RETHINK EDUCATION
North Carolina Department of Public Instruction

An At-Home Guide for Families

6th Grade Math in North Carolina Public Schools

Course Outline

At the end of the course, my child will know…

- how to find the area of triangles and rectangles.
- how to use 2-dimensional models made up of rectangles and triangles to find the surface area of right prisms and right pyramids and use to solve real-world problems.
- how to find the volume of rectangular prisms with fractional side lengths.
- how to write the prime factorization of a whole number and use to find the Greatest Common Factor.
- how to find the Least Common Multiple of two numbers and use to add and subtract fractions.
- how to create equivalent ratios and use to solve problems.
- how to add, subtract, multiply, and divide with decimal numbers or fractions.
- how to divide numbers with at least four-digits and interpret the result in real-world problems.
- how to plot numbers on a number line, interpret the order of numbers, and interpret in real-world problems.
- how to determine where a point will fall based on the signs and draw points on a coordinate plane.
- how to find the distance between two points when they are either horizontal to each other or vertical to each other.
- how to write expressions with variables, grouping symbols, and/or exponents and simplify.
- how to solve equations with one-variable keeping the left and right side of the equal sign balanced.
- how to write an inequality, draw on a number line, and explain what it means in a problem.
- how to use two variables to represent and analyze amounts in context, equations, tables, and graphs.
- how to display and interpret statistical data using dot plots, histograms, and box plots and describe by its center, spread, and overall shape.
- how to recognize a statistical question anticipates variability in the data and accounts for it in answers.

Curious what the specific standards are for 6th Grade Math in North Carolina?

Check out the **North Carolina Standard Course of Study here** to learn more. Looking for additional explanations about what students should be able to do at the end of this course? Check out **NC DPI's unpacked contents document** aligned to the course standards.

RETHINK EDUCATION
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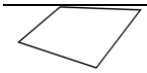
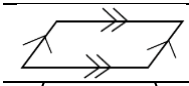
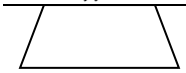
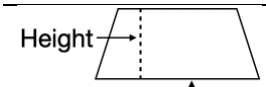
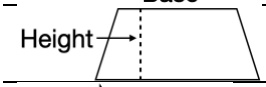
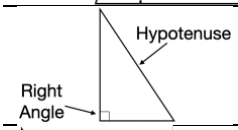
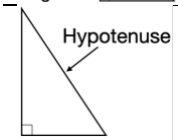
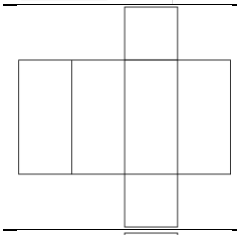
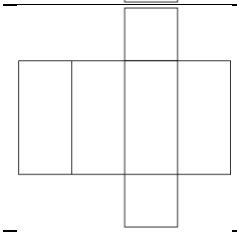
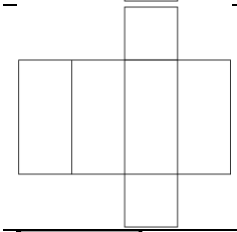
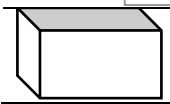
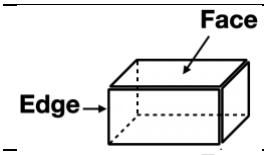
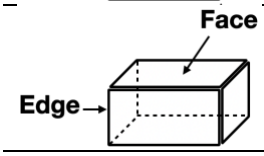
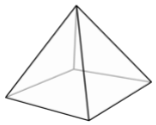
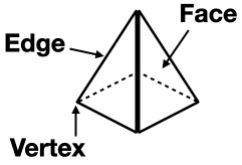
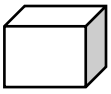
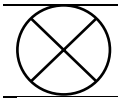
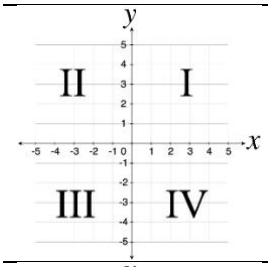
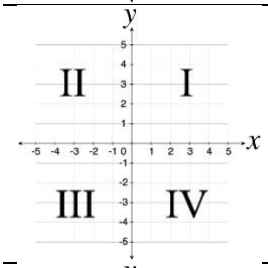
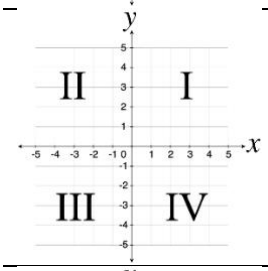
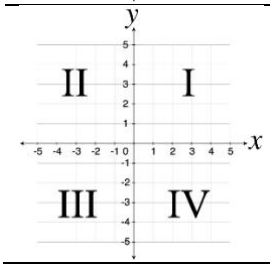
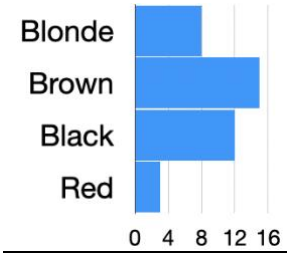
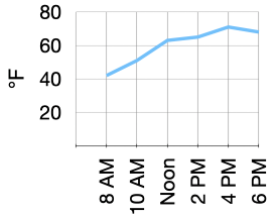
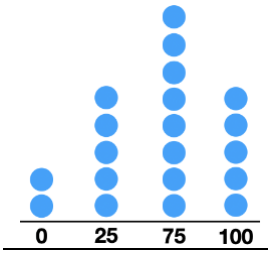
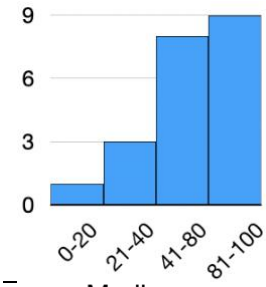
Key Vocabulary

