Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 1: Ratios and Proportional Relationships **(Approximate Instructional Time: 6 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
● 7.RP.A.2. Recognize and represent proportional relationships between quantities. 7.RP.A.2a. 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.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 7.RP.A.2c. 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*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Proportional relationships, unit rates and the constant of proportionality ● *Proportions represent equality between two ratios.* Students are able to: ● use tables and graphs to determine if two quantities are in a proportional relationship. ● identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. ● write equations representing proportional relationships. ● Interpret the origin and (1, r) on the graph of a proportional relationship in context. ● interpret a point on the graph of a proportional relationship in context. **Learning Goal 1**: Determine if a proportional relationship exists between two quantities e.g. by testing for equivalent ratios in a table or graph on the coordinate plane and observing whether the graph is a straight line through the origin. **Learning Goal 2:** Identify the constant of proportionality (unit rate) from tables, graphs, equations, diagrams, and verbal descriptions. **Learning Goal 3**: Write equations to model proportional relationships in real world problems. **Learning Goal 4**: Use the graph of a proportional relationship to interpret the meaning of any point (x, y) on the graph in terms of the situation - including the points (0, 0) and (1, r), recognizing that r is the unit rate.

relationship between the total cost and the number of items can be expressed as t = pn. 7.RP.A.2d. 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.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. 7.EE.B.4a. 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?* *(benchmarked)	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Representing proportional relationships with equations Students are able to: • use the constant of proportionality to represent proportional relationships by equations in real world contexts as they relate the equations to a corresponding ratio table and/or graphical representation. • write an equation of the form px + q = r or p(x + q)=r in order to solve a word problem. • fluently solve equations of the form px + q = r and p(x + q)= r. **Learning Goal 5**: Build conceptual understanding of the constant of proportionality as being a rate that can be represented in a table, graph or equation form.

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● 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 1/2 mile in each 1/4 hour, compute the unit rate as the 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.*	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): Ratios and rates involving fractions Students are able to: ● compute unit rates with ratios of fractions. ● compute unit rates with ratios of fractions representing measurement quantities. in both like and different units of measure. ● solve multi-step ratio problems including fractional markdowns, markups, commissions, fees, etc **Learning Goal 6**: Calculate and interpret unit rates of various quantities involving ratios of fractions that contain like and different units. **Learning Goal 7:** Use proportional relationships to solve multistep ratio problems.
● 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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Ratios of scale drawings Students are able to: ● use ratios and proportions to create scale drawings. ● understand that the scale factor is a unit rate. ● reproduce a scale drawing at a different scale. ● computing actual lengths and areas from a scale drawing. ● solve problems involving scale drawings using proportions. **Learning Goal 8:** Use ratio and proportion to solve problems involving scale drawings of geometric figures.

Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force* *Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object.* **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships,**

	write and solve equations, and use basic statistics: *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?* **MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on*

	grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly. *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.** Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.** Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.** Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.** **CRP5. Consider the environmental, social and economic impacts of decisions.** **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

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District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 1)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	
❑ *Ratio Table (See example in module overview)* ❑ *Coordinate Plane (See example in module overview)* ❑ *Equations of the form y = kx*	7.RP.A.1 Cooking with the Whole Cup 7.RP.A.2 Sore Throats, Variation 1 7.RP.A.2 Buying Coffee 7.RP.A.2c Gym Membership Plans 7.G.A.1 Floor Plan 7.G.A.1 Map distance 7.RP.A.3, 7.EE.B.3,4 Gotham City Taxis

District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments
Instructional Best Practices and Exemplars	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Proportional To** (Measures of one type of quantity are proportional to measures of a second type of quantity if there is a number $k > 0$ so that for every measure x of a quantity of the first type the corresponding measure y of a quantity of the second type is given by kx, i.e., $y = kx$.) • **Proportional Relationship** (A one-to-one matching between two types of quantities such that the measures of quantities of the first type are proportional to the measures of quantities of the second type.) • **Constant of Proportionality** (If a proportional relationship is described by the set of ordered pairs that satisfies the equation $y = kx$, where k is a positive constant, then k is called the constant of proportionality. For example, if the ratio of y to x is 2 to 3, then the constant of proportionality is 2/ 3 and $y = 2/3\ x$.) • **One-to- One Correspondence** (Two figures in the plane, S and S', are said to be in one-to-one correspondence if there is a pairing between the points in S and S', so that each point P of S is paired with one and only one point P' in S', and likewise, each point Q' in S' is paired with one and only one point Q in S.) • **Scale Drawing and Scale Factor**[4] (For two figures in the plane, S and S', S' is said to be a scale drawing of S with scale factor r if there exists a one-to-one correspondence between S and S' so that under the pairing of this one-to-one

	correspondence, the distance $\|PQ\|$ between any two points P and Q of S is related to the distance $\|P'Q'\|$ between corresponding points P' and Q' of S' by $\|P'Q'\| = r\|PQ\|$.) • [4] *These terms will be formally defined in Grade 8. A description is provided in Grade 7*

Focus Mathematical Concepts

Grade Level Fluency Requirement:

- **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."

6.RP.A.2 Understand the concept of a unit rate a/b associated with a ratio a:b with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."3

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.3 Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.

Common Misconceptions:

- Students might not pay attention to the order of the ratio for the constant of proportionality in word problems.

Differentiation/Accommodations/Modifications

Gifted and Talented

(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments

- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.

- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.

- Establish procedures for accommodations / modifications for assessments.

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Unit 2: Rational Numbers
(Approximate Instructional Time: 6 weeks)

NJ Student Learning Standards	Suggested Standards for Mathematical Practice	Critical Knowledge & Skills ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
• 7.NS.A.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line. 7.NS.A.1a. Describe situations in which opposite quantities combine to make 0. *For example, In the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?* 7.NS.A.1b. Understand $p + q$ as the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure.	Concept(s): Addition and subtraction of integers and rational numbers • *Opposite quantities combine to make 0 (additive inverses).* • *$p + q$ is the number located a distance $\|q\|$ from p, in the positive or negative direction depending on whether q is positive or negative.* • *Subtraction of rational numbers as adding the additive inverse, $p – q = p + (–q)$* • *The product of two whole numbers is the total number of objects in a number of equal groups.* Students are able to: • represent addition and subtraction on a horizontal number line. • represent addition and subtraction on a vertical number line. • interpret sums of rational numbers in real-world situations. • show that the distance between two rational numbers on the number line is the absolute value of their difference. **Learning Goal 1:** Describe real-world situations in which (positive and negative) rational numbers are combined, emphasizing rational numbers that combine to make 0. Represent sums of rational numbers $(p + q)$ on horizontal and vertical number lines, showing that the distance along the number line is $\|q\|$ and including situations in which q is negative and positive. **Learning Goal 2:** Add and subtract (positive and negative) rational numbers, showing that the distance between two points on a number line is the absolute value of their difference and representing subtraction using an additive inverse.

