Unit 2 : Fractions

Content Area: **Mathematics**
Course(s): **Math - Grade 5**
Time Period: **3rd Marking Period**
Length: **8- 10 Weeks**
Status: **Published**

Unit Overview

Students will extend understanding of fraction equivalence and ordering. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. Add, subtract, multiply, and divide fractions and mixed numbers with like and unlike denominators. Understand decimal notation for fractions, and compare fractions.

Benchmarks:

At the end of the previous unit, students will complete the second benchmark assessment (LinkIt Form B SGO) covering all units. Use these scores to determine previous knowledge of fractions and identify strengths and weaknesses within the unit.

Transfer

Students will be able to independently use their learning to...

Compare, add, and subtract fractions with like and unlike denominators, as well as find and compare the decimal notation for the fractions. Students will be able to use their knowledge of fractions to assist with measurement of objects.

For more information, read the following article by Grant Wiggins.

http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60

Meaning

Understandings

Students will understand that...

- Computational fluency includes understanding not only the meaning, but also the appropriate use of numerical operations.
- The magnitude of numbers affects the outcome of operations on them.
- In many cases, there are multiple algorithms for finding a mathematical solution, and those algorithms are frequently associated with different cultures.
- Fractions, decimals, and percents and how can fractions be modeled, compared, and ordered

Essential Questions

Students will keep considering...

- How are factors and multiples helpful in solving problems?
- How can equivalent fractions help me add and subtract fractions?
- What strategies can be used to multiply and divide fractions?

Application of Knowledge and Skill

Students will know...

Students will know...

- How to compare and order fractions and mixed numbers
- How to add and subtract fractions and mixed numbers
- How to multiply and divide fractions and mixed numbers

Students will be skilled at...

Students will be skilled at...

- Finding common denominators and creating equivalent fractions in order to compare and order fractions.
- Adding and subtracting fractions with unlike denominators, including mixed numbers, by replacing given fractions with equivalent fractions.
- Choosing an operation involving fractions and mixed numbers to solve a real life problem.
- Finding area of a rectangle with fractional side lengths.

- Interpreting a fraction as division of the numerator by the denominator and solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.
- Solving real world problems involving division of fractions by non-zero whole numbersand division of whole numbers by fractions.

Academic Vocabulary

benchmark fraction

denominator

estimate

fraction

mixed number

reasonableness

refer

unlike

whole

word problem

denominator

fraction

greater than

interpret

less than

multiplication

multiply

number

numerator

product

real world

unit fraction

whole number

data

fraction

measurement

unit

LEARNING GOAL 1: Fractions and Decimals

Students will explore the different aspects of fractions and decimals.

Daily Targets- Fractions and Decimals

SWBAT:

- Solve word problems by interpreting a fraction as divison of the numerator by the denominator. **(Chapter 8, Lesson 1) (DOK 3)**
- Determine the commmon factors and the greatest common factor of a set of numbers. **(Chapter 8, Lesson 2) (DOK 2)**
- Generate equivalent fractions by writing a fraction in simplest form. *Divisibility rules can be used to assist in simplifying fractions*. **(Chapter 8, Lesson 3) (DOK 2)**
- Guess, check, and revise to solve problems. **(Chapter 8, Lesson 4/ "Power Up!" resource) (DOK 4)**
- Determine the common multiples and the least common multiple of a set of numbers. **(Chapter 8, Lesson 5) (DOK 2)**
- Compare fractions by using the least common denominator. **(Chapter 8, Lesson 6) (DOK 2)**
- Explore how to use models and fraction equivalence to write fractons as decimals. Use fraction equivalence to write fractions as decimals. **(Chapter 8, Lessons 7-8) (DOK 3)**

Examples:

1. 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; 3 ÷ 10. Using models or diagram, they divide each box into 10 groups, resulting in each team member getting 3/10 of a box.

