# 7th Grade
## Accelerated Mathematics

## Key Instructional Activities

In 7th grade Accelerated Mathematics, students take their understanding of unit rates and proportional relationships to a new level, connecting these concepts to points on a line and ultimately using them to solve linear equations that require them to apply algebraic reasoning as well as knowledge of the properties of operations. Students will also expand their understanding of numbers beyond rational numbers to include numbers that are irrational—meaning that they cannot be written as a simple fraction, such as the square root of 2 or $\sqrt{2}$.

Activities in these areas will include:

- Understanding that every *rational* number (such as ½, 0.3, 2, or -2) can be written as a decimal, but that the decimal form of an *irrational* number (such as $\sqrt{2}$ ) is both non-repeating and infinite
- Applying the properties of exponents to generate equivalent numerical expressions
- Determining the value of square roots of small perfect squares (such as $\sqrt{49}$ = 7) and cube roots of small perfect cubes (such as $\sqrt[3]{64}$ = 4)
- Graphing proportional relationships and interpreting the unit rate as the *slope* (how steep or flat a line is)
- Solving and graphing one- and two-variable linear equations
- Understanding that a *function* is a rule that assigns to each value of x exactly one value of y, such as y=2x, a rule that would yield such ordered pairs as (-2,-4), (3,6), and (4,8)
- Comparing the properties of two functions represented in different ways (in a table, graph, equation, or description)
- Determining *congruence* (when shapes are of equal size and shape) and *similarity* (same shape but different sizes)
- Learning and applying the Pythagorean Theorem (an equation relating the lengths of the sides of a right triangle: $a^2 + b^2 = c^2$)
- Finding the area of two-dimensional objects and the volume and surface area of three-dimensional objects
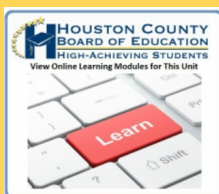- Solving problems involving the volume of cylinders, cones, and spheres



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## What resources are available for students and parents?

https://hcbemath.weebly.com/



- ✓ Online Math Textbook
- ✓ Parent Portal
- ✓ Overview of Units and Pacing
- ✓ The Learn Button!



What is the Learn Button on the Weebly Site? *Link to Georgia Virtual School Modules for instructional videos, examples, and practice by unit.*

# 7th Grade Accelerated Math Course Overview

### *Unit 1:  Transformations, Congruence, & Similarity*
**Expected Dates: Beginning of School Year to Mid-September**
This unit will have students explore and describe the effects of translations, rotations, reflections and dilations of two-dimensional figures using coordinates. Students will understand congruence or similarity of two-dimensional figures if the second can be obtained from the first by a sequence of geometric transformations. Using informal arguments about side and/or angle relationships, students will show that two triangles are congruent or similar. Students' work with congruence and similarity will allow them to make connections among proportional relationships, lines and linear equations in the upcoming units.

### *Unit 2:  Exponents*
**Expected Dates: Mid-September to Late October**
This unit will begin with familiar number sense topics to help students transition into the Grade 8 content. Turning decimal expansions into fractions and deepening understanding of the meaning of decimal expansions to set a firm foundation for understanding irrational numbers. Students will learn that the square roots of perfect squares are rational numbers, and that the square roots of non-perfect squares, such as $\sqrt{2}$ or $\sqrt{7}$, are examples of irrational numbers. Students will understand the value of square roots and cube roots and use this understanding to solve equations involving perfect squares and cubes. Further work with exponents, including scientific notation, naturally flow from the understanding of squares and cubes. Through the course of this study, students build on their knowledge
of solving equations to realize that there may be a single solution, infinite solutions, or no solutions. Generalizations of form for each situation are arrived at by noticing patterns in successive simplification of equations. The focus should be on the reasoning behind a solution or solution method as well as the actual procedure for solving.

### *Unit 3:  Geometric Applications of Exponents*
**Expected Dates: Late October to Late November**
This unit will have students apply their prior knowledge of triangles to the specific qualities of right triangles and find the missing side lengths of right triangles in various real-world 2-D and 3-D situations. They will also apply the concepts of squares and square roots. In grade 7, students begin to reason about relationships among two-dimensional figures using scale and informal geometric constructions, and gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. Through application in real-world contexts, students solve real-world and mathematical problems involving area, surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms. Students also learn the volume formulas for cylinders, cones and spheres. They then apply these formulas to not only find the volume of objects, but also missing dimensions such as the radius or height.

