Englewood Public School District
Mathematics
Grade 7
Second Marking Period

Unit – Algebraic Expressions

Overview: During this unit, students will learn about algebraic expressions, equations and inequalities, rates and percents.

Time Frame: Chapter 3 (3.3-3.7) – 14 days, Chapter 4 – 14 days, Chapter 5 (Online CC Additional Resources) – 10 days

Enduring Understandings:
Algebraic expression containing rational numbers and several variables can be simplified, expanded, or factored to write equivalent expressions.
Algebraic equations and inequalities can be used to model mathematical or real-world situations and to find values of variables.
You can use a rate to compare one quantity to another quantity, and use rates to solve problems.
Percent is a concept used to compare quantities expressed per hundred.

Essential Questions:
How can the properties of operations be used to transform linear expressions?
How can rewriting an expression be helpful when solving mathematical and real-world problems?
How are the properties of operations used to solve multi-step mathematical and real-world problems?
How can the reasonableness of an answer be assessed?
How can ratios of fractions and quantities measured in like or different units be expressed as unit rates?
How can proportional relationships be used to solve percent and ratio problems?

Standards	Topics and Objectives	Activities	Resources	Assessments
Chapter 3 (3.3-3.7)				
7.EE.A.1. **Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.** 7.EE.A.2. **Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the**	**Topics** Simplifying, expanding, factoring and writing algebraic expressions. Real-world problems involving algebraic reasoning. Twenty-First Century Themes and Skills include: • Creativity and	7.EE.A.1 Writing Expressions 7.EE.A.2 Ticket to Ride 7.EE.B.3 Discounted Books 7.EE.B.3 Shrinking **Math Playground**	**SE-7A:** 145-187 **My HRW** - Online access to all Math in Focus materials and Virtual Manipulatives Math in Focus **Teacher Resource Tools** Math in Focus **Performance Task**	**Unit 2 Benchmark Assessment:** Exact Path **Summative Assessments:** **Math in Focus Assessments** SE/TE: pp. 185, 186–187

quantities in it are related. ***For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."***

7.EE.B.3. **Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.** ***For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.***

Mathematical Practices

Innovation
- Critical Thinking and Problem Solving
- Communication and Collaboration

Objectives

The students will be able to:
- Simplify algebraic expressions with more than two terms.
- Simplify algebraic expressions by using the commutative property of addition.
- Simplify algebraic expressions with two variables.
- Expand algebraic expressions involving fractions, decimals, and negative factors.
- Factor algebraic expressions with two variables.
- Factor algebraic expressions with negative terms.

http://www.mathplayground.com/

Math Fact Practice
http://www.playkidsgames.com/games/mathfact/mathFact.htm

Grades 6-8 Math Fluency Support
https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8

Brain Genie
http://braingenie.ck12.org/

Math Game Time
http://www.mathgametime.com/

Everything you need to know about math journals:
https://thecornerstoneforteachers.com/math-journals/
(NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)

Use alge-tiles to illustrate operations:
https://technology.cpm.org/general/tiles/
(CRP2)

Technology Resources
- Math in Focus eBooks
- Math in Focus Teacher Resources CD
- Interactive Whiteboard lessons
- Virtual Manipulatives
- Online Professional Development Videos

North Carolina Dept of Ed. Wikispaces:
http://maccss.ncdpi.wikispaces.net/Middle+School

Math Goodies – Math Lessons
http://www.mathgoodies.com/

Standards Solution Lessons:
- **PARCC Lesson 8:** Type I-Selected-Response-Multiple Answers – Expanding Rational Expressions
- **PARCC Lesson 15:** Performance Based Assessment
- **PARCC Lesson 16:** Practice Type I items – Expressions and Equations domain
- **PARCC Lesson 18:** Performance Based Assessment

Assessments Course 2: Chapter 3

Test A pp. 31–33;
Test B pp. 34–36

ExamView® Assessment Suite CD-ROM Course 2

Formative Assessments:
Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)

Exit Ticket Out the Door

Multiple choice / short answer assessments (CRP8)

Mini quizzes – assess just one topic, or what was done within 1 or 2 days (CRP8)

Alternative Assessments:
Learning centers: each learning center focuses on a different type of problem (CRP8)

