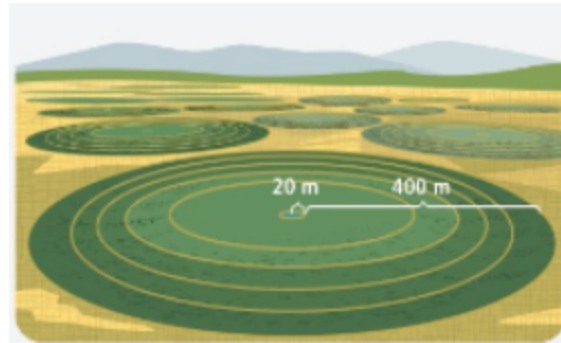
    a. What is the length of the path covered by the innermost sprayer when the irrigator rotates through an angle of $\frac{3\pi}{2}$ radians?

    b. What angle must the irrigator rotate through for the outermost sprayer to cover a path of the same length?

2. A solar day is 24 h and a lunar day is 24 h 50 min. A lunar day is 50 minutes longer than a solar day because the moon revolves around the Earth, and the Earth rotates around its axis in the same direction. This means it takes Earth 50 minutes longer to catch up with the moon. Each lunar day, two high tides and two low tides occur. High tides occur 12 h 25 min apart. Yesterday, the high tide was measured 8 ft above sea level and low tide was measured 2 ft above sea level. A cosine function models the depth of the water in feet, D, at time t in hours.

    a. What is the period of the function?

    b. The amplitude is the difference between the depth of the water at high tide and the average depth of the water. What is the amplitude?

    c. Write an equation to represent D as a function of t.

Informational Texts:
- **Informational Books:**
  - enVision Algebra 2 by Savvas Learning Company (Chapter 7: pages 356-411)

- **Media:**
- TI-nspire CX CAS graphing calculator
- Trigonometry Workbook Resources
- SMART Board
- SMART Math Tools

Online Resources / Websites:

- https://www.khanacademy.org/
- https://www.youtube.com/
- https://www.desmos.com/scientific

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Amplitude: the amplitude of a periodic function is half the distance between the maximum and minimum values of the function.

Asymptote: a line that a graph approaches. Asymptotes guide the end behavior of a function.

Cofunction: the trigonometric for the complement of an angle.

Cofunction identities: an equation that represents a trigonometric function with an equivalent trigonometric function related to its complement.

Cosecant: cosecant function, csc, is the reciprocal function of the sine function. For all real numbers θ except those that make $sin\ \theta\ =\ 0,\ csc\ \theta\ =\ \frac{1}{sin\theta}$.

Cosine: in a right triangle, the cosine of an acute angle is the ratio of the length of the side adjacent to the angle to the length of the hypotenuse.

Cotangent: the cotangent function, cot, is the reciprocal function of the tangent function. For all real numbers θ except those that make $tan\ \theta = 0$, $cot\ \theta = \frac{1}{tan\ \theta}$.

Coterminal angles: two angles in standard position are coterminal if they have the same terminal side.

Frequency: for a periodic function, the frequency is the reciprocal of the period.

Midline: the horizontal line through the average of the minimum and maximum values.

Period: the period of a periodic function is the horizontal length of one cycle.

Periodic function: a periodic function represents the pattern of y-values at regular intervals.

Radian: the measure of a central angle that intercepts an arc with the length equal to the radius of the circle.

Radian measure: the ratio of the length of an intercepted arc and the radius.

Reciprocal trigonometric functions: trigonometric functions formed by inverting the ratio of a given trigonometric function are reciprocal trigonometric functions.

Secant: the secant function, sec, is the reciprocal of the cosine function. For all real numbers θ except those that make $cos\ \theta = 0$, $sec\ \theta = \frac{1}{cos\ \theta}$.

Sine: in a right triangle, the sine of an acute angle is the ratio of the length of the side opposite the angle to the length of the hypotenuse.

Standard position: an angle in the coordinate plane is in standard position when the vertex is at the origin and one ray is on the positive x-axis.

Tangent: in a right triangle, the sine of an acute angle is the ratio of the length of the side opposite the angle to the length of the side adjacent to the angle. It is also equal to the ratio of the sine of the angle to the cosine of the angle.

Transformation: a transformation of a function maps each point of its graph to a new location.

Unit circle: the unit circle has a radius of 1 unit and its center is at the origin of the coordinate plane.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 1.5:

Lesson 10.1

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will write trigonometric ratios, use one trigonometric ratio to find another, find a missing side length, evaluate trigonometric ratios in special triangles, and explain trigonometric identities.

Examples:

1. Given the right triangle below, write the six trigonometric ratios for the given angle with measure θ.

2. Knowing that $tan\ \theta = \frac{15}{8}$, what are the other trigonometric ratios for θ?

3. A fire truck has an 84 foot ladder extended against a building forming a 55° angle with the top of the truck. The truck is 8 feet tall. The firefighters are trying to reach a window that is 75 feet above the ground. Will they be able to reach the window using the ladder set at this angle?

Lesson 10.2: Angles and the Unit Circle

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will find the measure of an angle in standard position, find the coordinates of a point on the unit circle, understand radian measure on the unit circle, convert between degrees and radians, use radians to find arc length, and use the unit circle to evaluate trigonometric functions.

Examples:

1. What is the measure of the angle shown below?

    $\left(-4, 4\sqrt{3}\right)$
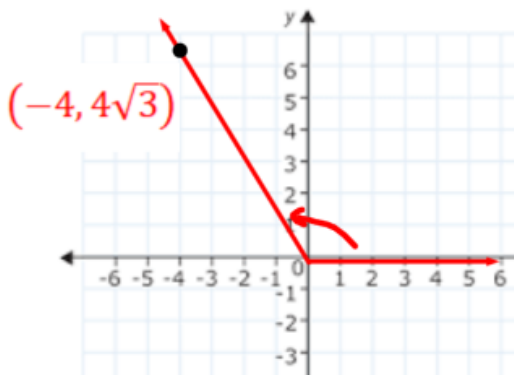
2. An angle, θ, has a measure of 60° and a terminal side that intercepts the unit circle at (x, y). What are the values of x and y?

3. Sketch a graph of an angle that measures $-\frac{5\pi}{6}$ in standard position.

4. Convert the angle measures.

    a.   112° to radians

    b. $\frac{\pi}{6}$ to degrees

5. NASA is tracking a satellite traveling in a circular orbit above Earth. It can only be tracked while it orbits through a $\frac{\pi}{6}$ angle. The radius of Earth is 6,400 km. What is the distance the satellite travels while it is being tracked?

6. Evaluate each of the following using the unit circle.

    a. *tan* 45°

    b. *cos* π

Weeks 1.5 - 3

Lesson 10.3: Graphing Sine and Cosine Functions
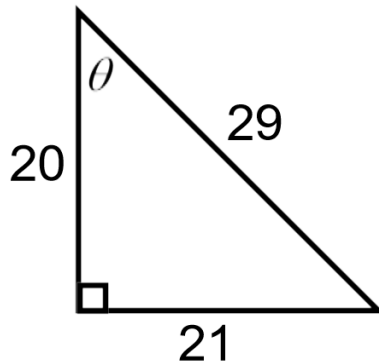
Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will understand the graph of a periodic function, identify amplitude and period, graph $y = a \sin bx$ and $y = a \cos bx$, and compare key features of two periodic functions.

Examples:

1. What is the graph of $f(x) = \sin x$?
2. What are the amplitude and period of $y = 3 \cos x$?
3. Graph the following graphs and find the frequencies.

    a. $y = 5 \sin \frac{1}{2}x$

    b. $y = 3 \cos 2x$
4. The equation for f and the graph of g are given below. How do the period and the amplitude of the functions compare?

$$f(x) = 4\cos(\tfrac{\pi}{4}x)$$

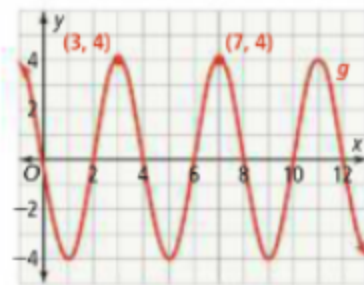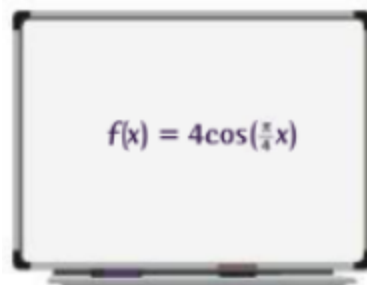*Lesson 10.4: Graphing Other Trigonometric Functions*

Through class discussions, lectures, small groups, one-on-one instruction and independent practice, students will graph $y = \tan x$, describe key features of tangent functions, and graph $y = a \tan bx$.

Examples:

1. Sketch the graph of $y = \tan x$. State the period, amplitude, and asymptotes.

2. Describe the key features (period, amplitude, and asymptotes) of the following graphs.
   a. $y = 2 \tan x$
   b. $y = \frac{1}{2} \tan 2x$
3. Sketch the graph of $y = 3 \tan 2x$. State the period, amplitude, and asymptotes.

Interdisciplinary / Real World / Global Connections

1. The sun shines at a 60° angle to the ground. How long is the shadow cast by a 20 foot flagpole?
2. Physicists use the Large Hadron Collider in France and Switzerland to observe particle collisions. A circular chamber with beam pipes to track the particle's circular path has a radius of 4.3 km. One beam tracks a particle's movement over an angle of $\frac{\pi}{4}$ radians. What is the distance traveled by the particle being tracked by the one beam pipe?
3. The relationship between the height of a point on a unicycle wheel, in feet, and time, in seconds, can be modeled by the sine function. A unicycle wheel has a diameter of 2 feet. A marker was placed on the wheel at time $t = 0$ s with a height of $h = 0$ ft. When Esteban is riding the unicycle, it takes $\frac{\pi}{2}$ seconds for the unicycle wheel to make one complete revolution.
   a. What is the period of the function?
   b. What is the amplitude of the function?
   c. Write an equation to represent this situation.
   d. How many revolutions will the unicycle wheel make in 4π seconds when Esteban is riding the unicycle?

Differentiation

Advanced:

Modifying Content: Content includes ideas, concepts, descriptive information, and facts. Content and learning experiences can be modified through acceleration, compacting, variety, reorganization, flexible pacing, and the use of more advanced or complex concepts, abstractions, and materials. Students will be encouraged to move through content areas at their own pace. If they master a particular unit, they will be provided with more advanced learning activities, not more of the same activity.

Modifying Process:
To modify processes, activities and learning will be restructured to be more intellectually demanding. For example, students need to be challenged by questions that require a higher level of response or by open-ended questions that stimulate inquiry, active exploration, and discovery. Although instructional strategies depend on the age of the students and the nature of the disciplines involved, the goal is always to encourage students to think about subjects in more abstract and complex ways.

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Struggling:
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Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Bell Work and Exit Slips
- Bell work example

- ○ Evaluate each of the following.
  - ■ $sin\ 135°$
  - ■ $cos\ \frac{\pi}{2}$
- ○ What is the period of the function $f(x) = cos\ x$? What are the other key features of the function?

- ● Exit slip example
  - ○ An angle, θ, has a measure of 145° and a terminal side that intercepts the unit circle at (x, y). What are the values of x and y?
  - ○ What is the amplitude and period of each function?
    - ■ $y = \frac{1}{3} cos\ \frac{1}{2} x$
    - ■ $y = 2\ sin\ \pi x$
- ● Quizzes

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- ● Unit Test

Westbrook Public Schools
Health Curriculum
Class: Health Grade(s): 9-10

Subject(s)	Health
Grade/Course	Grades 9 and 10 / Health
Unit of Study	Units 1 - 6: Current Events
Pacing	Daily

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
Standard 3 - Accessing Information Students will demonstrate the ability to access valid information, products, and services to enhance health

Supporting Standards:
AI 3.1.12 - Evaluate the validity and reliability of health information, products, and services.
INF 2.5.12 - Analyze the effect of media and technology on personal, family, and community health.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading
CCSS.ELA-LITERACY.RI.9-10.2

Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

Writing

CCSS.ELA-LITERACY.W.9-10.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Speaking and Listening

CCSS.ELA-LITERACY.SL.9-10.4

Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Summarize the event.	1. Health news, research and information is ever changing. It is imperative to use credible and reliable sources to access health information. and to be able to communicate that information clearly, concisely and logically.

Essential Questions	Corresponding Big Ideas
Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. Why is the event significant and important to share?	1. Current news and world events are important and significant. Making personal connections and acknowledging how others can be affected by health-related issues can increase understanding.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Standard 2: Communication and Collaboration - Students will use digital media and environments to communicate and work collaboratively, including at a distance to support individual learning and contribute to the learning of others.

Online Resources / Websites:
- Credible health news resources, such as:

NBC.com	MSN.com	FoxNews.com
CNN.com	NYTimes.com	CBS.com

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Current Event: important events happening around the world, and in the context of this class, within the medical, health, and wellness community.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Daily: Throughout the semester, students will be assigned dates to present a current health event. Each day, class starts with current event presentations. Topics range based on current news and world events and students are given autonomy when choosing subject matter as long as it is school appropriate. The theme can connect to physical, mental, social, emotional or spiritual health. Some examples include: advancements in health technology, food and safety recalls, bacteria/viral outbreaks (covid, monkeypox), updated data, statistics, and research on: stress, disease, safety, drug use, parenting, pregnancy, opioid use, sexual assault, exercise etc.

Interdisciplinary / Real World / Global Connections

- Current events are happening in real time and students want to discuss local and world news. Most world events can be connected to an aspect of health; physical, mental, social, emotional or spiritual.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- ☒ Reading a wide range of texts effectively
- ☐ Writing effectively for a variety of purposes
- ☒ Presenting ideas accurately with the support of engaging media
- ☐ Thinking critically to solve problems and reach well reasoned judgments
- ☐ Working responsibly and collaboratively

Differentiation

Advanced:
- Higher level questions.

Struggling:
- Extended time.
- Assigned topic and article.

