Trimester:	Unit Title:	Recommended Instructional Days:
2	**Ratios and Proportions**	**19 - 23 days**

Domains: Ratios and Proportional Relationships; Geometry

Strand:

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 complex fraction ½/¼ miles per hour, equivalently 2 miles per hour.

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

7.RP.A.2 Recognize and represent proportional relationships between quantities.
b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

7.RP.A.2 Recognize and represent proportional relationships between quantities.
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.*

7.RP.A.2 Recognize and represent proportional relationships between quantities.
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.*

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

Key:

Major Cluster **Supporting Cluster** **Additional Cluster** **Climate Change Opportunity**

Progress Indicators: ◊ Tests ◊ Homework / Classwork ◊ Projects ◊ Formative Assessments ◊ Summative Assessments

Mathematical Practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Questions:
Lesson 1: How can you use ratios to solve real-world problems?
Lesson 2: How do you find and use unit rates?
Lesson 3: How do you find an unknown value in a proportion?
Lesson 4: How can you represent a relationship with a proportion?
Lesson 5: What does the graph of a proportional relationship look like? How can you identify proportional relationships?
Lesson 6: How do scale drawings and actual measurements represent proportional relationships? How does the concept of similarity help us solve real-world problems?

Essential Understandings:
A ratio is the relationship of two or more quantities or measurements.
Unit rates can help us to solve many real-world problems.
Equivalent ratios and unit rates can be used to compare ratios and solve problems.
Quantities in a proportional relationship can be described by equivalent ratios.
Equations in the form $y = kx$, where k is the constant of proportionality, can be used to represent proportional relationships and solve problems.
The graph of a proportional relationship is a straight line through the origin.
By recognizing proportional quantities, you can use what you know about proportional relationships to solve problems.

A proportion can be used when two objects are similar.
Ratios and proportions are used to develop and understand scale drawings and models.

Vocabulary:

- ratio
- value of the ratio
- equivalent ratios
- ratio table
- rate
- unit rate
- equivalent rates
- proportion
- cross products
- proportional
- constant of proportionality
- scale drawing
- scale model
- scale
- scale factor

**Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts. When students encounter a new definition, encourage them to write in their Big Ideas Student Journals. They will revisit these definitions during the Chapter Review.*

Suggested Activity Descriptions:

- Chapter Exploration problems on TB page 182.
- Exploration Activities at the beginning of each section.
- Have students write ratios in three ways to compare various quantities within the classroom. For example, they might write a ratio of the number of desks to the number of windows.
- Have students write two equal ratios and use them to form a proportion. Next, have them erase one of the numbers and trade with a friend who will solve the proportion.
- Snap a few pictures at the grocery store of various barcodes where the unit rate is included to share with students. Try to get a few where the rates are different (i.e. price per pound, price per unit).
- Then, continue to fractional unit rates by sharing the example, "A child can ride a bike at a rate of 3 miles every 1⁄2 hour." Help students to then make the jump to a complex fraction. For example, "A canoe can travel at a rate of 1⁄2 mile every 1⁄3 of an hour."
- Prompt students to see the constant of proportionality in real life. From the cost of a song in iTunes to the cost of a gallon of gas, proportionality can be easily spotted in the real-world.
- List three different tables on the board, one that does not have a proportional relationship and two that do have a proportional relationship.

Ask students to predict which ones are proportional. At the end of the lesson return to the various predictions and discuss.

- Have students construct similar figures with geometry software.
- Project an image onto the board. Then, use the computer to resize the image both by reduction and enlargement. Help students connect the change in size to being proportional.
- Provide students with maps of various states. Have them plan a road trip that includes at least two cities. They should determine the distance between each of their stops using the scale on the map.