In groups, create posters illustrating the main objectives of the unit (RH.6-8.7)(9.2.8.B.3)

MP.1, MP.2, MP.3, MP.4 MP.6, MP.7, MP.8		**Alge-tiles activity:** http://thewessens.net/ClassroomApps/subindex.html?id=algebratiles&topic=models&path=Models (CRP2) **What is factoring – video:** https://www.youtube.com/watch?v=YrQpUC0_J4w (8.1.8.A.1) **Equation rummy – solving one and two step equations:** https://www.teacherspayteachers.com/Product/Equation-Rummy-Solving-Equations-Game-255779 (8.1.8.A.1) **Algebra jeopardy:** http://www.math-play.com/7th-Grade-Algebra-Jeopardy/Algebra-Jeopardy_html5.html (8.1.8.A.1) **Additional texts:** www.newsela.com www.readworks.org www.commonlit.org	• **CCSS Lesson Plan:** Multi-Step Real-Life and Mathematical Problems • **CCSS Prescriptive Lesson Plan:** Fractions, Decimal and Percents **7th grade assessments, interactive, videos, games, lessons, homework:** https://www.opened.com/search?area=mathematics&grade=7&offset=0&resource_type=interactive-assessment (CRP2, CRP4, CRP8, 8.1.8.A.1) **7th grade worksheets, games, lessons, activities:** https://www.education.com/resources/math/middle-school/ (CRP2, CRP4, CRP8, 8.1.8.A.1) 7th **grade common core worksheets:** https://www.ixl.com/math/grade-7 (CRP2, CRP4, CRP8) **Khan Academy – videos, lessons, assessments** **www.khanacademy.org** (8.1.8.A.1)	Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)

Chapter 4

7.EE.B.4. **Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.** **a. Solve word problems leading to equations of the form *px+q=r* and *p(x+q)=r*, where *p*, *q*, and *r* are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*** **b. Solve word problems leading to inequalities of the form *px+q>r* or *px+q < r*, where *p*, *q*, and *r* are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of*	**Topics** Understanding equivalent equations, solving algebraic equations and inequalities, and real-world problems involving algebraic equations and inequalities. Twenty-First Century Themes and Skills include: • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration **Objectives** The students will be able to: • Identify equivalent equations. • Solve algebraic equations with variables on the same side of the equation. • Solve algebraic equations in factored form. • Solve real-world problems algebraically. • Solve algebraic inequalities. • Graph the solution set of an inequality on a number line.	7.EE.B.4 Fishing Adventures 2 7.EE.B.4, 7.NS.A.1 Bookstore Account 7.EE.B.4b Sports Equipment Set **Math Playground** http://www.mathplayground.com/ **Math Fact Practice** **http://www.playkidsgames.com/games/mathfact/mathFact.htm** **Grades 6-8 Math Fluency Support** https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8 **Brain Genie** http://braingenie.ck12.org/ **Math Game Time** http://www.mathgametime.com/ **Solving inequalities – lesson and activity:** https://betterlesson.com/lesson/496095/solving-inequalities	**SE-7A:** 189-243 **My HRW** - Online access to all Math in Focus materials and Virtual Manipulatives Math in Focus **Teacher Resource Tools** Math in Focus **Performance Task** **Technology Resources** • Math in Focus eBooks • Math in Focus Teacher Resources CD • Interactive Whiteboard lessons • Virtual Manipulatives • Online Professional Development Videos **North Carolina Dept of Ed. Wikispaces:** **http://maccss.ncdpi.wikispaces.net/Middle+School** **Math Goodies – Math Lessons** **http://www.mathgoodies.com/** **Standards Solution Lessons:** • **PARCC Lesson 9:** Type I – Selected-Response-	**Summative Assessments: Math in Focus Assessments** SE/TE: pp. 241, 242–243 Assessments Course 2: Chapter 4 Test A pp. 40–42; Test B pp. 43–45 ExamView® Assessment Suite CD-ROM Course 2 **Formative Assessments:** Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1) Exit Ticket Out the Door Multiple choice / short answer assessments (CRP8) Mini quizzes – assess just one topic, or what was done within 1 or 2 days (CRP8) **Alternative Assessments:** Learning centers: each learning center focuses on a different type of

