



Journey Learning



**Building sturdy human beings...**

## 8<sup>th</sup> Grade Mathematics

### Course Description

This course will address the 8th grade Colorado Academic Standards. Math 8 emphasizes the study of multiple representations of linear functions. It includes mathematical concepts for working with rational numbers, various expressions, analyzing and solving linear equations, data analysis, statistics, Pythagorean Theorem investigations, and geometric transformations. Students will use hands-on materials and calculators when needed in solving problems in which algebra or geometry concepts are applied. Students in Math 8 will take the CMAS Math Assessment in the spring. Students who successfully complete Math 8 will take Algebra 1 the next academic school year.

### Colorado Content Standards

#### Number Sense, Properties, and Operations

- In the real number system, rational and irrational numbers are in one to one correspondence to points on the number line.

#### Patterns, Functions, and Algebraic Structures

- Linear functions model situations with a constant rate of change and can be represented numerically, algebraically, and graphically.
- Properties of algebra and equality are used to solve linear equations and systems of equations.
- Graphs, tables and equations can be used to distinguish between linear and nonlinear functions.

#### Data Analysis, Statistics, Probability

- Visual displays and summary statistics of two-variable data condense the information in data sets into usable knowledge.

#### Shape, Dimension, and Geometric Relationships

- Transformations of objects can be used to define the concepts of congruence and similarity.
- Direct and indirect measurement can be used to describe and make comparisons.

### Disciplinary Skills

- ✓ Make Sense of problems and persevere in solving them.
- ✓ Construct viable arguments and critique the reasoning of others.
- ✓ Reason abstractly and quantitatively.
- ✓ Model with Mathematics.
- ✓ Look for and make use of structure.

### Essential Questions to be Explored

- ❖ *What is a variable and how can I solve for it?*
- ❖ *How can you check the reasonableness of your solution?*
- ❖ *What methods can be used to solve systems of linear equations?*
- ❖ *How does the pattern show up in the table, graph, and rule?*
- ❖ *How would you apply the Pythagorean Theorem to a real-world situation?*
- ❖ *What are the similarities and differences between the images and pre-images generated by translations?*
- ❖ *What is the relationship between the coordinates of the vertices of a figure and the coordinates of the vertices of the figure's image generated by translations?*
- ❖ *How can translations be applied to real-world situations?*

### Units of Study

- **Algebraic Linear Equations and Properties of Exponents**  
Apply the properties of integer exponents to real world applications. Solve linear equations in one variable, including the number of solutions.
- **Lines and Linear Equations and Systems of Equations**  
Derive and graph the equation  $y = mx + b$  for a line. Analyze and solve pairs of simultaneous linear equations.
- **Functions and Pythagorean Theorem with volume and surface area of 3D shapes**  
Define, evaluate, and compare functions of proportional relationships represented in different ways. Explain a proof of the Pythagorean Theorem and its converse. Apply the Pythagorean Theorem to right triangles, finding the distance between two points and apply the formulas for the volumes of 3D shapes.
- **Transformations and Congruence and Similarity**  
Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. Determine if a two-dimensional figure is congruent or similar to another by a series of geometric transformations.