describing real-world contexts. 7.NS.A.1c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. 7.NS.A.1d. Apply properties of operations as strategies to add and subtract rational numbers.		
● 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.A.2a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.7 Look for and make use of structure.	Concept(s): Multiplication and division of integers and rational numbers ● *Every quotient of integers (with non-zero divisor) is a rational number.* ● *Decimal form of a rational number terminates in 0s or eventually repeats.* ● *Integers can be divided, provided that the divisor is not zero.* ● *If p and q are integers, then –(p/q) = (–p)/q = p/(–q).* Students are able to: ● multiply and divide signed numbers. ● use long division to convert a rational number to a decimal. **Learning Goal 3:** Multiply and divide signed numbers, including rational numbers, and interpret the products and quotients using real-world contexts. **Learning Goal 4:** Convert a rational number to a decimal using long division and explain why the decimal is either a terminating or repeating decimal.

of rational numbers by describing real-world contexts. 7.NS.A.2b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. 2c. Interpret quotients of rational numbers by describing real world contexts. 7.NS.A.2d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.		
● 7.NS.A.3. Solve real-world and mathematical problems involving the four operations with rational numbers. ● 7.NS.A.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. 7.NS.A.2c. Apply properties of operations as strategies to multiply and divide rational	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): Applying operations with rational numbers to expressions and equations ● *The process for multiplying and dividing fractions extends to multiplying and dividing rational numbers.* Students are able to: ● add and subtract rational numbers. ● multiply and divide rational numbers using the properties of operations. ● apply the convention of order of operations to add, subtract, multiply and divide rational numbers. ● solve real world problems involving the four operations with rational numbers.

numbers.		**Learning Goal 5:** Apply properties of operations as strategies to add, subtract, multiply, and divide rational numbers. **Learning Goal 6:** Solve mathematical and real-world problems involving addition, subtraction, multiplication, and division of signed rational numbers.
Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force* *Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object.* **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve**	

	equations & analyze data: *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, write and solve equations, and use basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?* **MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).*

	B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.* *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.** Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.** Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.** Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.** **CRP5. Consider the environmental, social and economic impacts of decisions.** **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge.

	8.2 Technology Education, Engineering, Design and Computational Thinking - Programming (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 2)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	
	7.NS.A.1 Comparing Freezing Points 7.NS.A.1b-c Differences of Integers 7.NS.A.2 Why is a Negative Times a Negative Always Positive

	7.NS.A.2d Equivalent fractions approach to non-repeating decimals 7.NS.A.2d Repeating decimal as approximation EOY Released Items 7.NS.A.1, 7.NS.A.2, 7.NS.A.3 - #1, 2, 3, 9, 10, 11, 12 EOY Released Items 7.EE.A.1, 7.EE.A.2 - #4, 5 2015 EOY Released Items PBA Released Items 7.NS.A.1, 7.NS.A.2, 7.NS.A.3 - #5,6 PBA Released Items 7.EE.A.1, 7.EE.A.2 - #4 2015 PBA Released Items
District/ School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs.	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments
Instructional Best Practices and Exemplars	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Additive Identity** (The additive identity is 0.) • **Additive Inverse** (The additive inverse of a real number is the opposite of that number on the real number line. For example, the opposite of −3 is 3. A number and its additive inverse have a sum of 0.) • **Break-Even Point** (The break-even point is the point at which there is neither a profit nor loss.) • **Distance Formula** (If p and q are rational numbers on a number line, then the distance between p and q is $\|p - q\|$.) • **Loss** (A decrease in amount, as when the money earned is less than the money spent.) • **Multiplicative Identity** (The multiplicative identity is 1.) • **Profit** (A gain, as in the positive amount represented by the difference between the money earned and spent) • **Repeating Decimal** (The decimal form of a rational number, for example, 1 3 =

	0. $\bar{3}$.) ● **Terminating Decimal** (A decimal is called terminating if its repeating digit is 0.)

Focus Mathematical Concepts

Grade Level Fluency Requirement:

- ❖ **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

5.NF.B.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

6.NS.A.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*

Compute fluently with multi-digit numbers and find common factors and multiples.

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Apply and extend previous understandings of numbers to the system of rational numbers.

6.NS.C.5 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts,

explaining the meaning of 0 in each situation.

6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.

a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.

6.NS.C.7 Understand ordering and absolute value of rational numbers.

c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars*.

Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers.

a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*

b. Identify parts of an expression using mathematical terms (sum, term, product, factor quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*

c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6\ s^2$ to find the volume and surface area of a cube with sides of length s = 1/2.*

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

Reason about and solve one-variable equations and inequalities.

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.

Common Misconceptions:

- Setting up proportions correct
- Correctly reading a ruler to the nearest ¼ or ⅛
- When side measures are doubled, the perimeter of the shape is not doubled.

Differentiation/Accommodations/Modifications

Gifted and Talented

(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary

- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 3: Expressions & Equations **(Approximate Instructional Time: 6 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
● 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 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."*.	MP.2 Reason abstractly and quantitatively. MP.7 Look for and make use of structure.	Concept(s): Rewriting an expression in different forms (e.g. equivalent expressions) in a problem context can shed light on the problem. Students are able to: ● add and subtract linear expressions having rational coefficients, using properties of operations. ● factor and expand linear expressions having rational coefficients, using properties of operations. ● write expressions in equivalent forms to shed light on the problem and interpret the relationship between the quantities in the context of the problem. **Learning Goal 1:** Apply the properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. **Learning Goal 2:** Rewrite algebraic expressions in equivalent forms to highlight how the quantities in it are related.
● 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	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics.	Concept(s): Using expressions, equations and inequalities. Students are able to: ● solve multi-step real-life problems using rational numbers in any form. ● solve multi-step mathematical problems using rational numbers in any form. ● convert between decimals and fractions and apply properties of operations when calculating with rational numbers. ● estimate to determine the reasonableness of answers.

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.*	MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	**Learning Goal 3:** Solve multi-step real life and mathematical problems with rational numbers in any form (fractions, decimals) by applying properties of operations and converting rational numbers between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies.
● 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 . 7.EE.B.4a. 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?* 7.EE.B.4b. Solve word	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Using expressions, equations, and inequalities. Students are able to: ● compare an arithmetic solution to a word problem to the algebraic solution of the word problem, identifying the sequence of operations in each solution. ● write an equation of the form px + q = r or p(x + q)=r in order to solve a word problem. ● fluently solve equations of the form px + q = r and p(x + q)= r. ● write an inequality of the form $px + q > r$, $px + q < r$, $px + q \geq r$ or $px + q \leq r$ to solve a word problem. ● graph the solution set of the inequality. ● interpret the solution to an inequality in the context of the problem. **Learning Goal 4:** Use variables to represent quantities in a real-world or mathematical problem by constructing simple equations and inequalities to represent problems. **Learning Goal 5:** Fluently solve equations; solve inequalities, graph the solution set of the inequality and interpret the solutions in the context of the problem (*Equations of the form $px + q = r$ and $p(x + q) = r$ and inequalities of the form $px + q > r$, $px + q \geq r$, $px + q \leq r$, or $px + q < r$, where p, q, and r are specific rational numbers).*

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 sales you need to make, and describe the solutions.* *(benchmarked)		
● 7.G.B.4: Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Use equations and inequalities to solve geometry problems Students are able to: ● solve problems by finding the area and circumference of circles. ● show that the area of a circle can be derived from the circumference. **Learning Goal 6:** Know the formulas for the area and circumference of a circle and use them to solve problems. Give an informal derivation of the relationship between the circumference and area of a circle.