Two afterschool clubs are having pizza parties. For the Math Club, the teacher will order 3 pizzas for every 5 students. For the student council, the teacher will order 5 pizzas for every 8 students. Since you are in both groups, you need to decide which party to attend. How much pizza would you get at each party? If you want to have the most pizza, which party should you attend?

2. Example of fractions on a number line on workbook page 613.

3. Find the greatest common factor for 10 and 24. 10:,1,2,5,10 24: 1,2,3,4,6,8,12,24 The GCF is 2

4. Find the simplest form of 10/12. 10/12 in simplest form is 5/6.

5. Find the least common multiples of 8 and 12. 8: 8,16,24 12: 12, 24 The LCM is 24

6. Compare 1/2 and 2/5 1/2 can be turned into 5/10 2/5 can be turned into 4/10 1/2 > 2/5

7. 1/2 can be written as equivalent fraction 50/100 = .50 (Models on page 589)

MA.5.NF	Number and Operations—Fractions
MA.5.NF.A	Use equivalent fractions as a strategy to add and subtract fractions.
MA.5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
MA.5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
	For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, $a/b + c/d = (ad + bc)/bd$.)
	For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.
	Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
	Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and

represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

LEARNING GOAL 2: Adding and Subtracting Fractions

Students will be able to add and subtract fractions and mixed numbers. (Chapter 9)

Daily Targets- Adding and Subtracting Fractions

SWBAT:

- Use number lines and benchmark fractions, such as 1/2, to round fractions. **(Chapter 9, Lesson 1) (DOK 3)**
- Add and subtract like fractions and solve world problems involving the addition and subtraction of like fractions. **(Chapter 9, Lessons 2-3) (DOK 2)**
- Explore adding unlike fractions and solving word problems involving the addition of unlike fractions with and without models. **(Chapter 9, Lessons 4-5) (DOK 4)**
- Explore subtracting unlike fractions and solving word problems involving the subtraction of unlike fractions with and without models. **(Chapter 9, Lessons 4-5) (DOK 4)**
- Solve real-world problems by determining reasonable answers. **(Chapter 9, Lesson 8/ "Power Up!" resource for practice state testing problems) (DOK 4)**
- Use number sense and benchmark fractions to estimate sums and differences with mixed numbers. **(Chapter 9, Lesson 9)**
- Explore adding mixed numbers and solving word problems involving the addition of mixed numbers with and without models. **(Chapter 9, Lessons 10-11) (DOK 4)**
- Explore subtracting mixed numbers and solving word problems involving the subtraction of mixed numbers with and without models. **(Chapter 9, Lessons 12-13) (DOK 4)**

Examples:

1. *2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

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

3. $3\frac{1}{4}-\frac{1}{6}=3\frac{3}{12}-\frac{2}{12}=3\frac{1}{12}$

4. *Matt is hiking a trail that is 11/12 mile long. After hiking 1/4 mile, he stops for water. How much farther must he hike to finish the trail?*

   11/12 - 1/4 = 8/12 = 2/3

5. 2/5 + 1/2 = 3/7, The student should recognize that this answer is unreasonable because 3/7 < 1/2.

MA.5.NF	Number and Operations—Fractions
MA.5.NF.A	Use equivalent fractions as a strategy to add and subtract fractions.
MA.5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.
MA.5.NF.A.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.6	Attend to precision.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, $a/b + c/d = (ad + bc)/bd$.)

LEARNING GOAL 3: Multiplying and Dividing Fractions

Students will be able to multiply fractions and mixed numbers and divide whole numbers and unit fractions.

