

# Math - Grade 8

**Unit #1**

**Title:** Equations and Exponents and the Number System

**Pacing:** 30 days

## Stage 1- Desired Results

### Established Goals/NJSLS Standards

- Graph and analyze the different representations of proportional relationships and interpret the unit rate as the slope of the graph which indicates the rate of change. 8.EE.5
- Derive the equation of a line ( $y = mx$  for a line through the origin and the equation  $y = mx + b$  for a line intercepting the vertical axis at  $b$ ) and use similar triangles to explain why the slope ( $m$ ) is the same between any two points on a non-vertical line in the coordinate plane. 8.EE.6
- Solve linear equations in one variable with rational number coefficients that might require expanding expressions using the distributive property and/or combining like terms, including examples with one solution, infinite solutions, or no solution. 8.EE.7
- Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values. 8.F.4
- Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function. 8.F.5
- Compare rational and irrational numbers to demonstrate that the decimal expansion of irrational numbers do not repeat; show that every rational number has a decimal expansion which eventually repeats and convert such decimals into rational numbers. 8.NS.1
- Use rational numbers to approximate and locate irrational numbers on a number line and estimate the value of expressions involving irrational numbers. 8.NS.2
- Apply the properties of integer exponents to simplify and write equivalent numerical expressions. 8.EE.1
- Use scientific notation to estimate and express the values of very large or very small numbers and compare their values (how many times larger/smaller is one than the other). 8.EE.3
- Perform operations using numbers expressed in scientific notation, including problems where both decimals and scientific notation are used (interpret scientific notation generated when technology has been used for calculations). 8.EE.4
- Evaluate square roots and cubic roots of small perfect squares and cubes respectively and use square 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. Identify  $\sqrt{2}$  as irrational. 8.EE.2
- In real-world problem solving situations choose units of appropriate size for measurement of very small and very large quantities. 8.EE.4

### Enduring Understandings

*Students will understand...*

- Many of the patterns we see every day are linear.
- Linear equations can be used to predict the outcome of future events.
- A linear situation can have various representations.
- Each equation has a unique graph.
- We can create equations to model data that is not exactly linear
- Systems of linear equations occur often in our everyday world.
- We can use different methods to solve a system which result in the same solution.

### Essential Questions

*Students will consider...*

- What type of patterns do we see in our everyday lives?
- How can I use linear equations to model real life situations and make predictions?
- What is the best way to represent a pattern that is linear?
- How do I create a linear or exponential function from a real world situation?
- How can I use systems of equations to solve problems?
- What is the best method to solve a linear equation and why?
- What are the advantages and disadvantages to the various methods of solving linear equations?

<b>Knowledge</b> <i>Students will know...</i>		<b>Academic Vocabulary</b>	
<ul style="list-style-type: none"> <li>the classifications of numbers.</li> <li>the properties of exponents.</li> <li>how to solve multi-step linear equations.</li> <li>how to graph a line.</li> <li>that a linear equation in two variables has many solutions.</li> <li>how to create an equation form a graph or points.</li> <li>how to write numbers in scientific notation.</li> </ul>		<ul style="list-style-type: none"> <li>Functions</li> <li>Linear</li> <li>Slope</li> <li>Scatter Plot</li> <li>System</li> <li>Intersection</li> <li>Substitution</li> <li>Elimination</li> </ul>	
<b>Skills</b> <i>Students will be able to...</i>			
<ul style="list-style-type: none"> <li>Graph proportional relationships and find unit rates in proportional situations.</li> <li>Find the slope of a line.</li> <li>Graph linear equations on a coordinate plane given an equation in various forms.</li> <li>Create an equation that represents a line or linear pattern on a graph.</li> <li>Model real world situations with linear equations.</li> <li>Graph scatter plots and create equations based on lines of best fit.</li> <li>Solve systems of linear equations by graphing, substitution, or elimination</li> <li>Create systems of equations to model real world problems.</li> <li>Analyze systems of equations to determine the best methods to solve them.</li> </ul>			
<b>21<sup>ST</sup> Century/ Interdisciplinary Themes</b>		<b>21<sup>st</sup> Century Skills</b>	
<b>Global Awareness</b> <b>Financial, Business, &amp; Entrepreneurial Literacy</b> Civic Literacy Environmental Literacy Health Literacy		Creativity & Innovation <b>Communication &amp; Collaboration</b> Media Literacy <b>Critical Thinking &amp; Problem Solving</b> Information Literacy <b>Information, Communication, &amp; Technology</b> <b>Life &amp; Career Skills</b>	
<b>Stage 2- Assessment Evidence</b>			
<b>Formative Assessments</b>		<b>Student Self-Assessment</b>	
<ul style="list-style-type: none"> <li>Homework assignments.</li> <li>In class assignments</li> <li>Review games</li> </ul>		<ul style="list-style-type: none"> <li>Exit tickets</li> <li>Homework review</li> </ul>	
		<b>Common Assessments</b>	
		<ul style="list-style-type: none"> <li>Benchmark Assessments</li> <li>Big Ideas Chapter Tests</li> </ul>	

