# Unit A - *Graphing*

## Overview

In this unit students will work with graphing on the coordinate plane in three different ways. First they will use graphing to represent equations with two variables. Then they will create best fit lines for scatter plots to help describe relationships and make predictions. Finally, students will graph transformations on the coordinate plane and note the differences and similarities between the pre and post images. The concept of transformations will help them graph functions in later math courses.

Throughout this course the teacher should adjust pacing and presentation to meet the needs of the learners.

**21st Century Capacities:** ANALYZING

## Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

**MP2** Reason abstractly and quantitatively
**MP3** Construct viable arguments and critique the reasoning of others
**MP6** Attend to precision
**MP7** Look for and make use of structure

**CC.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. (Function notation is not required in Grade 8.)
**CC.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.
**CC.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.

***Transfer:***

*Students will be able to independently use their learning in new situations to...*

1. Draw conclusions about graphs, shapes, equations, or objects. (Analyzing)

***Meaning:***

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians specify locations and describe spatial relationships using coordinate geometry.
2. Mathematicians make predictions based on data.
3. Transformations result in images that are congruent or similar to the pre-images
4. Mathematicians use various representations of relationships to build meaning.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. What is this graph telling you?
B. What are the similarities and differences between the images and pre-images generated by translations?

| | ***Acquisition:*** | |
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| **CC.8.F.5** Describe qualitatively the functional relationship between two quantities by reading 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.<br>**CC.8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.<br>**CC. 8.SP.1** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.<br>**CC. 8.SP.2** Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.<br>**CC. 8.G** Understand congruence and similarity using physical models, transparencies, or geometry software<br>**CC. 8.G.1** Verify experimentally the properties of rotations, reflections, and translations<br>**CC. 8.G.1a** Lines are taken to lines, and line segments to line segments of the same length.<br>**CC. 8.G.1b** Angles are taken to angles of the same measure.<br>**CC. 8.G.1c** Parallel lines are taken to parallel lines.<br>**CC. 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.<br>**CC. 8.G.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.<br>**CC. 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. | *Students will know…*<br><br>1. When you graph a linear equation, the points will form a straight line<br>2. When a set of data has a positive, a negative or no correlation<br>3. When a set of data has an outlier<br>4. Shapes that are transformed by translations, reflections, and/or rotations are congruent to the original figure<br>5. Shapes that are transformed by dilations are similar to the original figure<br>6. Vocabulary: correlation, cluster, outlier, linear, nonlinear, transformation, translation, reflection, rotation, dilation, similar, congruent | *Students will be skilled at…*<br><br>1. Making a table and a graph from an equation with two variables<br>2. Drawing a best fit line for a set of data<br>3. Using a best fit line to make predictions<br>4. Writing a story problem from a graph<br>5. Writing a graph from a story problem<br>6. Identifying the appropriate graph as described by a real world situation<br>7. Translating points and shapes on the coordinate plane<br>8. Rotating points and shapes on the coordinate plane<br>9. Reflecting points and shapes on the coordinate plane<br>10. Dilating shapes when the origin is the center of dilation<br>11. Determining the scale factor of a dilation |