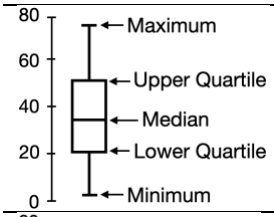
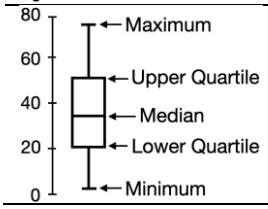
Visual	Term	Definition
	**Polygon**	A closed, two-dimensional shape composed of three or more straight lines.
	**Quadrilateral**	A four-sided, two-dimensional figure.
	**Parallelogram**	A quadrilateral with opposite sides parallel to each other.
	**Trapezoid**	A quadrilateral with one pair of parallel sides
	**Base**	The bottom side of a polygon.
	**Height**	The length measured from the top of a figure to the base.
	**Right Triangle**	A triangle that contains a right angle.
	**Hypotenuse**	The longest side of a right triangle.
	**Area**	Area is the number of square units that covers a two-dimensional region, without any gaps or overlaps. Measured in square units.
	**Net**	A flat pattern that can be folded to form a solid shape.
	**Surface area**	The total area of the faces of a three-dimensional figure.
	**Polyhedron**	A solid composed of flat faces, no curves.

Visual	Term	Definition
	**Prism**	A polyhedron with two identical faces.
	**Edge**	a line segment joining the corners of a shape
	**Face**	A flat surface of a solid shape.
	**Pyramid**	A polyhedron with a polygon base and the rest of the faces are triangles.
	**Vertex**	Where two or more line segments meet at a point. Plural is vertices.
	**Volume**	The amount of space in a 3-dimensional shape. Measured in cubic units.
$\frac{3}{2}$	**Rational number**	Any number that can be written as the division of two integers.
15	**Integer**	A number with no fractional parts.
8.2	**Positive Number**	A number greater than 0.
-5	**Negative Number**	A number less than 0.
1.25	**Decimal**	A type of number with whole numbers and the fractional part behind a decimal point.
|-5| = 5	**Absolute Value**	The distance a number is from zero. Symbol is | |.
3 and -3	**Additive Inverse**	The number you add to another number to get zero.
Factor Factor $3 \times 5 = 15$	**Factor**	Numbers we can multiply together to get another number.
$3 \times 5 = 15$ Multiple of 3 and 5	**Multiple**	The result of multiplying a number by an integer.
6: 1 ,2, **3**, 6 9: 1, **3**, 9 GCF is 3	**Greatest Common Factor**	The largest factor that two or more numbers have in common. Abbreviated GCF.
6: 6, 12, **18**, 24 9: 9, **18**, 27 LCM is 18	**Least Common Multiple**	The smallest multiple that two or more numbers have in common. Abbreviated LCM.