## ***Stage 3- Learning Plan***

### ***Suggested Learning Activities***

- Teacher led practice.
- Group practice and collaboration.
- Application examples.
- Graphing activities.

### ***Resources/Instructional Materials*** ***(articles, novels, websites, books, magazines, art, media)***

- Big Ideas Math text and web based instruction.
- IXL
- Study Island

### ***Technology Resources***

- |                       |                        |                                  |               |
|-----------------------|------------------------|----------------------------------|---------------|
| ● Desmos Graphing App | ● IXL                  | ● Web based tutorials/activities | ● Socrative   |
| ● Study Island        | ● Geometer's Sketchpad | ● Kahoot!                        | ● Google Apps |

### ***Accommodations & Modifications*** ***for Special Ed., At Risk, ELL, & Gifted Students***

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"><li>● Allow oral responses</li><li>● Allow verbalization before writing</li><li>● Use audio materials when necessary</li><li>● Modify homework assignments</li><li>● Read tests aloud</li><li>● Provide math manipulatives as necessary</li><li>● Restate, reword, clarify directions</li><li>● Re-teach concepts using small groups</li><li>● Provide educational “breaks” as necessary</li><li>● Chunking Content</li><li>● Calculator</li></ul> | <ul style="list-style-type: none"><li>● Use mnemonic devices</li><li>● Provide a cueing system</li><li>● Untimed and/or extended test taking time</li><li>● Shorten assignments to focus on mastery concept</li><li>● <b>Acronyms</b></li><li>● <b>Graphic Organizers</b></li><li>● <b>Notes Provided</b></li><li>● Check agenda book for parent(s) communication</li><li>● Read directions aloud</li></ul> | <ul style="list-style-type: none"><li>● <b>Assignment, Project, and Assessment Modification Based on Individual Student Needs</b></li><li>● <b>Speech to Text/Text to Speech Features in Google Apps</b></li><li>● <b>Technology assisted instruction</b></li><li>● Preferential seating utilized</li><li>● Redirect student(s) as necessary</li><li>● Student choice for project or approach to assignment</li><li>● Inquiry-Based Learning</li></ul> |
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## Math - Grade 8

**Unit #2**

**Title:** Function and Systems

**Pacing:** 30 days

### *Stage 1- Desired Results*

#### Established Goals/NJSLS Standards

- Define functions 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.1
- 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.2
- Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values. 8.F.4
- Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function. 8.F.5
- Utilize equations, graphs, and tables to classify functions as linear or non-linear, recognizing that  $y = mx + b$  is linear with a constant rate of change. 8.F.3
- Solve systems of linear equations in two variables by inspection, algebraically, and/or graphically (estimate solutions) to demonstrate solutions correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. 8.EE.8

#### **Enduring Understandings**

*Students will understand...*

- A function is a relationship between two quantities where each input has only one output.
- Functions are an efficient tool to find solutions to problems and predict future outcomes.
- The domain and range describe the inputs and output of a function.
- Functions and sequences represent real world examples.
- Functions may be linear or nonlinear.
- Systems of equations find common solutions.

