Fifth Grade Mathematics Teaching & Learning Framework 2021-22

Quarter 1			Quarter 2	Quarter 3		Quarter 4	
Unit 1 4 weeks	**Unit 2** 3 weeks	**Unit 3** 4 weeks	**Unit 4** 10 weeks	**Unit 5** 2 weeks	**Unit 6** 4 weeks	**Unit 7** 2 weeks	**Unit 8** 7 weeks
Order of Operations and Whole Numbers	**Decimals**	**Multiplying and Dividing with Decimals**	**Adding, Subtracting, Multiplying and Dividing Fractions**	**2D Figures**	**Volume and Measurement**	**Geometry and the Coordinate Plane**	**Review, Mastery and Extend**
Topic 1: Order of operations and whole numbers **MGSE5.OA.1** (Use parenthesis and evaluate expressions) **MGSE5.OA.2** (Write simple expressions) **Topic 2: Place value** **MGSE5.NBT.1** (Place value) **MGSE5.NBT.2** (Powers of 10) **Topic 3: Multiplication & division** **MGSE5.NBT.5** *(Fluently multiply standard algorithm)* **MGSE5.NBT.6** *(Fluently divide whole number quotients)*	**Topic 1: Reading, writing, and comparing decimals** **MGSE5.NBT.1** (Place value) **MGSE5.NBT.3** (Read, write and compare decimals to thousandths) **MGSE5.NBT.4** (Round decimals) **Topic 2: Adding and subtracting decimals** **MGSE5.NBT.7** (Add, subtract decimals)	**Topic 1: Decimal operations** **MGSE5.NBT.7** (All operations with decimals) **MGSE5.NBT.2** (Powers of 10 w/decimals) **MGSE5.OA.1** (Use parenthesis and evaluate expressions w/decimals)	**Topic 1: Adding and subtracting fractions** **MGSE5.NF.2** (Word problems, add and subtract fractions) **MGSE5.NF.1** (Add and subtract fractions) **Topic 2: Multiplying and dividing fractions** **MGSE5.NF.6** (Real world problems of fractions and mixed numbers) **MGSE5.NF.4** (Multiply fractions) **MGSE5.NF.5** (Multiplication as scaling) **MGSE5.NF.7** (Division of Unit fraction-visual models) **MGSE5.NF.3** (Interpret fraction as division) **Topic 3: Represent and interpret data** **MGSE5.MD.2** (Line plot) **MGSE5.OA.1** (Use parenthesis and evaluate expressions w/fractions)	**Topic 1: 2D Figures** **MGSE5.G.4** (Classify two-dimensional figures) **MGSE5.G.3** (Understanding attributes)	**Topic 1: Volume** **MGSE5.MD.5** (Volume) **MGSE5.MD.3** (Volume as an attribute) **MGSE5.MD.4** (Volume by counting cubes) **Topic 2: Line plots** **MGSE5.MD.2** (Line plot w/redistribution) **Topic 3: Measurement conversions** **MGSE5.MD.1** (Converting measurement)	**Topic 1: Geometry and the Coordinate Plane** **MGSE5.G.2** (Real world math problems with coordinate plane) **MGSE5.G.1** (Define a coordinate system) **MGSE5.OA.3** (Generate patterns)	**Review all standards based on student needs.** **Mastery:** **MGSE5.NF.2** (Word problems, add and subtract fractions) **MGSE5.NF.6** (Real world fractions) **MGSE5.NBT.5** *(Fluently multiply)* **MGSE5.NBT.6** *(Fluently divide)* **Extend:** **MGSE.6.NS.1** (Divide fractions-algorithm) **MGSE.6.NS.3** (All operations with decimals)

These units were written to build upon concepts from prior units, so later units contain tasks that depend upon the concepts addressed in earlier units.
All units will include the Mathematical Practices and indicate skills to maintain.

NOTE*: Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.*

Grades 3-5 Key: MGSE = Mathematics Georgia Standards of Excellence, G= Geometry, MD=Measurement and Data, NBT= Number and Operations in Base Ten, NF = Number and Operations, Fractions, OA = Operations and Algebraic Thinking

Fifth grade students work with strategies when investigating division. One strategy that assists students is *multiplying up.*

$$634 \div 26$$

$$26 \times 10 = 260$$
$$26 \times 10 = 260$$
$$\underline{\hspace{2cm}} 520$$
$$26 \times 2 = 52$$
$$\underline{\hspace{2cm}} 572$$
$$26 \times 2 = 52$$
$$\overline{24} \quad \overline{624}$$
$$R\ 10$$

Ans: 24 R 10

This student has used the *partial quotient* strategy to divide this problem.

$$634 \div 26 =$$

Ans: 24 R 10

Division of a fraction by a fraction is not a standard for Grade 5.

A strategy a fifth grader might use for division is *proportional reasoning.*

$$768 \div 16 =$$

$$768 \div 16$$
$$\div 2 \quad \div 2$$
$$384 \div 8$$
$$\div 2 \quad \div 2$$
$$192 \div 4$$
$$\div 2 \quad \div 2$$
$$96 \div 2$$
$$\div 2 \quad \div 2$$
$$48 \div 1 = 48$$

Students in Grade 5 will use equivalent fractions in order to add and subtract.

$$\frac{2}{3} + \frac{5}{4}$$

$$\frac{8}{12} + \frac{15}{12} = \frac{23}{12}$$

Fifth graders solve fraction word problems. This example involves multiplication of a whole number and a fraction.