Interdisciplinary Connections:
Science:

1. Big Ideas STEAM Video and corresponding questions on TB page 181.
2. Big Ideas STEAM Performance Task. QR Code on TB page 223.
3. Example #2 on TB page 191: A scientist estimates that a jet of liquid iron in the Earth's core travels 9 feet every ½ hour. How far does the liquid iron travel in 1 day?
4. Question #43 on TB page 202: The shadow of the moon during a solar eclipse travels 2300 miles in 1 hour. In the first 20 minutes, the shadow traveled 766⅔ miles. How long does it take for the shadow to travel 1150 miles? Justify your answer

Social Studies:

1. Example #2 on TB page 219: A scale model of the Sergeant Floyd Monument is 10 inches tall. The actual monument is 100 feet tall. What does 1 inch represent in the model? What is the scale? What is the scale factor of the model?
2. Question #7 on TB page 220: A scale drawing of the Parthenon is shown. Find the actual perimeter and area of the rectangular face of the Parthenon. Then recreate the scale drawing with a scale factor of 0.2. Find the perimeter and area of the rectangular face in your drawing.

Physical Education:

1. Question #36 on TB page 201: You do 90 sit-ups in 2 minutes. Your friend does 126 sit-ups in 2.8 minutes. Do these rates form a proportion? Explain.
2. Question #40 on TB page 201: A pitcher coming back from an injury limits the number of pitches thrown in bullpen sessions as shown. Which quantities are proportional? How many pitches that are not curveballs will the pitcher likely throw in Session 5?

Language Arts:

1. Vocabulary Question #3 on TB page 191: How can you tell when a rate is a unit rate?
2. Writing Question #4 on TB page 191: Explain why rates are usually written as unit rates.
3. Vocabulary Question #11 on TB page 198: Explain how to determine whether two quantities are proportional.
4. Vocabulary Question #3 on TB page 219: In your own words, explain the meaning of the scale and scale factor of a drawing or model.

Spot Light On: Tyler Kelly

Social and Emotional Learning: *Competencies*	**Social and Emotional Learning: *Sub-Competencies***
SEL Competencies: • Self-Awareness • Social Awareness • Self-Management • Relationship Skills • Responsible Decision-Making	• Recognizing the importance of self-confidence in handling daily tasks and challenges. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Identify and apply ways to persevere through alternative methods to achieve goals. • Utilize positive communication and social skills to interact effectively with others. • Develop, implement, and model effective problem solving and critical thinking skills.
Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: • Teacher Observations • Exit Tickets • Quizzes • Self Assessments • Big Ideas Student Journals • Homework/Classwork • Teacher Created Assessments • Progress Monitoring Items • Formative Assessment Tips in Big Ideas Teacher Edition	**Benchmarks & Summative Assessments:** • Chapter/Unit Assessments • Standardized Tests • Project-based Assessments • Benchmark Tests

Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
Big Ideas Student Journal, Dynamic Assessment System, iReady, Khan Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core,	Reteach worksheets, Extra Practice worksheets, Math manipulatives, Scaffolding Instructions in each section of textbook, Tutorial Videos, Skills Review Handbook, Skills Trainer	Dictionary for native language, Video tutorial in native language, ELL Support in each section of Big Ideas Teacher's Edition	ST Math Challenge Objectives, G&T tasks, Enrichment and Extension worksheets, Art of Problem Solving, Leveled assessments

Desmos			
Supplemental Resources			
Technology: • Chromebooks • Scientific Calculators • Online math manipulatives **Other:** • Google Classroom, Google Meets, Schoology, Interactive Workbooks • Illustrative Mathematics • insidemathematics.org • National Library of Virtual Manipulatives			
Differentiated Student Access to Content: **Recommended *Strategies & Techniques***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics.	Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.	Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect students to related content.

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept(s):** Digital Citizenship	
	Core Ideas:	Digital identities must be managed in order to create a positive digital footprint.
	Performance Expectation/s:	9.4.5.DC.5: Identify the characteristics of a positive and negative online identity and the lasting implications of online activity.
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	**X**	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	**X**	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*