#### **Essential Questions**

*Students will consider...*

- What is the difference between functions and equations?
- What is the best way to represent a function?
- How can I tell whether it's a function by just looking at a graph?
- How do I create a linear or exponential function from a real world situation?
- How can I use systems of equations to solve real life problems?

#### **Knowledge**

*Students will know...*

- how to evaluate a function.
- how to find domain and range of a function.
- how to solve a system of equations using multiple methods.
- various representations of a function can be used.

#### **Academic Vocabulary**

- Functions, Relations
- Domain
- Range
- Piecewise
- Discrete
- Continuous
- Sequences
- Converse
- System

<b>Skills</b> <i>Students will be able to...</i>		
<ul style="list-style-type: none"> <li>• Write linear functions.</li> <li>• Find the domain and range of nonlinear functions.</li> <li>• Form graphs from functions and vice versa.</li> <li>• Compare functions in different forms.</li> <li>• Analyze a function and determine its properties.</li> <li>• Create equations from scatterplots.</li> <li>• Solve systems of linear equations by graphing, substitution, or elimination</li> <li>• Create systems of equations to model real world problems.</li> <li>• Analyze systems of equations to determine the best methods to solve them</li> </ul>		
<b>21<sup>ST</sup> Century/ Interdisciplinary Themes</b>		<b>21<sup>st</sup> Century Skills</b>
<b>Global Awareness</b> <b>Financial, Business, &amp; Entrepreneurial Literacy</b> Civic Literacy Environmental Literacy Health Literacy		Creativity & Innovation <b>Communication &amp; Collaboration</b> Media Literacy <b>Critical Thinking &amp; Problem Solving</b> Information Literacy <b>Information, Communication, &amp; Technology</b> <b>Life &amp; Career Skills</b>
<b>Stage 2- Assessment Evidence</b>		
<b><i>Formative Assessments</i></b>	<b><i>Student Self-Assessment</i></b>	<b><i>Common Assessments</i></b>
<ul style="list-style-type: none"> <li>• Homework assignments.</li> <li>• In class assignments</li> <li>• Review games</li> <li>• 3 way solve project</li> <li>• Performance-based tasks</li> </ul>	<ul style="list-style-type: none"> <li>• Exit tickets</li> <li>• Homework review</li> </ul>	<ul style="list-style-type: none"> <li>• Benchmark Assessments</li> <li>• Big Ideas Chapter Tests</li> </ul>
<b>Stage 3- Learning Plan</b>		
<b><i>Suggested Learning Activities</i></b>		
<ul style="list-style-type: none"> <li>• Teacher led practice</li> <li>• Group practice and collaboration</li> <li>• Application examples</li> <li>• Graphing activities</li> </ul>		
<b><i>Resources/Instructional Materials</i></b> <i>(articles, novels, websites, books, magazines, art, media)</i>		
<ul style="list-style-type: none"> <li>• Big Ideas Math text and web based instruction</li> <li>• IXL</li> <li>• Study Island</li> </ul>		

### *Technology Resources*

- Desmos Graphing App
- IXL
- Web based tutorials/activities
- Socrative
- Study Island
- Geometer's Sketchpad
- Kahoot!
- Google Apps

### *Accommodations & Modifications for Special Ed., At Risk, ELL, & Gifted Students*

- Allow oral responses
- Allow verbalization before writing
- Use audio materials when necessary
- Modify homework assignments
- Read tests aloud
- Provide math manipulatives as necessary
- Restate, reword, clarify directions
- Re-teach concepts using small groups
- Provide educational "breaks" as necessary
- Chunking Content
- Calculator
- Use mnemonic devices
- Provide a cueing system
- Untimed and/or extended test taking time
- Shorten assignments to focus on mastery concept
- Acronyms
- Graphic Organizers
- Notes Provided
- Check agenda book for parent(s) communication
- Read directions aloud
- Assignment, Project, and Assessment Modification Based on Individual Student Needs
- Speech to Text/Text to Speech Features in Google Apps
- Technology assisted instruction
- Preferential seating utilized
- Redirect student(s) as necessary
- Student choice for project or approach to assignment
- Inquiry-Based Learning

Adapted from: Wiggins, Grant and J. McTighe. (1998). *Understanding by Design*. Association for Supervision and Curriculum Development