There are 4 sheets of colored paper, and I need to use $\frac{5}{6}$ of each sheet to finish my art project. How much paper will I use?
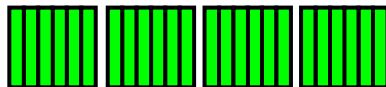
$\frac{5}{6}$ four times means that $\frac{20}{6}$ of the paper is used which is 3 whole sheets of paper and $\frac{2}{6}$ of the last sheet.
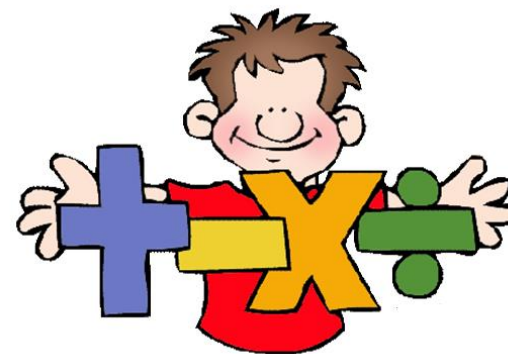

Fifth graders explore division of fractions. $\frac{3}{4}$ is the result of $3 \div 4$, and they should note that $\frac{3}{4}$ multiplied by 4 is 3.
If 3 pizzas were shared equally by 4 people, each person has a share of size $\frac{3}{4}$.

Parent Math Strategy Guide

Grade 5

Strategies for Division, Working with Decimals, and Fractions

Cobb County Schools

Math

Having worked with addition, subtraction, multiplication and division in both third and fourth grade, fifth grade students are expected to continue apply this understanding when working with decimals.

A strategy used in earlier grades is working with *place value.* This is a written example of what students are able to do in grade 5.

$$1.8 + 2.86$$

$$(1 + 0.8) + (2 + 0.8 + 0.06)$$

$$(1 + 2) + (0.8 + 0.8) + (0.06)$$

$$3 + 1.6 + 0.06$$

$$4.66$$

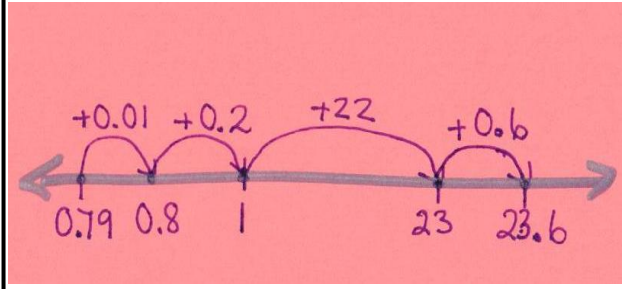Fifth graders also do this with subtraction.

2.86 − 1.8
2 − 1 = 1
1.86 − 0.8 = 1.06

Students may solve a decimal subtraction problem by using *an open number line*. This strategy is still based on place value understanding.

$$23.6 - 0.79 = 22.81$$

+0.01 +0.2   +22   +0.6
0.79 0.8   1   23   23.6

The strategy *doubling and halving* is applied to decimal multiplication.

$$8 \times 2.5 =$$

8 × 2.5
÷2   ×2
4 × 5.0
÷2   ×2
2 × 10.0
= 20.0

Fifth grade students are expected to be able to fluently multiply multi-digit whole numbers using the standard algorithm.


```
    326
  ×  34
  1 3 0 4
  9 7 8 0
 11,084
```

A fifth grader should apply knowledge of multiplication working with decimals.
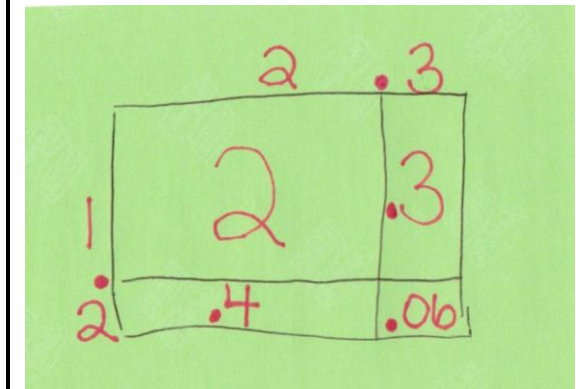
2   .3

1
.2
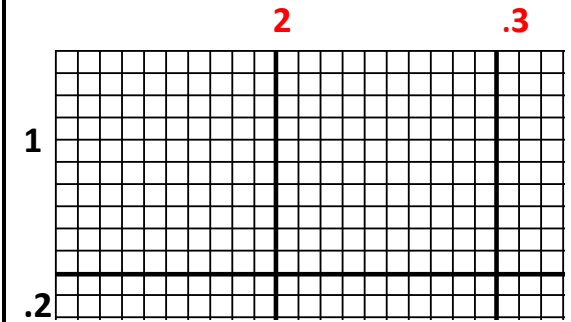
Students will use a grid to show a model of a problem. The use of models continues as does working with the distributive property.

$$1.2 \times 2.3 = 2.76$$
$$(1.0 \times 2.0) + (1.0 \times 0.3) + (0.2 \times 2.0) + (0.2 \times 0.3)$$
$$2.0 + 0.3 + 0.4 + 0.06 = 2.76$$

---

2   .3
1
2
.2   .4   .06

A student's model of 1.2 x 2.3 (which means 1 and 2-tenths of 2 and 3-tenths). Each section is labeled to show the product.

Grade 5 Unit 1
Order of Operations and Whole Numbers

References

Helpful Links:

http://www.k-5mathteachingresources.com/5th-grade-number-activities.html

http://tasks.illustrativemathematics.org/5

http://www.jmathpage.com/wpjmp/start-fifth/

Dear Parents,

Welcome to the new school year! We are eager to work with you and your students as we learn new mathematical concepts. Your student's math class is calling for students to be actively engaged in doing math in order to learn math. In the classroom, students will frequently work on tasks and activities to discover and apply mathematical thinking. Students will be expected to explain or justify their answers and to write clearly and properly.