Visual	Term	Definition
3^5 ← Exponent	**Exponent**	The exponent of a number says how many times to use that number in multiplication. Also known as a power.
Prime Number $48 = 2^4 \cdot 3$	**Prime Number**	A number greater than one that cannot be made by multiplying other whole numbers.
$48 = \underbrace{2^4 \cdot 3}$ Prime Factorization	**Prime Factorization**	Finding which prime numbers multiply together to make the original number.
$2(3n + 5) =$ $2 \cdot 3n + 2 \cdot 5$	**Distributive Property**	Multiplying the sum of two or more numbers or variables by a number is the same as multiplying separately and adding the products.
	**Division**	Splitting into equal groups.
8 ← Quotient $4\overline{)32}$ Divisor, Dividend	**Dividend**	The amount you want to divide into equal groups.
8 ← Quotient $4\overline{)32}$ Divisor, Dividend	**Divisor**	The number we divide by.
8 ← Quotient $4\overline{)32}$	**Quotient**	The answer to a division problem.
8 ← Quotient $4\overline{)32}$ Divisor, Dividend	**Long Division**	Used to find the quotient between two numbers.
Variable $5n$	**Variable**	A symbol, usually a letter, used to represent an unknown value
$5n$ **Coefficient**	**Coefficient**	The number in front of a variable (multiplier of the variable)
$3x - 2$	**Expression**	Numbers and symbols grouped together with operations that show the value of something.
$\underbrace{3n}_{\text{Term}} + \underbrace{8}_{\text{Term}}$	**Term**	Parts of an expression separated by addition or subtraction.

Visual	Term	Definition
Constant ↓ $3n + 8$	**Constant**	A number without a variable.
$3x - 2 = 7$	**Equation**	A mathematical sentence that is showing two things are equal on both sides of the equal sign.
$>, <, \geq, \leq$	**Inequality**	Compares two values as less than, less than or equal to, greater than, or greater than or equal to.
$5 > 3$	**Greater than**	Anything that has a greater value.
$3 \geq 3$	**Greater than or equal to**	Anything that is equal or has a greater value.
$2 < 4$	**Less than**	Anything that has a lesser value.
$2 \leq 2$	**Less than or equal to**	Anything that is equal or has a lesser value.
	**Coordinate Plane**	A plane that is created by the intersection of the x-axis and y-axis.
	**x-axis**	The horizontal line on a graph (moves left to right).
	**y-axis**	The vertical line on a graph (moves up and down).
	**Quadrant**	The four areas on the coordinate plane. Labeled using Roman numerals I, II, III, and IV.

Visual	Term	Definition
What color hair do you have?	**Statistical Question**	A question that is answered by collecting information.
Hair Color 	**Categorical Data**	Data that can be grouped into different categories.
Tuesday Temperatures 	**Numerical Data**	Data that is measurable like time, height, weight, and temperature.
Quiz Scores 	**Dot Plot**	An illustrative way to show the distribution of the data individually on a number line with dots.
Test Scores 	**Histogram**	A data display using bars; each bar represents an interval of data values.
Median 18, 19, **21**, 25, 29 112 ÷ 5 = **22.4** Mean	**Measure of Center**	A value that seems typical for a data distribution.
18, 19, **21**, 25, 29 112 ÷ 5 = **22.4** Mean	**Mean**	The calculated "central" value of the distribution. It is the average value or the balance point in the data set.

