

Grade Level:	8
Standard	KY.8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.
SMP	MP.3, MP.7, MP.8 Students construct mathematical arguments and reasoning emphasized as students learn the properties of exponents (MP.3). Students reason $5^3 \cdot 5^2 = (5 \cdot 5 \cdot 5) \cdot (5 \cdot 5) = 5^5$ through numerous experiences of working with exponents, students generalize the properties of exponents (MP.7) before using them fluently. Students notice if calculations are repeated (MP.8) and look both for general methods and for shortcuts.

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Exponent
- base

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- Use the properties of integer exponents to generate equivalent numerical expressions

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can simplify expressions by multiplying with the same integer base
- I can simplify expressions by dividing with the same integer base

- I can simplify expressions by raising a power to a power
- I can simplify an expression with a negative exponent

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

- Expressions can be simplified based on exponent rules.

Grade Level:	8
Standard	KY.8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 (Scientific Notation) to estimate very large or very small quantities and express how many times larger or smaller one is than the other.
SMP	MP.3, MP.5, MP.6 Students compare and interpret scientific notation quantities in the context of the situation, recognizing the powers of 10 indicated in quantities expressed in scientific notation follow the rules of exponents shown previously (MP.3).

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Scientific notation

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To represent very large and very small numbers in scientific notation.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can convert numbers in decimal notation into scientific notation.
- I can convert numbers in scientific notation to decimal notation.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.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. Interpret scientific notation that has been generated by technology.
SMP	MP.2, MP.7, MP.8 Students expand their exponent work as they perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used (MP.2, MP.7, MP.8).

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Scientific notation

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To operate on numbers expressed in scientific notation.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can add and subtract numbers expressed in scientific notation.
- I can multiply numbers expressed in scientific notation.
- I can divide numbers expressed in scientific notation.

- I can perform all four operations when both numbers may be in decimal or scientific notation.
- I can interpret scientific notation expressed by technology.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.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.
SMP	MP.2, MP.3, MP.4 Students represent real-world situations symbolically (MP.4). Students identify important quantities from a context and represent the relationship in the form of an equation, a table and a graph. Students analyze the various representations and draw conclusions and/or make predictions (MP.3). Once a solution or prediction has been made, students reflect on whether the solution makes sense in the context presented (MP.4). One example of this is when students determine how many buses are needed for a field trip. As this is most probably not an exact solution, students must interpret their fractional solution and make sense of it as it applies to the real world.

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Linear relationship
- Slope
- Unit rate
- y-intercept

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To compare multiple representations of proportional linear relationships.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can compare the slope of graphs, tables, equations, and word problems of proportional relationships.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	KY.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; know 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 .
SMP	MP.3, MP.4, MP.7 Students use the structure of an equation to make sense of the information in the equation (MP.7). For example, students write equations that represent the constant rate of motion for a person walking. In doing so, they interpret an equation such as $y = \frac{3}{5}x$ as the total distance a person walks, y , in x amount of time, at a rate of $\frac{3}{5}$. Students look for patterns or structure in tables and show a rate is constant; students also understand a lack of a pattern represents a non-constant (non-linear) rate.

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Similar Triangles
- Slope
- Non - Vertical Line
- Coordinate Plane
- Origin
- Intercepting
- Y - Intercept
- Vertical Axis

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. *“I am learning”*

- That the slope of a line is the same between any two points on the line.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can explain why the slope of a line is the same between any two points.
- I can explain the difference and relevance between proportional and non-proportional equations.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	<p>KY.8.EE.7 Solve linear equations in one variable.</p> <p>a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $xx = aa$, $aa = aa$, or $aa = b$ results (where a and b are different numbers).</p> <p>b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.</p>
SMP	<p>MP.2, MP.3, MP.7 Students solve linear equations in one variable, including cases with one solution, an infinite number of solutions and no solutions. Students show examples of each of these cases by successively transforming an equation into simpler forms. Some linear equations require students to expand expressions by using the distributive property and to collect like terms (MP.2, MP.7).</p>

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Linear Equations
- Infinitely Many Solutions
- No Solutions
- Transforming
- Simpler Forms
- Equivalent Equations
- Rational Numbers
- Coefficients
- Expanding Expressions
- Distributive Property
- Combining Like Terms

