

Englewood Public School District

Mathematics

Grade 7

Third Marking Period

Unit 3 – Geometry Construction

Overview: During this unit students will learn about direct and inverse proportion, angle properties and straight lines, and geometric construction.

Time Frame: Chapter 5 – 15 days, Chapter 6 (6.1 & 6.2 only) – 8 days, Chapter 7 – 15 days

Enduring Understandings:

Two quantities that are in a proportional relationship can be used to solve real-world and mathematical problems.

Angles formed on a straight line, or by parallel lines and a transversal have special properties that are useful in solving problems.

Triangles and quadrilaterals can be constructed using a compass, a protractor, and a straightedge.

Essential Questions:

How can ratios of fractions and quantities measured in like or different units be expressed as unit rates?

How can proportional relationships be represented?

What are the properties of a proportional relationship and how can they be identified?

How can these properties be identified when the relationship is modeled in various ways?

How can a proportional relationship be represented by an equation?

How can proportional relationships be used to solve percent and ratio problems?

How do scale drawings assist in problem solving?

How do the given conditions affect the drawing of a geometric shape?

How can the properties of angles be used to solve multi-step problems?

Standards	Topics and Objectives	Activities	Resources	Assessments
Chapter 5				
7.RP.A.2. Recognize and represent proportional relationships between quantities. a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or	Topics Understanding direct proportion, representing direct proportion graphically, solving direct proportion problems, and understanding inverse proportion.	<u>7.RP.A.2 Sore Throats, Variation 1</u> <u>7.RP.A.2 Buying Coffee</u> <u>7.RP.A.2c Gym Membership Plans</u>	SE-7A: 244-297 My HRW - Online access to all Math in Focus materials and Virtual Manipulatives Math in Focus Teacher Resource Tools	Unit 3 Benchmark Assessments: Common Formative Assessment Exact Path

graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p , the relationship between the total cost and the number of items can be expressed as $t = pn$.*
d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.

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

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 direct proportion.
- Recognize that a constant of proportionality can be a constant rate.
- Use a graph to interpret direct proportion.
- Solve real-world direct proportion problems.
- Identify inverse proportion.
- Use a graph to interpret inverse proportion.
- Solve inverse proportion problems.
- Reinforce, consolidate, and extend chapter skills and concepts.

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/>

Everything you need to know about math journals:

<https://thecornerstoneforteachers.com/math-journals/>
(NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)

Direct proportion activities and practice:

http://www.singaporemath.com/v/vspfiles/assets/images/sp_dmt7b.pdf
(CRP2)

Proportion word problems:
(videos and more practice

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 6:** Type - Constructed-Response – Constant of Proportionality
- **PARCC Lesson 14:** Practice Type I items – Ratio and Proportional Relationships domain
- **PARCC Lesson 14:** Performance Based Assessment
- **PARCC Lesson 17:** Performance Based Assessment
- **CCSS Lesson Plan:** Graphing Proportional Relationships
- **CCSS Lesson Plan:**

Summative Assessments:

Math in Focus Assessments

SE/TE: pp. 290–293, 294–297

Assessments Course 2:
Chapter 5

Test A pp. 48–51;
Test B pp. 52–55

Assessments Course 2:
Mid-Course Test A
pp. 56–67;
Mid-Course Test B
pp. 68–78

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

on the left hand side)
<https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-write-and-solve-proportions/e/constructing-proportions-to-solve-application-problems>
(8.1.8.A.1)

Classifying proportion and non-proportion situations:
<http://map.mathshell.org/lessons.php?unit=7215&collection=8&redir=1>
(CRP8)

Inverse proportions activity (includes writing assignments):
<https://www.ket.org/education/sitelet/scalecity/pdf/Drive-InLessonPlan.pdf>
(RH.6-8.7, NJSLSA.W2, NJSLSA.L1)

Additional texts:
www.newsela.com
www.readworks.org
www.commonlit.org

Equation Match Up: An Introduction to Linear Equations

- **CCSS Prescriptive Lesson Plan:** Determining Proportional Relationships

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)

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)

Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)

(6.1 and 6.2 only)

7.G.A.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.B.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