Daily Targets- Multiplying Fractions

SWBAT:

- Explore how to find part of a number. **(Chapter 10, Lesson 1) (DOK 3)**
- Estimate products of fractions using compatible numbers and rounding. **(Chapter 10, Lesson 2) (DOK 2)**
- Explore multiplying whole numbers and fractions using models. Multiply whole numbers and fractions. **(Chapter 10, Lessons 3-4) (DOK 3)**
- Explore using models to multiply a fraction by a fraction. Multiply fractions. **(Chapter 10, Lessons 5-6) (DOK 3)**
- Multiply mixed numbers. **(Chapter 10, Lesson 7) (DOK 2)**
- Interpret multiplication of fractions as scaling. **(Chapter 10, Lesson 8) (DOK 3)**

Example:

1. 3/4 of 16 = 3/4 x 16 = 12. Draw bar diagram to support. (Page 707)

2. Estimate 1/3 of 17. Use compatible numbers to round 17 to 18. 1/3 of 18 = 6. So, 1/3 of 17 is about 6.

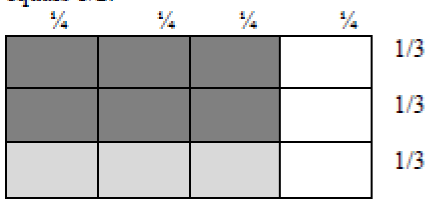
3. Three-fourths of the class is boys. Two-thirds of the boys are wearing tennis shoes. What fraction of the class are boys with tennis shoes?

This question is asking what 2/3 of ¾ is, or what is 2/3 x ¾? What is 2/3 x ¾ in this case you have 2/3 groups of size ¾. (a way to think about it in terms of the language for whole numbers is 4 x 5 you have 4 groups of size 5.

The array model is very transferable from whole number work and then to binomials.

Student 1

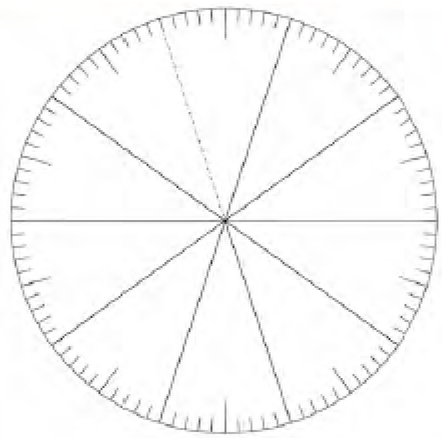
I drew a rectangle to represent the whole class. The four columns represent the fourths of a class. I shaded 3 columns to represent the fraction that are boys. I then split the rectangle with horizontal lines into thirds. The dark area represents the fraction of the boys in the class wearing tennis shoes, which is 6 out of 12. That is 6/12, which equals 1/2.



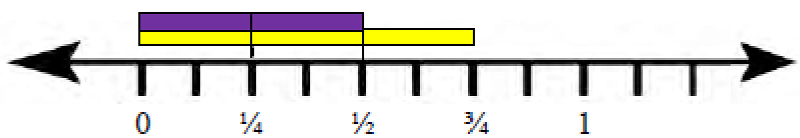
Student 3

Fraction circle could be used to model student thinking.

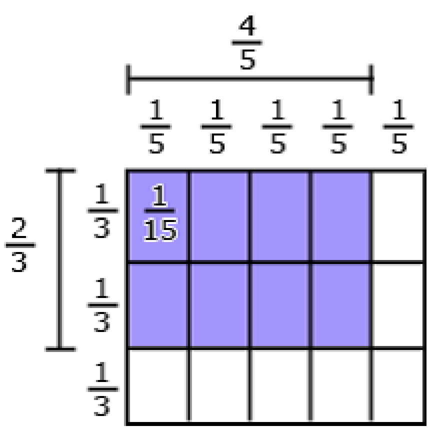
First I shade the fraction circle to show the ¾ and then overlay with 2/3 of that?



Student 2



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



5. Mrs. Bennett is planting two flower beds. The first flower bed is 5 meters long and 6/5 meters wide. The second flower bed is 5 meters long and 5/6 meters wide. How do the areas of these two flower beds compare? Is the value of the area larger or smaller than 5 square meters? Draw pictures to prove your answer.

MA.5.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
MA.5.NF.B.5	Interpret multiplication as scaling (resizing), by:
MA.5.NF.B.6	Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the

	problem.
MA.5.NF.B.4a	Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$.
MA.5.NF.B.4b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
MA.5.NF.B.5a	Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.
MA.5.NF.B.5b	Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
	Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.
	Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
	Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning.