Assessments
Include an overview of authentic assessments

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

Current Health Events

Throughout the course of the semester students will be required to present two current health events to the class; one each quarter. Each student will be assigned one day each quarter to discuss a topic that is significant in health today. It can be a global or local issue. The article and information must come from a credible source. To help organize the presentation, a brief two paragraph paper or slides presentation summarizing the event is required.

The paper or presentation must include the following:

Summary of the event
- What happened?
- Why did it happen?
- Who/What was involved?

Significance and Reaction
- Why is this event significant and important to share?
- Is there a personal connection or reaction to the event?

Source
- Credible source with proper MLA/APA citation

Presentation
- Demonstrates knowledge and understanding of the topic and is organized, effective, efficient and appropriate

Pictures or a short video can augment the presentation but are not required

Westbrook Public Schools
Health Curriculum
Class: Health Grade(s): 9-10

Subject(s)	Health
Grade/Course	Grades 9 and 10 / Health
Unit of Study	Unit 1: Understanding Health and Wellness
Pacing	2-3 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
Standard 3: Accessing Information Students will demonstrate the ability to access valid information, products, and services to enhance health.

Supporting Standards:
AI 3.1.12 Evaluate the validity and reliability of health information, products, and services.
INF 2.2.12 Analyze how personal attitudes, values, and beliefs influence healthy and unhealthy behaviors.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Writing
CCSS.ELA-LITERACY.W.9-10.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
Speaking and Listening
CCSS.ELA-LITERACY.SL.9-10.1
Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
CCSS.ELA-LITERACY.SL.9-10.4
Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Identify ways to take charge of one's physical, mental/emotional and social health.	1. A lifetime of good health involves making good choices and practicing healthful behaviors. Health is a combination of physical, mental, social and emotional well-being. Maintaining physical health includes: getting eight to ten hours of sleep each night, eating healthy foods and drinking plenty of fluids, making time for 30-60 minutes of physical activity each day, avoiding the use of tobacco, alcohol and other drugs and maintaining a standard for personal hygiene and cleanliness. Maintaining mental/emotional health includes: enjoying challenges that help you grow, accepting responsibility for your actions, expressing emotions in appropriate ways, having a positive outlook and making thoughtful and responsible decisions. Maintaining social health includes: seeking and lending support when needed, communicating clearly and listening to others and showing respect and care for yourself and others.

2. Understand health literacy and evaluate health products and services to reduce disparities and avoid fraud.	2. A health literate consumer carefully evaluates health products and services. One should read product labels and do some comparison shopping before buying products. It is important to know that a product's cost does not always reflect the quality. Products have different features, so, only buy what you need, ask about warranties, evaluate a product's safety and listen to recommendations from reliable sources.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. What are some behaviors that put your health at risk?	1. Risky behaviors harm your health, but there are steps you can take to avoid or reduce these risks. Examples of risky behaviors include: riding in a car without a seatbelt, texting and driving, tobacco/alcohol/drug use, inadequate exercise, unhealthy eating and high-risk sexual behaviors that may lead to STDs or pregnancy. It is important to recognize risky behaviors, evaluate consequences and choose ways to promote health, happiness and longevity.
2. Why is it important to be a health literate consumer?	2. Media and advertising can influence consumer choices in a number of ways. Advertisements use specific techniques to convey hidden messages that may not be entirely true. It is important to listen to factual and reliable information and to only purchase high quality products that you actually need and want.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Standard 2: Communication and Collaboration - Students will use digital media and environments to communicate and work collaboratively, including at a distance to support individual learning and contribute to the learning of others.

Informational Texts:

- Health Making Life Choices – Glencoe – The McGraw Hill Companies - p.3-48 (2010)
- Glencoe Health - McGraw Hill Education - p.2-51 (2022)

Media:

- What The Health Documentary
  - https://www.whatthehealthfilm.com/
- Ask The Doctor- Netflix series
- Ted Talks - Health
  - https://www.ted.com/topics/health

Online Resources / Websites:
- https://www.healthline.com/health/fitness-nutrition/healthy-lifestyle-benefits
- https://www.medicalnewstoday.com/articles/322268
- https://www.healthline.com/nutrition/10-benefits-of-exercise
- https://www.healthline.com/nutrition/10-reasons-why-good-sleep-is-important
- https://www.verywellmind.com/the-importance-of-mental-health-for-wellbeing-5207938
- https://www.healthline.com/nutrition/7-health-benefits-of-water

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Health: the combination for physical, mental, social and emotional well-being.

Spiritual health: a deep-seated sense of meaning and purpose in life.
Wellness: an overall state of well-being of your total health.
Chronic disease: an ongoing condition or illness such as heart disease, obesity, or cancer.
Heredity: all the traits that were biologically passed on to you by your parents.
Environment: the people you see everyday and the culture in which you live**.**
Culture: the collective beliefs, customs and behaviors of a group.
Media: various methods for communicating information.
Technology: a method to deliver media such as phones, computers, radio and television.
Risk behaviors: actions that can potentially threaten your health or the health of others.
Infection: a condition that occurs when pathogens in the body multiply and damage body cells.
Prevention: taking steps to keep something from happening or getting worse.
Lifestyle factors: personal habits or behaviors related to how a person lives.
Health education: providing accurate health information and teaching health skills to help people make healthy decisions.
Health literacy: a person's capacity to learn about and understand basic health information and services and to use these resources to promote one's health and wellness.
Advocacy: taking action to influence others to address a health-related concern or to support a health-related belief.
Values: ideas, beliefs and attitudes about what is important that help guide the way you live.
Decision-making skills: steps that enable you to make a healthful decision.
Health consumer: someone who purchases or uses health products or services.
Malpractice: failure of a health professional to meet accepted standards.
Health Fraud: the sale of worthless products or services that claim to prevent disease or cure other health problems.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week 1: Unit one is an introduction to health. The semester starts with a group icebreaker and by reviewing the syllabus and class expectations. The initial goal is to establish a safe learning environment. The class then transitions to a group discussion about overall health. Students will work with a partner to answer a variety of introductory questions about health and wellness. The questions and answers will drive class discussion for the first day. The goal is to have students identify the importance of physical,

mental/emotional, social and spiritual health. Students will understand how heredity, environment and other factors that affect health drive health-related decisions. In pairs, students will compare and contrast a number of advertisements and discuss how to determine when health information is valid. The class will discuss how technology has impacted the health status around the world and why it is important to access information from reliable sources and be a health-literate consumer.

Week 2: At the start of week 2, students will understand that risky behaviors can harm one's health and that it is important to reduce exposure to health risks. Students will work in pairs to chart long and short term consequences for risky behaviors Then, in small groups, the students will read and respond to a number of teacher generated decision making scenarios. For each scenario, students will use decision making skills to help make a healthful decision. Students will state the situation, list the options, weigh the possible outcomes, make a decision, and finally, evaluate their choice. Students will then create their own "decision making scenario" which will be presented as a comic strip or written narrative.

Week 3: At the end of week 2 and part of week 3, students will focus on accessing health information from reliable sources. A connection will be made to other academic areas and prior knowledge for finding credible information. Students will then complete a mini research project on a relevant health disease. Students will be given one day to research and prepare a presentation on a current and relevant health issue. Students will use reliable sources (FDA, CDC) to gather information and present their findings to the class. This will be the first class presentation of the semester and will be used to guide "current health event" presentations.

Interdisciplinary / Real World / Global Connections

- Health is a topic that is relatable to all people and is something that many take for granted. Family, peers and the media influence health-based decisions. Students will make connections to everyday lifestyle choices and their overall health.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- Reading a wide range of texts effectively
- Writing effectively for a variety of purposes
- ☒ Presenting ideas accurately with the support of engaging media
- Thinking critically to solve problems and reach well reasoned judgments
- ☒ Working responsibly and collaboratively

Differentiation

Advanced:
- Pair students with struggling individuals or allow them to work independently.
- Raise expectations when applicable.
- Higher level questions.

Struggling:
- Pair students with advanced individuals.
- Teacher check-in.
- Paper copies when applicable.
- Extended time if needed.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Decision Making Story

Option 1: Working individually or with a partner, write a narrative that tells a story about a teen who has to make an important decision. The story should include a plot, characters and should be told in a logical order. Show use of the decision making process

as the teen weighs the pros and cons of the decision. Proofread and correct work before turning in the final product. Be prepared to summarize your story for the class.

Option 2: Working individually or with a partner, create a comic strip that depicts a teen who has to make an important decision. The comic strip should include a plot, characters and should be designed in a logical order. Show use of the decision making process as the teen weighs the pros and cons of the decision This can be done digitally or by hand. Be prepared to summarize your comic strip for the class.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

Today's Health

Directions: With a partner, research an approved topic in health "today". Use reliable sources such as; the FDA and CDC, and credible online news websites such as; USA Today, The Wall Street Journal, cnn.com, msnbc.com, c-span.com etc., to gather information and present the findings to the class. Points will be awarded for accessing factual information, effective group work and providing an organized presentation. Be sure to properly cite your sources and review your assignment before submitting to google classroom.

Presentation Options Include: Google Slides, Digital Poster, Digital Pamphlets or other approved options.

Sample Topics: Medicine shortage, food recall, obesity epidemic, healthcare professional shortage, adolescent mental health, stress in the workplace, paleo diet, keto diet, and mindfulness.

Westbrook Public Schools
Health Curriculum
Class: Health Grade(s): 9-10

Subject(s)	Health
Grade/Course	Grades 9 and 10 / Health
Unit of Study	Unit 2: Relationships, Sexual Health and Disease Education
Pacing	8 Weeks

CT State Standards
What are the goals of this unit?
Priority/Focus Standards: **Standard 1**: Students will comprehend concepts related to health promotion and disease prevention to enhance health **Supporting Standards:** **SH 1.5.12** Summarize ways to reduce the risk of pregnancy, HIV, and other STDs (e.g., abstinence, avoiding alcohol and other drugs, limiting sexual partners, using protection). **SH 1.15.12** Describe the emotional, social, physical, and financial effects of being a teen parent **OWDP 1.3.12** Examine the controllable factors that contribute to optimal wellness and chronic diseases (i.e., heart disease, cancer, diabetes, hypertension, and osteoporosis). Intake (food, air, water, substances) Output (physical activity and movement; elimination of waste) Sleep Stress Management **SAAP 1.4.12** Differentiate between respectful (healthy) and disrespectful (unhealthy) relationships including active consent.

Correspondence to CT Core Standards

What are the goals of this unit?

Reading

CCSS.ELA-LITERACY.RI.9-10.2

Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

Writing

CCSS.ELA-LITERACY.W.9-10.1

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

CCSS.ELA-LITERACY.W.9-10.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Speaking and Listening

CCSS.ELA-LITERACY.SL.9-10.1

Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.4

Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unwrapped Priority Standards

| Skills/Suggested Outcomes
What must students do? | Concepts
What must students know? |
|---|---|
| 1. Explain the importance of maintaining healthy relationships. | 1. Strong relationships are important to overall health. People have many different types of relationships but one's role can be different in all of them. One of the most basic needs is the need to belong and feel loved. Building and maintaining healthy relationships can help you meet |

	this need. Relationships exist with family members, friends, teachers, classmates and people in the community. Healthy relationships are nurturing and encourage healthful choices. Qualities of healthy relationships include: mutual respect, honesty and commitment.
2. Discuss sexual assault statisics, affirmative consent and explain why this education is important.	2. Every 68 seconds, an American is sexually assaulted. Sexual violence affects hundreds of thoudands of Americans each year. While we are making progress, even today, only 25 of 1,000 rapists will end up in prison. In addition, one in 9 girls and one in 53 boys under the age of 18 experience sexual abuse or assault at the hands of an adult, and 8 out of 10 times, the survivor knows their perpetrator. Although it is a difficult topic to discuss, students need to be educated and made aware of this type of violence. Consent is not optional but mandatory. Affirmative consent is an active clear and voluntary agreement by a person to engage in sexual activity with another person.
3. Identify the stages of the human life cycle from fertilization through birth.	3. A single cell formed from one egg and one sperm, can grow into a complex human being. Fetal development occurs over nine months. At 0-2 weeks, the zygote attaches to the uterus, the spinal cord grows, the brain, ears and arms begin to form and the heart starts to beat. At 3-8 weeks, the embryo is about 1 inch long. The mouth, nostrils, eyelids, hands, fingers, feet and toes begin to form. At 9-14 weeks, sex organs, eyelids, fingernails and toenails develop and the fetus can make crying motions. At 15-20 weeks, the fetus can blink, is becoming more active and the limbs are fully proportioned. At 21-28 weeks, the fetus is about 1lb., can hear conversation and has a regular wake and sleep cycle.

	At 29-40 weeks, the fetus will continue to put on weight, organs will develop and the fetus can use all 5 senses.
4. Explain the roles and responsibilities for being a parent.	4. Parents find great joy and rewards in raising children but parenthood is a great responsibility which continues for many years. Parents must provide food, clothing, shelter, education and medical care for their children. In addition, parents must provide emotional care which includes, guidance, instilling values, setting limits, and providing unconditional love.
5. Explain the difference between communicable and noncommunicable diseases and identify examples of each.	5. Communicable diseases are caused by several kinds of microorganisms and are passed from one living organism to another or through the environment. Examples include: viruses (flu, measles, chicken pox etc.), bacteria (strep throat, lyme disease, pink eye etc.), fungi (athlete's foot), protozoa (malaria) and rickettsias (typhus). A noncommunicable disease is a disease that is not transmitted by another person, vector or the environment. Examples include: cardiovascular disease, cancer, allergies, asthma, arthritis, mental and physical abnormalities etc.
6. Identify the symptoms, diagnoses and treatments for common STDs, including AIDS.	6. Sexually transmitted diseases are highly communicable infections that are contracted through sexual contact. There are 25 different STDs, but the six most common are HPV, chlamydia, genital herpes, gonorrhea, trichomoniasis, and syphilis. STDs are identified through blood and urine tests. The symptoms range in severity and some STDs can lead to death. AIDS is the late stage of the HIV infection that occurs when the body's immune system is badly damaged from the virus.