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To solve linear equations with one solution, no solution, or infinitely many solutions.
- To solve linear equations with rational coefficients that include combining like terms and using the distributive property

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can solve linear equations with one solution, no solution, or infinitely many solutions.
- I can solve linear equations with rational coefficients that include combining like terms and use the distributive property.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) “I am learning this because”

Grade Level:	8
Standard	<p>KY.8.EE.8 Analyze and solve a system of two linear equations.</p> <p>a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously; understand that a system of two linear equations may have one solution, no solution, or infinitely many solutions.</p> <p>b. Solve systems of two linear equations in two variables algebraically by using substitution where at least one equation contains at least one variable whose coefficient is 1 and by inspection for simple cases</p> <p>c. Solve real-world and mathematical problems leading to two linear equations in two variables.</p>
SMP	<p>MP.1, MP.3, MP.4 Solving pairs of simultaneous linear equations builds on the skills and understandings students used to solve linear equations with one variable and systems of linear equations may also have one solution, an infinite number of solutions, or no solutions (MP.2, MP.3). Students discover these cases as they graph systems of linear equations and solve algebraically</p>

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Analyze
- Solve a system of two linear equations
- Points of Intersections
- One Solution, No Solution, Infinitely Many Solutions
- Substitutions

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. *Describe the standard and/or element(s) as statements of intended learning. “I am learning”*

- To solve systems of equations by graphing
- To solve systems of equations using substitution.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can graph a system of equations and interpret the answer (one solution, no solution, infinitely many solutions).
- I can solve a system of linear equations using substitution and interpret the answer (one solution, no solution, infinitely many solutions).
- I can solve real world problems that lead to a system of equations and interpret the answer in relation to the given problem.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	KY.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.
SMP	MP.7, MP.8

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Function
- Input
- Output
- Ordered Pairs

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. *“I am learning”*

- To determine if a relation is a function.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. *“I will know that I learned it when”*

- I can look at relations represented in multiple ways (tables, ordered pairs, equations, graphs, verbal descriptions) and determine if they are functions.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this*

because”

Grade Level:	8
Standard	KY.8.F.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
SMP	MP.1, MP.2, MP.4

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Compare Properties
- Functions
- Algebraically, Graphically, Numerically
- Tables

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To compare properties of functions represented in two different ways.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can look at functions represented in multiple ways (tables, ordered pairs, equations, graphs, verbal descriptions) and compare the rate of change and the initial value.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) “I am learning this because”



Grade Level:	8
Standard	<p>KY.8.F.3 Understand properties of linear functions.</p> <p>a. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line.</p> <p>b. Identify and give examples of functions that are not linear.</p>
SMP	MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Properties of Linear Functions
- Interpret
- Not linear
- Slope Intercept

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. **“I am learning”**

- To interpret the properties of linear functions.
- To determine if a function is linear and give examples of linear and nonlinear functions.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. **“I will know that I learned it when”**

- I can interpret an equation modeling a linear function and determine its initial value and rate of change.
- I can determine if a function is linear and why.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	<p>KY.8.F.4 Construct a function to model a linear relationship between two quantities.</p> <p>a. 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.</p> <p>b. 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.</p>
SMP	MP.4, MP.5, MP.8

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Construct
- Linear Relationships
- Quantities
- Rate of Change
- Initial Value
- (x,y) values
- Tables and graphs
- Linear Functions

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- Construct a function to model a linear function.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can determine the initial value and rate of change and represent these in multiple ways (tables, ordered pairs, equations, graphs, verbal descriptions).

