Parent Guide to the Standards

6th Grade

Mathematics

This guide provides a summary of what your child will learn by the end of sixth grade in mathematics in the state of Kansas. This guide will also give some examples of the sixth grade mathematics so you can assist your child. To view the standards in their entirety, please go to: http://community.ksde.org/Default.aspx?tabid=5276 .

The Mathematics Standards are divided into two sections. The first section is the same for every grade level from Prekindergarten to 12th Grade and is described below. The Standards for Mathematical Practice address *how* mathematics is to be taught and *how* the students are to engage with the mathematics. The second section outlines the content at each grade level.

Standards for Mathematical Practice — 6th

1. Making 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

Your child will be taught skills that will encourage critical thinking and problem solving. Some examples include:

- Students in the 6th grade students solve real-world problems through the application of algebraic and geometric concepts. These problems involve ratio, rate, area and statistics.
- Teachers will expect students to construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays.
- Students are expected to use number lines to compare numbers and represent inequalities.
- Teachers will expect students to continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning.
- Students compose and decompose two- and three-dimensional figures to solve real world problems involving area and volume.

Content Standards for Mathematics — 6th

The specific skills and content your child will be taught come from the content standards. The domains are listed with <u>some</u> examples of the mathematics at the 6th grade level.

Ratios and Proportional Relationships:

- Understand ratio, unit rate, and unit rate notation and language.
- Use ratio and rate reasoning to solve real-world and mathematical problems.

The Number System:

- Divide fractions by fractions.
- Compute multi-digit numbers (including decimals) and find common factors and multiples.
- Understand negative and positive numbers to describe quantities.

Expressions and Equations:

- Write, read, and evaluate expressions in which letters stand for numbers.
- Solve one-step equations with non-negative rational numbers.
- Use two variables to represent two quantities that change in relationship to one another.

Geometry:

- Solve real-world and mathematical problems involving area, surface area, and volume.
- Use the coordinate plane to solve real-world and mathematical problems.

Statistics and Probability:

- Analyze a set of data collected to answer a statistical question.
- Recognize that a measure of center (mean, median, and/or mode) for a numerical data set summarizes all of its values with a single number.

Samples of Math Applications

6th

Sixth grade students are expected to use and understand the language and notations used to communicate about unit rate.

Example: Students can determine ratios used in cooking. *I noticed that this recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is* $\frac{3}{4}$ *cup of flour for each cup of sugar.*

Real-Life Application

Thinking about the example above, students can begin to think how helpful knowing unit rates can be when needing to make large batches of food.

If your child knows that there is $\frac{3}{4}$ cup of flour for every cup of sugar, then ask how many cups of flour will be needed if you are making a recipe that asks for 15 cups of sugar.

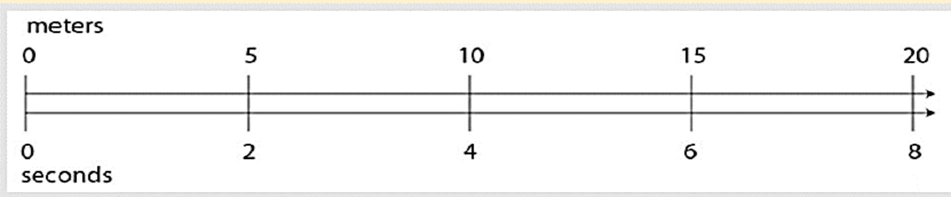
Why Must I Learn Math?

Here is a Math Guide!
http://www.mathguide.com/issues/whymath.html#6

Representing Ratios with Double Number Lines

Double number line diagrams are great visual tools to use when the quantities have different units. Double number line diagrams can help make visible that there are many pairs with the same ratio.

The example below shows how a double number line can be used in place of a table or chart. Multiple methods to display information will allow some students to access math problems more easily.



Why Study Math?

Ask Dr. Math!
http://mathforum.org/dr.math/faq/faq.why.math.html

Real-Life Application

Students need to be able to evaluate expressions from formulas that are used in real life and in math class.

Example: The formula for finding the surface area of a cube is $A = 6s^2$. Students need to understand that the variables in the formula represent numbers/quantities. Ask your child to share what they know about this formula.

Writing Algebraic Expressions and Equations

Sixth grade students continue the work started in elementary school with writing expressions and equations but become much more complex.

Example: Daniel went to visit his grandmother, who gave him \$5.50. Then he bought a book costing \$9.20. If he has \$2.30 left, how much money did he have before visiting his grandmother?

Your child should be familiar with writing situation equations (equations that represent exactly the situation of the problem). Since the unknown quantity is how much Daniel started with at the beginning of the problem, the equation would be:

$$x + \$5.50 - \$9.20 = \$2.30$$

Career Applications

Stock Analysts use ratios to analyze the health and value of companies.

Bankers use a specific ratio called a “debt ratio” to decide if they will loan money to someone applying for a loan at their bank.

Nurses need to use ratios when figuring out how much medicine someone will need based on their weight.

Division with Fractions

In order to be able to apply mathematics in the real world, we need to understand what it really means. Division with fractions is a skill that most people have memorized a procedure for using but there is no meaning or understanding behind it. Many were told, “Yours is not to reason why, but to invert and multiply!” Often after memorizing a procedure without meaning, people will misapply the procedure – “Do I invert and multiply for multiplication? Division? Both?” – which then leads to frustration and the feeling that mathematics just does not make sense.

Mathematics builds on previous understanding. Think back to whole number division. $10 \div 2 = ?$ is basically asking “How many groups of 2 can I get out of 10?”. I can get 5 groups of 2 out of 10. It is the same with fractions! $\frac{2}{3} \div \frac{1}{6} = ?$ is asking “How many groups of size $\frac{1}{6}$ can get out of $\frac{2}{3}$? I can get 4 groups of size $\frac{1}{6}$. That is why the solution for division of fractions is often a whole number. It is telling how many of that fractional group size, not the whole number.

Now do a few on your own and with your child thinking about the meaning. Have fun!

Math Careers http://www.careercornerstone.org/math/math.htm

Helpful Websites:

- ✓ Kansas Math Standards – http://community.ksde.org/Default.aspx?tabid=5276
- ✓ Parent Roadmaps from the Council of Great City Schools – http://www.cgcs.org/Page/328
- ✓ PTA’s Parent Guides to Student Success - http://www.pta.org/parents/content.cfm?ItemNumber=2583