Mathematical Practices
MP.1, MP.2, MP.3, MP.4, MP.5, MP.6, MP.7, MP.8

Topics	Math Playground http://www.mathplayground.com/	SE-7B: 2-31	Summative Assessments:
Complementary, supplementary and adjacent angles and angles that share a vertex.	Math Fact Practice http://www.playkidsgames.com/games/mathfact/mathfact.htm	Common Core Additional Resources	Math in Focus Assessments
Twenty-First Century Themes and Skills include:	Grades 6-8 Math Fluency Support https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8	My HRW - Online access to all Math in Focus materials and Virtual Manipulatives	SE/TE: pp. 55–56, 58–61, Items: 1–19, 25–26
<ul style="list-style-type: none"> • <u>Creativity and Innovation</u> • <u>Critical Thinking and Problem Solving</u> • <u>Communication and Collaboration</u> 	Brain Genie http://braingenie.ck12.org/	Math in Focus Teacher Resource Tools	Assessments Course 2: Chapter 6 Test A pp. 80–83, Items: 1–9, 11–12;
Objectives	Math Game Time http://www.mathgametime.com/	Math in Focus Performance Task	Test B pp. 84–87, Items: 1–9, 11–12
The students will be able to:	Everything you need to know about math journals: https://thecornerstoneforteachers.com/math-journals/ (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)	Technology Resources <ul style="list-style-type: none"> • Math in Focus eBooks • Math in Focus Teacher Resources CD • Interactive Whiteboard lessons • Virtual Manipulatives • Online Professional Development Videos 	ExamView® Assessment Suite CD-ROM Course 2
<ul style="list-style-type: none"> • Explore the properties of complementary angles and supplementary angles. • Explore the properties of adjacent angles. • Explore and apply the properties of angles at a point. • Explore and apply the properties of vertical angles. 	Angle pairs lesson: https://betterlesson.com/lesson/435296/angle-pairs (RH.6-8.7)	North Carolina Dept of Ed. Wikispaces: http://maccss.ncdpi.wikispaces.net/Middle+School	Formative Assessments: Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)
		Math Goodies – Math Lessons http://www.mathgoodies.com/	Exit Ticket Out the Door
		Standards Solution Lessons: CCSS Prescriptive Lesson Plan: Finding Unknown Angle Measurements	Multiple choice / short answer assessments (CRP8)
	Four types of angles –	7th grade assessments,	Mini quizzes – assess just one topic, or what was done within 1 or 2 days (CRP8)
			Alternative Assessments: Learning centers: each

includes paper folding activity:

<https://www.oercommons.org/courseware/lesson/3311/overview>
(RH.6-8.7)

Angles, angles everywhere

(complementary and supplementary angles):
<http://www.cpalms.org/Public/PreviewResourceLesson/Preview/37261>
(RH.6-8.7, CRP8)

Interactive supplementary and vertical angles – lesson and game:
<http://theteacherscafe.com/interactive-supplementary-and-vertical-angles-7th-grade-geometry/>
(RH.6-8.7, 8.1.8.A.1)

Complementary and supplementary angles lesson and worksheets:
<https://betterlesson.com/lesson/617758/complementary-supplementary-algebra>
(RH.6-8.7)

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)

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)

Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)

Game with all 4 types of

angles:

<https://www.mathgames.com/skill/8.85-complementary-supplementary-vertical-and-adjacent-angles>
(8.1.8.A.1)

Vertical angles lesson and activity:

<http://www.cpalms.org/Public/PreviewResourceLesson/Preview/55125>
(RH.6-8.7)

Additional texts:

www.newsela.com
www.readworks.org
www.commonlit.org

Chapter 7

7.G.A.1. Solve problems involving scale drawings of geometric figures, such as computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

7.G.A.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the

Topics

Constructing angle bisectors, perpendicular bisectors, triangles, quadrilaterals and understanding scale drawings.

Twenty-First Century Themes and Skills include:

- [Creativity and Innovation](#)
- [Critical Thinking and Problem Solving](#)
- [Communication and Collaboration](#)

7.G.A.1 Floor Plan

7.G.A.1 Map distance

7.G.A.2 A task related to

Math Playground

<http://www.mathplayground.com/>

Math Fact Practice

<http://www.playkidsgames.com/games/mathfact/mathfact.htm>

Grades 6-8 Math Fluency

SE-7B: 62-119

Common Core Additional Resources

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

Summative Assessments:

Math in Focus Assessments

SE/TE: pp. 115–116, 117–119

Assessments Course 2: Chapter 7

Test A pp. 91–95;