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	<p>KY.8.F.5 Use graphs to represent functions.</p> <p>a. Describe qualitatively the functional relationship between two quantities by analyzing a graph.</p> <p>b. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</p>
SMP	MP.3, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Graphs
- Functions
- Qualitatively
- Functional Relationships
- Analyzing a graph
- Sketch a graph
- Qualitative Features

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To describe a functional relationship represented by a graph.
- To sketch a graph representing the qualities of a verbally described function.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can determine if a function (or parts of a function) are increasing/decreasing and linear/nonlinear.
- I can be given a contextual situation and can sketch a graph that represents it with a focus on the initial value and the rate of change.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	<p>KY.8.G.1 Verify experimentally the properties of rotations, reflections and translations:</p> <ul style="list-style-type: none"> ● Lines are congruent to lines. ● Line segments are congruent to line segments of the same length. ● Angles are congruent to angles of the same measure. ● Parallel lines are congruent to parallel lines.
SMP	MP.5, MP.6

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Rotations
- Reflections
- Translations
- Lines
- Congruent
- Segments
- Angles
- Parallel Lines

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- How a rigid motion affects a figure’s coordinates, orientation, and size.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can demonstrate lines, segments, and angle measures are congruent in the image when a figure has been translated.
- I can demonstrate lines, segments, and angle measures are congruent in the image when a figure has been reflected.
- I can demonstrate lines, segments, and angle measures are congruent in the image when a figure has been rotated.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	KY.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.
SMP	MP.2, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Two-Dimensional Figures
- Congruent
- Sequence
- Rotations, Reflections, Translation
- Congruent Figures

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To determine a series of rigid motions that result in an image being congruent to the preimage.
- If a series of transformations result in the image being mapped onto the preimage, then the two figures are congruent.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can tell what rigid motions (translations, reflections, rotations) occurred resulting in two congruent figures.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

Grade Level:	8
Standard	KY.8.G.3 Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates.
SMP	MP.3, MP.5, MP.6
Also See	

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Dilations
- Translations
- Rotations
- Reflections
- Two-Dimensional Figures
- Coordinates

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. *Describe the standard and/or element(s) as statements of intended learning. “I am learning”*

- To find the effect of transformations (translations, reflections, rotations, dilations) on two-dimensional figures’ coordinates.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can identify the pattern of change in the x and y values following transformations

(translations, reflections, rotations, dilations).

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***“I am learning this because”***

Grade Level:	8
Standard	KY.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.
SMP	MP.2, MP.5, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Two-Dimensional Figures
- Similarity
- Sequence of Rotations, Reflections, Translations, and Dilations

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To determine a series of transformations that result in an image being similar to the preimage.
- If a series of transformations result in the image being similar to the preimage, then the two figures are similar.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can tell what transformations (translations, reflections, rotations, dilations) occurred resulting in two similar figures.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.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.
SMP	MP.3

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Angle sum theorem
- Exterior angles
- Remote interior angles
- Parallel lines
- Transversals
- Angle angle similarity

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To prove the triangle angle sum theorem.
- To prove the triangle exterior angle theorem.
- To prove the relationships of angles created by parallel lines and a transversal.
- To prove similar triangles exist using angle-angle criterion.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can use technology or tools to prove the triangle angle sum theorem and find missing angle measures.
- I can use technology or tools to prove the triangle exterior angle theorem and find missing angle measures.
- I can use technology or tools to prove the relationships of angles created by parallel lines and a transversal and find missing angle measures.
- I can prove two triangles are similar based on angle-angle criterion.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***“I am learning this because”***

--

Grade Level:	8
Standard	KY.8.G.6 Explain a proof of the Pythagorean Theorem and its converse.
SMP	MP.3, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Pythagorean theorem
- Converse of the pythagorean theorem

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. *Describe the standard and/or element(s) as statements of intended learning. “I am learning”*

- To prove the Pythagorean Theorem and its converse.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can prove, using a model, the Pythagorean Theorem.
- I can prove that a triangle is a right triangle if it satisfies the Pythagorean Theorem.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) “I am learning this because”

Grade Level:	8
Standard	KY.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.
SMP	MP.1, MP.2, MP.4

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Pythagorean theorem
- Legs
- Hypotenuse
- Two-dimensional
- Three-dimensional

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To use the Pythagorean Theorem to find unknown side lengths in real-world and mathematical problems in two-dimensional and 3D figures.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can use the Pythagorean Theorem to find unknown leg and hypotenuse lengths in two-dimensional figures (triangles, squares, rectangles, etc) in real-world and mathematical problems.