sales you need to make, and describe the solutions. *Mathematical Practices* MP.1, MP.2, MP.3, MP.4 MP.7, MP.8	• Solve multi-step algebraic inequalities. • Solve real-world problems involving algebraic inequalities.	(CRP2, CRP4, CRP8) **Inequalities trivia review:** https://betterlesson.com/lesson/556377/inequalities-trivia-review (CRP2, CRP4, CRP8, 8.1.8.A.1) **Inequalities and equations activities (registration required):** https://www.buzzmath.com/badges/criteria/content-cc7-equations-inequalities-gold (CRP2, CRP4, CRP8) **Create an anchor chart to illustrate the properties of inequalities:** https://www.maneuveringthemiddle.com/how-to-teach-one-and-two-step-inequalities/ (RH.6-8.7) **Solving inequalities word problem practice:** https://www.teacherspayteachers.com/Product/Solving-Inequalities-Word-Problem-Practice-3045776 (CRP2, CRP4, CRP8, NJSLSA.R1)	Menu Style Items – Linear Word Problems • **PARCC Lesson 11:** PBA Pre-Assessment • **CCSS Prescriptive Lesson Plan:** Writing Equations and Inequalities **7th grade assessments, interactive, videos, games, lessons, homework:** https://www.opened.com/search?area=mathematics&grade=7&offset=0&resource_type=interactive-assessment (CRP2, CRP4, CRP8, 8.1.8.A.1) **7th grade worksheets, games, lessons, activities:** https://www.education.com/resources/math/middle-school/ (CRP2, CRP4, CRP8, 8.1.8.A.1) 7th **grade common core worksheets:** https://www.ixl.com/math/grade-7 (CRP2, CRP4, CRP8) **Khan Academy – videos, lessons, assessments www.khanacademy.org** (8.1.8.A.1)	problem (CRP8) In groups, create posters illustrating the main objectives of the unit (RH.6-8.7)(9.2.8.B.3) Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)

		Everything you need to know about math journals: https://thecornerstoneforteachers.com/math-journals/ (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1) **Additional texts:** www.newsela.com www.readworks.org www.commonlit.org		

Chapter 5 (Online Common Core Additional Resources)				
Note: It is recommended that additional lessons be taught for the following standards. The lessons are listed in the Resources column and are located in the Online Common Core Additional Resources. 7.RP.A.1**. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.** ***For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the***	**Topics** Rates and unit rates, real-world problems involving rates and unit rates and percents and percent of change. Twenty-First Century Themes and Skills include: • Creativity and Innovation • Critical Thinking and Problem Solving • Communication and Collaboration **Objectives**	7.RP.A.1 Cooking with the Whole Cup **Math Playground** http://www.mathplayground.com/ **Math Fact Practice** **http://www.playkidsgames.com/games/mathfact/mathFact.htm** **Grades 6-8 Math Fluency Support** https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8	***Online Common Core Additional Resources for Course** 2:* 5.1 Rates and Unit Rate ***Online Common Core Additional Resources for Course 2:*** 5.2 Real-World Problems: Rates and Unit Rates ***Online Common Core Additional Resources for Course 2:*** 6.4 Real-World Problems: Percent	**Summative Assessments:** **Math in Focus Assessments** ***Online Common Core Additional Resources for Course 2:*** Chapter 5 Rates Review/Test: Items: 1–11 ***Online Common Core Additional Resources for Course 2:*** Assessments Chapter 5 Test A, Items: 1–11; Test B, Items: 1–11