Test B pp. 96–100

ExamView® Assessment Suite CD-ROM Course 2

<p>conditions determine a unique triangle, more than one triangle, or no triangle.</p> <p><i>Mathematical Practices</i> MP.1, MP.2, MP.3, MP.4, MP.5, MP.6, MP.7, MP.8</p>	<p>Objectives</p> <p>The students will be able to:</p> <ul style="list-style-type: none"> • Understand the meaning of an angle bisector. • Construct an angle bisector. • Understand the meaning of a perpendicular bisector. • Construct a perpendicular bisector. • Construct a triangle with given measures. • Determine whether a unique triangle, more than one triangle, or no triangle can be drawn from given side lengths. • Construct a rectangle, square, rhombus, or parallelogram. • Identify the scale factor in diagrams. • Solve problems involving scale drawings of geometric figures. • Reinforce, consolidate, and extend chapter skills and concepts. 	<p>Support https://www.engageny.org/resource/mathematics-fluency-support-grades-6-8</p> <p>Brain Genie http://braingenie.ck12.org/</p> <p>Math Game Time http://www.mathgametime.com/</p> <p>Everything you need to know about math journals: https://thecornerstoneforteachers.com/math-journals/ (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)</p> <p>Constructions worksheet: http://www.math-aids.com/Geometry/Constructions/ (RH.6-8.7)</p> <p>Geometric drawings lesson and hands-on activity: https://betterlesson.com/lesson/435294/geometric-drawings (RH.6-8.7)</p> <p>Constructions and scale factor videos: https://study.com/academy/topic/common-core-math-grade-7-geometry-</p>	<ul style="list-style-type: none"> • Math in Focus eBooks • Math in Focus Teacher Resources CD • Interactive Whiteboard lessons • Virtual Manipulatives • Online Professional Development Videos <p>North Carolina Dept of Ed. Wikispaces: http://maccss.ncdpi.wikispaces.net/Middle+School</p> <p>Math Goodies – Math Lessons http://www.mathgoodies.com/</p> <p>7th grade assessments, interactive, videos, games, lessons, homework: https://www.opened.com/search?area=mathematics&grade=7&offset=0&resource_type=interactive-assessment</p> <p>(CRP2, CRP4, CRP8, 8.1.8.A.1)</p> <p>7th grade worksheets, games, lessons, activities: https://www.education.com/resources/math/middle-school/ (CRP2, CRP4, CRP8, 8.1.8.A.1)</p> <p>7th grade common core worksheets:</p>	<p>Formative Assessments: Math journal (NJSLSA.R1, NJSLSA.W2, NJSLSA.L1)</p> <p>Exit Ticket Out the Door</p> <p>Multiple choice / short answer assessments (CRP8)</p> <p>Mini quizzes – assess just one topic, or what was done within 1 or 2 days (CRP8)</p> <p>Alternative Assessments: Learning centers: each learning center focuses on a different type of problem (CRP8)</p> <p>In groups, create posters illustrating the main objectives of the unit (RH.6-8.7) (9.2.8.B.3)</p> <p>Create a dictionary defining and illustrating vocabulary terms (RH.6-8.7)</p>
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[geometric-construction.html](http://www.ixl.com/math/grade-7)
(8.1.8.A.1, RH.6-8.7)

<https://www.ixl.com/math/grade-7>
(CRP2, CRP4, CRP8)

Additional texts:

www.newsela.com
www.readworks.org
www.commonlit.org

Khan Academy – videos, lessons, assessments
www.khanacademy.org
(8.1.8.A.1)

Key Vocabulary:

Chapter 5:

proportion, direct proportion, constant of proportionality, cross products, inverse proportion

Chapter 6 :

complementary angles, supplementary angles, adjacent angles, vertical angles, congruent angles

Chapter 7 :

bisector, bisect, equidistant, straightedge, perpendicular, midpoint, included side, included angle, scale, scale factor

NJ Learning Standards Vocabulary:

7.RP.A.2 & 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

7.G.A.1

Draw, construct, and describe geometrical figures and describe the relationships between them.

scale drawing, dimensions, scale factor

7.G.A.2 & 3

Draw, construct, and describe geometrical figures and describe the relationships between them.

plane sections, right rectangular prism, right rectangular pyramids, parallel, perpendicular, scalene triangle, obtuse

7.G.B.5

Solve real-life and mathematical problems involving angle measure.

supplementary, vertical, adjacent, complementary

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:
<ul style="list-style-type: none"> • Increased one – on – one and small group time • 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 necessary • Provide a vocabulary list with definitions • Use of alge-tiles when needed • Use of number line when needed 	<ul style="list-style-type: none"> • Allow tests to be taken in a separate room • 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 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 	<ul style="list-style-type: none"> • Increased one – on – one and small group time • Use visual demonstrations, illustrations and models • Give directions / instructions verbally and in simple written format • Peer support • Teachers may modify 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, 	<ul style="list-style-type: none"> • Inquiry based instruction • Independent study • Higher order thinking skills • Adjusting the pace of the lessons • Real world scenarios • Student driven instruction • Allow students to complete an independent project as an alternative test

	assessments <ul style="list-style-type: none"> • Provide extra time to complete a task when needed • Provide definitions of different graphs / charts with illustrations • Allow students to use a calculator when appropriate • Divide test into small sections of similar questions or problems • Use of alge-tiles when needed • Use of number line when needed 	on assignments and (if teacher allows) on assessments <ul style="list-style-type: none"> • Allow students to complete an independent project as an alternative test • Use of alge-tiles when needed • Use of number line when needed 	
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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)