Unit 1: Ready Classroom **Proportional Relationships** *Ratios, Rates and Circles*	**7th Grade**	**7 Weeks**	**SCSD** **Math 2020**

Domain(s):	Ratios and Proportional Relationships	7.RP
	Geometry	7.G

Essential Question(s): How can you use mathematics to describe change and model real-world situations?

How can you use different measurements to solve real-life problems?

When and why do I use proportional comparisons?

How does comparing quantities describe the relationship between them?

Cluster(s): Analyze proportional relationships and use them to solve real-world and mathematical problems.

7.RP.1 Compute unit rates associated with ratios of fractions.

e.g., If a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the rate as the complex fraction $\frac{\frac{1}{2}}{\frac{1}{4}}$ miles per hour, equivalently 2 miles per hour with 2 being the unit rate.

Note: Problems may include ratios of lengths, areas, and other quantities measured in like or different units, including across measurement systems.

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

a. Decide whether two quantities are in a proportional relationship.

Note: Strategies include but are not limited to the following: testing for equivalent ratios in a table and/or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
c. Represent proportional relationships by equations.
   e.g., If total cost *t* is proportional to the number *n* of items purchased at a constant price *p*, the relationship between the total cost and the number of items can be expressed as *t=pn*
d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.

Cluster(s): Draw, construct, and describe geometrical figures and describe the relationships between them.
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

7.G.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.

7.G.4 - Apply the formulas for the area and circumference of a circle to solve problems.

Note: Students in grade 7 are not expected to calculate the radius of a circle given its area.

Essential Skills	Vocabulary	District Resources
- Computing unit rates associated with ratios of fractions including ratios of lengths, areas, and other quantities measured in like or different units. - Determine if two quantities are proportional. - Use tables, graphs, equations, diagrams, and verbal descriptions to identify the constant of proportionality. - Representing proportional relationships by equations.	● Scale ● Scale Drawing ● Scale factor ● Area ● Dimension ● Unit rate ● Complex Fraction ● Equivalent ratios ● Rate ● Ratio ● Constant of proportionality ● Proportional relationship ● Equivalent ratios ● Ordered pair ● Origin	**Ready Classroom-** Unit 1 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

- Explain unit rate on a coordinate plane. - Give an informal derivation of the relationship between the circumference and area of a circle.	● X-coordinate ● Y-coordinate ● Coordinate plane ● Center (of a circle) ● Circle ● Circumference ● Diameter ● Pi (π) ● Radius (of a circle) **Academic Vocabulary** ● Actual ● Justify ● Involve ● Depend on ● Suppose ● Identify ● Illustrate ● Certain ● Verbal description ● Approximate ($\approx$)	

Unit 2: Ready Classroom **Numbers and Operations** *Add and Subtract Rational Numbers*	**7th Grade**	**4 weeks**	**SCSD** **Math 2020**

Domain(s): The Number System 7.NS

Essential Question(s): How can mathematical ideas be represented? Why is it helpful to write numbers in different ways?

Cluster(s): Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

7.NS.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 0.
b. Understand addition of rational numbers; 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. 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 real-world contexts.
d. Apply properties of operations as strategies to add and subtract rational numbers.

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Apply the basic mathematical operations to simplify expressions containing rational numbers - Calculating absolute value - Understanding inverses - Converting between fraction and decimal - Solving real-world and mathematical problems involving addition and subtraction with rational numbers. - Understand complex fractions	● Zero pair ● Negative numbers ● Opposite numbers ● Positive numbers ● Integers ● Rational number ● Absolute value	● Relative to ● Elevation ● Claim ● Counterexample ● Notation ● Represent	**Ready Classroom-** Unit 2 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 3: Ready Classroom **Numbers and Operations** *Multiply and Divide Rational Numbers*	**7th Grade**	**4 weeks**	**SCSD** **Math 2020**

Domain(s):	The Number System	7.NS
	Expressions and Equations	7.EE

Essential Question(s): How can mathematical ideas be represented?

Why is it helpful to write numbers in different ways?

How do mathematical operations relate to each other?

Cluster(s):

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

7.NS.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 real-world 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 $-\left(\frac{p}{q}\right)=\frac{-p}{q}=\frac{p}{-q}$). Interpret quotients of rational numbers by describing real-world contexts.
c. Apply properties of operations as strategies to multiply and divide rational numbers.

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

Note: Computations with rational numbers extend the rules for manipulating fractions to complex fractions limited to $\frac{\frac{a}{b}}{\frac{c}{d}}$ where *a, b, c,* and *d* are integers and *b, c*, and *d* ≠ 0.

7.EE.3 - Solve multi-step real-world 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.

e.g,

- If a woman making $25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary an hour, or $2.50, for a new salary of $27.50.
- If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ 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.