complex fraction $\frac{1/2}{1/4}$ ***mph, equivalently 2 mph.*** 7.RP.A.3. **Use proportional relationships to solve multistep ratio and percent problems.** ***Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*** *Mathematical Practices* MP.1, MP.2, MP.3, MP.4, MP.5, MP.6, MP.7, MP.8	The students will be able to: • Solve unit rate problems including unit pricing and constant speed. • Solve problems involving rates and unit rates. • Solve problems involving percent. • Solve problems involving percent increase and decrease.	**Brain Genie** http://braingenie.ck12.org/ **Math Game Time** http://www.mathgametime.com/ **Everything you need to know about math journals:** https://thecornerstoneforteachers.com/math-journals/ (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1) **Let's make a deal – unit rate activity:** https://www.teacherspayteachers.com/Product/Lets-Make-A-Deal-Unit-Rate-Activity-379894 (CRP2, CRP8, 8.1.8.A.1) **Unit rates in real life – Starbucks:** https://www.teacherspayteachers.com/Product/Unit-Rates-in-Real-Life-Starbucks-63350 (CRP2, CRP8) **Unit rate activities, games and assessment:** https://www.teacherspayteachers.com/Browse/Search:unit%20rates/Grade-	***Online Common Core Additional Resources*** *for Course 2:* 6.5 Percent of Change **My HRW** - Online access to all Math in Focus materials and Virtual Manipulatives Math in Focus **Teacher Resource Tools** Math in Focus **Performance Task** **Technology Resources** • Math in Focus eBooks • Math in Focus Teacher Resources CD • Interactive Whiteboard lessons • Virtual Manipulatives • Online Professional Development Videos **North Carolina Dept of Ed. Wikispaces:** **http://maccss.ncdpi.wikispaces.net/Middle+School** **Math Goodies – Math Lessons** **http://www.mathgoodies.com/** **Standards Solution Lessons:**	***Online Common Core Additional Resources for Course 2:*** Chapter 6 Percent Review/Test: Items: 15–16, 19, 20–28 ***Online Common Core Additional Resources for Course 2:*** Assessments Chapter 6 Test A, Items: 8–12; Test B, Items: 8–12 **Formative Assessments:** Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1) Multiple choice / short answer assessments (CRP8) Mini quizzes – assess just one topic, or what was done within 1 or 2 days (CRP8) **Alternate Assessments:** Learning centers: each learning center focuses on a different type of problem (CRP8)

		Level/Seventh/Price-Range/Free (8.1.8.A.1) **Best buy activity (some teacher prep required):** http://www.elginschools.org/userfiles/205/Classes/9880/Lesson%2041.5-%20Best%20Buy%20Activity.pdf (CRP2, CRP8, NJSLSA.R1, NJSLSA.W2) **Percent of change scavenger hunt:** https://mathbythemountain.wordpress.com/2016/10/08/percent-of-change-scavenger-hunt-activity-free-download/ • You can also use the site below if you just want the PowerPoint and pdf: https://app.box.com/s/yrjdswihxc96aqzsz172eb0i0wih02d2 (CRP2, CRP8, 8.1.8.A.1) **Additional texts:** www.newsela.com www.readworks.org www.commonlit.org	• **CCSS Lesson Plan:** An Introduction to Simple Interest • **CCSS Lesson Plan:** Discovering Percent Increase and Decrease • **CCSS Lesson Plan:** Gratuities and Commissions • **CCSS Lesson Plan:** The Complex Race: Computing Unit Rates as Complex Fractions • **CCSS Prescriptive Lesson Plan:** Unit Rates with Fractions **7th grade assessments, interactive, videos, games, lessons, homework:** https://www.opened.com/search?area=mathematics&grade=7&offset=0&resource_type=interactive-assessment (CRP2, CRP4, CRP8, 8.1.8.A.1) **7th grade worksheets, games, lessons, activities:** https://www.education.com/resources/math/middle-school/ (CRP2, CRP4, CRP8, 8.1.8.A.1) 7th **grade common core worksheets:**	In groups, create posters illustrating the main objectives of the unit (RH.6-8.7)(9.2.8.B.3) Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)

		https://www.ixl.com/math/grade-7 (CRP2, CRP4, CRP8) **Khan Academy – videos, lessons, assessments** **www.khanacademy.org** (8.1.8.A.1) **Percent games, tutorials and worksheets:** https://www.homeschoolmath.net/online/percent.php (CRP2, CRP4, CRP8, 8.1.8.A.1)

Key Vocabulary:
Chapter 3:
No vocabulary

Chapter 4:
equivalent equations, solution set, equivalent inequalities

Chapter 5:
Rate, unit rate, speed, average speed, sales tax, commission, interest, interest rate, markup, discount