Visual	Term	Definition
Median ↓ 18, 19, **21**, 25, 29	**Median**	The middle value of the data distribution when the data values are listed in order.
18, 19, 21, 25, 29, **83** ↑ Outlier	**Outlier**	is a data value that is much smaller or larger than the other value in the distribution
	**Box Plot**	A type of data display that shows a 5-number summary: minimum, lower quartile, median, upper quartile, and maximum.
	**Quartile**	Values that divide a data set into quarters.

Learning in Action: Examples of Grade Level Skills

Examples of Grade Level Skills

Problem: There are 25 pens in a box. If 15 of the pens are black, 7 are blue and 3 are red, what percentage of the pens are blue?

Solution:
The question is asking for the ratio of blue pens to the total pens. There 7 blue pens and 25 total pens.
In words, the ratio is $\frac{\text{blue pens}}{\text{total pens}}$.
Substitute what is given in the problem in the ratio to get the ratio $\frac{7}{25}$.
Use long division to change the ratio from a fraction to a decimal.

$$\begin{array}{r} .28 \\ 25\overline{)\,7.00} \\ \underline{50} \\ 200 \\ \underline{200} \\ 0 \end{array}$$

The ratio of blue pens to the total pens is .28 as a decimal. Multiply by 100 to change to a percent.

$$.28 \times 100\% = 28\%$$

Thus, **28%** of the pens are blue in the box.

Problem: What is the value of $(6^2 - 8) \div 7 \times 2$?

Solution:
First, simplify exponents.

$$(6 \times 6 - 8) \div 7 \times 2$$
$$(36 - 8) \div 7 \times 2$$

Second, simplify inside parenthesis.

$$28 \div 7 \times 2$$

Third, simplify multiplication and division in order from left to right.

$$4 \times 2$$
$$8$$

We have a single number so no more simplifying needed.

Thus, the value of the expression $(6^2 - 8) \div 7 \times 2$ is **8**.

Problem: The inequality $t \geq 68$ indicates the temperature t, in degrees Fahrenheit, it must be for Jordan to swim in her outdoor pool. What does the inequality mean in the context of the problem?

Solution:
The inequality symbol is the greater than or equal symbol. This means 68˚F is the lowest temperature for Jordan to swim in her outdoor pool.

Jordan will swim in her outdoor pool if the temperature is 68 degrees or higher.

Problem: James needs to walk $\frac{5}{6}$ of a mile to get to a friend's house. He has already walked $\frac{1}{4}$ of a mile. How much more does Jake need to walk?

Solution:
You are given how far James needs to walk and how far he has already walked. To find how much further he needs to walk, subtract the amounts.

$$\frac{5}{6} - \frac{1}{4}$$

Because the fractions have different denominators, find the Least Common Multiple (LCM) of the denominators.

Multiples of 6: 6, 12, 18, …
Multiples of 4: 4, 8, 12, …

The LCM is 12. Count how many multiples it takes to get to 12 to determine what to multiply each fraction by.

For 6, it takes 2 multiples. This gives us $\frac{5}{6} \times \frac{2}{2} = \frac{10}{12}$.

For 4, it takes 3 multiples. This gives us $\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}$.

Subtract the new fractions. The denominators are the same so subtract the numerators.

$$\frac{10}{12} - \frac{3}{12} = \frac{10-3}{12} = \frac{7}{12}$$

Thus, Jake needs to walk $\frac{7}{12}$ **of a mile** to get to his friends' house.

Problem: Liam needs to plot the point $(-3,4)$ on the coordinate plane. In which quadrant will the point fall?

Solution: Because this is asking only for the quadrant, focus on the signs. The first coordinate is negative and the second is positive.

Negative first coordinates are in Quadrants II and III.
Positive second coordinates are in Quadrants I and II.