	MP.8 Look for and express regularity in repeated reasoning.	
• 7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Use equations and inequalities to solve geometry problems. Students are able to: • solve real-world and mathematical problems involving area of two dimensional objects composed of triangles, quadrilaterals, and polygons. • solve real-world and mathematical problems involving volume of three dimensional objects composed of cubes and right prisms. • solve real-world and mathematical problems involving surface area of three-dimensional objects composed of cubes and right prisms. **Learning Goal 7:** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force*	

	Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object. **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, write and solve equations, and use basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?*

	MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking: *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.* *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.*** *Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.*** *Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.*** *Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.*** *Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.*** *Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
• 21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.**

	CRP5. Consider the environmental, social and economic impacts of decisions. **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 3)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings

	Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	
❑ Area Model ❑ Coordinate Plane ❑ Equations and Inequalities ❑ Expressions ❑ Geometric Figures ❑ Nets for Three-Dimensional Figures ❑ Number Line ❑ Protractor ❑ Tape Diagram	7.G.B.4 Wedges of a Circle 7.G.B.4 Eight Circles 7.G.B.6, 7.RP.A.3 Sand under the Swing Set 7.G.A.2 A task related to 7.G.A.2 7.G.A.3 Cube Ninjas! 7.RP, 7.EE, 7.NS Drill Rig 7.EE.A.1 Writing Expressions 7.EE.A.2 Ticket to Ride7.EE.B.3 Discounted Books 7.EE.B.3 Shrinking 7.EE.B.4 Fishing Adventures 2 7.EE.B.4, 7.NS.A.1 Bookstore Account 7.EE.B.4b Sports Equipment Set 7.RP.A.3, 7.EE.B.3,4 Gotham City Taxis
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments

Instructional Best Practices and Exemplars	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **An Expression in Expanded Form** (An expression that is written as sums (and/or differences) of products whose factors are numbers, variables, or variables raised to whole number powers is said to be in expanded form. A single number, variable, or a single product of numbers and/or variables is also considered to be in expanded form.) • **An Expression in Factored Form** (middle school description) (An expression that is a product of two or more expressions is said to be in factored form.) • **An Expression in Standard Form** (An expression that is in expanded form where all like terms have been collected is said to be in standard form.) • **Coefficient of the Term** (The number found by multiplying just the numbers in a term together is called the coefficient of the term.) • **Circle** (Given a point C in the plane and a number $r > 0$, the circle with center C and radius r is the set of all points in the plane that are distance r from the point C.) • **Diameter of a Circle** (The diameter of a circle is the length of any segment that passes through the center of a circle whose endpoints lie on the circle. If r is the radius of a circle, then the diameter is $2r$.) • **Circumference** (The circumference is the length around a circle.)[3] • **Pi** (The number pi, denoted π, is the value of the ratio given by the circumference to the diameter in a circle; that is, π = (circumference)/(diameter).) • **Circular Region or Disk** (Given a point C in the plane and a number $r > 0$, the circular region (or disk) with center C and radius r is the set of all points in the plane whose distance from the point C is less than or equal to r. The interior of a circle with center C and radius r is the set of all points in the plane whose distance from the point C is less than r.)

Focus Mathematical Concepts

Grade Level Fluency Requirement:

- **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Understand and apply properties of operations and the relationship between addition and subtraction

1.OA.B.3 Apply properties of operations as strategies to add and subtract. *Examples: If is known, then is also known. (Commutative property of addition.) To add , the second two numbers can be added to make a ten, so . (Associative property of addition.)*

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.B.5 Apply properties of operations as strategies to multiply and divide.[2] *Examples: If is known, then is also known. (Commutative property of multiplication.) can be found by , then , or by , then . (Associative property of multiplication.) Knowing that and , one can find as . (Distributive property.)*

Geometric measurement: understand concepts of angle and measure angles.

4.MD.C.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:

a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through of a circle is called a "one-degree angle," and can be used to measure angles.

b. An angle that turns through one-degree angles is said to have an angle measure of degrees.

4.MD.C.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.A.3 Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression to produce the equivalent expression ; apply the distributive property to the expression to produce the equivalent expression ; apply properties of operations to to produce the equivalent expression .*

6.EE.A.4 Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions and are equivalent because they name the same number regardless of which number stands for.*

Reason about and solve one-variable equations and inequalities.

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

6.EE.B.7 Solve real-world and mathematical problems by writing and solving equations in the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all nonnegative rational numbers

6.EE.B.8 Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas and to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

a. Describe situations in which opposite quantities combine to make . *For example, a hydrogen atom has charge because its two constituents are oppositely charged.*

b. Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in realworld contexts.

d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing realworld contexts.

b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

c. Apply properties of operations as strategies to multiply and divide rational numbers.

d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in s or eventually repeats.

Differentiation/Accommodations/Modifications

Gifted and Talented

(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed

- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.

- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 4: Percent and Proportional Relationships **(Approximate Instructional Time: 5 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
• 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* *(benchmarked)	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Fluency with percents Students are able to: • use proportions to solve multistep percent problems including simple interest, tax, markups, discounts, gratuities, commissions, fees, percent increase, percent decrease, percent error. • use proportions to solve multistep ratio problems. **Learning Goal 1:** Solve multi-step ratio and percent problems using proportional relationships (*simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error).*
• 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 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction* $\frac{1/2}{1/4}$ *mph, equivalently 2 mph.* • 7.RP.A.3: Use proportional	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): Fluency with percents Students are able to: • solve multi-step ratio problems including fractional markdowns, markups, commissions, fees, etc • solve problems involving percent increase, decrease, error and simple interest. **Learning Goal 2:** Use proportional relationships to solve multistep ratio problems that are related to real world applications.

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.RP.A.2. Recognize and represent proportional relationships between quantities. 7.RP.A.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Fluency with percents and scale drawings. Students are able to: ● identify the constant of proportionality (unit rate) as the scale factor ● solve problems involving area and scale, noting percent growth **Learning Goal 3**: Use percent increase and decrease in relation to length and area of scale drawings.
● 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.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Fluency with percents and scale drawings Students are able to: ● use ratios and proportions to create scale drawings. ● understand that the scale factor is a unit rate. ● reproduce a scale drawing at a different scale. ● computing actual lengths and areas from a scale drawing. ● solve problems involving scale drawings using proportions. **Learning Goal 4:** Reinforce goal from earlier unit: Use ratio and proportion to solve problems involving scale drawings of geometric figures.