They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. (In general, $(a/b) \times (c/d) = ac/bd$.)

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

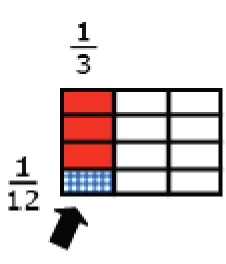
Daily Targets- Dividing Fractions

SWBAT...

- Use bar diagrams to divide whole numbers by unit fractions. **(Chapter 10, Lesson 10) (DOK 3)**
- Use bar diagrams to divide unit fractions by whole numbers. **(Chapter 10, Lesson 11) (DOK 3)**
- Solve problems by drawing a diagram. **(Chapter 10, Lesson 12/ "Power Up!" resource) (DOK 4)**

Examples:

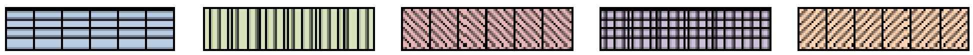
1. Four students sitting at a table were given 1/3 of a pan of brownies to share. How much of a pan will each student get if they share the pan of brownies equally? The diagram shows the 1/3 pan divided into 4 equal shares with each share equaling 1/12 of the pan.



2. Create a story context for 5 ÷ 1/6. Find your answer and then draw a picture to prove your answer and use multiplication to reason about whether your answer makes sense. How many 1/6 are there in 5?

Student
The bowl holds 5 Liters of water. If we use a scoop that holds 1/6 of a Liter, how many scoops will we need in order to fill the entire bowl?

I created 5 boxes. Each box represents 1 Liter of water. I then divided each box into sixths to represent the size of the scoop. My answer is the number of small boxes, which is 30. That makes sense since 6 x 5 = 30.



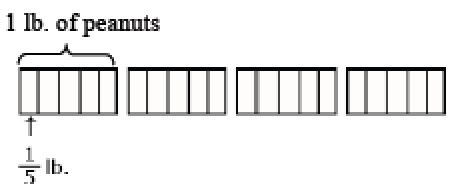
1 = 1/6 + 1/6 + 1/6 + 1/6 + 1/6 a whole has 6/6 so five wholes would be 6/6 + 6/6 + 6/6 + 6/6 + 6/6 =30/6

3. How many 1/3-cup servings are in 2 cups of raisins?

Student
I know that there are three 1/3 cup servings in 1 cup of raisins. Therefore, there are 6 servings in 2 cups of raisins. I can also show this since 2 divided by 1/3 = 2 x 3 = 6 servings of raisins.

4. Angelo has 4 lbs of peanuts. He wants to give each of his friends 1/5 lb. How many friends can receive 1/5 lb of peanuts?

A diagram for 4 ÷ 1/5 is shown below. Students explain that since there are five fifths in one whole, there must be 20 fifths in 4 lbs.



MA.5.NF.B.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
MA.5.NF.B.7	Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
MA.5.NF.B.7a	Interpret division of a unit fraction by a non-zero whole number, and compute such quotients.
MA.5.NF.B.7b	Interpret division of a whole number by a unit fraction, and compute such quotients.
MA.5.NF.B.7c	Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.5	Use appropriate tools strategically.

MA.K-12.6	Attend to precision.
MA.K-12.8	Look for and express regularity in repeated reasoning.