Essential Questions	Corresponding Big Ideas

What essential questions will be considered?	*What understandings are desired?*
1. How does kindness support psychological health?	1. Kindness has been shown to increase self-esteem, compassion and empathy, and improve mood. Kindness can increase your connectivity to others, which can directly impact loneliness, improve low mood and enhance relationships. Psychologically, kindness can change your brain. Being kind boosts serotonin and dopamine which are neurotransmitters in the brain that can provide feelings of satisfaction and wellbeing.
2. What is affirmative consent and how does it affect sexual relationships?	2. Affirmative consent is explicit, informed and voluntary agreement to perform in a sexual act. Giving or refusing consent requires communication skills. Each person should communicate their feelings assertively and they should also listen to each other. Consent should be given freely; meaning that both parties agree to engage in sexual activity. One person should not intimidate or threaten the other - this is called coercion. Consent can not be given if a person is under the influence of drugs or alcohol and if sexual activity occurs while someone is under the influence, it is rape and considered a crime.
3. Which stage of a pregnancy is important? At what point does a fetus become viable and can live outside the womb?	3. Pregnancy has 3 trimesters, each of which is marked by specific fetal development. A pregnancy is considered full term at 40 weeks and infants delivered before 37 weeks are considered premature, however, a baby can be born as early as 24 weeks and have a chance to survive. Each stage of pregnancy is important, however, the first trimester is the most important. During this time, the baby's body structure and organ systems develop and most miscarriages and birth defects can occur during this time. It is important for pregnant women to eat well,

	maintain a healthy level of fitness and avoid harmful substances throughout the pregnancy.
4. Why is teen parenthood particularly challenging?	4. Although parenthood is rewarding, it requires maturity. Teen parents must be prepared to deal with financial difficulties, emotional stress, limitations on social and personal life and restrictions on educational and career plans.
5. In what ways can communicable diseases spread from person to person?	5. Communicable diseases can spread from person to person, passed through objects or through the air. Pathogens spread through direct contact which include; touching, biting, kissing or sexual contact. However, you do not need to be in direct contact with a person to become infected; indirect contact can be just as dangerous. This includes contact with contaminated objects, vectors, contaminated food and water. Lastly, disease can pass through airborne transmission. When an infected person sneezes or coughs the tiny droplets can travel up to 10 feet in the air and potentially be inhaled by others.
6. Why is early detection for STDs/HIV/AIDS important?	6. STD symptoms are often difficult to pinpoint or sometimes non-existent. Most STDs are either curable or treatable and catching them early can help both immediate discomforts as well as minimize the entire treatment process. If left untreated, STDs can cause serious long-term health challenges such as infertility, cancer or even death.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Standard 2: Communication and Collaboration - Students will use digital media and environments to communicate and work collaboratively, including at a distance to support individual learning and contribute to the learning of others.

Informational Texts:
- **Informational Books:**
- Health Making Life Choices – Glencoe – The McGraw Hill Companies - p. (2010)
- Glencoe Health - McGraw Hill Education - p. 118-141, 388-453 (2022)

Media:
- SPEAK - movie about relationship violence
- Life's Greatest Miracle - PBS Documentary
- A Baby Story - TLC TV series

Online Resources / Websites:
- OPENPhysEd.org
- https://www.healthline.com/
- https://www.medicalnewstoday.com/
- https://kidshealth.org/
- https://www.rainn.org/about-sexual-assault
- https://portal.ct.gov/SDE/Publications/Statewide-K12--Sexual-Assault-Abuse--Prevention-Awareness--Program-Guidelines/Introduction
- https://endsexualviolencect.org/stats-2018/
- https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/the-art-of-kindness
- https://www.healthline.com/health/baby/baby-development-stages
- https://www.babycenter.com/pregnancy/your-baby/fetal-development-week-by-week_10406730

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:
- **Relationship:** bond or connection you have with other people.
- **Infatuation:** the state of being carried away by unreasoning passion or attraction.
- **Intimacy:** being very close and familiar as in relationships involving private and personal sharing.

- **Mature love:** a strong affection for and a deep attachment to, a person whose character a partner knows well.
- **Date:** to engage in social events designed to allow people to explore their compatibility and to get to know each other.
- **Commitment:** a promise to make a long-term choice in the face of many possible options with the knowledge that the relationship will not always be perfect.
- **Conception:** the union of an ovum and sperm that starts a new individual.
- **Sperm:** male reproductive cells.
- **Semen:** a thick fluid containing sperm and other secretions.
- **Testosterone:** the male sex hormone.
- **Ovum:** female reproductive cells.
- **Uterus:** the hollow, muscular, pear shaped organ that nourishes and protects a fertilized ovum until birth.
- **Fallopian tubes:** a pair of tubes with fingerlike projections that draw in the ovum.
- **Ovulation:** the process of releasing a mature ovum into the fallopian tube each month.
- **Menstruation:** shedding of the uterine lining.
- **Fertilization:** the union of a male sperm cell and female egg cell.
- **Implantation:** the process by which the zygote attaches to the uterine wall.
- **Embryo:** the developing infant during the third through eighth week of conception.
- **Fetus:** a group of developing cells after the eighth week of conception.
- **Placenta:** a new organ that permits the exchange of materials between maternal and fetal blood.
- **Amniotic sac:** a fluid-filled balloon that houses the developing fetus.
- **Umbilical cord:** a rope-like structure stretching from the fetus' belly button to the placenta.
- **Miscarrigae:** the expelling of a zygote, embryo or fetus from the uterus, not induced by medical means.
- **Ectopic pregnancy:** the zygote implants not in the uterus but in the fallopian tube, abdomen, ovary or cervix.
- **Morning sickness:** the nausea a pregnancy may suffer at any time of day.
- **High-risk pregnancy:** a pregnancy more likely than others to have problems such as premature delivery or low birth weight.
- **Prenatal care:** medical and healthcare provided during a pregnancy.
- **Low birth weight:** an infant weighs less than 5.5lbs.
- **Amniocentesis:** a test of fetal cells drawn by a needle through the female's abdomen.
- **Sudden Infant Death Syndrome (SIDS):** the sudden unexplained death of an infant
- **Lightening:** the sensation a pregnancy woman experiences when the fetus settles into the birth position.
- **Labor:** contractions of the uterus strong enough to push the fetus through the vagina for delivery.
- **False labor:** warm-up contractions
- **Dilation stage:** the stage of childbirth during which the cervix is opening.

- **Expulsion stage:** the stage of childbirth in which the uterine contractions push the infant through the birth canal.
- **Placental stage:** the final stage of childbirth in which the placenta is expelled.
- **Afterbirth:** the placenta and membranes expelled after the birth of the child.
- **Breech birth:** an infant is born in a position other than normal head first.
- **Cesarean section:** surgical childbirth in which the infant is lifted through an incision in the woman's abdomen.
- **Postpartum depression**: the emotional depression a new mother experiences after the birth of an infant.
- **Communicable disease**: a disease that is spread from one living organism to another or through the environment.
- **Noncommunicable disease**: a disease that is not transmitted by another person, vector, of the environment.
- **Sexaully transmitted disease (STD):** diseases that are transmitted by way of direct sexual contact.
- **Human Immunodeficiency Virus (HIV):** the virus that causes AIDS
- **Chlamydia:** an infection of the reproductive tract without symptoms.
- **Pelvic Inflammatory disease:** an infection of the fallopian tubes and pelvic cavity in females, causing ectopic pregnancy and miscarriage.
- **Gonorrhea:** a bacterial STD that attacks many organs of the body when left untreated.
- **Genital herpes:** a common incurable STD caused by a virus that produces blisters.
- **Human papillomavirus:** a group of over 100 related viruses, the effects of which cause genital warts and cervical cancer.
- **Genital warts:** contagious wart-like growths on infected areas caused by human papilloma virus.
- **Syphilis:** a bacterial STD that if untreated advances from a soccer (chancre) to flu like symptoms, then through a long symptomless period and later to a final stage of irreversible brain and severe nerve damage, ending in death.
- **Chancre:** a hard painful sore.
- **Hepatitis B:** a viral STD that causes loss of liver function.
- **Trichomoniasis:** an STD caused by a parasite that can cause bladder and urethra infections.
- **Pubic lice:** an STD caused by tiny parasites that breed in pubic hair and cause intense itching.
- **Yeast infection:** an infection caused by yeast that multiplies out of control in the vagina.
- **Urinary tract infection:** bacterial infections of the urethra that can travel to the bladder and kidneys.
- **Abstinence:** refraining from sexual relations with other people.
- **Monogomous:** having sexual relations with one partner only, excluding all others.
- **Sexual violence:** a broad term which includes sexual assault, sexual harrassment, relationship violence, child sexual abuse and stalking.
- **Sexual assault:** any type of sexual contact or behavior that occurs by force or without consent of the recipient of the unwanted sexual activity.

- **Sexual abuse:** unwanted sexual activities with perpetrators using force, making threats or taking advantage of victims not able to give consent.
- **Sexual harassment:** an behavior or communication directed at someone with the intention of attacking their sexuality, sexual identity or sense of safety.
- **Perpetrator:** a term for the person causing the violence.
- **Survivor:** a term for an individual who experienced an act of sexual violence.
- **Affirmative consent:** an active clear and voluntary agreement by a person to engage in sexual activity with another person.
- **Grooming:** when someone builds an emotional connection with a child to gain their trust for the purposes of sexual abuse, sexual exploitation or trafficking.
- **Sexual exploitation:** means taking advantage of sexuality or attractiveness of a person to make a personal gain or profit.
- **Human trafficking:** the unlawful act of transporting or coercing people in order to benefit from their work or service, typically in the form of forced labor or sexual exploitation.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week 1: Unit 2, *Relationships, Sexual Health and Disease Education,* begins with a discussion about the characteristics of healthy and unhealthy relationships. In the whole group discussion, students will identify why healthy relationships (with anyone) are important. Students will list and rank the most important qualities of a healthy relationship and share what it feels like to lose faith and trust in someone. Working with a partner, students will respond to agree or disagree statements which will then be discussed as a class. From here, the teacher will introduce the cycle of violence and how it applies to relationships - this will prepare the group for the next topic.
Week 2: In week 2, the class will transition to sexual assault and abuse prevention. The teacher will begin by explaining why this content is important to teach in schools and will then share current sexual assault and abuse statistics. The teacher will introduce and define the following vocabulary; sexual violence, sexual assault, sexual abuse, sexual harrassment, perpetrator, survivor, affirmative consent, grooming, sexual exploitation and human trafficking. Next, the teacher will discuss the concept of power and control and how all forms of sexual violence are about gaining power and feeling a sense of dominance over someone. Students will complete sexual violence scenario matching, debunk common myths about sexual violence and complete a Personal Bill of Rights.

Week 3: Sexual assault and abuse prevention will carry into the first class of week three. Students will identify physical and emotional signs of dating violence, complete the "red flag" assignment and the sexual assault and abuse scenarios task. If time allows, students will watch the movie SPEAK and answer the corresponding questions. At the end of week three, classes will begin pregnancy and birth. As a review, students will discuss the key processes of the menstrual cycle, ovulation and fertilization.

Week 4: Students will then identify the stages of the human life cycle from fertilization through birth. The PBS documentary "Life's Greatest Miracle" and the corresponding questions can be used to support this information. Students will be able to recognize significant vocabulary such as; fallopian tube, placenta, amniotic sac, cesarean section, postpartum depression etc. Students will understand the stages of a pregnancy and know why prenatal care is important. The class will identify support and healthcare resources for expecting families.

Week 5: Next, classes will explain the roles and responsibilities for being a parent. Students will answer opinion based questions about parenting, adoption, fostering and teen pregnancy; thoughts and opinions will first be shared in small groups and then in full class discussion. The rest of week 5 and part of week 6 is dedicated to the Baby Budget Project.

Week 6: Students will gain an understanding for the financial responsibility that parents must embrace by planning for their child's first year of expenses. *See formative assessments for full project details.* If time allows, students can watch and discuss youtube clips from "A Baby Story".

Week 7: In week six, students will explain the difference between communicable and noncommunicable diseases and identify examples of each. Students will identify the four pathogens that cause communicable diseases (virus, bacteria, fungi, and protozoa) and spend one class period working with a partner to research a communicable disease. Presentations will be shared with the class so the group can understand the signs, symptoms and treatments for many common illnesses.

Week 8: The last section of this unit starts with a review of common STDs, HIV and AIDS by answering a number of true/false statements and debunking common myths about the illnesses. The teacher will share a slides presentation with signs, symptoms and treatments for the following STDs: chlamydia, gonorrhea, genital herpes, genital warts (HPV), syphilis, pubic lice, trichomoniasis and hepatitis B. The teacher will ask where STDs, HIV and AIDS originated and how they are spread from person to person. Students will understand why early detection for STDs/HIV/AIDS is important and identify public health resources for testing and support. Students will end the unit with STD/HIV/AIDS Decision Making Scenarios and thoughts and opinions will be shared in group discussion.

Interdisciplinary / Real World / Global Connections

- People who have healthy relationships are more likely to feel happier and satisfied with their lives. Healthy relationships increase your sense of worth and belonging and help you feel less alone.
- Supportive relationships foster healthy lifestyle choices which can help eliminate health disparities, improve quality of life and identify adequate health resources and information.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
☐ Reading a wide range of texts effectively
☐ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced:
- Pair students with struggling individuals or allow them to work independently.
- Raise expectations when applicable.
- Higher level questions.

Struggling:
- Pair students with advanced individuals.
- Teacher check-in.
- Paper copies when applicable.
- Extended time if needed.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Agree and Disagree

Read each of the following statements and write agree or disagree after each with an explanation as to why you feel the way you do.