Concepts Students will Use and Understand

- Solve problems by representing mathematical relationships between quantities using mathematical expressions and equations.
- Use the four whole number operations efficiently, including the application of order of operations.
- Write, evaluate, and interpret mathematical expressions with and without using symbols.
- Apply strategies for multiplying a 2- or 3-digit number by a 2-digit number.
- Develop paper-and-pencil multiplication algorithms (not limited to the traditional algorithm) for 3- or 4-digit number multiplied by a 2- or 3-digit number.
- Apply paper-and-pencil strategies for division (not the standard algorithm)
- Solve problems involving multiplication and division.
- Investigate the effects of multiplying whole numbers by powers of 10.
- **Fluent** use of standard algorithm is a 6th grade standard

Vocabulary

- **Exponent:** Showing the number of times the base number is multiplied by itself
- **Expression:** Numbers and symbols with no equal sign
- **Quotient:** Answer to a division problem
- ***Fluently is accurately and efficiently.***

Try http://www.amathsdictionaryforkids.com/ for further examples.

Symbols

+ addition

- subtraction

Example 1

$2.5 \times 10^3 = 2.5 \times (10 \times 10 \times 10) = 2.5 \times 1,000 = 2,500$

× multiplication

÷ division

( ) parenthesis

{ } braces

[ ] brackets

Example 2

$350 \div 10 = 35$ $\quad\quad\quad$ $^{350}/_{10} = 35$ $\quad\quad\quad$ $(350 \times {}^{1}/_{10}) = 35$

Example 3

What numbers can you make with 1, 2, 3, and 4? Using the operations of addition, subtraction, and multiplication, we can make many different numbers. For example, we can write 13 as

$$13 = (3 \times 4) + 1.$$

You can use parentheses as many times as you like and each of the numbers 1, 2, 3, and 4 can be used *at most* once.
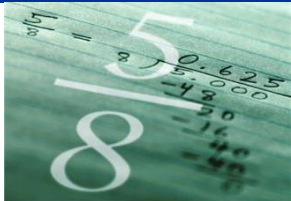
a. Find two different ways to make 9.

b. Find two different ways to make 7.

c. Find two different ways to make 11.

d. Can you make 26?

Possible solutions for example 3:

a. Using the fact that 9 = 3 x 3 we have 9 = 3 x (4 - 1). Also, using the fact that 9 = 8 + 1 we have 9 = (4 x 2) + 1

b. Using the fact that 9 = 8 + 1 we have 9 = (4 x 2) -1. Also, using the fact that 7 – 8 – 1 we have 7 = (4 x 2) – 1. Or, avoiding multiplication, we have 7 = 4 + 2 + 1

c. Using the fact that 11 = 8 + 3 we have 11 = (4 x 2) + 3. Also, using the fact that 11 = 12 – 1 we have 11 = (4 x 3) – 1

d. We have 26 = 2 x 13 so if we can write 13 using 1, 3 and 4 we can get 26 by doubling. We have 3 x 4 = 12 and 12 + 1 =13. Putting all of this together gives {(3 x 4) + 1}.

Activities at Home

- Make up numbers, roll numbers with dice, or find numbers (on labels) and compare them.
- Find numbers and write them in expanded form.
- Draw pictures and make models of numbers.
- Practice addition, subtraction, multiplication and division facts.

Grade 5 Unit 2
Adding and Subtracting with Decimals

References

Helpful Links:

http://tasks.illustrativemathematics.org/5

http://www.math-play.com/decimal-math-games.html

https://www.splashlearn.com/decimal-games-for-5th-graders

Dear Parents,

Your student's math class is calling for students to be actively engaged in doing math in order to learn math. In the classroom, students will frequently work on tasks and activities to discover and apply mathematical thinking. Students will be expected to explain or justify their answers and to write clearly and properly.

Concepts Students will Use and Understand

- Solve problems by understand that like how numbers, the location of a digits in decimal numbers determines the value of a digit.
- Understand that rounding decimals should be "sensible" for the context of the problem.
- Understand that decimal numbers can be represented with models.
- Understand that addition and subtraction with decimals are based on the fundamental concept of adding and subtracting the numbers in like position values.

Vocabulary

- **Decimal:** Number with one or more digits to the right of the decimal point
- **Tenths:** The value of a number one decimal place to the right of the whole number 1/10
- **Hundredths:** The value of a number two decimal places to the right of the whole number 1/100
- **Thousandths:** The value of a number three decimal places to the right of a whole number 1/1,000

Try http://www.amathsdictionaryforkids.com/ for further examples.

Symbols

+ addition

- subtraction

× multiplication

÷ division

. decimal

Example 1

In the number 55.55, each digit is 5, but the value of the digits is different because of the placement.
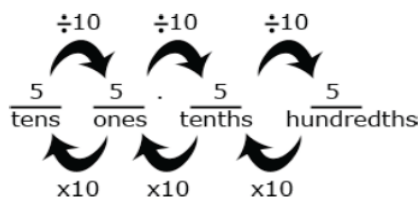
5	5	.	5	5

The 5 that the arrow points to is $\frac{1}{10}$ of the 5 to the left and 10 times the 5 to the right. The 5 in the ones place is $\frac{1}{10}$ of 50 and 10 times five tenths.