### *Unit 4A:  Inferences*
**Expected Dates: December**
This unit will have students build upon their understanding of statistics by examining how selected data can be used to draw conclusions, make predictions, and compare populations.

### *Unit 4B:  Probability*
**Expected Dates: January**
This unit will have students develop a general understanding of the likelihood of events occurring by realizing that probabilities fall between 0 and 1. They gather data from simulations to estimate theoretical probability using the experimental probability. Students will make predictions about the relative frequency of an event by using simulations to collect, record, organize and analyze data. They will develop probability models to be used to find the probability of simple and compound events. Students will determine from each sample space the probability or fraction of each possible outcome.

### *Unit 5: Functions*
**Expected Dates: Late January to Early February**
This unit will have students understand that functions describe relationships and will be able to compare and construct a function. The equation y= mx + b will be interpreted as a straight line, where m and b are constants. Students will establish a routine of exploring functional relationships algebraically, graphically, and numerically in tables and verbal descriptions.

### *Unit 6: Linear Functions*
**Expected Dates: Mid-February to Mid-March**
This unit will have students understand that the equation y  = mx + b  will be interpreted as a straight line, where  m and b are constants. Students will establish a routine of exploring functional relationships algebraically, graphically, and numerically in tables and verbal descriptions. When using functions to model a linear relationship between quantities, students learn to determine the rate of change of the function which is the slope of a graph.

### *Unit 7: Linear Models and Tables*
**Expected Dates: Mid-March to Early April**
This unit will have students understand that functions describe relationships and will be able to compare and construct a function.  They will learn to recognize linearity in a table when constant differences between input values produce constant differences between output values, and they can use the constant rate of change and initial value appropriately in a verbal description of a context. Students apply experience with coordinate planes and linear functions in the study of association between two variables related to a question of interest. They will analyze bivariate measurements on a scatterplot describing shape, center, and spread. The shape is a description of the cloud of points on a plane, the center is the line of best fit, and the spread is how far data points are from the line.

### *Unit 8:  Solving Systems of Linear Equations*
**Expected Dates: Mid-April to End of School Year**
This unit will have students graph a system of two linear equations, recognizing that the ordered pair for the point of intersection is the x-value that will generate the given y-value for both equations. Students recognize that graphed lines with one point of intersection (different slopes) will have one solution, parallel lines (same slope, different y-intercepts) have no solutions, and lines that are the same (same slope, same y-intercept) will have infinitely many solutions.

# Helpful Tips for Parents and Guardians

Believe that every child can be successful in math. It takes good teaching, coaching, encouragement and practice.

## *Partnering with your child's teacher*

• Get to know your child's math teacher! Your child will thank you (someday) for being involved in his or her learning. Also – know about the online resources that are available!

• Don't be afraid to reach out to your child's teacher—you are an important part of your child's education. Ask to see a sample of your child's work or bring a sample with you.

• Talk with your child's teacher about difficulties he/she may be experiencing. When teachers and parents work together, children benefit.

• Ask the teacher questions like:

  • Where is my child excelling? How can I support this success?

  • What do you think is giving my child the most trouble? How can I help my child improve in this area?

  • What can I do to help my child with upcoming work?

## *Helping your child learn outside of school*

• Talk about math in a positive way. A positive attitude about math is infectious. Encourage your child to stick with it whenever a problem seems difficult. This will help your child see that everyone can learn math.

• Encourage persistence. Some problems take time to solve. Praise your child when he or she makes an effort, and share in the excitement when he or she solves a problem or understands something for the first time

• Encourage your child to experiment with different approaches to mathematics. There is often more than one way to solve a math problem.

• Encourage your child to talk about and show a math problem in a way that makes sense

• When your child is solving math problems ask questions such as: Why did you...? What can you do next? Do you see any patterns? Does the answer make sense? How do you know? This helps to encourage thinking about mathematics.

• Connect math to everyday life and help your child understand how math influences them (i.e. shapes of traffic signs, walking distance to school, telling time).

• Play family math games together that add excitement such as checkers, junior monopoly, math bingo and uno.

• Computers + math = fun! There are great computer math games available on the internet that you can discover with your child.