• 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.*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): Fluency with percents involving problems with population, mixture and counting. Students are able to: • write and use algebraic expressions and equations to solve percent word problems related to populations of people and compilations. • write and use algebraic expressions and equations to solve percent word problems related to mixtures. • solve counting problems related to computing percents (foundation for probability concepts) **Learning Goal 5:** Solve multi-step real life and mathematical problems with rational numbers in any form (fractions, decimals) by applying properties of operations and converting rational numbers between forms as needed. Assess the reasonableness of answers using mental computation and estimation strategies.
Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.*	

	MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions: *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force* *Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object.* **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, write and solve equations, and use basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?*

	MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking: *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?* **MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.* *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.*** *Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.*** *Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.*** *Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.*** *Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient*

	points. ***SL.7.6.*** *Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
• 21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.** **CRP5. Consider the environmental, social and economic impacts of decisions.** **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 4)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar)

	Khan Academy ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	**Suggested Tasks for Use During Unit**
❑ Calculator ❑ Coordinate Plane ❑ Double Number Line Diagrams ❑ Equations ❑ Expressions ❑ Geometric Figures ❑ Ratio Tables ❑ Tape Diagrams	Anna in DC Buying Protein Bars and Magazines Chess Club Comparing Years Double Discounts Finding 10% Increase Measuring the Area of a Circle The Price of Bread
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments

- Star and Accelerated Math programs

Instructional Best Practices and Exemplars	Mathematical Terms/Vocabulary
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Absolute Error** (Given the exact value x of a quantity and an approximate value a of it, the absolute error is $\|a - x\|$.) • **Percent Error** (The percent error is the percent the absolute error is of the exact value ($\|a-x\|/\|x\|$) (100%), where x is the exact value of the quantity, and a is an approximate value of the quantity.)

Focus Mathematical Concepts

Grade Level Fluency Requirement:

❖ **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Understand ratio concepts and use ratio reasoning to solve problems.

6.RP.A.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was , because for every wings there was beak." "For every vote candidate A received, candidate C received nearly three votes."*

6.RP.A.2 Understand the concept of a unit rate associated with a ratio with , and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of cups of flour to cups of sugar, so there is cup of flour for each cup of sugar." "We paid for hamburgers, which is a rate of per hamburger."*

6.RP.A.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took hours to mow lawns, then at that rate, how many lawns could be mowed in hours? At what rate were lawns being mowed?*

c. Find a percent of a quantity as a rate per (e.g., of a quantity means times the quantity); solve problems involving finding the whole, given a part and the percent.

d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.

Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

b. Understand $p + q$ as the number located a distance $|q|$ from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

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 and , where , , and 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 . Its length is . What is its width?*

Differentiation/Accommodations/Modifications
Gifted and Talented
(content, process, product and learning environment) **Extension Activities**

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations

- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice

- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 5: Statistics & Probability **(Approximate Instructional Time: 5 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
● 7.SP.C.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Calculating & interpreting probabilities ● *Probability of a chance event is a number between 0 and 1.* ● *Probability expresses the likelihood of the event occurring.* ● *Larger probability indicates greater likelihood.* Students are able to: ● draw conclusions about the likelihood of events given their probability. **Learning Goal 1:** Interpret and express the likelihood of a chance event as a number between 0 and 1, relating that the probability of an unlikely event happening is near 0, a likely event is near 1, and 1/2 is neither likely nor unlikely.
● 7.SP.C.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*	MP.2 Reason abstractly and quantitatively. MP.1 Make sense of problems and persevere in solving them. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	Concept(s): Calculating & interpreting probabilities ● *Relative frequency* ● *Experimental probability* ● *Theoretical probability* Students are able to: ● collect data on chance processes, noting the long-run relative frequency. ● predict the approximate relative frequency given the theoretical probability. **Learning Goal 2:** Approximate the probability of a chance event by collecting data and observing long-run relative frequency; predict the approximate relative frequency given the probability

● 7.SP.C.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. ● 7.SP.C.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected*. ● 7.SP.C.7b. . Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): Calculating & interpreting probabilities ● Uniform (equally likely) and non-uniform probability models *Students are able to:* ● develop a uniform probability model. ● use a uniform probability model to determine the probabilities of events. ● develop (non-uniform) probability models by observing frequencies in data that has been generated from a chance process. **Learning Goal 3:** Develop a uniform probability model by assigning equal probability to all outcomes; develop probability models by observing frequencies and use the models to determine probabilities of events; compare probabilities from a model to observed frequencies and explain sources of discrepancy when agreement is not good

● 7.SP.C.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. ● 7.SP.C.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. ● 7.SP.C.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event. ● 7.SP.C.8c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Calculating & interpreting probabilities ● *Just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space.* Students are able to: ● use organized lists, tables, and tree diagrams to represent sample spaces. ● given a description of an event using everyday language, identify the outcomes in a sample space that make up the described event. ● design simulations. ● use designed simulations to generate frequencies for compound events. **Learning Goal 4:** Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams, identifying the outcomes in the sample space which compose the event. Use the sample space to find the probability of a compound event. **Learning Goal 5:** Design and use a simulation to generate frequencies for compound events.
● 7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid	MP.3 Construct viable arguments & critique the reasoning of others. MP.6 Attend to precision.	Concept(s): Random sampling and estimating population characteristics ● *Statistics can be used to gain information about a population by examining a sample of the population.* ● *Generalizations about a population from a sample are valid only if the sample is representative of that population.*

only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.		● *Random sampling tends to produce representative samples.* Students are able to: ● analyze and distinguish between representative and non-representative samples of a population. **Learning Goal 6:** Distinguish between representative and non-representative samples of a population (*e.g. if the class had 50% girls and the sample had 10% girls, then that sample was not representative of the population*).
● 7.SP.A.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be*.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.6 Attend to precision.	Concept(s): Random sampling and estimating population characteristics ● *Inferences can be drawn from random sampling.* Students are able to: ● analyze data from a sample to draw inferences about the population. ● generate multiple random samples of the same size. ● analyze the variation in multiple random samples of the same size. **Learning Goal 7:** Use random sampling to produce a representative sample. **Learning Goal 8:** Develop inferences about a population using data from a random sample and assess the variation in estimates after generating multiple samples of the same size.
● 7.SP.B.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of	Concept(s): Comparing populations using measures of central tendency and variability Students are able to: ● locate, approximately, the measure of center (mean or median) of a distribution ● visually assess, given a distribution, the measure of spread (mean absolute deviation or inter-quartile range). ● visually compare two numerical data distributions and describe the degree of overlap. ● measure or approximate the difference between the measures centers and express it as a multiple of a measure of variability.

(mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.	structure.	**Learning Goal 9:** Visually compare the means of two distributions that have similar variability; express the difference between the centers as a multiple of a measure of variability.
• 7.SP.B.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	Concept(s): Comparing populations using measures of central tendency and variability Students are able to: • using measures of center, draw informal inferences about two populations and compare the inferences. • using measures of variability, draw informal inferences about two populations and compare the inferences. **Learning Goal 10:** Draw informal comparative inferences about two populations using their measures of center and measures of variability.
• **Interdisciplinary Connections:** • • **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force*	

	Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object. **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, write and solve equations, and use basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?*

	MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking: *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.* *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.*** *Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.*** *Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.*** *Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.*** *Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.*** *Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
• 21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.**

	CRP5. Consider the environmental, social and economic impacts of decisions. **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 5)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings

	Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	**Suggested Tasks for Use During Unit**
❑ *Calculator* ❑ *Dot Plots* ❑ *Histograms*	7.SP.A.1 Mr. Briggs Class Likes Math 7.SP.A.2 Valentine Marbles 7.SP.B.3,4 College Athletes 7.SP.B.3,4 Offensive Linemen 7.SP.C.6 Heads or Tails 7.SP.C.7, 6 Rolling Dice 7.SP.C.7a How Many Buttons 7.SP.C.8 Tetrahedral Dice 7.SP.C.8 Waiting Times 2015 EOY Released Items
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments

Instructional Best Practices and Exemplars	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Compound Event** (A compound event is an event consisting of more than one outcome from the sample space of a chance experiment.) • **Inference** (Inference is the act of drawing conclusions about a population using data from a sample.) • **Long-Run Relative Frequency** (The proportion of the time some outcome occurs in a very long sequence of observations is called a long-run relative frequency.) • **Probability** (Probability is a number between 0 and 1 that represents the likelihood that an outcome will occur.) • **Probability Model** (A probability model for a chance experiment specifies the set of possible outcomes of the experiment—the sample space—and the probability associated with each outcome.) • **Random Sample** (A random sample is a sample selected in a way that gives every different possible sample of the same size an equal chance of being selected.) • **Simulation** (A simulation is the process of generating "artificial" data that are consistent with a given probability model or with sampling from a known population.) • **Tree Diagram** (A tree diagram consists of a sequence of nodes and branches. Tree diagrams are sometimes used as a way of representing the outcomes of a chance experiment that consists of a sequence of steps, such as rolling two number cubes, viewed as first rolling one number cube and then rolling the second.) • **Uniform Probability Model** (A uniform probability model is a probability model in which all outcomes in the sample space of a chance experiment are equally likely.)
Focus Mathematical Concepts	
Grade Level Fluency Requirement: ❖ **7.NS.1** Perform operations with rational numbers.	

Prerequisite skills
Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Summarize and describe distributions.
6.SP.B.5 Summarize numerical data sets in relation to their context, such as by:
a. Reporting the number of observations.
b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.
Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.3c Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
Analyze proportional relationships and use them to solve real-world and mathematical problems.
7.RP.A.2 Recognize and represent proportional relationships between quantities.

Common Misconceptions:

- One random sample is not representative of an entire population.
- Many samples must be taken to make an inference that is valid.
- Students may believe that the theoretical probability and experimental probability will match. By providing students opportunities to simulate experimental probability, students will recognize that the probabilities typically do not match.

Differentiation/Accommodations/Modifications
Gifted and Talented
(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations

- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
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Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 6: Geometry **(Approximate Instructional Time: 6.5 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
• 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.	MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Using ratios and equations to solve for unknown angles Students are able to: • use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations. • solve mathematical problems by writing and solving simple algebraic equations based on the relationships between and properties of angles (supplementary, complementary, vertical, and adjacent. **Learning Goal 1:** Write and solve ***simple*** multi-step algebraic equations involving supplementary, complementary, vertical, and adjacent angles.
• 7.G.A.2. Draw (with technology, with ruler and protractor as well as freehand) 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	MP.3 Construct viable arguments & critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Constructing triangles • *Conditions for unique triangles, more than one triangle, and no triangle.* Students are able to: • draw geometric shapes with given conditions, including constructing triangles from three measures of angles or sides. • recognize conditions determining a unique triangle, more than one triangle, or no triangle. **Learning Goal 2:** Use freehand, mechanical (i.e. ruler, protractor) and technological tools to draw geometric shapes with given conditions (e.g. scale factor), focusing on constructing triangles.
• 7.G.A.3. Describe the two-dimensional figures that	MP.5 Use appropriate tools	Concept(s): Slicing solids • *Identify cross-sections of three-dimensional objects parallel, perpendicular and*

result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	*diagonal to base shape.* Students are able to: ● analyze three dimensional shapes (right rectangular pyramids and prisms) by examining and describing all of the 2-dimensional figures that result from slicing it at various angles. **Learning Goal 3:** Describe all of the 2-dimensional figures that result when a 3-dimensional figures are sliced from multiple angles.
● 7.G.B.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments & critique the reasoning of others. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	Concept(s): Problems involving area, surface area and volume Students are able to: ● solve real-world and mathematical problems involving area of two dimensional objects composed of triangles, quadrilaterals, and polygons. ● solve real-world and mathematical problems involving volume of three dimensional objects composed of cubes and right prisms. ● solve real-world and mathematical problems involving surface area of three-dimensional objects composed of cubes and right prisms. **Learning Goal 4:** Reinforce concepts learned in earlier unit: Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.*	

	The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed). *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force* *Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object.* **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, write and solve equations, and use basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.*

	MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking: *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?* **MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.* *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.*** *Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.*

	SL.7.3. *Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.*** *Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.*** *Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.*** *Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
• **21st Century Skills/ Career Ready Practices:**	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.** **CRP5. Consider the environmental, social and economic impacts of decisions.** **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (Unbound Ed - Module 6)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8

	Sadlier Progress in Mathematics Workbooks ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	**Suggested Tasks for Use During Unit**
❑ Familiar objects and pictures to begin discussions around cross sections, such as an apple, a car, a couch, a cup, a guitar, etc. A site on Annenberg Learner that illustrates cross sections: **http://www.learner.org/courses/learningmath/geometry/session9/part_c/**	7.G.B.6, 7.RP.A.3 Sand under the Swing Set 7.G.A.2 A task related to 7.G.A.2 7.G.A.3 Cube Ninjas! EOY Released Items 7.G.B.4, 7.G.B.5, 7.G.B.6, 7.G.A.2, 7.G.A.3 - #17, 24, 25, 26 2015 EOY Released Items 2015 PBA Released Items
District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric)

• Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs	• Teacher/District created benchmark assessments
Instructional Best Practices and Exemplars	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Correspondence** (A *correspondence* between two triangles is a pairing of each vertex of one triangle with one and only one vertex of the other triangle. A triangle correspondence also induces a correspondence between the angles of the triangles and the sides of the triangles.) • **Identical Triangles** (Two triangles are said to be identical if there is a triangle correspondence that pairs angles with angles of equal measure and sides with sides of equal length.) • **Unique Triangle** (A set of conditions for two triangles is said to determine a *unique* triangle if whenever the conditions are satisfied, the triangles are identical.) • **Three sides condition** (Two triangles satisfy the *three sides condition* if there is a triangle correspondence that pairs all three sides of one triangle with sides of equal length. The three sides condition determines a unique triangle.) • **Two angles and the included side condition** (Two triangles satisfy the *two angles and the included side condition* if there is a triangle correspondence that pairs two angles and the included side of one triangle with angles of equal measure and a side of equal length. This condition determines a unique triangle.) • **Two angles and the side opposite a given angle condition** (Two triangles satisfy the t*wo angles and the side opposite a given angle condition* if there is a triangle correspondence that pairs two angles and a side opposite one of the angles with angles of equal measure and a side of equal length. The two angles and the side opposite a given angle condition determines a unique triangle.) • **Two sides and the included angle condition** (Two triangles satisfy the *two sides and the included angle condition* if there is a triangle correspondence that pairs two sides and the included angle with sides of equal length and an angle of equal measure. The two sides and the included angle condition determines a unique triangle.)

	• **Two sides and a non-included angle condition** (Two triangles satisfy the two sides and a non-included angle condition if there is a triangle correspondence that pairs two sides and a non-included angle with sides of equal length and an angle of equal measure. The two sides and a non-included angle condition determines a unique triangle if the non-included angle measures 90° or greater. If the non-included angle is acute, the triangles are identical with one of two non-identical triangles.) • **Right rectangular pyramid** (Given a rectangular region B in a plane E, and a point V not in E, the rectangular pyramid with base B and vertex V is the union of all segments $\overline{VP}$ for any point P in B. It can be shown that the planar region defined by a side of the base B and the vertex V is a triangular region, called a lateral face. If the vertex lies on the line perpendicular to the base at its center (the intersection of the rectangle's diagonals), the pyramid is called a right rectangular pyramid.) • **Surface of a pyramid** (The surface of a pyramid is the union of its base region and its lateral faces.)

Focus Mathematical Concepts

Grade Level Fluency Requirement:

- **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Geometric measurement: understand concepts of angle and measure angles.

4.MD.C.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

Solve real-world and mathematical problems involving area, surface area, and volume.

6.G.A.1 Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes;

apply these techniques in the context of solving real-world and mathematical problems.

6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = B\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Solve real-life and mathematical problems involving area, surface area, and volume.

7.G.B.4 Know the formulas for area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

Common Misconceptions:

- Students may have difficulty when dealing with circumference (linear measurements) and area.
- Students struggle with the understanding of circumference as "surrounding" and area as "covering".

Differentiation/Accommodations/Modifications

Gifted and Talented

(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.
- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time

- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests

- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Green Township School District Grade 7 Mathematics Curriculum - Revised 2017

Unit 7: Integer Exponents & Intro to Functions **(Approximate Instructional Time: 4 weeks)**		
NJ Student Learning Standards	**Suggested Standards for Mathematical Practice**	**Critical Knowledge & Skills** ***(Learning goals are for the Unit but may not necessarily be in sequential order.)***
● 8.EE.A.1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. ● 8.G.C.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Properties of integer exponents ● *Exponents as simplified representation of repeated multiplication.* Students are able to: ● apply properties of exponents to numerical expressions. ● generate equivalent numerical expressions using positive and negative integer exponents. ● find volume of cones, cylinders and spheres using to solve real world problems. **Learning Goal 1:** Apply the properties of integer exponents to write equivalent numerical expressions; apply formulas to find the volume of a cone, a cylinder, or a sphere when solving real-world and mathematical problems.
● 8.EE.A.3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as* 3×10^8 *and the population of the world as* 7×10^9*, and determine that the world population is more than 20 times larger.*	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Introduction to exponents and the power of 10 ● *Very large and very small quantities can be approximated with numbers expressed in the form of a single digit times an integer power of 10.* Students are able to: ● estimate very large and very small quantities with numbers expressed in the form of a single digit times an integer power of 10. ● compare numbers written in the form of a single digit times an integer power of 10 and express how many times as much one is than the other. **Learning Goal 2:** Estimate and express the values of very large or very small numbers with numbers expressed in the form of a single digit times an integer power of 10. Compare numbers expressed in this form, expressing how many times larger or smaller one is than the other.

● 8.EE.A.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	MP. 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Operations with scientific notation Students are able to: ● multiply and divide numbers expressed in scientific notation, including problems in which one number is in decimal form and one is in scientific notation. ● add and subtract numbers expressed in scientific notation, including problems in which one number is in decimal form and one is in scientific notation. ● use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. ● interpret scientific notation that has been generated by technology (e.g. recognize 4.1E-2 and 4.1e-2 as 4.1×10^{-2}). **Learning Goal 3:** Perform operations using numbers expressed in scientific notation, including problems where both decimals and scientific notation are used. In real-world problem-solving situations, choose units of appropriate size for measurement of very small and very large quantities and interpret scientific notation generated when technology has been used for calculations.
● 8.F.A.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	MP.2 Reason abstractly and quantitatively. MP.5 Use appropriate tools strategically.	Concept(s): Introduction to functions ● *A function is a rule.* ● *If a rule is a function, then for each input there is exactly one output.* Students are able to: ● use function language. ● describe a function as providing a single output for each input. ● determine whether non-numerical relationships are functions. ● describe a function as a set of ordered pairs. ● read inputs and outputs from a graph. ● describe the ordered pairs as containing an input, and the corresponding output. **Learning Goal 4:** Define a function as a rule that assigns one output to each input and determine if data represented as a graph or in a table is a function.

• 8.F.A.2. Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*	MP.5 Use appropriate tools strategically. MP.8 Look for and express regularity in repeated reasoning.	Concept(s): Compare functions • *Functions (quantitative relationships) can be represented in different ways.* • *Functions have properties; properties of linear functions.* Students are able to: • analyze functions represented algebraically, as a table of values, and as a graph. • interpret functions represented by a verbal description. • given two functions, each represented in a different way, compare their properties. **Learning Goal 5:** Compare two functions each represented in a different way (numerically, verbally, graphically, and algebraically) and draw conclusions about their properties (rate of change and intercepts).
• 8.F.A.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*	MP.2 Reason abstractly and quantitatively. MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically.	Concept(s): Introduction to linear functions • *A linear function is defined by the equation $y = mx + b$.* • *The graph of a linear function is a straight line.* Students are able to: • analyze tables of values, graphs, and equations in order to classify a function as linear or non-linear. • determine if equations presented in forms other than $y = mx + b$ (for example $3y - 2x = 7$) define a linear function. • give examples of equations that are non-linear functions. • show that a function is not linear using pairs of points. **Learning Goal 6:** Classify functions as linear or non-linear by analyzing equations, graphs, and tables of values; interpret the equation $y = mx + b$ as defining a linear function.