5	5	.	5	5

The 5 that the arrow points to is $\frac{1}{10}$ of the 5 to the left and 10 times the 5 to the right. The 5 in the tenths place is 10 times five hundredths.

$$\div 10 \quad \div 10 \quad \div 10$$

$\frac{5}{\text{tens}}$	$\frac{5}{\text{ones}}$.	$\frac{5}{\text{tenths}}$	$\frac{5}{\text{hundredths}}$

$$\times 10 \quad \times 10 \quad \times 10$$

Example 2
Some equivalent forms of 0.72 are:

$^{72}/_{100}$ $^{70}/_{100} + {}^{2}/_{100}$

$^{7}/_{10} + {}^{2}/_{100}$ 0.720

$7 \times (^{1}/_{10}) + 2 \times (^{1}/_{100})$ $7 \times (^{1}/_{10}) + 2 \times (^{1}/_{100}) + 0 \times (^{1}/_{1000})$

0.70 + 0.02 $^{720}/_{1000}$
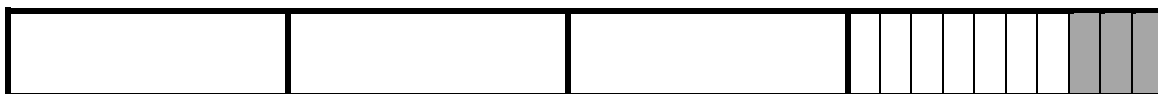
Example 3
Round 14.235 to the nearest tenth.
Students recognize that the possible answer must be in tenths thus, it is either 14.2 or 14.3. They then identify that 14.235 is closer to 14.2 (14.20) than to 14.3 (14.30).

14.2   14.3
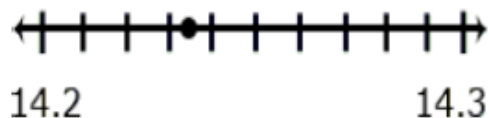
Example 4
3 tenths subtracted from 4 wholes. One of the wholes must be divided into tenths.

The solution is 3 and $^{7}/_{10}$ or 3.7.

Activities at Home

- Create number cubes or spinners and have the student identify the place value and value of different digits in that number.
- Roll or pick numbers to create decimals. Add, subtract, multiply, or divide the decimals.
- Find the batting averages or other statistics in the sports section of a newspaper and add or subtract the statistics.
- Estimate and find the sums and differences of items at the store and in restaurants.
- Practice basic addition and subtraction facts.
- Choose a four-digit number. Multiply and divide by powers of 10 (10, 100, 1,000, etc.) by moving the decimal point left or right as appropriate.

Grade 5 Unit 3
Multiplying and Dividing with Decimals

References

Helpful Links:

https://www.k-5mathteachingresources.com/5th-grade-number-activities.html

http://tasks.illustrativemathematics.org/5

https://www.mathgames.com/decimals

https://www.splashlearn.com/division-games-for-5th-graders

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Concepts Students will Use and Understand

- Understand place value
- Use whole number exponents to denote powers of 10
- Compare decimals
- Model multiplication and division of decimals
- Multiply and divide decimals by powers of 10
- Use estimation when multiplying and dividing decimals
- Multiply and divide decimals with fluency
- Determine relationship between quantities algebraically
- Recognize student errors in multiplication and division of decimals
- Use decimals to solve problems

Vocabulary

- **Decimal:** Number with one or more digits to the right of the decimal point
- **Tenths:** The value of a number one decimal place to the right of the whole number 1/10
- **Hundredths:** The value of a number two decimal places to the right of the whole number 1/100
- **Thousandths:** The value of a number three decimal places to the right of a whole number 1/1,000

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Symbols

\+ addition

\- subtraction

× multiplication

÷ division

. decimal

Example 1

$2.5 \times 10^3 = 2.5 \times (10 \times 10 \times 10) = 2.5 \times 1{,}000 = 2{,}500$

Example 2

$350 \div 1{,}000 = 0.350 = 0.35$

$$^{350}/_{10} = 35 \qquad ^{35}/_{10} = 3.5 \qquad ^{3.5}/_{10} = 0.35$$

Example 3

$36 \times 10 = 36 \times 10^1 = 360$
$36 \times 10 \times 10 = 36 \times 10^2 = 3600$
$36 \times 10 \times 10 \times 10 = 36 \times 10^3 = 36,000$
$36 \times 10 \times 10 \times 10 \times 10 = 36 \times 10^4 = 360,000$

Example 4

$523 \times 10^3 = 523,000$ The place value of 523 is increased by 3 places.
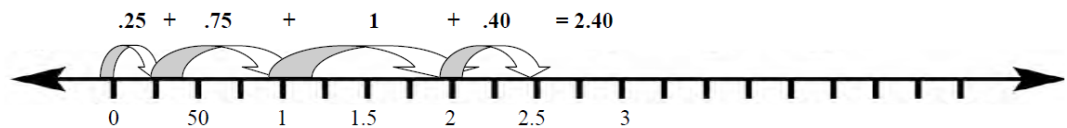$5.223 \times 10^2 = 522.3$ The place value of 5.223 is increased by 2 places.
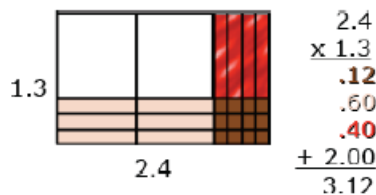$52.3 \div 10^1 = 5.23$ The place value of 52.3 is decreased by one place.

Example 5

I saw that the 0.25 in the 1.25 cups of milk and the 0.75 cups of water would combine to equal 1 whole cup. That plus the 1 whole in the 1.25 cups of milk gives me 2 whole cups. Then I added the 2 wholes and the 0.40 cups of oil to get 2.40 cups.

Example 6

An area model can be useful for illustrating products.

Students should be able to describe the partial products displayed by the area model.

For example, "$^3/_{10}$ times $^4/_{10}$ is $^{12}/_{100}$.