1. You can tell when love is real because it hits you in an instant whether or not you want to be in love.
2. The best way to learn how to date may not be by dating but by attending social functions.
3. Couples in healthy intimate relationships spend all their free time together.
4. Distrust is never a part of mature loving relationships.
5. Beginning a relationship with someone who is on the rebound is asking for trouble.
6. If a couple has been in a close relationship for a year, continuing abstinence will ruin their relationship.
7. If a girl is dressed seductively she is just "asking" for sexual attention.
8. Physical intimacy makes a relationship last.
9. Teens don't really know how to be in a mature, loving relationship.
10. There is no such thing as healthy conflict in a relationship.
11. In order to love someone else, you must love yourself first.

Short Answer

12. What are the most important qualities necessary in a healthy relationship?
13. What is the difference between mature love and infatuation?
14. In your opinion, what are the stages of a mature loving relationship?
15. What does marriage mean to you?

Decision Making Scenarios

Do You Agree or Disagree

Explain

1.   Marcus and Shondra, age 27, have been married for 7 years and are unable to have children. Shondra would like to adopt or have artificial insemination. Marcus says NO. He says he's content to go on without children and won't change his mind. Shondra really wants children.

_____Shondra should consider ending the marriage while she's still young enough to adopt or have children with someone else.

2.   Kelly and Scott have been married for 5 years. Kelly just found out that Scott has been having an affair with one of her good friends. Scott begged forgiveness and promised it would never happen again. He even said he'd go to marriage counseling if it would save their marriage.

_____Kelly should get a divorce because she can never trust him again

 3.   Rosa and Luis have been married for 6 years. They both have successful careers. Rosa is pregnant. She wants to take 6 months to a year off work once she has the baby. Luis wants her to quit her job until they are done having children and the kids are all in school. This is causing a lot of tension between them.

_____Rosa should agree to quit her job and stay at home with the kids.

4.   Kara and Jeff have been married for 2 years. Kara wants to have a baby but Jeff has always been a heavy drinker and lately he's gotten worse.

_____Kara should not have a baby until Jeff cleans up his act.

5.   Kim and Li have been married for 3 years. Li's mother always stops over and lets herself in (Li gave her a key). To add to this she constantly criticizes Kim's housekeeping and cooking. Kim has told Li that she would rather his mother not have a key and only come over when invited. Li says Kim is just overreacting.

_____Kim should confront her mother-in-law and let her know how she feels.

Sexual Assault Scenario #1

As you read the scenario below, look for the red flags for sexual assault and write them in the space at the bottom of the sheet.

Maggie's Story

Maggie was excited and a little nervous. She checked her makeup and hair; she wanted to look really nice for Josh. Maggie met Josh through a mutual friend and had been immediately attracted to him. After a couple of weeks of flirting, Josh asked Maggie to the beach party. At the party, Josh paid a lot of attention to her. Maggie was enjoying getting to know Josh. She had heard some rumors that he had "a lot of girlfriends" but he seemed really sweet and genuine. She could tell he liked her too. Josh smiled at Maggie and pulled her close. Maggie put her arms around Josh's neck and put her face on his chest. Josh began to rub Maggie's back and let his hands wander down to her buttocks. Maggie felt uncomfortable about the way Josh was touching her, so she pushed him away and suggested they get something to drink. Josh took Maggie's hand and led her over to the cooler. He handed her a beer and gave her a long, slow kiss. Maggie was surprised by the kiss and felt unsure about her feelings. She laughed nervously and began talking about how much she liked the beach as Josh led her away from the party. When Josh and Maggie got away from the noise of the party, Josh suggested they sit and talk. Maggie hesitated. She told Josh that she was feeling a little sick and should probably go home. Josh said, "We won't talk long. I just want to get to know you better." He took Maggie's hand and pulled her down beside him on the sand. Maggie sat down feeling confused. Josh began to kiss her. He pushed her down onto the sand and unfastened the back of her bra. Maggie stopped responding to his kisses and said she wanted to leave. Josh ignored her and said, "Don't worry, I won't hurt you." and had sex with her. Maggie felt guilty and wondered what she had done to make Josh act that way.

List the red flags you found in this scenario

Sexual Assault Scenario #2

As you read the scenario below, look for the red flags for sexual assault and write them in the space at the bottom of the sheet.

Ana's Story

Ana went to the party to have a good time, to meet some people. At the party she saw Eric, a guy she met once or twice before. She saw him looking in her direction even though he was talking to some other guys. Ana went over and started a conversation. She really liked his looks and he seemed nice. As Ana learned more about him, she found that she was attracted to him and thought she would enjoy getting to know him better. Ana really enjoyed the party -- probably because of Eric. She was surprised and flattered when he asked if he could take her home. When he suggested going to his place, it sounded like a good idea. Ana was enjoying his company and thought that she didn't want to do anything stupid that would ruin her chances with him. When they got to his apartment, he put on some music and they talked for a little while. Then he kissed her. Ana didn't mind that, but when he started to pull at her blouse, she got upset. She got up to leave and he grabbed her hand. He told her to sit down, that he just wanted to talk. Ana was uncomfortable, but she didn't want to hurt his feelings. Plus, she liked him, so she sat down. Things really changed in a hurry. He went from Dr. Jekyll to Mr. Hyde. Ana remembered him saying, "Just relax -- you know it feels good." She was really scared then and tried to get away from him. That's when he grabbed her hands and held her down. Ana started to cry and kept begging him to stop, but he just ignored what she was saying and forced himself on her. Ana couldn't believe it was happening.

List the red flags you found in this scenario

Sexual Assault Scenario #3

As you read the scenario below, look for the red flags for sexual assault and write them in the space at the bottom of the sheet.

Dream Romance

Jennifer actually thought she knew what she was doing. The problem was that she was 15 years old when she was sexually assaulted by a 26-year-old man. It started with an innocent crush. "I thought Gabe was really cute. I used to dream about him asking me to marry him and taking me away to some island paradise." That never happened. Instead, one night Jennifer's older brother invited her to go dancing with them. There was no problem getting in the club, Jennifer had piled on tons of makeup and she looked old enough. The older crowd thought it might be fun to see Jennifer drunk. " I remember my brother yelling, 'Let's get my sister drunk!' and everyone is cheering with us." As the night wore on Jennifer drank and danced. At around 3 a.m., her brother left with some friends to go pick up his girlfriend. "Ten minutes later Gabe led me out of the club," remembers Jennifer. "He drove to the nearest motel and got a room. Then he began to kiss and touch me." "I'd never been touched like that. I'm not sure what I was thinking. I guess I felt lucky that Gabe actually liked me. I didn't ask him to stop because I was afraid he'd stop liking me and leave." That night Gabe had sex with Jennifer. She never screamed or fought back or even said, "no." The next day, Jennifer went to Gabe's house to see him. She thought that now they would be together forever. When she got there, Gabe wouldn't talk to her and she found out that he lived with his girlfriend, someone his own age. Jennifer was exploited and molested. At 15 years old she was too young to consent to sex.

List the red flags you found in this scenario

Sexual Assault Scenario #4

As you read the scenario below, look for the red flags for sexual assault and write them in the space at the bottom of the sheet.

Sweet Sixteen

Maria was excited about Friday night. Her cousin was turning sixteen and they were having a big party. A lot of her friends were coming to the party. There would be good food, good music and dancing. The evening started off great, she was having fun and her cousin seemed really happy. As things were getting going, someone offered Maria a drink of orange juice with tequila. Maria

decided that even though she didn't drink, it wouldn't hurt to try it. She was going to sleep at her aunt's house, all her friends and cousins were there, so why not? Later that night, as the party was winding down, one of her cousin's friends arrived – he was with two guys Maria had never seen before. She thought it was kind of weird that they showed up so late, but her cousin seemed to be cool with it. The guys were kind of quiet. Maria noticed the guy named Martin staring at her and watching her dance with her friends. After a while, Martin came over. It turned out that he knew her cousin's friend from school. Martin seemed kind of drunk. He told Maria that they had been partying at the park before coming over. He headed to the kitchen for another beer and offered to get a drink for Maria. She really didn't want one, but she said yes to be polite. A little while later, after sipping the drink Martin brought her, Maria started to feel dizzy and sick. She was vaguely aware of Martin coming over to her and telling her she needed fresh air. She didn't want to go with him but he took her hand and led her outside and to his car. Maria didn't want to sit in his car, but she couldn't seem to say the words. He helped her into the car. The next thing Maria knew, Martin was forcing her head down into his lap.

List the red flags you found in this scenario

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Baby Budget Project

Objective: *To identify the financial responsibility for having a baby and becoming a parent*

Imagine you are about to have a baby! Choose a name and gender for your child! You will work with a partner to complete this assignment. The assignment is broken into 4 parts, charts have been provided for your reference and a notes page is included to help further explain the directions.

Part 1- Questions to Consider

Part 2- From the list on the next page, look at the items your baby will "need" in its 1ˢᵗ year. First, identify how much (quantity) of the item you will use, second place an estimated price next to each item and third figure out a total estimated cost for one year; (we will assume clothing will be paid for by family and friends). *See charts for ongoing costs*

Part 3- Research the actual cost for each of these items. Go to: http://www.babycenter.com/baby-cost-calculator and place the actual costs in the column next to your estimated costs (remember to input your needed quantity). At the bottom of the page, figure out a total for your actual expenses for one year.

Part 4- Reflection Questions

Questions to Consider

1.   Think about child care, will one of you choose to take time off or work to raise the child? If not, when will you go back to work? Will the baby go to daycare? How many hours a week will the baby be in daycare? Will you use a home daycare, daycare center or get a nanny? *Note: a typical paid (where the mother has to use her sick days) maternity leave is 6-8 weeks - will you want to take more time than this off?*

2.   How do you plan to feed the child? Will you breast feed? If so, for how long? What equipment/materials will you need? If not, research how many bottles the baby will need a day. Refer to the chart provided.

3.   Where will the baby sleep? Will he/she have his/her own room? What about furniture? Crib, changing table, rocking chair etc.

4.   How many doctor visits will the child have in its first year? Research the cost for well care and sick Doctor visits.

5.   When will you start saving for college? How much per month?

Diapers

Age	Diaper changes per day	Number of diapers	Cost
0-1 mons	10-12	320	$64.00
1-5 mons	8-10	870	$174.00
5-9 mons	8	870	$174.00
9-12 mons	8	728	$145.60

Wipes

$3.00/package; 150 count   3 wipes/diaper change

Day Care

Service Type	Lowest Cost	Highest Cost	Average Cost
Infant/Toddler Center Full-Time	$121.00/week	$434.00/week	$242.73/week

Infant/Toddler Home Full-Time	$75.00/week	$375.00/week	$180.04/week
Nanny – Full Time	$8-12.00/hour	$15-20/hour	$10-15/hour

Insurance

9 healthy visits "check-up"

Don't forget "sick" visits

With insurance - $10-$30/visit co-pay	Without insurance - $95/visit
	Immunizations - $620/year

Formula

Each container of formula makes about **168 fluid ounces** and cost $27.00

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Disease/Illness Research and Presentation

Directions: With a partner, research an assigned disease and prepare a presentation to share with the class. Points will be awarded for accessing factual information, effective group work and providing an organized presentation. Be sure to properly cite your sources and review your assignment before submitting to google classroom. The following information should be included in each presentation:
- a definition and description of the disease,
- symptoms,
- treatment and prevention of the disease
- and whether the disease is caused by a bacteria, virus or other source.

Presentation Options Include: Google Slides, Digital Poster, Digital Pamphlets or other approved options.

Sample Topics: flu, common cold, staph infections, ebola, lyme disease, COVID, monkeypox, mono, meningitis, strep throat, koksaki.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

STI Scenarios

Objective: Students will recognize that there is often more than one choice in a given situation; each with its own consequences.

Directions: Read the situation and answer the discussion questions using complete sentences.. *Think about how you would react if you were involved in any of these situations.*

Scenario 1: Jane and Chris have been dating for two months. Sometimes they have sex. Jane suspects that Chris is having sex with other partners, but isn't sure. What should Jane do and why?

Scenario 2: Paul and Mary have been dating for a long time, and the relationship has progressed to a place where both partners want to have sexual intercourse. When Mary asks Paul to use a condom, Paul is insulted. He says he is clean, that condoms are unnatural, fake and a total turn off, and since Mary is on the pill it shouldn't be necessary. What should Mary do and why?

Scenario 3: Karen's boyfriend Jerrold recently noticed an unusual discharge from his penis. When he got tested, the results showed that he had gonorrhea. He accused Karen of giving it to him, since he'd been faithful to Karen. Karen has had sex with other partners, but doesn't have any symptoms. Jerrold would like Karen to get tested, but Karen doesn't want to. Why should Karen get tested?

Scenario 4: Roberta's younger sister thinks she may have an STI. She doesn't know where to go for testing. She also doesn't want her parents to know. She has asked Roberta for help. Where could Roberta's sister go for testing and what can Roberta do?

Scenario 5: Daniel has never had sex. He recently shared needles with friends at a tattooing party. He realizes he has put himself at risk for HIV, Hepatitis B & C, and is worried. What should Daniel do and why?

Scenario 6: Stacey is not in a steady relationship. She sometimes has sex with casual dates. She is worried about STIs and wants to know how to recognize the symptoms. What should Stacey do and why?

Scenario 7: Last year Javi was diagnosed with genital herpes. Since that time, she has been abstinent. Now she is dating someone new. What should Javi do and why?

Scenario 8: Lorrie and Dale have been in a long term relationship, and have been having sex for the last 8 months. Dale has been trying to convince Lorrie to stop using condoms "now that they know each other so well." What should Lorrie do and why?

Scenario 9: Donny has been dating the same person for six months. When they first had sex, they used condoms, but stopped using them about a month ago. Now Donny has small itchy bumps on her genitals. What should Donny do and why?

Scenario 10: Six months ago, Jonas was at a party and had too much to drink. He ended up having unprotected sex. Now he has heard a rumor that the person he had sex with is HIV positive. What should Jonas do and why?

Westbrook Public Schools
Health Curriculum
Class: Health Grade(s): 9-10

Subject(s)	Health
Grade/Course	Grades 9 and 10 / Health
Unit of Study	Unit 3: Substance Abuse
Pacing	6 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:
Standard 1 - Students will comprehend concepts related to health promotion and disease prevention to enhance health.