# Math - Grade 8

Unit #3

Title: Geometry

Pacing: 30 days

## Stage 1- Desired Results

### Established Goals/NJSLS Standards

- Utilize the properties of rotation, reflection, and translation to model and relate pre-images of lines, line segments, and angles to their resultant image through physical representations and/or Geometry software. 8.G.1
- Apply an effective sequence of rotations, reflections, and translations to prove that two dimensional figures are congruent. 8.G.2
- Use the coordinate plane to locate pre-images of two-dimensional figures and determine the coordinates of a resultant image after applying dilations, rotations, reflections, and translations. 8.G.3
- Recognize dilation as a reduction or an enlargement of a figure and determine the scale factor. 8.G.3
- Apply an effective sequence of transformations to determine that figures are similar when corresponding angles are congruent and corresponding sides are proportional. Write similarity statements based on such transformations. 8.G.4
- Justify facts about angles created when parallel lines are cut by a transversal. 8.G.5
- Justify facts about the exterior angles of a triangle, the sum of the measures of the interior angles of a triangle and the angle-angle relationship used to identify similar triangles. 8.G.5
- Explain a proof of the Pythagorean Theorem and its converse. 8.G.6
- 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.B.7.
- Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. 8.G.B.8.

### Enduring Understandings

*Students will understand...*

- We are constantly using transformations in everyday life.
- Transformations may or may not produce congruent figures.
- Similar figures are used constantly on our everyday world.
- Similar figures have the same shape but different sizes.
- Parallel lines are all around us.
- Specific properties of angles are formed when lines are parallel.
- There is a relationship between the angle measures in a triangle.
- The Pythagorean Theorem is used to find the missing side of a right triangle.
- The Pythagorean Theorem is a useful tool in real world applications such as construction or architecture.
- We can use the Pythagorean Theorem to determine whether a triangle is right or to find the distance between two points

### Essential Questions

*Students will consider...*

- What is a transformation?
- What is the importance of congruence?
- How can I use transformations in the real world?
- What patterns occur in coordinates on the graph when I perform a transformation?
- What are similar figures and how can I use the properties of similar figures?
- Why are parallel lines important?
- What is the relationship between the angle measures in a triangle and why do they occur?
- Why does the Pythagorean Theorem work?
- How can I use the Pythagorean Theorem to solve real life problems?

<b>Knowledge</b> <i>Students will know...</i>		<b>Academic Vocabulary</b>	
<ul style="list-style-type: none"> <li>• how to find the missing side of a right triangle.</li> <li>• how to perform transformations on the coordinate plane.</li> <li>• methods to find missing angles formed between parallel lines and a transversal.</li> <li>• how to find missing interior and exterior angles in polygons.</li> <li>• that proportions can be used to find missing lengths in similar figures.</li> </ul>		<ul style="list-style-type: none"> <li>• Reflection</li> <li>• Rotation</li> <li>• Translation</li> <li>• Congruence</li> <li>• Parallel</li> <li>• Transversal</li> <li>• Corresponding Angles</li> <li>• Alternate Interior Angles</li> <li>• Alternate Exterior Angles</li> <li>• Vertical Angles</li> <li>• Supplementary</li> <li>• Similarity</li> <li>• Ratio</li> <li>• Hypotenuse</li> </ul>	
<b>Skills</b> <i>Students will be able to...</i>			
<ul style="list-style-type: none"> <li>• Graph and describe congruence transformations including translations, reflections and rotations.</li> <li>• Describe a sequence of transformations that lead from one figure to another.</li> <li>• Find the coordinates of a transformation with or without a graph.</li> <li>• Find the missing side of a right triangle using the Pythagorean Theorem.</li> <li>• Use the Pythagorean Converse Theorem to determine whether a triangle is a right triangle.</li> <li>• Use the Pythagorean Theorem to find the distance between two points on the coordinate plane.</li> </ul>			
<b>21<sup>ST</sup> Century/ Interdisciplinary Themes</b>		<b>21<sup>st</sup> Century Skills</b>	
<b>Global Awareness</b> <b>Financial, Business, &amp; Entrepreneurial Literacy</b> Civic Literacy Environmental Literacy Health Literacy		Creativity & Innovation <b>Communication &amp; Collaboration</b> Media Literacy <b>Critical Thinking &amp; Problem Solving</b> Information Literacy <b>Information, Communication, &amp; Technology</b> <b>Life &amp; Career Skills</b>	
<b>Stage 2- Assessment Evidence</b>			
<b>Formative Assessments</b>		<b>Student Self-Assessment</b>	
<ul style="list-style-type: none"> <li>• Homework assignments.</li> <li>• In class assignments</li> <li>• Review games</li> </ul>		<ul style="list-style-type: none"> <li>• Exit tickets</li> <li>• Homework review</li> </ul>	
		<b>Common Assessments</b>	
		<ul style="list-style-type: none"> <li>• Benchmark Assessments</li> <li>• Big Ideas Chapter Tests</li> </ul>	