$^3/_{10}$ times 2 is $^6/_{10}$ or $^{60}/_{100}$.

1 group of $^4/_{10}$ is $^4/_{10}$ or $^{40}/_{100}$.

1 group of 2 is 2."

Activities at Home:
- Create number cubes or spinners and have the student identify the place value and value of different digits in that number.
- Roll or pick numbers to create decimals. Multiply and divide the decimals.
- Find the batting averages or other statistics in the sports section of a newspaper and add or subtract the statistics.
- Estimate and find the sums and differences of items at the store and in restaurants.
- Practice basic multiplication and division facts.
- Roll or pick numbers to create decimals. Compare and order the numbers.
- Choose a four-digit number. Multiply and divide by powers of 10 (10, 100, 1,000, etc.) by moving the decimal point left or right as appropriate.

Grade 5 Unit 4
Adding, Subtracting, Multiplying and Dividing Fractions

References

Helpful Links:

http://www.arcademics.com/games/dirt-bike-comparing-fractions/dirt-bike-comparing-fractions.html

http://www.counton.org/games/map-fractions/falling/

http://www.mathplayground.com/Fraction_bars.html

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Concepts Students will Use and Understand

- Use multiple strategies to find equivalent fractions
- Find and generate equivalent fractions and use them to solve problems
- Simplify fractions
- Use concrete, pictorial, and computational models to find common denominators
- Use fractions (proper and improper) and add and subtract fractions and mixed numbers with unlike denominators to solve problems
- Use concrete, pictorial, and computational models to multiply fractions
- Use concrete, pictorial, and computational models to divide unit fractions by whole number and whole numbers by unit fractions
- Estimate products and quotients

Vocabulary

- **Denominator:** The number below the line in the fraction. The denominator represents the number of equal pieces the whole is broken into.
- **Mixed Number:** A number that is made up of a whole number and a fraction.
- **Numerator:** The number above the line in a fraction. The numerator represents how many pieces of the whole, or how many parts of a set, that are discussed.
- **Product:** The result (answer) of multiplying a set of numbers together.
- **Factor:** A number that is multiplied by another (factor x factor = product)
- **Equivalent Fractions:** Two or more fractions with the same value. Example: ½ = 2/4
- **Improper Fractions:** A fraction where the numerator is greater than the denominator.

Try http://www.amathsdictionaryforkids.com/ for further examples.

Example 1

$$\frac{2}{5} + \frac{7}{8} = \frac{16}{40} + \frac{35}{40} = \frac{51}{40}$$

Example 2

Explore the problem 1/3 + 1/6. Encourage students to use the clock face as a model for solving the problem. Have students share their approaches with the class and demonstrate their thinking using the clock model.
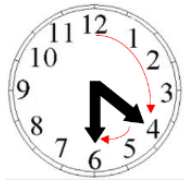
Example 3

Ten team members are sharing 3 boxes of cookies. How much of a box will each student get?

When working this problem a student should recognize that the 3 boxes are being divided into 10 groups, so s/he is seeing the solution to the following equation, 10 ⬚ n = 3 (10 groups of some amount is 3 boxes) which can also be written as n = 3 ÷ 10. Using models or diagram, they divide each box into 10 groups, resulting in each team member getting 3/10 of a box.

Example 4

Your teacher gives 7 packs of paper to your group of 4 students. If you share the paper equally, how much paper does each student get?

Each student receives 1 whole pack of paper and 1/4 of the each of the 3 packs of paper. So each student gets 13/4 packs of paper.

Example 5

Three-fourths of the class is boys. Two-thirds of the boys are wearing tennis shoes. What fraction of the class are boys wearing tennis shoes?

This question is asking what is 2/3 of 3/4 what is 2/3 ⬚ ¾? In this case you have 2/3 groups of size 3/4. (A way to think about it in terms of the language for whole numbers is by using an example such as 4 ⬚ 5, which means you have 4 groups of size 5.)

Boys

Boys wearing tennis shoes = ½ the class
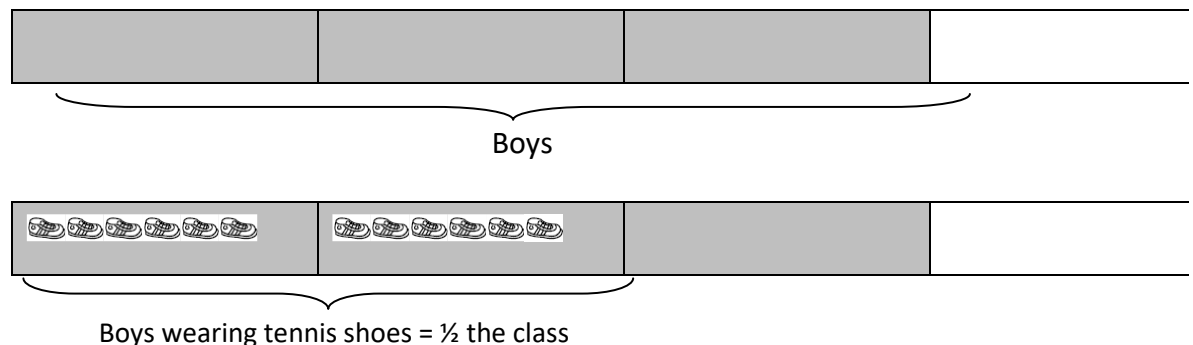
The array model is very transferable from whole number work and then to binomials.