Supporting Standards:
ANOD 1.5.12 Compare the relationship between ANOD use and other risks, such as unintentional injuries, violence, suicide, sexual risk behaviors, decreased school and job performance, school and job absenteeism, and job loss.
ANOD 1.7.12 Identify treatments for addiction to ANOD.
ANOD 1.3.12 Examine the resiliency skills that empower people to remain alcohol- and drug-free.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading
CCSS.ELA-LITERACY.RI.9-10.2

Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.

Writing

CCSS.ELA-LITERACY.W.9-10.1

Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

CCSS.ELA-LITERACY.W.9-10.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Speaking and Listening

CCSS.ELA-LITERACY.SL.9-10.1

Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.9-10.4

Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Explain the purpose of medicine, how medicine is classified and how medicines affect people differently.	1. Medicines are classified based on how they work in the body. People use medicines to help restore their health when they are ill. Medicines are drugs that are used to treat or prevent diseases or other conditions. All medicines are drugs but not all drugs are medicines. Drugs are effective in treating illness when taken as directed by a physician or according to the label instructions. Medicines can be broken down into four categories: medicines that help prevent disease, medicines that fight pathogens, medicines that relieve

pain and other symptoms and medicines that manage chronic conditions, help maintain or restore health and regulate the body's systems.

2. Explain the health risks of using tobacco and ways to avoid tobacco products.

2. All forms of tobacco contain chemicals that are dangerous to your health. Medical studies have shown that tobacco use is the leading cause of preventable death and disability in the United States. The reason tobacco users find it hard to quit is nicotine which is a drug that causes physiological and/or psychological dependence. Electronic cigarettes are a nicotine delivery system. Tobacco based products and electronic cigarettes can lead to the following health effects: brain chemistry changes, respiration and heart rate increase, dulled sense of tastes and smell, bad breath, yellow teeth, smelly hair, skin and clothes, chronic bronchitis, emphysema, lung cancer, coronary heart disease and stroke, and a weakened immune system. More teens than ever are recognizing the health risks of tobacco use and steering clear of tobacco products. The best way to avoid tobacco products is to never start using them. A few additional strategies to live tobacco free are: identify and resist marketing tactics, surround yourself with positive influences, reduce peer pressure and be prepared with refusal skills.

3. Identify how alcohol use can harm the body and the brain and cause a person to make poor decisions.

3. Ethanol (the active ingredient in alcohol) is a powerful and addictive drug. Alcohol is a depressant or a drug that slows down the central nervous system. Using it slows down reaction time, impairs vision, and diminishes judgment. Alcohol does not affect everyone the same way. Its effects may appear slowly or quickly and may be more or less intense from person to person. Factors

	that influence alcohol's effects include: body size, gender, food, rate of intake, amount and interactions with other drugs. Excessive alcohol use over a long period of time can cause damage to nearly every body system. Its effects include: damage to brain cells and a reduction in brain size affecting memory and brain function, buildup of fat cells in the liver which can lead to cell death, damage to the lining of the stomach which can result in ulcers and stomach cancer, destruction of the pancreas. Consuming a large amount of alcohol over a short period of time can be fatal. Alcohol impairs judgment and lowers inhibitions which may lead people to make poor decisions and compromise their values.
4. Discuss Illegal drug misuse and substance abuse as life threatening behaviors and identify drugs that have serious physical and mental side effects.	4. Drug misuse and abuse are life threatening behaviors. Unlike medicines, illegal drugs are not tested for quality, purity or strength which can possibly lead to overdose. Illicit drugs can affect your total health in ways you may not be able to predict. Some drugs may alter a person's brain structure and functioning which impacts the ability to think or reason. Users run the risk of physiological and psychological dependence and some may suffer effects on their social health. All drugs can have potentially serious side effects including: marijuana, inhalants, steroids, psychoactive drugs, stimulants, club drugs, stimulants, depressants, and opiates.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*

1. What is the purpose of vaccines and medicine?

1. In the past few years, the use and or need for vaccines and medicines have been questioned by the media. It is important to understand the purpose of each before choosing to get vaccines and use medicines. According to healthline.com, a vaccine teaches the body to recognize new diseases. It stimulates the body to make antibodies against antigens or pathogens. It also primes immune cells to remember the types of antigens that cause infection. Kidshealth.org explains that medicines are chemicals or compounds used to cure, hault, or prevent disease; ease symptoms or help in the diagnosis of illnesses. Advances in medicines have enabled doctors to cure many diseases and save lives.

2. Why should people avoid tobacco products?

2. The use of tobacco products can lead to a number of health risks. All forms of tobacco products contain chemicals that are dangerous to your health. Most people tend to focus on the link between smoking and heart/lung disease, however, according to healthline.com smoking can lead to much more. Tobacco use has been linked to: early menopause, poor vision, dull sense of smell and taste, lung cancer, constricted blood vessels, loss of appetite, yellow fingers, cervical cancer, wrinkly skin, problems with pregnancy, blood clots, diabetes, erectile dysfunction. infertility, immune system functioning, high cholesterol, bronchitis, unhealthy teeth, smelly hair, COPD, anxiety, irritability and mood stimulation.

3. Why is it important to use alcohol responsibly?

3. Alcohol is the most commonly used and abused drug in the world and according to the CDC binge drinking is responsible for 40% of alcohol related deaths. Each year in the U.S., excessive alcohol use is responsible for:

	140,000 deaths, shortening lives by an average of 26 years, 1 in 10 deaths among working age adults and $249 billion in economic costs. Drinking responsibly means drinking in moderation and drinking an amount that does not harm your health or the health of others. People who shouldn't drink at all include those that are under 21, pregnant or might be pregnant, have certain medical conditions or are taking medications that interact with alcohol or are recovering from an alcohol use disorder.
4. How can drug misuse and abuse impact one's physical and mental health?	4. There are many different types of illicit drugs all of which range in the effects they have on users. It is important to understand that drug users run the risk of physical or psychological dependence, addiction, overdose, relationship problems and consequences from society. Physiological dependence occurs when the user's body develops a need for the drug and without it withdrawal symptoms occur. With psychological dependence, the user comes to feel that he or she needs the drug in order to feel good or function normally. After going through detox and a rehabilitation program to rid the body of its physical addiction, most addicts continue to struggle with the psychological addiction to the drug.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Standard 2: Communication and Collaboration - Students will use digital media and environments to communicate and work collaboratively, including at a distance to support individual learning and contribute to the learning of others.

Informational Texts:

- Health Making Life Choices – Glencoe – The McGraw Hill Companies - p.228-397 (2010)
- Glencoe Health - McGraw Hill Education - p.456-546 (2022)

Online Resources / Websites:
- EVERFI K-12 Programs and Resources
- OPENPhysEd.org
- https://www.healthline.com/
- https://www.medicalnewstoday.com/
- https://kidshealth.org/
- https://www.healthline.com/health/vaccinations#how-it-works
- https://kidshealth.org/en/teens/meds.html
- https://www.healthline.com/health/smoking/effects-on-body
- https://www.cdc.gov/chronicdisease/resources/publications/factsheets/alcohol.htm
- https://www.cdc.gov/tobacco/data_statistics/index.htm
- https://www.naturalhigh.org/for-educators/
- https://cptv.pbslearningmedia.org/subjects/health-and-physical-education/personal-mental-and-emotional-health/substance-abuse/drugs/
- https://www.history.com/news/music-legends-who-lived-fast-and-died-at-27-slideshow

Media
- Heroin(e) - Netflix documentary
- Recovery Boys - Netflix documentary
- Intervention - https://www.aetv.com/shows/intervention

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Medicines: drugs that are used to treat or prevent diseases or other conditions.
Drugs: substances other than food that change the structure or function of the body or mind.

Vaccines: a preparation that prevents a person from contracting a specific disease.

Antibiotic: a medicine that kills harmful bacteria in the body or prevents them from reproducing.

Prescription Medicines: medicines that are dispensed only with the written approval of a licensed physician or nurse practitioner.

Over-the-counter medicines: medicines you can buy without a doctor's prescription.

Medicine misuse: using a medicine in ways, other than the intended use.

Medicine abuse: intentionally taking medicines for non-medical reasons.

Nicotine: the addictive drug found in tobacco.

Carcinogen: a cancer-causing substance.

Stimulant: a drug that increases the action of the central nervous system, the heart and other organs.

Smokeless tobacco: tobacco that is sniffed through the nose, held in the mouth or chewed.

Environmental tobacco smoke: "second-hand smoke", air that is contaminated by tobacco smoke.

Mainstream smoke: the smoke that is exhaled from the lungs of a smoker.

Side-stream smoke: smoke from the burning end of a cigarette, pipe, cigar.

Ethanol: the active drug in alcohol.

Fermentation: the chemical action of yeast on sugars.

Depressant: a drug that slows the central nervous system.

Intoxication: the state in which the body is poisoned by alcohol or another substance.

Binge drinking: drinking five or more alcoholic drinks in one sitting.

Alcohol poisoning: a severe and potentially fatal reaction to an alcohol overdose.

Alcoholism: a disease in which a person has a physical or psychological dependence on alcohol.

Psychological dependence: a condition in which a person believes that a drug is needed in order to feel good or function normally.

Physiological dependence: a condition in which the user has a physical need for a drug.

Blood Alcohol Concentration (BAC): the amount of alcohol in a person's blood expressed as a percentage.

Alcoholic: a person that is physically or psychologically dependent on alcohol.

Sobriety: living without drugs or alcohol.

Substance Abuse: deliberately using medicines for non-medical purposes.

Illegal Drugs: chemical substances that people of any age may not lawfully manufacture, possess, buy or sell.

Illicit Drug Use: the sale of prescription drugs to people who do not have a doctor's prescription.

Overdose: a strong, sometimes fatal reaction to taking a large amount of a drug.

Addiction: physiological or psychological dependence on a drug.

Marijuana: a plant whose leaves, bud and flowers are often smoked for their intoxicating effects.

Paranoia: an irrational suspiciousness or district of others.

Inhalants: substances whose fumes are sniffed or inhaled to give effect.
Anabolic-androgenic Steroids: synthetic substances similar to male sex hormones.
Psychoactive Drugs: chemicals that change the way the central nervous system functions alter activity in the brain.
Designer Drugs: synthetic drugs that are made to imitate the effects of other drugs.
Hallucinogens: drugs that alter moods, thoughts and sense perceptions, including vision, hearing, smell and touch.
Euphoria: a feeling of intense well-being or elation.
Opiates: "narcotics" - drugs such as those derived from the opium plant that are obtainable only by prescription and are used to relieve pain.
Rehabilitation: the process of medical and psychological treatment for physiological or psychological dependence on a drug or alcohol.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)
Week 1: Unit 3, substance abuse begins with a discussion about medicines and drugs. In the first week, students will learn about the classifications of medicines and the different effects medicines have on different people. Working in pairs, students will be asked to explain the difference between vaccines (preventing disease), antibiotics (fighting pathogens), analgesics (pain relievers) and medications for chronic conditions (allergies, blood pressure, anxiety etc.) Students will then learn about using medicines safely and the difference between drug use, drug misuse and drug abuse. Opioids and the opioid epidemic will be used as examples when describing how prescription drugs can become addictive when not used appropriately and monitored by a doctor. From here, the discussion will transition to potentially harmful drugs including tobacco, nicotine, alcohol, marijuana and other illegal drugs.
Week 2: The topic for week two of unit 3 is tobacco, which includes cigarettes, cigars, chewing tobacco, snuff and e-cigarettes. As a review, students will work with a partner to make a poster of the long and short term health effects for using tobacco products. Students will be asked why people use tobacco products? Here students will discuss the influence from advertisements/social media and parents/friends. Current statistics from the CDC about tobacco use will be shared and discussed. Students will learn about the substances in tobacco and the harmful health effects of its use. Students will compare and contrast a healthy lung to a smoke damaged lung and be able to identify significant long-term risks such as COPD, chronic bronchitis, emphysema, coronary heart disease and cancers. Students will learn that not using tobacco has lifelong health benefits. In addition, students will learn about the

effect tobacco products have on the environment and how tobacco smoke can harm non-smokers. Lastly, students will have a class period to complete the "E-Cigarette Mini Project"; see "assessments" below, for details.

Week 3: Week 3 starts with the "E-Cigarette Mini Project" presentations. Students then transition to discussions about alcohol use and abuse for the rest of week 3 and week 4. Students begin with a review of vocabulary and understanding of alcohol's influences due to access and acceptability. Students will identify ways that alcohol can harm the body and brain, causing an individual to make poor decisions. In addition, questions about how a drink is measured, the difference between moderate and problem drinking, and long-term risk of alcohol use will be addressed. Students will turn and talk to a neighbor about what their opinion is on the current drinking laws. Students will learn about how choosing not to use alcohol protects them from dangerous health consequences and a discussion will be had about the benefits of choosing to live alcohol-free.

Week 4: A realistic approach to teen drinking and alcohol use will be taken as students review current statistics on alcohol abuse and binge drinking. Students will respond to true/false statements and answer discussion questions about common myths associated with alcohol use. Lastly, students will read and respond to decision making scenarios. Students will identify the problem, list consequences and provide possible solutions for each issue associated with alcohol use. The scenarios will be shared in class discussion.

- *During this unit, guest speakers from a local rehabilitation center come in to share their experience with alcohol and/or drug addiction and their current road to recovery. Students will listen and write a reflection about what they hear.*

Week 5: Weeks 5 and 6 focus on how illegal drugs affect the body and provide strategies for avoiding the use of illegal drugs. Students will learn that drug misuse and substance abuse can pose serious risks to health. Working in pairs, students will research the difference between physical and psychological addiction and explain why it is so difficult to "quit drugs". In addition, signs of drug abuse will be listed and a realistic approach to helping family/friends will be discussed. Students will then unpack the use and effects of many illegal drugs including but not limited to: marijuana, inhalants, steroids, psychoactive drugs, stimulants, depressants, hallucinogens and opiates. As a culminating activity for this unit, students will work in small groups to complete a "drug research project" (see assessments for the assignment and details).

