

## A SAMPLE OF WHAT YOUR CHILD WILL BE LEARNING

- Understanding slope, and relating linear equations in two variables to lines in the coordinate plane
- Solving linear equations (e.g.,  $-x+5(x+\frac{1}{3})=2x-8$ ); solving pairs of linear equations (e.g.,  $x+6y=-1$  and  $2x-2y=12$ ); and writing equations to solve related word problems
- Understanding functions as rules that assign a unique output number to each input number; using linear functions to model relationships
- Analyzing statistical relationships by using a best-fit line (a straight line that models an association between two quantities)
- Working with positive and negative exponents, square root and cube root symbols, and scientific notation (e.g., evaluating  $\sqrt{36+64}$ ; estimating world population as  $7 \times 10^9$ )
- Understanding congruence and similarity using physical models, transparencies, or geometry software (e.g., given two congruent figures, show how to obtain one from the other by a sequence of rotations, translations, and/or reflections)
- Understanding and applying the Pythagorean Theorem ( $a^2+b^2=c^2$ ) to solve problems

## MATHEMATICAL PRACTICES

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 structure.
8. Look for and express regularity in repeated reasoning.

## TALK TO YOUR CHILD'S TEACHER

Keep conversations focused on concepts your child will be learning.

Ask to see a sample of your child's work and ask the teacher questions such as:

- Is my child at the level where he/she should be at this point of the school year?
- Where is my child excelling?
- 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?

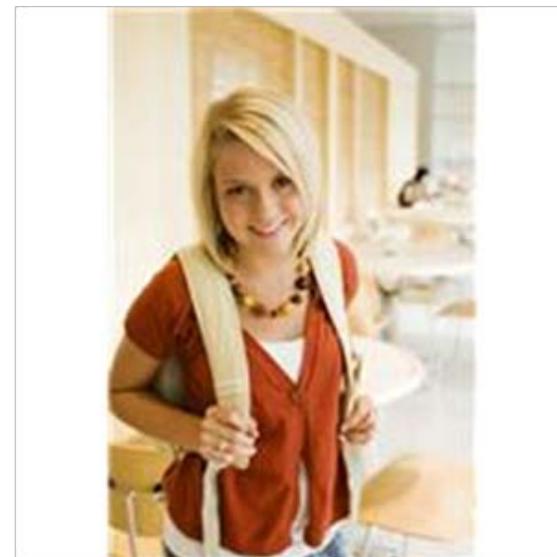
## ACTIVITIES FOR HOME TO SUPPORT LEARNING

- Ask your child to do an Internet search to determine how mathematics is used in specific careers. This could lead to a good discussion and allow students to begin thinking about their future aspirations.
- Have your child use magazines, clip art, and other pictures to find and describe examples of similar and congruent figures.
- Using different objects or containers (such as a can of soup or a shoebox), ask your child to estimate surface area and volume, and check the answer together.
- Prompt your child to face challenges positively and to see mathematics as a subject that is important. Avoid statements like "I wasn't good at math" or "Math is too hard."
- 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.

# 8th Grade

## Parent Resource

### Mathematics



## COMMON CORE STATE STANDARDS



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## EXAMPLES OF WORKING WITH EXPRESSIONS AND EQUATIONS

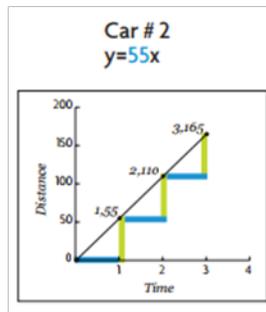
Students interpret and compare linear relationships represented in different ways, making the connection between equations, tables of values, and graphs.

*Problem:* Two cars are traveling from point A to point B. Their speeds are represented on a graph and in a table. Which car is traveling faster?

*Solution:* Even though car #1 starts out ahead by 4 miles, students identify the rate of change-or slope-of the equations presented in the table and graph as equal (55 miles per hour), meaning that both cars are traveling at the same speed.

Car #1  
 $y=55x + 4$

Time (x)	Distance (y)
1	59
2	114
3	169



## Expressions & Equations

### 7th Grade Mathematics

- Re-write an expression in different forms to show different solutions to a problem or how quantities are related.
- Use variables to represent quantities and construct simple equations and inequalities (for example,  $5x + 2 > 10$ ) to solve problems.
- Solve multi-step word problems involving positive and negative numbers.
- Understand that solving an inequality or an equation such as  $\frac{1}{4}(x+5)=21$  means answering the question, "What number does  $x$  have to be to make this statement true?"

### 8th Grade Mathematics

- Know and apply the properties of integer exponents (positive numbers, negative numbers, or 0) to write equivalent expressions (such as  $4^2 \cdot 4^3 = 4^5$ , where " $\cdot$ " means to multiply).
- Graph proportional relationships, identifying the unit rate as the slope (how steep or how flat a line is).
- Solve linear equations (equations that make a straight line when they are graphed, such as  $y=2x+1$ ).

### High School Mathematics

- Solve quadratic equations (equations that include the square of a variable, such as  $5x^2 - 3x + 3 = 0$ ).
- Use the structure of an expression to identify ways to rewrite it [for example,  $x^4 - y^4 = (x^2)^2 - (y^2)^2$ ].

## Rates, Ratios & Proportions

### 7th Grade Mathematics

- Analyze proportional relationships and use them to solve real-world problems.
- Calculate the unit rates associated with ratios of fractions, such as the ratio of  $\frac{1}{2}$  a mile for every  $\frac{1}{4}$  of an hour.
- Recognize and represent proportional relationships in various ways, including using tables, graphs, and equations.
- Identify the unit rate in tables, graphs, equations, and verbal descriptions of proportional relationships.

### 8th Grade Mathematics

- Understand that a function is a rule that assigns to each input exactly one output, and the graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- Compare the properties of two functions each represented in a different way (for example, in a table, graph, equation, or description).
- Determine the rate of change and initial value of a function based on a description of a proportional relationship or at least two given  $(x,y)$  values.

### High School Mathematics

- Calculate and interpret the average rate of change of a function over a given interval.
- Understand and use function notation (for example,  $f(x)$  denotes the output of  $f$  corresponding to the input  $x$ ).
- For a function that models a relationship between two quantities, interpret key features of graphs and tables, including intercepts, intervals where the function is increasing or decreasing, relative maximums and minimums, etc.

## EXAMPLES OF UNDERSTANDING RATES, RATIOS AND PROPORTIONS

Students apply their understanding of rates and ratios to analyze pairs of inputs and outputs and to identify rates of change and specific values at different intervals.

This table shows the height of a tree, in inches, in the months after it was planted.

Month	Height, in inches
3	51
5	54
9	60
11	63

Given these sets of values, determine that the rate of change is constant: a tree replanted as a sapling grows 3 inches every 2 months, which is  $\frac{3}{2}$ -or 1.5-inches each month. Therefore, students can compute the tree's height when it was replanted by taking its height at month 3 (51 inches) and subtracting 3 months of growth:  $51 - \frac{3}{2} \cdot 3 = 51 - 4.5 = 46.5$  inches.