Example 6

In solving the problem 2/3 x 4/5, students use an area model to visualize it as a 2 by 4 array of small rectangles each of which has side lengths 1/3 and 1/5. They reason that 1/3 x 1/5 = 1/(3 x 5) by counting squares in the entire rectangle, so the area of the shaded area is (2 x 4) x 1/(3 x 5) = (2 x 5)/(3 x 5). They can explain that the product is less than 4/5 because they are finding 2/3 of 4/5. They can further estimate that the answer must be between 2/5 and 4/5 because of is more than 1/2 of 4/5 and less than one group of 4/5.
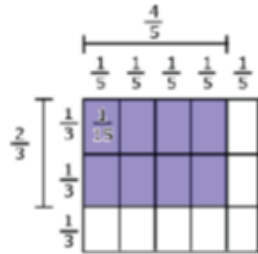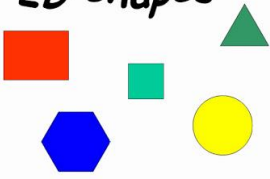

The area model and the line segments show that the area is the same quantity as the product of the side lengths.

Activities at Home:

- Create or pick numbers to make fractions. Add, subtract, or simplify the fractions that you find.
- Find examples of fractions around the house or neighborhood. Add, subtract, multiply, divide or simplify the fractions that you find.
- Create numbers to use in fractions. Draw these fractions as parts of a whole or set.
- Use measuring cups when baking or cooking.
- Identify the use of decimals in sporting events and in newspapers.
- Draw different shapes. Divide them into different fractions.
- Practice multiplication and division facts.

Grade 5 Unit 5
2D Figures

References

Helpful Links:

https://www.splashlearn.com/geometry-games-for-5th-graders

https://www.turtlediary.com/games/fifth-grade/geometry.html

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Concepts Students will Use and Understand

- Identify similarities and differences among two-dimensional figures.
- Reason about attributes (properties) of two-dimensional figures.
- Have experiences discussing the property of two-dimensional figures.
- Build upon their fourth-grade knowledge and create a hierarchy diagram
- Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category

Vocabulary

- **Two Dimensional:** A measure in two directions, such as length and width.
- **Angles:** The figure formed when two rays or line segments share the same endpoint.
- **Point:** An exact position or location.
- **Line Segment:** A part of a line that includes two points, called endpoints, and all the points between them.
- **Perpendicular Lines:** Lines that intersect to form right angles.
- **Parallel Lines:** Lines in a plane that never intersect.
- **Base:** A polygon's side or a face of a solid figure by which the figure is measured or named.
- **Quadrilateral:** A polygon with four sides.
- **Parallelogram:** A quadrilateral (4-sided figure) that has both pairs of opposite sides equal and parallel. Example: all rhombi (plural for rhombus). Squares and rectangles are parallelograms.
- **Irregular Polygon:** A polygon that doesn't have all equal sides or all equal angles.

Try http://www.amathsdictionaryforkids.com/ for further examples.

Symbols

Δ triangle

|| parallel lines

Example 1

Examine whether all quadrilaterals have right angles. Justify your answer by giving examples and non-examples.

↔ line

⊥ perpendicular
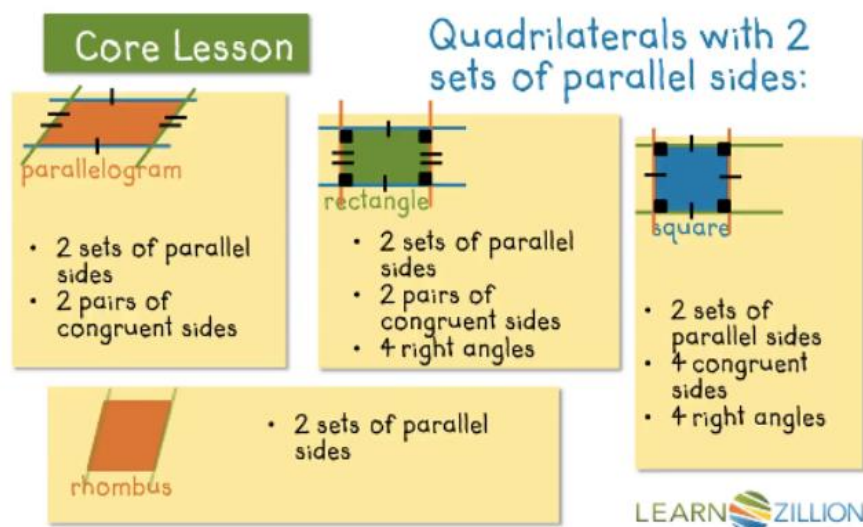
X intersecting

Example 2

Explain, how a right triangle can be both scalene and isosceles, but not equilateral.

Example 3

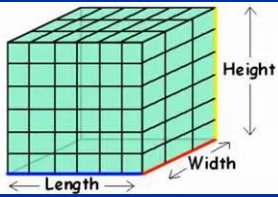Compare and contrast rectangles and parallelograms.

Parallelogram   Rectangle

Example 4

Core Lesson

Quadrilaterals with 2 sets of parallel sides:

parallelogram
- 2 sets of parallel sides
- 2 pairs of congruent sides

rectangle
- 2 sets of parallel sides
- 2 pairs of congruent sides
- 4 right angles

square
- 2 sets of parallel sides
- 4 congruent sides
- 4 right angles

rhombus
- 2 sets of parallel sides

LEARN ZILLION

Activities at Home:

- Name two-dimensional figures and find examples at home.
- Draw different polygons within a piece of triangle grid paper, or use combinations of triangles to create other polygons.
- Make flash cards of different geometric figures and their properties.
- Identify, describe, and different household objects as two-dimensional figures.
- Use a compass or a computer to draw geometric figures

Grade 5 Unit 6
Volume and Measurement

References

Helpful Links:

http://www.xpmath.com/forums/arcade.php?do=play&gameid=118#.UgGYD1PodJM

https://www.splashlearn.com/geometry-games-for-5th-graders

https://www.khanacademy.org/math/cc-fifth-grade-math/5th-volume

Dear Parents,

Your student's math class is calling for students to be actively engaged in doing math in order to learn math. In the classroom, students will frequently work on tasks and activities to discover and apply mathematical thinking. Students will be expected to explain or justify their answers and to write clearly and properly.