Week 6: Students will be given up to 3 classes to complete the drug research project which will then be presented at the end of week 6. Students not presenting will be evaluated on being attentive and respectful during presentations and on the understanding of each drug group.

Interdisciplinary / Real World / Global Connections

- The use of medicines and vaccines should not be confused with the use of harmful drug substances. The earlier teens start using substances, the greater their chances of continuing to use substances and developing substance abuse problems later in life.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
☐ Reading a wide range of texts effectively
☐ Writing effectively for a variety of purposes
☒ Presenting ideas accurately with the support of engaging media
☐ Thinking critically to solve problems and reach well reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced:
- Pair students with struggling individuals or allow them to work independently.
- Raise expectations when applicable.
- Higher level questions.

Struggling:
- Pair students with advanced individuals.
- Teacher check-in.
- Paper copies when applicable.
- Extended time if needed.

Assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:
- Teacher observation
  - Class discussion
  - Small group work/individual tasks
    - Medicines chart - compare and contrast
    - Tobacco chart - long and short-term risks
    - Alcohol t/f and myth statements
    - Attitudes about current alcohol laws including drinking and driving
    - Illegal drugs t/f
    - Drug abuse fact sheet
- WHS Working Responsibly Rubric (when applicable)

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

E-Cigarette Mini Project

Objective: *To develop a creative and effective smoke-free campaign that convinces young people not to vape or use e-cigarettes*

CCSS.ELA-LITERACY.SL.9-10.5
Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

The U.S. Centers for Disease Control successfully uses public service announcements and advertisements to get people, especially students, to quit, or not even start, using nicotine products.

You are going to take this strategy and create your own public service announcement or advertisement. Program ideas may include: a radio spot, a television announcement, a social media post, "reel", a short (skit) or a digitally created print advertisement. Be sure to send the message that e-cigarette products are dangerous to one's health and should be avoided!

- This activity can be done individually or with a partner
- If you choose to produce a commercial, radio spot or a skit you must turn in a script/write-up - (approximately 1 min)
- You must record your program to augment the presentation
- Digitally created prints, social media posts and "reels" are computer generated and posted to google drive
- You will present your idea to the class on the assigned due date

Standards For Success	Points Possible	Points Awarded
Content *(completely accurate, all facts are precise and explicit)*	**5**	
Preparation *(organization of ideas, planning process, use of class time, time management)*	**5**	
Collaboration *(considering/respecting all ideas, dividing work up evenly, taking responsibility for assignment/task)*	**5**	
Presentation *(organization of final product, format, effectiveness, appropriate use of equipment)*	**5**	
Creativity *(innovative idea/concept, use of costumes/props/voice/sounds/background etc.)*	**5**	
Grade		**/25**

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

Decision Making Scenarios - Alcohol

Objective: Students will realize that there is often more than one choice in a given situation; each with its own potential consequences.

Directions: Read the following scenarios and list at least 3 potential consequences and provide 2 solutions for each of the problems. Be prepared to share your thoughts with the class.

1. Cindy is 18 years old. Cindy's parents and her 23-year old brother Rich are going away for the weekend. Renee, Cindy's best friend, is pressuring her to throw a huge Saturday night party for all their friends since no one will be home. Renee even asked Rich if he could pick up a few kegs. Rich brought back two kegs of beer, spiked seltzers, a bottle of Vodka, and a few bottles of wine, which he hid in the basement. Renee also spread the word around school for everyone to show up. Cindy now has a lot of alcohol hidden in the basement, an empty house for the weekend, and an unknown number of friends expected to show up.

2. Bill and Tom, both 18, are driving around on a Saturday night looking for something to do. Tom stops at his house to make some phone calls and pick up some beer for the road. He hands the 6-pack to Bill, who immediately cracks one open and tosses the rest in the backseat. Tom, distracted by Bill, drives through a stop sign. The next thing the boys notice is the siren from an approaching police car.

3. Julie, 21, and her friends go out to a frat party. Julie is spending most of her time dancing and socializing with a few guys, some of whom she knows. The guys are taking turns getting her drinks when she starts to feel a little woozy. She notices that she needs to refocus her eyes every time she blinks. She also can't seem to hear everything that's being said. Looking around, she can't locate any of her friends.

4. Eric is 16 years old. Eric's dad Larry was laid off from work about 6 months ago and cannot seem to find another job. Every time Larry gets another job rejection phone call or letter he storms out of the house and goes to the bar for hours and returns home drunk and angry. The last time he came home drunk, Larry started hitting and beating Eric. Eric's mother was too afraid to stand up to her husband and defend her son. She told Eric that everything will be better once Larry gets a job.

5. Jack is 21 and Jill is 19. They go to the same college and just started dating last week. Jack invited Jill to a party off campus. When he picked her up in his new truck, the first thing he did was tell her to change her shirt because it was too revealing. Jill did as he asked, and then the two went to the party. Jill only knew a few other people at the party, but was excited because she was there with Jack. Shortly after they arrived, Jack chugged 2 beers and did a keg stand. Watching all this, Jill decided not to drink so she could drive back to campus. When it was time to leave, Jill asked for the keys. Jack flipped out and told her that no one drives his new truck but him, especially some girl. He then escorts her to the truck and takes a seat behind the wheel.

6. Suzie is a senior in college and was just appointed to an internship at a big advertising company. She is working with 3 other interns on an upcoming project. Each intern was given a different responsibility for the project, but it was made clear to them that they would not only be presenting together, but also be judged together. Suzie soon realizes that 2 of her group members are not taking this project seriously. They are going out to the bars and drinking and partying every night after work. Suzie is now worried that they are not going to get their part of the project done. She needs a good recommendation from this internship to help her get a job in the future.

7. Riley is 17 and a known babysitter in town. Her parents' friends Peter and Molly asked that she watch their two kids so they could go to a birthday party on Saturday night. They arrive home at 1:00 a.m. and it is clear that they have been drinking. Molly planned to drive Riley home that evening.

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

Drug Project

Part 1 – RESEARCH

Objective: Students will identify illegal drugs, the effects they have on the brain and body and how to treat an addicted person. Students will develop drug awareness and prevention programs. Students will create an impactful and meaningful drug intervention which will portray the life of an addict and how their drug habit affects others.

Healthy Balanced Standards: Demonstrate the ability to practice health-enhancing behaviors to reduce health risks

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

CCSS.ELA-LITERACY.WHST.9-10.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.

This project will also be assessed with the WHS Working Responsibly Rubric

Group Members_____

Assigned Drug/Group of Drugs _____

- This is a group project however; everyone will be graded separately so…Do Your Part!
- Each group will be assigned a drug or group of drugs to research and present to the class.
- You will have 1-2 classes to prepare your presentation.
- In addition to the presentation you will keep a log of information that other groups present (this will be given out on the first day of presentations).
- The presentation must be no longer than 10 slides on powerpoint, google docs.
- The following information needs to be addressed:
  - Name   1 pt
  - Clear definition of the drug   3 pts
  - How the drug is used; what forms it may come in?   3 pts
  - Common street names for the drug (no more than 5)   3 pts

o Drug effects on the brain (long and short term)   5pts

o Drug effects on the body (long and short term)   5 pts

o Treatment for an addicted person   5 pts

o Criminal penalties for being caught with or selling the drug   5 pts

o Other interesting information/facts (min 5 facts)   5 pts

o Format/Design/Organization   5 pts

o Source Citations   10 pts

/50pts

- Presentation of Part-1 – RESEARCH will be due on:_____

Drug Project

Part 2 Poster (30 points)

Option 1

Objective: Students will develop drug awareness and prevention programs.

Healthy Balanced Standards: Demonstrate the ability to practice health-enhancing behaviors to reduce health risks

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Create a Drug Prevention/Awareness poster that could be displayed in the classroom or school hallway. Posters can be hand drawn or created digitally (site options may include: www.postermywall.com, www.canva.com, www.fotor.com). The focus of your poster

can either reflect the drug you researched in *Drug Project Part 1* or can send a general message against all drugs. Each poster must include a slogan reflecting the topic and an original visual image.

You will have 1 class period to prepare your poster.

Poster Due:_____

<div align="center">

<u>Grading Criteria</u>

</div>

Slogan:	10 pts
Creativity/Originality/Artistry:	10 pts
Overall Impact:	10 pts
	/30 pts

<div align="center">

Drug Project

Part-2 Poem (30 points)

Option 2

</div>

<u>Objective:</u> Students will develop drug awareness and prevention programs.

<u>Healthy Balanced Standards</u>: Demonstrate the ability to practice health-enhancing behaviors to reduce health risks

<u>CCSS.ELA-LITERACY.SL.9-10.5</u> Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Imagine you just found out a friend is using the drug you researched. Create a meaningful and influential poem urging your friend to quit. You may wish to include the effects on the brain and body, the consequences they may face and the treatment possibilities. This is a chance to show your sensitive side; be creative!

You will have 1 class period to prepare your poem.

Poem Due:_____

Grading Criteria

Length – (minimum) 12 lines: 10 pts

Creativity/Originality/Artistry: 10 pts

Overall Impact: 10 pts

/30 pts

if time allows

Drug Project

Part-3 Intervention

Objective: *Students will create an impactful and meaningful drug intervention which will portray the life of an addict and how their drug habit affects others.*

Healthy Balanced Standards: Demonstrate the ability to practice health-enhancing behaviors to reduce health risks

CCSS.ELA-LITERACY.SL.9-10.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.

Group Members_____

Assigned Drug/Group of Drugs_____

Apply the information you have gathered from Part-1 Research, to Part-3 Intervention. With your group, create your own Intervention episode. Choose a drug and develop a script with a storyline that emulates the A&E television show *Intervention.*

- This is a group project however; everyone is assigned a specific role to lead and organize. You will be graded separately for your part and as a group for the overall presentation.
- The presentation should be no longer than 5 minutes and can either be recorded or performed live in front of the class.
- A typed outline must accompany the presentation (each person should contribute their assigned role).
- You may use costumes, props and other materials to enhance the presentation but they must be SCHOOL APPROPRIATE!
- You will have 1 class period to prepare the Intervention and 1 class period to practice and/or record.
- In the event you are absent for more than 1 period you will do an alternative assignment.

The storyline should include:

o <u>History</u>: short story about childhood, what may have caused the addiction etc.

   Group Member_____/10 pts

o <u>Current life</u>:
   - Age
   - Occupation (if there is one)
   - Associates – friends, family etc.
   - Home (apartment, house, who they live with)

- Frequency of drug use

Group Member_____ /10 pts

o <u>Pre-Intervention</u> – preparing family and friends
- Introduce the family therapist/social worker
- Family and friends set ground rules if the drug use continues

Group Member _____/10 pts

o <u>Intervention</u> –
- convincing addict to get help
- location of treatment facility

Group Member _____ /10 pts

o <u>Post-Intervention</u> –
- Did the treatment/rehab work?
- Where are they now?

Group Member _____/ 10 pts

<u>Overall Presentation</u>

Content Accuracy   /10 pts

Completely accurate, all facts are precise and explicit

Message/Goal   /10 pts

   Provides a clear, strong goal on your position against drug use

Organization/Creativity   /10 pts

   Extremely well organized; logical format that was easy to follow; flowed smoothly from one idea to another; the organization enhanced the effectiveness of the project

Cooperative Group Work/Use of Time   /10 pts

   Used time effectively, explored various ideas and concepts and the project shows that you carefully and thoroughly made decisions

Respect/Behaviors   /10 pts

   Follows school rules, considers audience, maintains a level of appropriateness throughout presentation

Total   **/100 pts**

   This project will also be assessed with the WHS Working Responsibly Rubric

Westbrook Public Schools
Science / Robotics Curriculum
Basic Robotics and Design: VEX 1, Grade(s) 9-12

Subject(s)	Science / Robotics / Engineering
Grade/Course	Basic Robotics and Design: VEX 1
Unit of Study	Unit 1: Introduction to VEX V5
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:

HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for society needs and wants.

Support Standards:
HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading
RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data,

video, multimedia) in order to address a question or solve a problem

RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Writing
CCSS.ELA-LITERACY.WHST.11-12.2
Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

Math
MP.2   Reason abstractly and quantitatively.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Students must demonstrate an understanding for basic safety procedures and protocols in the Robotics Lab. 2. Students will work together to build a variety of simple mechanisms, and identify which mechanism fits best for certain scenarios / tasks. 3. Students will know how to operate the VEX Brain - Controller - Radio System and will be able to troubleshoot issues as they arise.	1. Students will understand that lab safety is a collective effort. 2. Students will understand that there are a variety of ways to transmit energy within a robot / machine and will identify strengths and weaknesses of those methods. 3. The VEX communications system (Brain - Controller - Radio) operates via radio and Bluetooth connections. This system must be configured and paired to operate correctly.

4. Students will create simple programs (both driver control and autonomous) to power simple gear mechanisms.	4. There are multiple ways to assign controls to your VEX Controller. Programs can be run by a driver and can also operate autonomously.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. To what degree is safety the responsibility of the individual in the Robotics Lab?	1. Everyone in the lab is responsible for safety in the Robotics Lab, both as an individual as well as a member of the collective whole
2. To what extent are methods of transferring energy in a machine similar and / or different	2. Energy may be transferred to machines in a variety of ways. In the VEX system, we use mechanical and electrical connections to do so. There are a variety of mechanical connections that exist which can be used to manipulate the: input / output type, direction / flow, as well as the ratio of torque and speed.
3. To what extent are there benefits and limitations to the various VEX software and programming techniques	3. While the VEX platform affords new users' quick access to the platform via button assigning and block-based coding, each does have its limitations.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

Standard 1.6. Creative Communicator
- *1.6 d. Students publish or present content that customizes the message and medium for their intended audiences.*

1.7 Global Collaborator

- *1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

Online Resources / Websites:

- [VEX V5 Library](#) : Online text / visual resources created by VEX.
- [VEXCodev.5](#): Online programming software.