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Apply the basic mathematical operations to simplify expressions containing rational numbers - Calculating absolute value - Understanding inverses - Converting between fraction and decimal - Solving real-world and mathematical problems involving the four operations with rational numbers. - Understand complex fractions - Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. - Rewrite an expression in different but equivalent forms. - Solving multi-step real-life and mathematical problems with rational numbers	● Distributive property ● Equation ● Expression ● Opposite numbers ● Product ● Rational number ● Fraction ● Opposite numbers ● Product ● Quotient ● Reciprocal ● Repeating decimals ● Terminating decimals ● Dividend ● Divisor ● Quotient ● Evaluate ● Mean ● Round	● Justify ● Calculation ● Accurate ● Express ● Approximate ● Deposit ● Withdrawal	**Ready Classroom-** Unit 3 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 4: Ready Classroom **ALgebraic Thinking** *Expressions, Equations and Inequalities*	**7th Grade**	**7 weeks**	**SCSD** **Math 2020**

Domain(s): Expressions and Equations 7.EE

Essential Question(s): How can you use numbers and symbols to represent mathematical ideas?

How do I use algebraic expressions to analyze or solve problems?

How do the properties contribute to algebraic understanding?

Cluster(s): Use properties of operations to generate equivalent expressions.

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

7.EE.1 – Add, subtract, factor, and expand linear expressions with rational coefficients by applying properties of operations.

7.EE.2 - Understand that rewriting an expression in real-world and mathematical problems can reveal and explain how the quantities in it are related.

e.g., $a+0.05a$ and $1.05a$ are equivalent expressions meaning that "increase by 5%" is the same as "multiplying by 1.05."

7.EE.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.

Note: Solving equations that contain variables on both sides is not an expectation in grade 7

7.EE.4a – Solve word problems leading to equations of the form $px+q=r$ and $p(x+q)=r$, where *p, q*, and *r* are 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.

e.g., The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Notes: The words *leading to* in the standard may require students to simplify or combine like terms on the same side of the equation before it is in the form stated in the standard.

This standard is a fluency expectation for grade 7. For more guidance, see Fluency in the Glossary of Verbs Associated with the New York State Next Generation Mathematics Learning Standards.

7.EE.4b – Solve word problems leading to inequalities of the form $px+q>r$, $px+q\geq r$, $px+q<r$, $px+q\leq r$, where *p, q*, and *r* are rational numbers. Graph the solution set of the inequality on the number line and interpret it in the context of the problem.

e.g., 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.

Note: The words *leading to* in the standard may require students to simplify or combine like terms on the same side of the equation before it is in the form stated in the standard.

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. - Rewrite an expression in different but equivalent forms. - Solving multi-step real-life and mathematical problems with rational numbers - Solving word problems leading to equations and inequalities; and assess the reasonableness of your answer. - Constructing simple equations and inequalities by reasoning about the quantities.	● Factor (verb) ● Equivalent expressions ● Factor (noun) ● Like terms ● Rational number ● Term ● Expression ● Equation ● Unknown ● Coefficient ● Product ● Unknown ● Variable ● Inequality ● Solution of an inequality	● Determine ● Explain ● Modify ● Sketch ● Balance ● Reason ● Reasoning ● Represent ● Consider ● Interpret	**Ready Classroom-** Unit 4 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 5: Ready Classroom **Proportional Reasoning** *Percents and Statistical Samples*	**7th Grade**	**5 Weeks**	**SCSD** **Math 2020**

Domain(s): Statistics and Probability 7.SP

Ratios and Proportional Relationships 7.RP

Essential Question(s): Why is learning mathematics important and how can we use statistics and probability to draw conclusions?

Why is data collected and analyzed?

How do people use data to influence others?

When and why do I use proportional comparisons?

Cluster(s): Use random sampling to draw inferences about a population.

Draw informal comparative inferences about two populations.

Investigate chance processes and develop, use, and evaluate probability models.

7.SP.1 Construct and interpret box-plots, find the interquartile range, and determine if a data point is an outlier.

Note: Students in grade 7 are *not* expected to *construct* box-plots that include outliers in the data, but students are expected to *interpret* box-plots that may contain outliers.

7.SP.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.

7.SP.3 Informally assess the degree of visual overlap of two quantitative data distributions.

7.SP.4 Use measures of center and measures of variability for quantitative data from random samples or populations to draw informal comparative inferences about two populations.

Note: Measures of center are mean, median, and mode. The measures of variation include range and the interquartile range.

Cluster(s): Analyze proportional relationships and use them to solve real-world and mathematical problems.

7.RP.3 Use proportional relationships to solve multistep ratio and percent problems.

Note: Examples of percent problems include: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error.