- I can use the Pythagorean Theorem to find unknown leg and hypotenuse lengths in three-dimensional figures (cones, rectangular prisms, cylinders, etc) in real-world and mathematical problems.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.8.G.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system
SMP	MP.5, MP.6

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Pythagorean theorem
- Coordinate plane
- Ordered pairs

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To use the Pythagorean Theorem to find the distance between two points on a coordinate plane.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can find the distance between two points on a coordinate plane using the Pythagorean Theorem.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) “I am learning this because”



Grade Level:	8
Standard	KY.8.G.9 Apply the formulas for the volumes and surface areas of cones, cylinders and spheres and use them to solve real-world and mathematical problems.
SMP	MP.1, MP.7, MP.8

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Volume
- Surface area
- Cones
- Cylinders
- spheres

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To apply the formulas for the volume and surface area for cones and use them to solve real world problems.
- To apply the formulas for the volume and surface area for cylinders and use them to solve real world problems.
- To apply the formulas for the volume and surface area for spheres and use them to solve real world problems.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common

misconceptions. "I will know that I learned it when"

- I can choose the correct formula to find the volume and surface area for cylinders, cones, and spheres to solve real-world and mathematical problems.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *"I am learning this because"*

Grade Level:	8
Standard	KY.8.NS.1 Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
SMP	MP.2, MP.6, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Decimals
- Rational numbers
- Terminating decimals
- Repeating decimals
- Irrational numbers

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To differentiate between rational and irrational numbers based on their decimal expansion.
- To find the decimal expansion (terminating or repeating) of rational numbers.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can find the decimal expansion of numbers and determine if they are rational or irrational.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram and estimate the value of expressions.
SMP	MP.2, MP.7, MP.8

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Rational numbers
- Irrational numbers
- Approximation
- estimation

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- To estimate the value of irrational numbers.
- To use the estimate of irrational numbers to compare numbers, place them on a number line, and find the value of expressions.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can estimate the value of irrational numbers.
- I can place irrational numbers on a number line.
- I can compare the values of numbers (rational and irrational).

- I can estimate the value of expressions including irrational numbers.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***"I am learning this because"***

Grade Level:	8
Standard	KY.8.SP.1 Construct and interpret scatter plots for bivariate numerical data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association and nonlinear association.
SMP	MP.2, MP.7

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Scatter plots
- Bivariate data
- Association (positive, negative, none)
- Clustering
- Outliers
- linear/nonlinear

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. *Describe the standard and/or element(s) as statements of intended learning. “I am learning”*

- To identify the associations, trends, and patterns of a scatter plot
- To construct a scatter plot given bivariate numerical data and make predictions from the graph.

4. Establish success criteria by identifying strong and weak work. *Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”*

- I can identify the associations (positive, negative, none), trends (linear, non-linear), and patterns (clustering, outliers) in a scatter plot.
- I can create a scatter plot from bivariate numerical data and make predictions from the graph.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) ***“I am learning this because”***

--

Grade Level:	8
Standard	KY.8.SP.2 Know that lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a line and informally assess the model fit by judging the closeness of the data points to the line.
SMP	MP.2

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Linear association
- Line of best fit

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. “I am learning”

- Identify a line of best fit (if applicable) of a given scatter plot.
- To determine if a line represents the line of best fit.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. “I will know that I learned it when”

- I can create a line of best for a given scatter plot.
- I can make adjustments to a given line to make it the line of best fit.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) “I am learning this

because”

Grade Level:	8
Standard	KY.8.SP.3 Use the equation of a linear model to solve problems in the context of bivariate numerical data, interpreting the slope and intercept.
SMP	MP.2, MP.4

Standard for Mathematical Practice (select and highlight)

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

1. Critical vocabulary and questions as it relates to the standard.

- Line of best fit
- slope

2. Key Implementation Questions and Answers:

3. Develop “Learning Intention” statements. Describe the standard and/or element(s) as statements of intended learning. *“I am learning”*

- To use the equation of a line of best fit to solve problems about the data represented by scatter plots.

4. Establish success criteria by identifying strong and weak work. Identify the characteristics of strong and weak work related to the standard and/or element(s). Identify common misconceptions. *“I will know that I learned it when”*

- I can use the equation of a line of best fit (using the slope and y-intercept) to solve problems and make predictions about the data represented in a scatter plot.

5. Ideas for Relevance (Authentic Work with a Connection to Real-World) *“I am learning this because”*