Concepts Students will Use and Understand

- Change units to related units within the same measurement system by multiplying or dividing using conversion factors.
- Use line plots to display a data set of measurements that includes fractions.
- Use operations to solve problems based on data displayed in a line plot.
- Recognize volume as an attribute of three-dimensional space.
- Understand that volume can be measured by finding the total number of same size units of volume required to fill the space without gaps or overlaps.
- Understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume.
- Select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume.
- Decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes.
- Measure necessary attributes of shapes in order to determine volumes to solve real world and mathematical problems.
- Communicate precisely by engaging in discussion about their reasoning using appropriate mathematical language.

Vocabulary

- **Volume:** The amount of space that a three-dimensional figure contains. Volume is expressed in cubic units, (how many small cubes would fit inside a solid figure).
- **Three-Dimensional Figure:** A measure in three directions, such as length, and width.
- **Line Plot:** A number line long enough to encompass all numbers in the sample, showing an "x" over the position corresponding to each number.
- **Mass:** A measure of how much matter is in an object.
- **Capacity:** How much liquid a container can hold (see volume).
- **Rectangular Prism:** A prism with two identical, rectangular bases.
- **Right Prism:** A solid three-dimensional figure with two identical, parallel bases. All other faces are rectangles.

Try http://www.amathsdictionaryforkids.com/ for further examples.

Symbols

cm (centimeter)

m (meter)

mm (millimeter)

in (inches)

ft (foot/feet)

B (base)

u³ (cubic units)

Example 1

To convert from one unit to another unit in the standard and metric system, the relationship between the units must be known. In order for students to have a better understanding of the relationships between units, they need to use measuring tools in class. The number of units must relate to the size of the unit.

Example 1: 100 cm = 1 meter

Example 2: 12 inches = 1 foot   and   3 feet = 1 yard

Example 2

The metric system of measurement is based on 10 and powers of 10. The prefixes used for length, capacity, and mass tell what part of the basic unit is being considered. The symbols for each unit of measure are given in parentheses ( ). The most commonly used units are shown in **bold** below.

prefix	meaning	measure of length	measure of capacity	measure of mass
kilo-	1,000	**kilometer** (km)	kiloliter (kL)	**kilogram** (kg)
hecto-	100	hectometer (hm)	hectoliter (hL)	hectogram (hg)
deka-	10	dekameter (dkm)	dekaliter (dkL)	dekameter (dkg)
base unit	1	**meter** (m)	**liter** (L)	**gram** (g)
deci-	0.1	**decimeter** (dm)	deciliter (dL)	decigram (dg)
centi-	0.01	**centimeter** (cm)	centiliter (cL)	centigram (cg)
milli-	0.001	**millimeter** (mm)	**milliliter** (mL)	**milligram** (mg)

To change from a larger unit to a smaller unit, multiply by the appropriate power of 10.
To change from a smaller unit to a larger unit, divide by the appropriate power of 10.

kilo-   hecto-   deca-   base   deci-   centi-   milli-
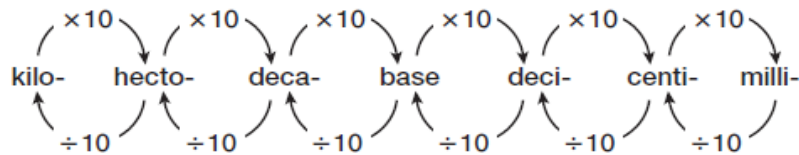
Example 3

Students measured objects in their desk to the nearest 1/2, 1/4, or 1/8 of an inch then displayed data collected on a line plot. How many objects measured 1/4? 1/2? If you put all the objects together end to end what would be the total length of all the objects?
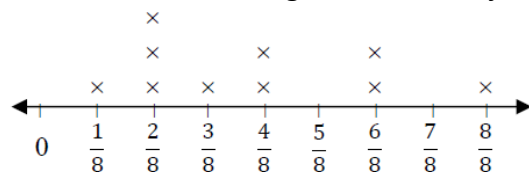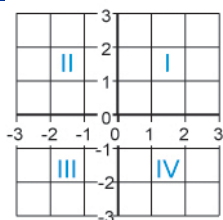
Example 4

Example:

When given 24 cubes, students make as many rectangular prisms as possible with a volume of 24 cubic units. Students build the prisms and record possible dimensions.

Length	Width	Height
1	2	12
2	2	6
4	2	3
8	3	1

Activities at Home:

- Make flash cards of different geometric figures and their properties.
- Identify different plane and solid figures in your environment.
- Find the volume of real-world objects in your home.
- Make nets for different solid figures using graph paper. Compare nets that work to nets that do not fold correctly to make the figures.
- Compare the estimated volume of a carton or bottle of liquid (such as 1/2 gallon juice or milk or two liter bottle of lemonade) in cubic inches or centimeters to its stated volume in ounces or milliliters.