NJ Learning Standards Vocabulary:
7.EE.A.1 & 2
Use properties of operations to generate equivalent expressions.
coefficients, like terms, distributive property, factor

7.EE.B.3 & 4
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
numeric expressions, algebraic expressions, maximum, minimum

7.RP.A.1 & 3

Analyze proportional relationships and use them to solve real-world and mathematical problems. :
unit rates, ratios, proportional relationships, proportions, constant of proportionality, complex fractions
proportion, percent, simple interest rate, principal, tax, discount, markup, markdown, gratuity, commissions, fees, percent of error

Accommodations and Modifications:

Students with special needs: Support staff will be available to aid students related to IEP specifications. 504 accommodations will also be attended to by all instructional leaders. Modifications, alternative assessments, and scaffolding strategies will be used to support this learning. The use of Universal Design for Learning (UDL) will be considered for all students as teaching strategies are considered. Additional staff should be included so all students can fully participate in the standards associated with this curriculum.

ELL/ESL students: Students will be supported according to the recommendations for "can do's" as outlined by WIDA - https://www.wida.us/standards/CAN_DOs/

Students at risk of school failure: Formative and summative data will be used to monitor student success at first signs of failure. Student work will be reviewed to determine support. This may include parent consultation, basic skills review and differentiation strategies. With considerations to UDL, time may be a factor in overcoming developmental considerations. More time will be made available with a certified instructor to aid students in reaching the standards.

Gifted and Talented Students: Students excelling in mastery of standards will be challenged with complex, high level challenges**.**

English Language Learners:	**Special Education:**	**At-Risk:**	**Gifted and Talented:**
• Use manipulatives whenever needed • Break down steps into a simple checklist • Teaching modeling • Peer modeling • Word walls • Give directions in small steps and in as few words as possible • Provide visual aids • Group similar problems together • Repeat directions when	• Allow students to use a calculator when appropriate • Divide test into small sections of similar questions or problems • Utilize modifications & accommodations delineated in the students' IEP • Work with paraprofessional • Work with a partner • Shorten assignments to focus on mastery or key concepts • Maintain adequate space	• Allow students to use a calculator when appropriate • Divide test into small sections of similar questions or problems • Use visual demonstrations, illustrations and models • Give directions / instructions verbally and in simple written format • Peer support • Increased one – on – one time • Teachers may modify	• Allow students to complete an independent project as an alternative test Inquiry based instruction • Independent study • Higher order thinking skills • Adjusting the pace of the lessons • Real world scenarios • Student driven instruction

necessary • Provide a vocabulary list with definitions • Use of alge-tiles when needed • Use of number line when needed	between desks • Keep workspaces clear of unrelated materials • Provide fewer problems to attain passing grades • Tape a number line to the student's desk • Create a math journal that they can use during class, on assignments and (if teacher allows) on assessments • Provide extra time to complete a task when needed • Provide definitions of different graphs / charts with illustrations • Allow tests to be taken in a separate room • Use of alge-tiles when needed • Use of number line when needed • Use manipulatives whenever needed • Break down steps into a simple checklist	instructions by modeling what the student is expected to do • Instructions may be printed out in large print and hung up for the students to see during the time of the lesson • Review behavior expectations and make adjustments • Create a math journal that they can use during class, on assignments and (if teacher allows) on assessments • Allow students to complete an independent project as an alternative test • Use of alge-tiles when needed • Use of number line when needed • Use manipulatives whenever needed • Break down steps into a simple checklist	

Interdisciplinary Connections: ELA

NJSLSA.R1. Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
NJSLSA.W2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content
NJSLSA.L1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking

Integration of Technology Standards NJSLS:

8.1.8.A.1: Demonstrate knowledge of a real world problem using digital tools.

21st Century Standards

9.2.8.B.3: Evaluate communication, collaboration and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

Career Ready Practices:

CRP2: Apply appropriate academic and technical skills
CRP4: Communicate clearly and effectively and with reason
CRP6: Demonstrate creativity and innovation
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them

History / Social Studies:

RH.6-8.7 Integrate visual information (e.g., in charts, graphs, photographs, videos or maps) with other information in print and digital texts

Major Supporting Additional (Identified by PARCC Model Content Frameworks)