Grade 8 Blueprint and FAL Alignment

Reporting Category: Expressions and Equations

Critical Areas of Focus

8.EE.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.

8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation *y = mx + b* for a line intercepting the vertical axis at*b*.

8.EE.7 Solve linear equations in one variable.

8.EE.8 Analyze and solve pairs of simultaneous linear equations.

Associated FALs

Comparing Value for Money: Baseball Jerseys

This lesson unit is intended to help you assess how well students are able to:

- Interpret a situation and represent the variables mathematically. Select appropriate mathematical methods to use. Explore the effects of systematically varying the constraints.
- Interpret and evaluate the data generated and identify the break-even point, checking it for confirmation. Communicate their reasoning clearly.

Building and Solving Linear Equations

This lesson unit is intended to help you assess how well students are able to:

- Find the slopes and equations of linear graphs defined by pairs of coordinates.
- Calculate the slope and *y*-intercept of a straight line.
- Use the slope and *y*-intercept of a straight line to derive its equation.

Defining Lines by Points, Slopes and Equations

This lesson unit is intended to help you assess how well students are able to:

- Classify solutions to a pair of linear equations by considering their graphical representations.
- Use substitution to complete a table of values for a linear equation.
- Identify a linear equation from a given table of values.
- Graph and solve linear equations.

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Classifying Solutions to Systems of Equations

This lesson unit is intended to help you assess how well students are able to:

- Interpret speed as the slope of a linear graph.
- Translate between the equation of a line and its graphical representation.

Comparing Lines and Linear Equations

This lesson unit is intended to help you assess how well students are able to:

- Solve linear equations in one variable with rational number coefficients.
- Collect like terms.
- Expand expressions using the distributive property.
- Categorize linear equations in one variable as having one, none, or infinitely many solutions.

Solving Linear Equations in One Variable

This lesson unit is intended to help you assess how well students are able to create and solve linear equations. In particular, the lesson will help you identify and help students who have the following difficulties:

- Solving equations with one variable.
- Solving linear equations in more than one way.

Interpreting and Using Data: Setting Taxi Fares

This lesson unit is intended to help you assess how well students are able to select and use mathematical ideas to solve a problem and then compare and critique alternative approaches. The lesson presents students with a distance-time scatter plot representing journeys made by a taxi cab. They use this to decide upon a suitable rate at which the driver should charge passengers.

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Reporting Category: Functions

Critical Areas of Focus

8.F.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.

8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

8.F.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.

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

8.F.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Associated FALs

Comparing Fuel Consumption: Buying Cars

This lesson unit is intended to help you assess how well students are able to solve a real-world problem that involves rates of change. In particular, it will help you assess how well students are able to create, compare, and evaluate different representations of functions.

Interpreting Distance-Time Graphs

This lesson unit is intended to help you assess how well students are able to interpret distance–time graphs and, in particular, to help you identify students who:

- Interpret distance–time graphs as if they are pictures of situations rather than abstract representations of them.
- Have difficulty relating speeds to slopes of these graphs.

Matching Situations, Graphs, and Linear Equations

This lesson unit is intended to help you assess how well students use algebra to:

- Explore relationships between variables in everyday situations.
- Find unknown values from known values.
- Find relationships between pairs of unknowns and express these as tables and graphs.
- Find general relationships between several variables and express these in different ways by rearranging formulas.

Reporting Category: Geometry

Critical Areas of Focus

8.G.1 Verify experimentally the properties of rotations, reflections, and translations.

8.G.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

8.G.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.G.6 Explain a proof of the Pythagorean Theorem and its converse.

8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Associated FALs

Representing and Combining Transformations

This lesson unit is intended to help you assess how well students are able to:

- Recognize and visualize transformations of 2D shapes.
- Translate, reflect and rotate shapes, and combine these transformations.

Identifying Similar Triangles

This lesson unit is intended to help you assess how students reason about geometry and, in particular, how well they are able to:

- Use facts about the angle sum and exterior angles of triangles to calculate missing angles.
- Apply angle theorems to parallel lines cut by a transversal.
- Interpret geometrical diagrams using mathematical properties to identify similarity of triangles.

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Finding the Shortest Route: The Schoolyard Problem

This lesson unit is intended to help students to:

- Select appropriate mathematics to solve a problem.
- Compare and evaluate different methods for solving a problem and make generalizations about the appropriateness of different approaches.
- Understand the Pythagorean Theorem and how it can be used to solve problems in the real world.

Discovering the Pythagorean Theorem

This lesson unit is intended to help you assess how well students are able to:

- Use the area of right triangles to deduce the areas of other shapes.
- Use dissection methods for finding areas.
- Organize an investigation systematically and collect data.
- Deduce a generalizable method for finding lengths and areas (The Pythagorean Theorem.)

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Reporting Category: The Number System

Critical Areas of Focus

8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.

8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.EE.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.

8.EE.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.

Associated FALs

Applying Properties of Exponents

This lesson unit is intended to help you assess how well students are able to:

- Recall and use the properties of exponents to generate equivalent numeric expressions.
- Identify the appropriate property to use and apply it correctly.
- Check the numerical value of an expression involving exponents without using a calculator.

Estimating Length Using Scientific Notation

This lesson unit is intended to help you assess how well students are able to:

- Estimate lengths of everyday objects.
- Convert between decimal and scientific notation.
- Make comparisons of the size of numbers expressed in both decimal and scientific notation.

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