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

1. **UV Light**: ultraviolet light. High energy low frequency, used to sterilize safety glasses.

2. **Angle Grinder**: power tool used for cutting, grinding, sanding metal.

3. **Drill Press**: vertical mounted drill, used for drilling holes normal to the surface.

4. **"Chuck"**: tool used for tightening the drill press and securing bits to the driver.

5. **Impact Driver**: power tool for tightening / loosening screws.

6. **Oscillating Tool**: Power tool which can be used to cut / sand.

7. **Dremel**: Small Power tool which uses rotary motion for a variety of purposes. Also called a rotary tool.

8. **Torx**: star shaped driver bit.

9. **T15**: Torx size used with couplers.

10. **T8**: Torx size used with standard fasteners.

11. **Standoffs**: couplers (various sizes) in the VEX Product Platform.

12. **Flat bearings**: used to stabilize shafts in the VEX Product Platform.

13. **Shaft Lock Collars**: both rubber and metal used to secure shafts in the VEX Product Platform.

14. **Pillow Block**: a bearing used in the VEX Product Platform.

15. **Gear Ratio**: a ration of the number of teeth between two or more gears.

16. **Torque**: refers to a force output by a gear system.

17. **Speed**: how fast a gear output turns.

18. **Cam and follower**: A gear system with one lobed gear and a straight piston.

19. **Worm and Wheel Gear**: A shaft with a spiral thread which engages a wheeled gear.

20. **Rack and Pinion**: A linear actuator which uses a wheel shaped gear (pinion) to engage a linear gear (rack).

21. **Bevel Gear**: Gear system with two gears that can mesh at a 90-degree angle.

22. **"Brain"**: Term used to refer to the central computer in the VEX Product Platform.

23. **Rotational Motion**: Input / Output type that is spinning in nature.

24. **Linear Motion**: Input / Output type that is horizontal in nature.

25. **Compound Gears**: When two or more gears are pinned together.

26. **Idler Gear**: Placed between input and output gears, used to change direction of motion.

27. **Universal Joint**: Allows for more flexibility when aligning axles / shafts.

28. **Lead Screw**: A leadscrew, also known as a power screw or translation screw, is a screw used as a linkage in a machine, to translate turning motion into linear motion.

29. **Crank and Slider:** A slider-crank linkage is a four-link mechanism with three revolute joints and one prismatic, or sliding, joint. The rotation of the crank drives the linear movement of the slider.

30. **Hat Blocks**: Name for blocks that start stack blocks, shaped to only be at top of stack.

31. **Stack Blocks**: Perform main commands, can attach above or below.

32. **Boolean Blocks**: Return a condition as either true or false. Fit inside any block with hexagonal inputs for other blocks.

33. **Reporter Blocks**: Report values in the form of numbers and fits inside any oval inputs.

34. **C Blocks**: Loop the blocks within them or check conditions., Shaped to attach stack blocks above or below, or inside them.

35. **Autonomous**: Done automatically, (without driver input).

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Week 1-3: Safety, Basic Systems

Safety: Students will first need to pass a basic safety quiz. The instructor will show students the location of tools etc. in the room and demonstrate proper use / cleanup of the lab.
- Basic Safety Quiz Discussion
- Basic Safety Quiz

Basic Systems:

Once students have completed the safety quiz, we will begin constructing various basic systems. To do this, Students will complete the Basic Systems Crash Course. This portion of the class is designed to introduce students to the VEX products, as well as the terminology used by VEX. Students will also explore various gear systems and identify the following: Input / output type, direction / flow of power, gear ratio, practical real world use of each.
- Basic Systems Crash Course

Students will make instructional videos for upload to our YouTube channel Westbrook Robotics YouTube similar to this example: Vex Mechanisms - Period 3 Cam and Follower) for future instruction

Basic Systems Assessment:
Students will be assigned a more complex mechanism to build as a team. They will briefly present their mechanism to the class. This assignment sheet contains the guidelines as well as a template for use during the presentation:

- [Basic Systems Assessment](#)

Week 4: Powering Basic Systems

Students will first be introduced to the [VEX V5 Library](#). Here students can access articles which discuss all areas / components of the VEX platform that will be covered within this course.

- Students will then complete the assignment: [Intro to VEX Electronics Part 1](#).

Week 5: Autonomous Programming Basic Systems

This portion of Unit 1 will be brief and is designed to ensure that students understand the basics of VEX Programming Language (blocks). By the completion of this, students will be able to program their controller rather than simply assign buttons. They will also be able to run "driver control" and "autonomous" programs (both with and without using the competition switch. Through direct instruction and modeling, the instructor will broadcast a VEX program on the Smartboard and walk students through the basic process.

- Students will then need to complete the autonomous challenge: [Intro to VEX Electronics Part 2](#).

Interdisciplinary / Real World / Global Connections

- Students will learn safety practices for using tools and working in a collaborative environment
- Students will understand gear ratios designed for speed and torque, as practical applications for such
- Students will learn to identify problems, and cooperatively think critically to solve those problems
- Students will develop troubleshooting skills

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…

☒ Reading a wide range of texts effectively

☐ Writing effectively for a variety of purposes

☒ Presenting ideas accurately with the support of engaging media

☒ Thinking critically to solve problems and reach well-reasoned judgments

☒ Working responsibly and collaboratively

Differentiation

Advanced: The Course is designed to follow a distinct path, yet students can advance at their own pace. Students with prior experience or particular interest can go beyond the scope of this course and explore more complex configurations, systems, etc. Advanced students are strongly encouraged to assist other classmates, as well as join the WHS Robotics Team.

Struggling: Students are given multiple resources including text based and video based. The instructor (while allowing students sufficient time to complete a given task) will facilitate student inquiry as needed to ensure that students do not stall in their progress.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- VEX 1 Basic Safety Quiz
- Basic Systems Assessment
- P.O.G. Rubric

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Unit 1 Reflection

Westbrook Public Schools
Science / Robotics Curriculum
Basic Robotics and Design: VEX 1, Grade(s) 9-12

Subject(s)	Science / Robotics / Engineering
Grade/Course	Basic Robotics and Design: VEX 1
Unit of Study	Unit 2: The VEX Speed Bot
Pacing	5 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:

HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Supporting Standards:

HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

Reading

CCSS.ELA-LITERACY.RST.11-12.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Math
MP.4 Model with Mathematics.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students do?*	**Concepts** *What must students know?*
1. Students will collaborate while following a build guide to construct their robot. 2. Design a drivetrain that is appropriate for the tasks that a robot must accomplish. 3. Design a passive manipulator specifically to solve a problem. 4. Write more complicated programs that a robot may use to navigate a maze.	1. Engineers work in teams to draw upon the talents of all members. 2. There are many types of drivetrains that may be used, each with a set of pros and cons. 3. Passive manipulators can be very effective tools for a competition robot which do not require dedicated power sources or complicated linkages, etc. 4. Programmers seek to write the simplest code possible while still successfully solving the problem.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*

1. To what extent does an engineer need to be an expert in all fields?	1. While it is obviously helpful to be an expert in all aspects of engineering, engineers typically work in teams to best utilize the strengths of the group.
2. To strengths and limitations are there with the direct - 2- wheel drive train?	2. While the 2-wheel direct drive train is the simplest drivetrain in VEX Robotics, it can be very effective under the right circumstances.
3. To what degree do manipulators need to be controlled by the robot?	3. Active manipulators can be more advantageous - including being more precise and powerful - yet they require dedicated power sources (which are limited to 8 in VEX competitions. Passive manipulators, although simpler, can be very effective without using as many resources as active manipulators.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.3 Knowledge Constructor
- *1.3.d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.*

1.7 Global Collaborator
- *1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

Online Resources / Websites:
The following articles can be used by the instructor and the student as needed
- [Bumper Sensor Article](#)
- [Creating a V5 Drivetrain](#)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Drivetrain: the system which provides power to the wheels of the VEX Robot.

Direct Drive: Motors are connected directly to the wheels.

Omni Wheels: Wheels that allow for motion in two dimensions.

Traction Wheels: Standard wheels in the VEX platform.

H Drive: Drivetrain where wheels are oriented in an "H" shape. Allows for power to drive the motor forward / back. Robot can also strafe sideways and turn. Requires 5 Omni wheels.

Holonomic: More complicated drive train. Has 4 wheels all angled at 45 degrees. Allows the robot to move 360 degrees very quickly. Requires 4 omni wheels.

Track Drive: Direct drive set up, but wheels are replaced with tank tracks.

Passive Manipulator: A mechanism that is designed to interact with its environment without requiring independent motion.

Active Manipulator: A mechanism that is designed to interact with its environment through independent motion. Requires a dedicated power source.

Cartesian Coordinates: (x,y) coordinate system.

Conditional Statements: programming statements which will execute a line(s) of code if a specified condition is met.

Loops: programming configuration that will continue to execute a line(s) of code if a condition is true and no break is encountered.

Functions: A group of code that can be called to carry out at once to carry out a procedure, etc.

Bumper Sensor: Essentially a button that when pressed will return a Boolean value.

Boolean Values: This is a true / false value (also defined as a 1 or a zero) The bumper sensor for example returns a digital value of 0 to the brain when it is pressed. While the button is not pressed, it returns a digital value of 1 to the brain.

Gyro Sensor: A sensor which tracks the turning position of a robot and therefore makes accurate turns possible. The sensor electronically maintains a digital reference to make specified turns accurate.

Learning Plan
Overview and Key Learning Events and Instruction Per Week

Learning Tasks Per Week (Including Instructional Strategies)

Weeks 1 - 3: Building the Speedbot

This is a guided build which requires students to follow a set of directions provided by VEX to complete this basic bot. Here is a link to the
- Speed Bot Build Manual

Prior to beginning construction of the bot, the instructor will lead a class discussion on the various drive train systems using this VEX V5 Library Article on Creating a V5 Drivetrain. Also, this article discussing adding 2 motor configurations will assist students in programming their new drive train

- Speed Bot Assignment Sheet

Students will also need to design a passive mechanism which will successfully push objects of various shapes and size from their point of origin to an end location (Cartesian Coordinates will be provided)

- [Snow Plow Challenge](#)

There are multiple options to modify this assignment depending on the class makeup, size, and skill level. For example, the teacher can have all students compete against the stopwatch with the same coordinates. The class can decipher together the coordinates and place the objects as well as mark their final destinations. Students can also be given different sets of coordinates so that they can figure this process out themselves.

Weeks 4-5: Autonomous Maze Navigation

[Maze Navigation](#)

The following [article](#) will help the instructor with the programming process and provide the basis for class discussion / direct instruction as needed.

Prior to this assignment being distributed, a brief discussion regarding functions as well as Boolean values will occur. Students will need to understand what a function is, as well as how to call a function both manually as well as with the return of a Boolean value. This assignment is progressively leveled. In other words, there are 3 tasks to challenge students. The hope is that they will be successful in at least one of the challenges.

Students will first measure the distances and angles to program their bot to navigate the maze. They will begin with a step-by-step navigation program. Students will then be given a bump sensor to add to their bot which can be used to trigger functions. Students will also write one function that will repeat until the robot exits the maze. A discussion will follow regarding shorter program code, the "thinking process" the robot went through as it navigated the maze, as well as the pros and cons of both methods used to navigate the maze.

Interdisciplinary / Real World / Global Connections
- Measuring distances accurately.   - Plotting locations based on a Cartesian Coordinate System.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…

☒ Reading a wide range of texts effectively
☒ Writing effectively for a variety of purposes
☐ Presenting ideas accurately with the support of engaging media
☒ Thinking critically to solve problems and reach well-reasoned judgments
☒ Working responsibly and collaboratively

Differentiation

Advanced: Advanced students could potentially upgrade their direct drive drivetrain for something more sophisticated such as the H - Drive, Tank Drive, or Holonomic drivetrain. Advanced students can also experiment with various algorithms connected to their bump sensor.

Struggling: The teacher can assist students in deciphering the grid coordinates if needed. Students struggling with programming the robot should be encouraged to be successful with both driver control as well as the step-by-step programming prior to moving forward with more advanced programming approaches. Advanced students could also be used as mentors in this process.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Speed Bot Build
- VEX Basic Build Rubric
- Completion of the Maze Challenge: Group Times will be recorded on the board in a competitive format

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- [Unit 2 Reflection](#)
- [WHS P.O.G. Rubric](#)

Westbrook Public Schools
Science / Robotics Curriculum
Basic Robotics and Design: VEX 1, Grade(s) 9-12

Subject(s)	Science / Robotics / Engineering
Grade/Course	Basic Robotics and Design: VEX 1
Unit of Study	Unit 3: The Clawbot
Pacing	6 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:

HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Supporting Standards:
HS-ETS1-2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Correspondence to CT Core Standards
What are the goals of this unit?

Reading
CCSS.ELA-LITERACY.RST.11-12.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases

as they are used in a specific scientific or technical context relevant to *grades 11-12 texts and topics*.

Math
MP.2 Reason abstractly and quantitatively.

MP.4 Model with Mathematics.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Students must construct a functioning claw from components that they have 3D printed.	1. In today's world, use of CAD and access to CAD files allows groups and individuals to instantly have necessary components.
2. Students will need to reverse engineer a functioning claw.	2. By methodically disassembling a component, Engineers can understand how systems work. They can make improvements on, or trouble shoot these systems as needed.
3. Students will further develop their programming skills both in driver control and autonomous mode.	3. Basic controls / autonomous programs can be improved upon greatly; however, programs must be carefully designed to ensure that flow and functionality are maintained.
4. Students will incorporate multiple sensors into their robot.	4. Sensors take information from the outside world and convert that into digital / analog information. Actuators convert digital / analog information into physical action.