## ***Stage 3- Learning Plan***

### ***Suggested Learning Activities***

- Teacher led practice
- Group practice and collaboration
- Application examples
- Graphing activities

### ***Resources/Instructional Materials*** ***(articles, novels, websites, books, magazines, art, media)***

- Big Ideas Math text and web based instruction
- IXL
- Study Island

### ***Technology Resources***

- |                       |                        |                                  |               |
|-----------------------|------------------------|----------------------------------|---------------|
| ● Desmos Graphing App | ● IXL                  | ● Web based tutorials/activities | ● Socratic    |
| ● Study Island        | ● Geometer's Sketchpad | ● Kahoot!                        | ● Google Apps |

### ***Accommodations & Modifications*** ***for Special Ed., At Risk, ELL, & Gifted Students***

- |   |   |  |
|---|---|--|
| ● Allow oral responses                      | ● Use mnemonic devices                            | ● Assignment, Project, and Assessment Modification Based on Individual Student Needs |
| ● Allow verbalization before writing        | ● Provide a cueing system                         | ● Speech to Text/Text to Speech Features in Google Apps                              |
| ● Use audio materials when necessary        | ● Untimed and/or extended test taking time        | ● Technology assisted instruction  |
| ● Modify homework assignments               | ● Shorten assignments to focus on mastery concept | ● Preferential seating utilized  |
| ● Read tests aloud                          | ● Acronyms  | ● Redirect student(s) as necessary   |
| ● Provide math manipulatives as necessary   | ● Graphic Organizers                              | ● Student choice for project or approach to assignment                               |
| ● Restate, reword, clarify directions       | ● Notes Provided                                  | ● Inquiry-Based Learning   |
| ● Re-teach concepts using small groups      | ● Check agenda book for parent(s) communication   |  |
| ● Provide educational "breaks" as necessary | ● Read directions aloud                           |  |
| ● Chunking Content                          |   |  |
| ● Calculator                                |   |  |

Adapted from: Wiggins, Grant and J. McTighe. (1998). *Understanding by Design*. Association for Supervision and Curriculum Development

## Math - Grade 8

**Unit #4**

**Title:** Volume, scatter plots, probability, and data analysis

**Pacing:** 30 days

### *Stage 1- Desired Results*

#### **Established Goals/NJSLS Standards**

- Using a linear equation to model real life problems then solve it by interpreting the meaning of the slope and the intercept. 8.SP.3
- Construct and interpret scatter plots for bivariate measurement data and identify and interpret data patterns (clustering, outliers, positive or negative association, possible lines of best fit, and nonlinear association). 8.SP.1 8.SP.2
- Construct frequency/relative frequency tables to analyze and describe possible associations between two variables. 8.SP.4
- Know and apply the appropriate formula for the volume of a cone, a cylinder, or a sphere to solve real-world and mathematical problems. 8.G.9

#### **Enduring Understandings**

*Students will understand...*

- Volume is used to determine how much material is used to fill a 3D object.
- We can break a shape into smaller parts to find the total volume of an irregular solid.
- Math can be used to analyze data and predict trends.
- Linear patterns exist all around us in the real world.
- Analyzing trends and patterns can save you money and lead to new ideas.
- Trends in a graph do not always follow a pattern.