Interdisciplinary Connections: **NGSS Appendix for Alignment**	***Science:*** **MS-PS1 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use signed numbers, write and solve equations, and use order of magnitude thinking and basic statistics:** *Ratios and Proportional Relationships (6–7.RP). Science examples: (1) A pile of salt has mass 100 mg. How much chlorine is in it? Answer in milligrams. What would the answer be for a 500 mg pile of salt? (2) Twice as much water is twice as heavy. Explain why twice as much water isn't twice as dense. (3) Based on a model of a water molecule, recognize that any sample of water has a 2:1 ratio of hydrogen atoms to oxygen atoms. (4) Measure the mass and volume of a sample of reactant and compute its density. (5) Compare a measured/computed density to a nominal/textbook value, converting units as necessary. Determine the percent difference between the two.* *The Number System (6–8.NS). Science examples: Use positive and negative quantities to represent temperature changes in a chemical reaction (signs of energy released or absorbed).* *Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot.* **MS-PS2 As part of this work, teachers should give students opportunities to work with signed numbers and interpret expressions:** *The Number System (6–8.NS). Science examples: (1) Represent a third-law pair of forces as a 100 N force on one object and a −100N force on the other object. (2) Represent balanced forces on a single object as equal and opposite numbers 5 N. (3) Represent the net result of two or more forces as a sum of signed numbers. For example, given a large force and an oppositely directed small force, represent the net force as (100 N) + (−5 N) = 95 N. Relate the number sentence to the fact that the net effect on the motion is approximately what it would have been with only the large force* *Expressions and Equations (6–8.EE). Science example: Interpret an expression in terms of a physical context, e.g., interpret the expression F1 + F2 in a diagram as representing the net force on an object.* **MS-PS3 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships and basic statistics:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for kinetic energy vs. mass (holding speed constant). Decide whether the two quantities are in a proportional relationship, e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.* **MS-PS4 As part of this work, teachers should give students opportunities to use ratios and proportional relationships:** *Ratios and Proportional Relationships (6–7.RP) Science examples: (1) Analyze an idealized set of bivariate measurement data for wave energy vs. wave amplitude. Decide whether the two quantities are in a proportional relationship, (e.g., by testing for equivalent ratios or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). (2) Interpret an idealized set of bivariate measurement data for wave energy vs. wave speed.* **MS-LS1 As part of this work, teachers should give students opportunities to use order of magnitude thinking, write and solve equations & analyze data:** *Expressions and Equations (6–8.EE). Science examples: (1) Quantify the sizes of cells and parts of cells, using convenient units such as microns.(2) Appreciate the orders of magnitude that span the difference in size between cells, molecules, and atoms. (3) Write a number sentence that expresses the conservation of mass as food moves through an organism. Assign values to the arrows in a diagram to show flows quantitatively. (4) Infer an unknown mass by using the concept of conservation to write and solve an equation with a variable.* **MS-LS2 As part of this work, teachers should give students opportunities to work with ratios and proportional**

	relationships, write and solve equations, and use basic statistics: *Ratios and Proportional Relationships (6–7.RP). Science example: Use ratios and unit rates as inputs for evaluating plans for maintaining biodiversity and ecosystem services (e.g., consider the net cost or net value of developing a wetland, using inputs such as the value of various wetland services in dollars per acre per year; in analyzing urban biodiversity, rank world cities by the amount of green space as a fraction of total land area; in analyzing social factors, determine the amount of green space per capita (m^2 per person)).* *Expressions and Equations (6–8.EE). Science examples: (1) Write a number sentence that expresses the conservation of total matter or energy in a system as matter or energy flows into, out of, and within it. Assign values to the arrows in a diagram to show flows quantitatively. (2) Infer an unknown matter or energy flow in a system by using the concept of conservation to write and solve an equation with a variable.* **MS-LS4 As part of this work, teachers should give students opportunities to work with ratios and proportional relationships, use concepts of probability, and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP) Science examples: Apply several ratios in combination to determine a net survival rate. For example, if 50 animals in a population have trait A while 50 have trait B, and each winter the survival rates are 80% for trait A and 60% for trait B, then how many of the animals with each trait will be alive after 1 winters? How about after 2 winters? 6 winters?* **MS-ESS2 As part of this work, teachers should give students opportunities to work with positive and negative numbers, and use order of magnitude thinking:** *The Number System (6–8.NS). Science examples: (1) Use positive and negative quantities to quantify changes in physical quantities such as atmospheric pressure and temperature; for example, if the temperature dropped from 24oC to 11oC, then the temperature change was −13oC. (2) Solve word problems relating to changes in signed physical quantities. For example, a shift in the jet stream caused a 10oC temperature increase in a single day; if the temperature before was −32oC, what was the temperature after?* **MS-ESS3 As part of this work, teachers should give students opportunities to use ratios and proportional relationships and use order of magnitude thinking:** *Ratios and Proportional Relationships (6–7.RP). Science example: Work with measurement quantities that are formed through division, such as atmospheric concentration of CO_2, extraction cost per barrel of oil in different forms, per-capita consumption of given resources, flow rates in freshwater rivers, etc.* ***English-Language Arts:*** ***RI.7.4.*** *Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.* ***RI.7.8.*** *Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.* ***W.7.2****. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.* *A. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using text structures (e.g., definition, classification, comparison/contrast, cause/effect, etc.) and text features (e.g., headings, graphics, and multimedia).* *B. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.* *C. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.* *D. Use precise language and domain-specific vocabulary to inform about or explain the topic.* *E. Establish and maintain a formal style academic style, approach, and form.* *F. Provide a concluding statement or section that follows from and supports the information or explanation presented.* ***SL.7.1.*** *Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on*

	grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly. *A. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.* *B. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.* *C. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.* *D. Acknowledge new information expressed by others and, when warranted, modify their own views.* ***SL.7.2.** Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.* ***SL.7.3.** Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.* ***SL.7.4.** Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.* ***SL.7.5.** Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.* ***SL.7.6.** Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.*
• 21st Century Skills/ Career Ready Practices:	**CRP1. Act as a responsible and contributing citizen and employee.** **CRP2. Apply appropriate academic and technical skills.** **CRP3. Attend to personal health and financial well-being.** **CRP4. Communicate clearly and effectively and with reason.** **CRP5. Consider the environmental, social and economic impacts of decisions.** **CRP6. Demonstrate creativity and innovation.** **CRP7. Employ valid and reliable research strategies.** **CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.** **CRP9. Model integrity, ethical leadership and effective management.** **CRP10. Plan education and career paths aligned to personal goals.** **CRP11. Use technology to enhance productivity.** **CRP12. Work productively in teams while using cultural global competence.**
2014 NJ Technology Standards:	**8.1 Educational Technology** (Word | PDF) All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and create and communicate knowledge. **8.2 Technology Education, Engineering, Design and Computational Thinking - Programming** (Word | PDF) All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment. Please see relevant projects for technology standards 8.1 and 8.2:

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District/School Primary and Supplementary Resources	
Primary Resource: **Eureka Math (UnboundEd - Module 1 Gr. 8)** **Eureka Math (Unbound Ed - Module 5 Gr. 8)**	**Supplementary Resources:** Number Talks: Building Numerical Reasoning Sadlier Progress In Mathematics Online Resources - Grade 7 Sadlier Progress In Mathematics Online Resources - Grade 8 ***Sadlier Progress in Mathematics*** Workbook ***Pre-Algebra*** (Publisher: Larsen) ***Study Island*** ***Excel Math*** (Publisher: AnsMar) ***Khan Academy*** ***Learnzillion*** ***IXL*** Visual Patterns: Gr. K-12 Number Strings Common Core Progression Documents **Performance Tasks are available for use from the following sites:** Illustrative Mathematics Coherence Map Inside Mathematics Problems of the Month Grade 7 YouCubed Tasks Grade 8 YouCubed Tasks
Suggested Tools & Representations:	**Suggested Tasks for Use During Unit**
❑ *Scientific Calculator* ❑ *3D solids: cones, cylinders, and spheres*	8.EE.A.1 Extending the Definitions of Exponents 8.F.A.1 Function Rules 8.F.A.2 Battery Charging 8.F.A.3 Introduction to Linear Functions **2015 EOY Released Items** **2015 PBA Released Items**

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District/School Formative Assessment Plan	**District/School Summative Assessment Plan**
• Teacher observation of students engaged in group and independent activities. • Individual and small group conferences/interviews to assess understanding with rubric • Sprints • Self-assessment by students with guidance from teacher. • Exit tickets • Khan Academy teacher reports • Star and Accelerated Math programs	• Teacher created assessments and projects • ***Sadlier*** Unit Assessments • ***Eureka Math*** Mid- and End- Module Assessments (Constructed response item with rubric) • Teacher/District created benchmark assessments • *Mammoth Math Gr. 7 Pre-Alg End of Year Procedural Assessment* • *Mammoth Math Gr. 7 Pre-Alg End of Year Procedural Assessment Answer Key*
Instructional Best Practices	**Mathematical Terms/Vocabulary**
❑ *Math Work Stations* ❑ *Use Communicators/manipulatives* ❑ *Number talks* ❑ *Hands-on activities* ❑ *Exploratory activities* ❑ *Games/play* ❑ *Using concrete materials to advance conceptual understanding* ❑ *Use drawings and diagrams to advance conceptual understanding* ❑ *Connect current concepts to previously learned skills* ❑ *Small group instruction* ❑ *Whole class discussion* ❑ *Research* ❑ *Use of open educational resources for instruction or practice*	• **Scientific Notation** (The scientific notation for a finite decimal is the representation of that decimal as the product of a decimal s and a power of 10, where s satisfies the property that it is at least 1, but smaller than 10, or in symbolic notation, $1 \leq s < 10$. For example, the scientific notation for 192.7 is 1.927×102 .) • **Order of Magnitude** (The order of magnitude of a finite decimal is the exponent in the power of 10 when that decimal is expressed in scientific notation. For example, the order of magnitude of 192.7 is 2 because when 192.7 is expressed in scientific notation as 1.927×102 , 2 is the exponent of 102 . Sometimes we also include the number 10 in the definition of order of magnitude and say that the order of magnitude of 192.7 is 102 .) • **Function** (A function is a rule that assigns to each input exactly one output.) • **Input** (The number or piece of data that is put into a function is the input.) • **Output** (The number or piece of data that is the result of an input of a function is the output.)

Focus Mathematical Concepts

Grade Level Fluency Requirement:

- **7.NS.1** Perform operations with rational numbers.

Prerequisite skills

Refer to Achieve the Core Coherence Map for full detail on vertical and horizontal alignment to prerequisite skills & future skills.

Coherence Map

Understand the place value system.

5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. Apply and extend previous understandings of arithmetic to algebraic expressions.

6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

7.G.B.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Understand concepts of volume and relate volume to multiplication and to addition.

5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.

5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real-world and mathematical problems involving volume.

a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

b. Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole–number edge lengths in the context of solving real world and mathematical problems.

c. Recognize volume as additive. Find volume of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to real world problems. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.B.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.B.6 Solve real-world and mathematical problems involving area, volume, and surface area of two-and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
Understand the connections between proportional relationships, lines, and linear equations.
8.EE.B.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. (This may have been taught in conjunction with earlier 7th grade units as part of the pre-algebra acceleration.)

Differentiation/Accommodations/Modifications

Gifted and Talented

(content, process, product and learning environment)

Extension Activities

- Conduct research and provide presentation of various topics.
- Design surveys to generate and analyze data to be used in discussion.
- Debate topics of interest / cultural importance.
- Authentic listening and reading sources that provide data and support for speaking and writing prompts.
- Exploration of art and/or artists to understand society and history.
- Implement RAFT Activities as they pertain to the types / modes of communication (role, audience, format, topic).

Anchor Activities

- Use of Higher Level Questioning Techniques
- Provide assessments at a higher level of thinking

English Language Learners

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice.
- Model skills/techniques that need to be mastered.

- Extended time to complete class work
- Visual dictionaries to help build vocabulary
- Provide copy of classnotes
- Pair with a peer for assistance during class

Modifications for Homework/Assignments

- Modified Assignments
- Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)
- Extended time for assignment completion as needed
- Highlight key vocabulary
- Use graphic organizers

Students with Disabilities

(**appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team**)

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.

Students at Risk of School Failure

Modifications for Classroom

- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments.
- Repetition and practice
- Model skills / techniques to be mastered.
- Extended time to complete class work
- Provide copy of classnotes
- Preferential seating to be mutually determined by the student and teacher
- Student may request to use a computer to complete assignments.
- Establish expectations for correct spelling on assignments.
- Extra textbooks for home.
- Student may request books on tape / CD / digital media, as available and appropriate.
- Assign a peer helper in the class setting
- Provide oral reminders and check student work during independent work time
- Assist student with long and short term planning of assignments
- Encourage student to proofread assignments and tests
- Provide regular parent/ school communication
- Teachers will check/sign student agenda daily
- Student requires use of other assistive technology device

Modifications for Homework and Assignments

- Extended time to complete assignments.
- Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.

- Provide the student with clearly stated (written) expectations and grading criteria for assignments.
- Implement RAFT activities as they pertain to the types / modes of communication (role, audience, format, topic).

Modifications for Assessments

- Extended time on classroom tests and quizzes.
- Student may take/complete tests in an alternate setting as needed.
- Restate, reread, and clarify directions/questions
- Distribute study guide for classroom tests.
- Establish procedures for accommodations / modifications for assessments.