Essential Questions *What essential questions will be considered?*	Corresponding Big Ideas *What understandings are desired?*
1. To what degree do engineers and consumers have instant access to necessary materials / components?	1. With access to CAD files (or independent CAD skills) engineers can design / access / obtain virtually any part they need. Limitations exist on access to the above, as well as the materials that may be used in 3D printing
2. What role does disassembly play in an engineer's understanding of how systems work?	2. Through the process of disassembly, engineers can gain tremendous understanding in how systems work and function. A methodical approach to this is crucial to growth from this experience, and success in re-assembly.
3. To what degree can a robot benefit from the use of sensors?	3. Sensors allow the robot to *learn from its environment*. Through the process of taking in information, the flow of the robot's program can be controlled.

Resources

Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.4 Innovative Designer
- *1.4.c. Students develop, test, and refine prototypes as part of a cyclical design process.*

1.5 Computational Thinking
- *1.5.a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.*

1.7 Global Collaborator
- *1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

Informational Texts:

- [Clawbot Build Guide](#)
- The CAD files for the Claw can be found [here](#):
- Using the [VEX Distance Sensor](#)
- Using the [VEX Optical Sensor](#)
- [Configuring the VEX Vision Sensor](#)
- [Using the VEX Vision Sensor](#)
- [3D Print Overview](#)

Websites:
- [VEX VR Playground](#)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

CAD: Computer aided design.

Purge: option on our 3D printer to push filament through the nozzle for the purposes of checking the filament and functionality of the printer.

Filament: The material that is used by the 3D printer when printing objects.

Heat bed: The bottom plate of the printer. This is the surface that the printer prints on.

Slicing*: Process of taking the downloaded CAD file and converting it into a file the 3D printer can understand and use.

Configure: another term for setting up. The vision sensor must be configured prior to use.

Distance Sensor: Simple sensor that's primary function is to measure distance via infrared light.

Optical Sensor: Sensor that can measure distances, recognize gestures, and detect colors.

Revolutions: number of times something spins. This is an option for programming our VEX motors that may be very useful in this unit.

Motor stopping mode: There are 3 settings that can be applied to our motors.

Brake Mode: Motor will stop as soon as it is de-powered.

Coast mode: Motor will spin freely once it is de-powered.

Hold Mode: Motor will stop as soon as it is de-powered and will hold its position.

Timeout: sets a time limit for a line of code. If the timeout is met, the program will move on to the next line. Helps protect components from being unintentionally destroyed due to program error or physical limits being reached.

Target game element: Term used to refer to game elements that students want to interact with.

Obstacle Game Element: Term used to refer to game elements that students will want to avoid.

Pseudo-code: A simple (plain English) explanation of your program's desired flow.

Vision Sensor: VEX Sensor that takes snapshots of its environment and can analyze the photos in several ways. Detects configured images, understands size, distance.

Operators: Blocks that allow for comparison in VEX Programming. For example, (value A < value B).

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week 1-3: 3D Printing and Building the Claw Bot

- [Clawbot Build Assignment Sheet](#)

Students will be instructed on how to locate and download CAD files directly from the VEX Website. Students will also need to learn how to *slice* the files, set up the 3D printers, and execute the print. Once this is completed, students will need to prep the parts, then disassemble a provided VEX Claw. They will use this as a model for constructing their own claws. This portion of the assignment will take the form of direct instruction, and the instructor will demonstrate how to locate / slice / print files for students. The [3D Print Overview](#) will help guide students through this process

Students will follow a [Clawbot Build Guide](#) to assemble the arm portion of the claw, but will need to reverse engineer the provided claw to construct their own functioning claw.

This portion of the unit ends with a class wide competition
- [Driver Control Claw Challenge](#)

Week: 4-5 Sensors and Autonomous Claw Challenge

Please see: [Autonomous Claw Challenge](#)

Students will need to add one of the provided sensors to their clawbot to assist in autonomous programming. Students should reflect on the Driver Control Claw Challenge to brainstorm what uses the sensors may have. One example may be that sensors may be used to control the speed of their robot. This will prevent the robot from bumping into the object it is supposed to pick up. Students will need to design a bracket to attach the sensor in a functional and non-interfering position. Students will use their sensors to program their Clawbot to autonomously pick up an object and move it to a desired location. Students will be required to first write "pseudo-code" to help the programming process.

Students will also be encouraged to explore their initial pseudo-code in the [VEX VR Playground](#)

The following articles will help students with this process
- Using the [VEX Distance Sensor](#)
- Using the [VEX Optical Sensor](#)

Week 6: Vision Sensor

Students will explore the uses of the VEX Vision sensor and explore its functionality with their clawbot. This is the most sophisticated (and complicated) currently in the VEX product line. Students will need to learn how to configure the sensor and employ it in a practical setting.
- Using the VEX Vision Sensor

The following articles will help students set up and use the vision sensor
- Configuring the VEX Vision Sensor
- Using the VEX Vision Sensor

Autonomous Claw Challenge Version 2

Interdisciplinary / Real World / Global Connections

- This style of automated and driver control clawbot can be seen in such applications as the Mars Perseverance Rover as well as in advanced and automated manufacturing worldwide.

- Students will begin to be exposed to CAD design and 3D printing. Virtually every Engineering field will require CAD design. 3D printing is quickly becoming an instant way to provide groups and individuals with needed parts immediately.

- Students will evaluate the cost of the VEX Claw when purchased vs. the cost of printing out the individual components and assembling on their own

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- ☒ Reading a wide range of texts effectively
- ☒ Writing effectively for a variety of purposes
- ☒ Presenting ideas accurately with the support of engaging media
- ☒ Thinking critically to solve problems and reach well-reasoned judgments
- ☒ Working responsibly and collaboratively

Differentiation

Advanced: The vision sensor component of this unit can be something that all students complete, or it can be something reserved for more advanced students. The sensor itself is going to be a challenge for students. In addition to that, the distance / optical sensor may take struggling students more time. They therefore may just not have enough time to get to the vision sensor. The autonomous challenge is something that can be accomplished without the vision sensor; therefore, students should still be able to experience success with the auto programming without the vision sensor.

If advanced students move through this unit quickly, they can be utilized as "peer coaches" for the other students. It would also be a great opportunity to introduce the VEX VRC Competition to those students, and set them to work applying the vision sensor to our team's competitive robot

Struggling: Additional teacher facilitation may be required in the autonomous programming phase. The pseudo code step can be a perfect place for this to happen. Students need to understand the flow of their program in simple terms prior to coding the robot to follow the desired procedure.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

There are several milestones that students will need to reach, each of which will provide clear feedback to the instructor regarding student mastery of concepts and skills. The following are examples of that:
- successful print of claw parts

- Participation and Success in the: Driver Control Claw Challenge, Autonomous (part 1 and 2) Claw Challenges
- "Pseudo Code" Review
- Submission of photos for Reverse Engineering the Claw, construction of claw

VEX Basic Build Rubric

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- Unit 3 Reflection

Westbrook Public Schools
Science / Robotics Curriculum
Basic Robotics and Design: VEX 1, Grade(s) 9-12

Subject(s)	Science / Robotics / Engineering
Grade/Course	Basic Robotics and Design: VEX 1
Unit of Study	Unit 4: VEX VRC and Competition Robot Systems
Pacing	4 Weeks

CT State Standards
What are the goals of this unit?

Priority/Focus Standards:

HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.

Supporting Standards:

HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

[Correspondence to CT Core Standards](#)
What are the goals of this unit?

RST.11 - 12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data,

video, multimedia) to address a question or solve a problem.

RST.11-12.8   Evaluate the hypothesis, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.

RST.11-12.9   Synthesize information from a range of sources (e.g., tests, experiments, simulations into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

WHS T.9-12.7Conduct short as well as more sustained research projects to answer a question (including self-generated questions) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

MP.2   Reason abstractly and quantitatively.

CCSS.ELA-LITERACY.SL.11-12.4**:** Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.

Unwrapped Priority Standards	
Skills/Suggested Outcomes *What must students **do**?*	**Concepts** *What must students **know**?*
1. Students will be able to identify problems facing VEX teams for the current season.	1. Students must know the general rules / scoring methods for the current VEX VRC game.
2. Students will use the engineering process to design an	2. Students must understand and follow the engineering

intake competition system for the current VEX VRC game.	process.
3. Students must share their product with the class in a formal presentation.	3. Engineers must possess strong "soft skills," communication skills. Engineers need to communicate both with other engineers as well as with clients.

Essential Questions *What essential questions will be considered?*	**Corresponding Big Ideas** *What understandings are desired?*
1. To what extent must the engineering process be followed?	1. The engineering design process sets a path forward for engineering teams to execute both small—and large-scale ideas. While the process is highly iterative, with parts that may need to be repeated many times before others can begin, it can create the foundation for an incredible final product.
2. What restrictions are there in VEX VRC?	2. The VEX VRC Game manual (year specific) outlines the regulations that all teams must follow. At VEX Competitions, judges inspect each robot to ensure that all specifications are met prior to the competition.
3. To what degree is there a "right answer" in engineering?	3. Ultimately, engineers seek to solve problems. There is no one way to do this.

Resources
Student Technology Integration and [Correspondence to ISTE Standards](#) when Applicable:

1.3 Knowledge Constructor
- *1.3.a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.*

1.4 Innovative Designer
- *1.4.a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.*

1.6 Creative Communicator
- *1.6.a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.*

1.7 Global Collaborator
- *1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

Online Resources / Websites:

- [2022-23 VEX Spin up Official Video](#)
- [2021-22 VEX Tipping Point Official Video](#)
- [2020-21 VEX Changeup Official Video](#)
- [VEX Spin Up Official Manual](#)

Vocabulary/Terminology

Vocabulary/Terminology with Definitions:

Disclaimer: There will be game specific vocab that will change each year. The instructor will need to update this list on a yearly basis. I have avoided game specific vocabulary here as the current season is over.

Constraints: Limitations or restrictions in the VEX VRC game.

Alliance: Two Robots that are paired together as a team (either Red Alliance or Blue Alliance).

Autonomous Win Point: Awarded to an alliance that has met the minimum requirements during the Autonomous Period.

Autonomous Bonus: Awarded to the Alliance that scores the most points during the Autonomous Period.

Alliance Station: The designated regions where the Drive Team Members must remain for the duration of the Match.

Entanglement: A Robot status. A Robot is Entangled if it has grabbed, hooked, or attached to an opposing Robot or a Field Element.

Match: A set time, consisting of Autonomous and / or Driver Controlled Periods, during which Teams play a defined version of Spin Up to earn points.

Autonomous Period: A time during which Robots operate and react only to sensor inputs and commands pre-programmed by the Students into the Robot control system.

Driver Controlled Period: A time during which Drive Team Members operate their robot via remote control.

Trapping: A Robot status. A Robot is Trapping if it has restricted an opposing Robot into a small, confined area of the field, approximately the size of one foam field tile or less and has not provided an avenue for escape. Trapping can be direct (e.g., pinning an opponent to a field perimeter wall) or indirect (e.g., preventing a robot from escaping from a corner of the field). This is not allowed.

Pre-loads: Often VEX VRC games allow robots to start a match with game elements already loaded into them.

Iteration: A new version, usually one of many versions of a single product.

Intake: A mechanism that may take many forms. The general purpose is to bring game elements into the robot's control.

Lift: can have many shapes / configurations. Generally used to elevate a game element so that it remains parallel to the ground.

Conveyor: a belt or other device that moves game elements.

Flywheel: a spinning wheel that can be used to move or propel game elements.

Spindles: components that can be made from a variety of VEX Parts. Generally used to grab a hold of game elements and through rotational motion pull / push the game elements along.

Learning Plan
Overview and Key Learning Events and Instruction Per Week
Learning Tasks Per Week (Including Instructional Strategies)

Week 1: Students will be introduced to the VEX VRC.

As a class, we will look at the VEX VRC in general, as well as this year and previous year's games. The class can watch the following official VEX videos to see previous year's competition games:
- 2022-23 VEX Spin up Official Video
- 2021-22 VEX Tipping Point Official Video
- 2020-21 VEX Changeup Official Video

We can also watch footage of our team at the previous year's competition.

Students will use the official VEX Spin Up Official Manual to learn about the VEX VRC competition format, goals, and constraints. The goal of this unit is to inspire students to take their mechanical and programming skills to the next level. They will follow the engineering process to develop VRC Game systems that could be deployed to the WHS Robotics Competition Bot. This unit will also hopefully help to recruit new members to the Robotics Team.

Please note: the VEX VRC Game changes from year to year. Documents included in this curriculum include the most recent game manual etc. The instructor will need to update this yearly.

Weeks 2-3 Final Project Build Time.

- Final Project Assignment Sheet

Each day students will meet with the teacher for an informal checkup and instructor feedback.
- [Final Project Build Daily Check In](#)

Interdisciplinary / Real World / Global Connections

- The Engineering process is followed in all engineering disciplines. It is very closely related to the scientific method, and is a procedure that students can employ in all aspects of creative design

- The skills that students are developing in this unit will directly translate to the actual VEX VRC competition. Student designs could potentially be adopted by the WHS Robotics Team immediately

- Students will need to prepare and deliver a formal presentation at the end of the unit. These soft skills are essential to success in the professional world.

Westbrook High School Learning Expectations

The Westbrook High School student will meet expectations by…
- ☒ Reading a wide range of texts effectively
- ☒ Writing effectively for a variety of purposes
- ☒ Presenting ideas accurately with the support of engaging media
- ☒ Thinking critically to solve problems and reach well-reasoned judgments
- ☒ Working responsibly and collaboratively

Differentiation

Advanced: The sky's the limit with this unit. Advanced students may be able to directly contribute to the WHS Robotics Team with their VRC Mechanism.

Struggling: Students that are struggling can receive direct assistance from the instructor or could potentially reverse engineer game mechanisms from the previous year. There are several game mechanisms in the lab that were used in the 2022-23 school year that students could utilize as models. Students could also set out to improve on those designs as well.

Assessments
Include an overview of authentic assessments

Formative Assessments and Corresponding Rubrics/Checklists when Applicable:

- [Final Project Build Daily Check In](#)

Summative Assessments and Corresponding Rubrics/Checklists when Applicable:

- [Final Project Assignment Sheet](#)
- [General Final Project Rubric](#)
- [WHS P.O.G. Rubric](#)