#### **Essential Questions**

*Students will consider...*

- How can we use the concepts learned in pre-algebra to interact in today's society?
- What data display is the best to use in a situation?
- If I discover a trend, how can I use it to predict future values?
- What types of information can I glean from a graph or table?
- When would I need to find the volume of a solid?
- How could I find the volume if the shape is not regular?

#### **Knowledge**

*Students will know...*

- how to find the volume of 3d figures.
- there are many ways to represent data.
- how to find a line of best fit from a scatterplot.
- how to create a linear equation from a line of best fit and use it to predict outcomes.
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#### **Academic Vocabulary**

- Base
- Cylinder
- Cone
- Prism
- Pyramid
- Scatter plot
- Data
- Linear regression
- Two-way tables
- Marginal Frequencies.

#### **Skills**

*Students will be able to...*

- Find the volume of cylinders, cones, prisms, pyramids and spheres.
- Apply the Pythagorean Theorem to solve real-life problems.
- Analyze data and choose an appropriate display for the data.
- Create a scatterplot from data and form an equation to represent that data.
- Create a two way table to describe data.
- Find and interpret marginal frequencies and percentages in a two way table.

21 <sup>ST</sup> Century/ Interdisciplinary Themes	21 <sup>st</sup> Century Skills
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***Stage 2- Assessment Evidence***

<b><i>Formative Assessments</i></b>	<b><i>Student Self-Assessment</i></b>	<b><i>Common Assessments</i></b>
<ul style="list-style-type: none"> <li>● Homework assignments.</li> <li>● In class assignments</li> <li>● Review games</li> </ul>	<ul style="list-style-type: none"> <li>● Exit tickets</li> <li>● Homework review</li> </ul>	<ul style="list-style-type: none"> <li>● Benchmark Assessments</li> <li>● Big Ideas Chapter Tests</li> </ul>

***Stage 3- Learning Plan***

<b><i>Suggested Learning Activities</i></b>
<ul style="list-style-type: none"> <li>● Teacher led practice</li> <li>● Group practice and collaboration</li> <li>● Application examples</li> <li>● Graphing activities</li> </ul>

***Resources/Instructional Materials***  
*(articles, novels, websites, books, magazines, art, media)*

<ul style="list-style-type: none"> <li>● Big Ideas Math text and web based instruction</li> <li>● IXL</li> <li>● Study Island</li> </ul>
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***Technology Resources***

<ul style="list-style-type: none"> <li>● Desmos Graphing App</li> <li>● Study Island</li> </ul>	<ul style="list-style-type: none"> <li>● IXL</li> <li>● Geometer’s Sketchpad</li> </ul>	<ul style="list-style-type: none"> <li>● Web based tutorials/activities</li> <li>● Kahoot!</li> </ul>	<ul style="list-style-type: none"> <li>● Socrative</li> <li>● Google Apps</li> </ul>
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***Accommodations & Modifications  
for Special Ed., At Risk, ELL, & Gifted Students***

- Allow oral responses
- Allow verbalization before writing
- Use audio materials when necessary
- Modify homework assignments
- Read tests aloud
- Provide math manipulatives as necessary
- Restate, reword, clarify directions
- Re-teach concepts using small groups
- Provide educational “breaks” as necessary
- Chunking Content
- Calculator
- Use mnemonic devices
- Provide a cueing system
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- Student choice for project or approach to assignment
- Inquiry-Based Learning

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## Math - Grade 8

**Unit #5**

**Title:** Application and Extensions

**Pacing:** 30 days

### Stage 1- Desired Results

#### Established Goals/NJSLS Standards

- 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.2
- Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values. 8.F.4
- Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function. 8.F.5
- Utilize equations, graphs, and tables to classify functions as linear or non-linear, recognizing that  $y = mx + b$  is linear with a constant rate of change. 8.F.3
- Using a linear equation to model real life problems then solve it by interpreting the meaning of the slope and the intercept. 8.SP.3
- Solve linear equations in one variable with rational number coefficients that might require expanding expressions using the distributive property and/or combining like terms, including examples with one solution, infinite solutions, or no solution. 8.EE.7
- Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values. 8.F.4
- Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function. 8.F.5

#### Enduring Understandings

*Students will understand...*

- Functions can Model real world situations.
- We can use data to create a linear model for some situations.
- When an algebraic model is created we can use it to predict future events.
- The rate of change is constant in a linear situation.

