Marking Period	Unit Title	Recommended Instructional Days					
2	2Ratios and Proportional Relationships20 - 24						
Domain							
Strand:							
7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.							
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 $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1}{2}/\frac{1}{4}$ 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 (<i>x</i>, <i>y</i>) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, <i>r</i>) where <i>r</i> is the unit rate. 							
7.RP.A.3 Use proportional relationships to solve multistep ratio and percent problems. <i>Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.</i>							

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 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 3/4 inches long in the center of a door that is 27 1/2 inches 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.							
Key:							
Major Cluster O Additional Cluster							
Progress Indicator:							
Mathematical Practices:							
 Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Construct viable arguments and critique the reason of others. Model with mathematics. Use appropriate tools strategically. Attend to precision. Look for and make use of structure. 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:

Module 4:

How can you use rates and proportionality to solve real-world problems?

- How do you find and use unit rates?
- How can you identify and represent proportional relationships?

What characteristics can you conclude about a proportional relationship?

How can you express a pattern to show a relationship?

How can you use graphs to represent and analyze proportional relationships?

How does a pattern support a prediction?

Module 5:

How can you use proportional relationships and percent to solve real-world problems? How do you use percents to describe change?

How can you rewrite expressions to help you solve markup and markdown problems?

How do you use percents to solve problems?

What information and strategies would you use to solve a percent proportion?

When would estimation be an appropriate strategy?

Essential Understandings:

Module 4:

Proportional relationships exist in everyday life. Real world relationships can be represented by constant rates of change. Not all linear relationships have a constant rate of change.

Module 5:

Percents exist in everyday life and can be used to solve problems. A percent is a ratio out of 100.

<u>Vocabulary:</u>

- complex fraction
- unit rates
- constant of proportionality
- proportion
- proportional relationship
- rate of change

- percent increase
- percent decrease
- principal
- simple interest

*Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts.

Suggested Activity Descriptions:

- Snap a few pictures at the grocery store of various barcodes where the unit rate is included. 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."
- Show students the Proportions video from BrainPOP.
- 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.
- Use the census for your local town to describe the historic population of your area. Discuss how the area has changed and how that can be represented mathematically.
- GoMATH Activity 4.3 Proportional or Not Proportional? (GoMATH TB page 134C-134D)
- GoMATH Game 4.3 Match the Proportional Relationships (GoMATH TB page 134E-134F)
- GoMATH Game 5.1 Percento! (GoMATH TB page 140A-140B)
- GoMATH Unit 2 Review Project: To Infinity (Almost)...and Beyond!

◊ Suggested Sample Tasks:

Interdisciplinary Connections: Comprehensive Health and Physical Education **Content:** Movement Skills and Concepts

The coach of a women's basketball team wants each of her starting players to make at least 75% of the free throws attempted during regular season games. The table shows the statistics for the starting players after the first 15 games.

Player	Free Throws Attempted	Free Throws Made	Percent
Wilson	36	24	

-				
	Bartholdi	42	37	
	Johnson	22	15	
	Garcia	29	16	
	O'Malley	14	12	

Part A

Use the table. Find the percentage of free throws made by each player. Round to the nearest percent.

Part B

Choose one of the players with a free-throw percentage less than 75%. Determine a number of free throws the player could attempt and make during the next 10 games to increase her free-throw percentage to at least 75%.

Part C

Choose one of the players with a free-throw percentage greater than 75%. Determine the number of free throws that the player could miss during the 10 games and still maintain an overall percentage of at least 75%.

KEY: Part A

Player	Free Throws Attempted	Free Throws Made	Percent	
Wilson	36	24	67%	
Bartholdi	42	37	88%	
Johnson	22	15	68%	
Garcia	29	16	55%	
O'Malley	14	12	86%	

Sample answer: If Wilson attempts 14 free throws in the next 10 games and makes them all, her overall free throw percentage will increase to 76%. Her attempts would be 50, her free throws made would be 38, and her overall percentage would be 76%.