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Using data from a random sample to draw inferences about a population. - Finding mean absolute deviation. - Calculate mean, median, mode. - Make decisions on when to use mean, median, mode. - Using mean, median, mode to make inferences. - Representing sample spaces for compound events (using organized lists, tables, and tree diagrams). - Approximating experimental probability. - Using measure of center and variability. - Finding probabilities of events. - Finding probabilities of compound events using lists, tables, tree diagrams, and simulation. - Developing experiments/models to test experimental probabilities. - Using simulation to generate data for compound events. - Calculate: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	● Commission ● Gratuity ● Markdown ● Markup ● Simple interest ● Tax ● Percent ● Proportional relationship ● Rate ● Percent change ● Percent decrease ● Percent error ● Percent increase ● Population ● Random sample ● Sample ● Data ● Box plot ● Estimate (noun) ● Estimate (verb) ● Mean ● Median ● Interquartile range ● Mean absolute deviation (MAD) ● Measure of center ● Measure of variability ● Range ● Variability	● Discount ● Original ● Representative ● Survey (noun) ● Survey (verb) ● Infer ● Inference ● Consistent ● Overlap	**Ready Classroom-** Unit 5 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 6: Ready Classroom Geometry *Solids, Triangles and Angles*	**7th Grade**	**5 Weeks**	**SCSD Math 2020**
Domain(s):	Geometry		7.G
Essential Question(s):	How can you use different measurements to solve real-life problems? How do geometric models describe spatial relationships? How are geometric shapes and objects classified?		

7.G.2 - Draw triangles when given measures of angles and/or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

7.G.3 - Describe the two-dimensional figures that result from slicing three-dimensional solids parallel or perpendicular to the base.

Note: Focus of standard is on plane sections resulting from the slicing of right rectangular prisms and right rectangular pyramids.

7.G.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.

Note: Students in grade 7 are limited to solving equations that involve linear expressions on one side of the equation.

7.G.6 – Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles and trapezoids.

– Solve surface area problems involving right prisms and right pyramids composed of triangles and trapezoids.

– Find the volume of right triangular prisms, and solve volume problems involving three-dimensional objects composed of right rectangular prisms.

Notes: The inclusive definition of a trapezoid will be utilized, which defines a trapezoid as “A quadrilateral with at least one pair of parallel sides.” (This definition includes parallelograms and rectangles).

Right prisms include cubes.

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Solving problems involving scale drawings or geometric figures. - Drawing geometric shapes under given conditions. - Describe the two-dimensional figures that result from slicing 3D figures. - Identifying angle relationships (vertical, adjacent, complementary, supplementary) - Setting up and solving multi-step equations relating to angle relationships. - 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. -	● Decompose ● Dimension ● Face ● Right rectangular prism ● Right triangular prism ● Surface area ● Base (of a three dimensional figure) ● Right prism ● Volume ● Cylinder ● Plane section ● Parallel (II) ● Perpendicular (⊥) ● Prism ● Pyramid ● Rectangular prism ● Adjacent angles ● Complementary angles ● Straight angles ● Supplementary angles ● Vertical angles ● Acute angle ● Angle ● Obtuse angle ● Vertex ● Parallelogram ● Quadrilateral ● Rectangle ● Rhombus ● Triangle	● Claim ● Composite ● In terms of ● Strategy ● Counterexample ● Diagonal ● Result ● Extend ● Condition ● Unique	**Ready Classroom-** Unit 6 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**

Unit 7: Ready Classroom **Probability** *Theoretical Probability, Experimental Probability and Compound Events*	**7th Grade**	**5 Weeks**	**SCSD** **Math 2020**

Domain(s): Statistics and Probability 7.SP

Essential Question(s): Why is learning mathematics important and how can we use statistics and probability to draw conclusions?

Why is data collected and analyzed?

How do people use data to influence others?

When and why do I use proportional comparisons?

Cluster(s): Use random sampling to draw inferences about a population.

Draw informal comparative inferences about two populations.

Investigate chance processes and develop, use, and evaluate probability models.

7.SP.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.

7.SP.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.

7.SP.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. 43 a. 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. b. 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?

7.SP.8 Find probabilities of compound events using organized lists, sample space tables, tree diagrams, and simulation.

a. 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.
b. Represent sample spaces for compound events using methods such as organized lists, sample space 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.
c. Design and use a simulation to generate frequencies for compound events.
e.g., 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?

Essential Skills	Vocabulary	Academic Vocabulary	District Resources
- Using data from a random sample to draw inferences about a population. - Finding mean absolute deviation. - Calculate mean, median, mode. - Make decisions on when to use mean, median, mode. - Using mean, median, mode to make inferences. - Representing sample spaces for compound events (using organized lists, tables, and tree diagrams). - Approximating experimental probability. - Using measure of center and variability. - Finding probabilities of events. - Finding probabilities of compound events using lists, tables, tree diagrams, and simulation. - Developing experiments/models to test experimental probabilities. - Using simulation to generate data for compound events.	● Event ● Experiment ● Outcome ● Probability ● Factor ● Fraction ● Integers ● Multiple ● Prime number ● Experimental probability ● Trial ● Sample space ● Theoretical probability ● Compound event ● Tree diagram	● At random ● Likelihood ● Occur ● Conduct ● Predict ● Prediction ● Favorable ● Non-favorable ● Simulate ● Simulation	**Ready Classroom-** Unit 7 **I-Ready Math Pathways** **Problem-Attic** **Delta Math** **Edpuzzle**