Quadrant II has a negative first coordinate and positive second coordinate in Quadrant II, which matches the signs for the point $(-3,4)$.

Thus, the point $(-3,4)$ falls in **Quadrant II**.

Problem: Saar has $\frac{3}{4}$ cups of sugar. One of his recipes requires $\frac{1}{8}$ cup of sugar. What is the maximum number of times Saar can make the recipe?

Solution:
To find how many times Saar can make the recipe, he needs to know how many $\frac{1}{8}$ are in $\frac{3}{4}$. To do this, divide.

$$\frac{3}{4} \div \frac{1}{8}$$

Find a common denominator using Least Common Multiples (LCM).

Multiples of 4: 4, 8, 12, 16, 20, …
Multiples of 8: 8, 16, …

The LCM is 8. Multiply the fractions to get a common denominator of 8. Only the first fraction needs changed. The second fraction already has a denominator of 8.

$$\frac{3}{4} \times \frac{2}{2} = \frac{6}{8}$$

This gives us the new problem as follows:

$$\frac{6}{8} \div \frac{1}{8}$$

Because the denominators are the same, divide straight across.

$$\frac{6 \div 1}{8 \div 8} = \frac{6}{1} = 6$$

Thus, Saar can make the recipe **6 times**.

Problem: Huy bought gas for his car.

- Gas cost $3.35 per gallon.
- He bought 8 gallons.

What was the total cost for Huy's gas?

Solution:
To find the total cost, multiply the cost of the gas by the number of gallons.

Step 1. Multiply the whole numbers.

$$\begin{array}{r} 335 \\ \times\ 8 \\ \hline 2685 \end{array}$$

Step 2. Estimate the product.

$$3.35 \times 8 \approx 3 \times 8 = 24$$

Step 3. Place the decimal to create a number close to the estimated product.

$$26.85$$

Huy's total cost for gas was **$26.85**.

Resources

Links and online resources to allow you to support your child's learning.

- Algebra Foundations, Khan Academy
- Grade 6 Mathematics, Open Up Family Resources
- Grade 6 Mathematics, Open Up Student Resources
- 6th Grade Common Core Resource, Inside Mathematics at UTA
- 6th Grade Math, Khan Academy
- 6th Grade Math Resource, MathChimp
- 6th Grade Math Resource, IXL
- Middle School Math Resource, Virtual Nerd
- Pre-Algebra Resource, Virtual Nerd

At-Home Connections

- Tell me how you solved a problem encountered in math class today.
- Tell me the opposite of ¾. [Substitute any number.]
- Tell me a number equal to 8/4. [Substitute any integer, fraction, decimal, or percent.]
- Tell me the sum (or difference) of -5 and 6. [Substitute any two integers between -20 and 20.]

Challenges to Anticipate

It is hard to watch our children struggle but this is an important part of the learning process. Be supportive and encouraging when struggles happen.

- Try the problem even if it is wrong. Learning occurs through failure.
- Ask your child to explain an example to you they understood to help build confidence. Explaining to you will help with their understanding.
- Take a short break to come back to the problem with a clear head.

Let's face it, fractions look scary and possibly why fractions often give people trouble. Understanding how to write fractions in different ways so they are equal is helpful when working with fractions. Visit Virtual Nerd for more help with finding equivalent fractions.

Working with integers is challenging because it is difficult to understand how adding two numbers can result in a negative number or subtracting two number can result in a positive number. Visit Virtual Nerd for more help with adding integers and subtracting integers.

Communicating with Your Child's Teacher

Still feeling stuck? Reach out to your child's teacher to discuss what you can do further your child's learning. Some questions that might guide your discussion:

- What resources would you suggest I use to support my child?
- Where do you see my child struggling? What can we do together to help?
- What should my child practice at home?
- What collective message can we send together to help my child learn?

Need Technical Help?

Reach out to your student's home school for technical assistance. Include the type of device (PC, Mac, Chromebook, etc.) and browser (Chrome, Firefox, Safari, etc.).