Part C

Sample answer: If O'Malley takes and misses 2 free throws over the course of the next 10 games, she will maintain an overall percentage of 75%. Her attempts would be 16, her free throws made would still be 12, and her overall percentage would be 75%.

Interdisciplinary Connections:

Science:

1. The grizzly bear population in Yellowstone National Park in 1970 was about 270. Over the next 35 years, it increased by about 115%. What was the population in 2005? (GoMATH page 143)

2. In chemistry class, Bob recorded the volume of a liquid as 13.2 mL. The true volume was 13.7 mL. Use the formula to find the percent error of Bob's measurement to the nearest tenth of a percent. (GoMATH page 158)

3. Acceleration is the rate at which the velocity of an object changes. Students in a science class study the acceleration of an object due to gravity. They perform an experiment in which they drop a ball from a balcony and measure the ball's velocity in meters per second at various times as it falls toward the ground. The table shows their measurements. (GoMATH page 164)

Social Studies:

1. Careers in Math (GoMATH page 111)

2. Differentiate Instruction Activity: Population density is the average number of people per square mile. Write the population density of each state. Round your answers to the nearest whole number. (See corresponding chart in Teacher's Edition.) (GoMATH TE page 122)

Language Arts:

- 1. Vocabulary Preview Activity on GoMATH page 112.
- 2. Reading Startup Activities on GoMATH pages 115 and 139.

*Grade 7 Math/Science Connection

Marking Period: 2 Science Module: H Math Module(s): 5 Topics that Overlap: Solar System and Scale

Solar System Model Performance Task: Earth and Solar System: Hands on Lab - Model the Solar System Unit 2 Lesson 2 Science Aspects: Calculate and create a scale model of each planet and a scale model of the distance between the planets. Skills: Solar System, scale model, measurement, collaboration Math Aspects: Unit 2 Project: To Infinity (Almost)and Beyond! In this project, students use the scale 1 inch = 10,000 miles to calculate the diameters of the Sun and planets and the distances of the planets from the Sun in a scale model of the solar system. Skills: Scale, numerical operations Spot Light On: Fern Hunt						
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 • Math Journals • Homework/Classwork • Teacher created assessments	Benchmarks & Summative Assessments: • Chapter/Unit Assessments • Standardized Tests • District Assessments • Project-based Assessments					

Differentiated Student Access to Content: Teaching and Learnin <u>g <i>Resources/Materials</i></u>							
Core Resources	Alternate Core Resources IEP/504/At-Risk/ESL	ELL Core Resources	Gifted & Talented Core Resources				
Go Math Workbook, IXL, Personal Math Trainer, Math on the Spot Videos, My HRW, Khan Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core, Desmos	Reteaching worksheets, Skill puilding workbook, Math nanipulatives, Leveled practice vorksheets	Dictionary for native language, Video tutorial in native language, Success for English Learners worksheets, GoMATH Leveled Strategies for English Learners, GoMATH Linguistic Support	ST Math Challenge Objectives, G&T tasks, Enrichment worksheets, Art of Problem Solving, Leveled assessments, GoMATH Teaching for Depth, Math Olympiad				
Supplemental Resources							
 Technology: Chromebooks • Scientific/Graphing Calculators (upper grades only) • 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 <u>Strategies & Techniques</u>							
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 (V approach during instruction provide alternate presenta of skills by varying the m (repetition, simple explan additional examples, mod etc.), modify test content		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	Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities,				

	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.	and/or rubric.	and connect student to related content.				
	Disciplinary Concept(s): Critical T	ciplinary Concept(s): Critical Thinking and Problem Solving					
NISI S CADEED	Core Ideas:	With a growth mindset, failure is an important part of success.					
READINESS, LIFE LITERACIES & KEY	Performance Expectation/s:	9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas.					
SKILLS	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)									
X	Amistad Law: N.J.S.A. 18A 52:16A-88		Holocaust Law: N.J.S.A. 18A:35-28		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: <i>Climate Change</i>