#### Essential Questions

*Students will consider...*

- How can I use Algebraic model to answer problems in real life?
- When can I use data to predict future events?
- In Which ways can I represent a real world situation?

#### Knowledge

*Students will know...*

- Math can be used to analyze data and predict trends.
- Linear patterns exist all around us in the real world.
- Analyzing trends and patterns can save you money and lead to new ideas.
- Trends in a graph do not always follow a pattern.

#### Academic Vocabulary

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>● Linear</li> <li>● Equation</li> <li>● Line</li> <li>● Represent</li> <li>● Rate</li> </ul> | <ul style="list-style-type: none"> <li>● Change</li> <li>● Function</li> <li>● Model</li> <li>● Qualitative</li> <li>● Value</li> </ul> |
|---|---|

#### Skills

*Students will be able to...*

- Flow between a graph, equation or table representing the same information.
- Represent a situation with various representations
- Analyze data and choose an appropriate display for the data.
- Create a scatterplot from data and form an equation to represent that data.
- Create a two way table to describe data.
- Find and interpret marginal frequencies and percentages in a two way table.

21 <sup>ST</sup> Century/ Interdisciplinary Themes	21 <sup>st</sup> Century Skills
<b>Global Awareness</b> <b>Financial, Business, &amp; Entrepreneurial Literacy</b> Civic Literacy Environmental Literacy Health Literacy	Creativity & Innovation <b>Communication &amp; Collaboration</b> Media Literacy <b>Critical Thinking &amp; Problem Solving</b> Information Literacy <b>Information, Communication, &amp; Technology</b> <b>Life &amp; Career Skills</b>

**Stage 2- Assessment Evidence**

<i>Formative Assessments</i>	<i>Student Self-Assessment</i>	<i>Common Assessments</i>
<ul style="list-style-type: none"> <li>• Homework assignments.</li> <li>• In class assignments</li> <li>• Review games</li> </ul>	<ul style="list-style-type: none"> <li>• Exit tickets</li> <li>• Homework review</li> </ul>	<ul style="list-style-type: none"> <li>• Benchmark Assessments</li> <li>• Big Ideas Chapter Tests</li> </ul>

**Stage 3- Learning Plan**

***Suggested Learning Activities***

- Teacher led practice
- Group practice and collaboration
- Application examples
- Graphing activities

***Resources/Instructional Materials***  
*(articles, novels, websites, books, magazines, art, media)*

- Big Ideas Math text and web based instruction
- IXL
- Study Island

***Technology Resources***

- |                       |                        |                                  |               |
|-----------------------|------------------------|----------------------------------|---------------|
| • Desmos Graphing App | • IXL                  | • Web based tutorials/activities | • Socrative   |
| • Study Island        | • Geometer's Sketchpad | • Kahoot!                        | • Google Apps |

***Accommodations & Modifications  
for Special Ed., At Risk, ELL, & Gifted Students***

- Allow oral responses
- Allow verbalization before writing
- Use audio materials when necessary
- Modify homework assignments
- Read tests aloud
- Provide math manipulatives as necessary
- Restate, reword, clarify directions
- Re-teach concepts using small groups
- Provide educational “breaks” as necessary
- Chunking Content
- Calculator
- Use mnemonic devices
- Provide a cueing system
- Untimed and/or extended test taking time
- Shorten assignments to focus on mastery concept
- Acronyms
- Graphic Organizers
- Notes Provided
- Check agenda book for parent(s) communication
- Read directions aloud
- Assignment, Project, and Assessment Modification Based on Individual Student Needs
- Speech to Text/Text to Speech Features in Google Apps
- Technology assisted instruction
- Preferential seating utilized
- Redirect student(s) as necessary
- Student choice for project or approach to assignment
- Inquiry-Based Learning

Adapted from: Wiggins, Grant and J. McTighe. (1998). *Understanding by Design*. Association for Supervision and Curriculum Development