Grade 5 Unit 7
Geometry and the Coordinate Plane

References

Helpful Links:

http://www.shodor.org/interactivate/activities/MazeGame/

http://www.mathplayground.com/spaceboyrescue.html

https://www.splashlearn.com/geometry-games-for-5th-graders

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Concepts Students will Use and Understand

- Generate patterns using given rules
- Identify relationships between terms and between two numbers
- Form ordered pairs consisting of corresponding terms from the two patterns
- Create a coordinate grid and graph ordered pairs in the first quadrant of the coordinate plane
- Generate line graphs to represent patterns and linear functions
- Articulate directions as students plot points
- Interpret coordinate values of points in the context of situations
- Represent real world and mathematical problems using coordinate terminology and graphed model

Vocabulary

- **Ordered Pairs:** A pair of numbers where order is important, for example, (4,6) is different to (6, 4). Often used to indicate on a coordinate plane, graph or map.
- **Coordinate Plane:** A plane containing two perpendicular axes (x and y) intersecting at a point called the origin (0, 0).
- **Patterns:** A sequence of shapes or numbers that follow a logical rule.
- **Function:** A mathematical relationship between two values. The second value depends on (is a function of) the first one.

Try http://www.amathsdictionaryforkids.com/ for further examples.

Symbols

(4, 6) 4 on the x-axis and 6 is on the y-axis

x name of axis

y name of axis

Example 1

For example, given the rule "add 4" and the starting number 0, and given the rule "add 8" and the starting number 0, generate terms in the resulting sequences of numbers (0, 4, 8, 12, 16, …) and (0, 8, 16, 24, 32,…). Students should see that the terms in the second sequence are double the terms in the first sequence, or that the terms in the first sequence are half the terms in the second sequence.

x	y

Example 2

The graph of both sequences of numbers is a visual representation that will show the relationship between the two sequences of numbers.

Encourage students to represent the sequences in T-charts so that they can see a connection between the graph and the sequences.

0	0
1	4
2	8
3	12
4	16

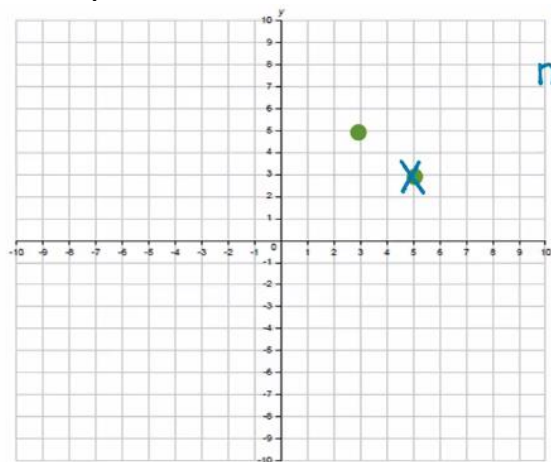| 0	0
1	8
2	16
3	24
4	32

Example 3

How are (1,7) and (7,1) different when plotted on a coordinate grid?

Example 4

What is the difference between the x axis and the y axis?

Example 5

The specific way I name a point on the coordinate plane does not matter.

THEN Walk!

Crawl

Playground: (3,5)

Activities at Home:
- Play battleship and practice naming coordinates
- Create rules (ex. n = 3) and have your student extend the number pattern (3, 6, __, _).
- Create a number pattern and have your student write the rule.
- Create an input/ output machine (function table) for a given rule and have the student fill in the missing Inputs and Outputs.
- Create an input/ output machine (function table) for an unknown rule and have the student fill in the missing Inputs and Outputs and write the rule.

Fifth Grade Unit 8
Review, Mastery, and Extend

References

Helpful Links:
Links for Parents to build background knowledge to preview 6th Grade:

(6.NS.1 & 2)
https://www.khanacademy.org/commoncore/grade-6-NS

(6.NS.3)
https://learnzillion.com/resources/72552-perform-operations-with-decimals-using-the-standard-algorithm-6-ns-b-3

Dear Parents,

Fifth Grade is coming to an end! At this time, students are reviewing standards learned, mastering standards, and possibly previewing standards for sixth grade. The fifth-grade focus was to:

- Compute with fractions and decimals
- Understanding volume
- Applying the understanding of the coordinate plane

## Concepts students may preview for 6th Grade

- 6.NS.1 Interpret and compute quotients of fractions using the traditional algorithm
  $2 \frac{1}{2} \div \frac{1}{4} =$ _____
- 6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Vocabulary

- **Quotient:** answer to a division problem
- **Fluently:** accurately and efficiently
- **Reciprocal:** two numbers whose product is 1

Example 1

Six friends share ¾ of a cake. How much of the cake does each friend get?

¾ cake
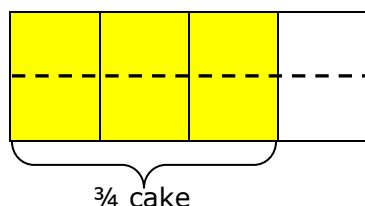
$6 \div \frac{3}{4}$ cake = 1/8 piece of cake

Solution: Each friend gets 1/8 piece of the cake.

Example 2

Henry plans to purchase 39 games that cost $6.70 each. Henry determined that he would need $80.40. Review Henry's calculations to determine what error he made.

```
      2
      6
      6  .7
  x   3   9
  6   0   3
+ 2   0   1
  8   0  .4
```

A. basic fact mistake
B. error in regrouping
C. error in addition
D. place value error

Example 3

Sophia's dad paid $43.25 for 12.5 gallons of gas. What is the cost of one gallon of gas?

Home Activities

- When grocery shopping, have your child figure out the cost for multiple items.
- Have your child figure out the mileage from place to place as you drive.
- When at the gas station, have your child figure out how much your bill will be based on the number of gallons of gas.
- Children may measure a length of something at home and then divide in half and thirds.
- Give children scenarios to discover: you make this amount of money and work so many hours, how much money do you make per hour?; a horse eats about 5.75 lbs. of grain twice a day, how much grain do they eat in 30 days?