For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Formative Assessment and Performance Opportunities

- Teacher observation
- Math journals
- Do-nows
- Exit slips
- Quick checks during class
- Classwork activities and games
- Center work/ small group work
- Group work activities

- Homework
- Google Classroom questions
- Google Forms quick checks
- ALEKS
- Power Up for state assessment
- Leveled Readers
- Chapter 8 Project Based Learning- Fraction Party (Student workbook page 542)
- Chapter 9 Project Based Learning- Flight School Contest (Student workbook page 606)
- Chapter 10 Project Based Learning- I'm Game (Student workbook page 700)
- Chapter 8 Performance Task- *Free Throw Averages* (Student workbook pages 640PT1-PT2)
- Chapter 9 Performance Task- *Community Pick Up* (Student workbook pages 698PT1-PT2)
- Chapter 10 Performance Task- *Creating a Floor Plan* (Student workbook pages 768PT1-PT2)

Summative Assessment

- Quizzes
- Tests/Common Assessment
- Projects (paper and technology based)
- Short & Extended Constructed Response
- ALEKS test or quiz

21st Century Life and Careers & Technology

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP6.1	Career-ready individuals regularly think of ideas that solve problems in new and different ways, and they contribute those ideas in a useful and productive manner to improve their organization. They can consider unconventional ideas and suggestions as solutions to issues, tasks or problems, and they discern which ideas and suggestions will add greatest value. They seek new methods, practices, and ideas from a variety of sources and seek to apply those ideas to their own workplace. They take action on their ideas and understand how to bring innovation to an organization.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.

Accommodations and Modifications

- IEP modifications
- 504 accomodations
- BSI support
- ELL vocabulary/ word webs
- English Learner Support Interactive Guide/ Tiered Questions: ***A New Nation* Spanish Reader and Real- World Problem Solving Spanish Reader**
- Leveled Readers: ***A New Nation* is available in 3 lexile reader levels**
- Interactive Guide: Scaffolded differentiated activities (emergenging, expanding, bridging levels)
- Leveled learning centers
- Use of manipulatives/ models: **Base ten blocks, hundreds grids, blank number lines, fraction tiles and/or circles, bar diagrams**
- Performance Tasks
- Reteach lesson pages: **Chapters 8-10**
- Enrich lesson pages: **Chapters 8-10**
- Co-teach environment
- Small group instuction
- Various forms of assessments
- Math fact charts: **When necessary**
- Divisibility rule chart: **Chapter 8**
- Advanced Learners: **Project Based Learning**

Unit Resources

My Math Grade 5, Vol. 2 Teacher Edition, Chapters 8-10 and Student Workbook: 2014 McGraw-Hill Education

My Math Online Portal

Teacher Made assessments

Benchmarks 1&2

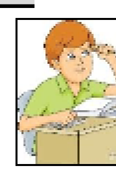
- http://bealearninghero.org/
- http://forstudentsuccess.org/
- https://www.illustrativemathematics.org/
- The Link It Learning Library (Use the reporting dashboard to pull up a test, click on the blue bar for the class you wish to examine, click on standards tab when student data appears, and double click on the color coded percentage mastery box to open the learning library)

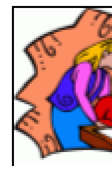
- Desmos is a fun site that can be used as a graphing calculator but also has lessons already created
  - https://www.desmos.com/
  - https://teacher.desmos.com/
  - https://student.desmos.com/
- Coherence Map to enhance student learning
- http://achievethecore.org/coherence-map/#4/17/160/214/1

YouCubed Math games and activities

- https://www.youcubed.org/

Proficiency Scale

Unit? 2-- Proficiency Scale -- Fractions -- Chapters 8-10		
Topic: Perform operations with fractions and mixed numbers.		
Grade: 5 **(5.NF.A.1) Use equivalent fractions as a strategy to add and subtract fractions with unlike denominators.** **(5.NF.B.3) Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b).** **(5.NF.B.4) Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.** **(5.NF.B.7) Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers l**		
Score 4	**I can extend my understanding of fractions to develop my own strategies to solve problems.**	

Score 3 (Learning Goal) What students will be able to do	**I am able to apply strategies to add, subtract, multiply and divide whole numbers, fractions, and mixed numbers when solving word problems.??**	
Score 2 What students will know	**I can:** • **Find the greatest common factor and least common multiple for two or more numbers** • **Use a common factor to simplify fractions** • **Read, write and compare fractions and mixed numbers** • **Identify fractions on a number line** • **Convert a fraction to a decimal**	
Score 1	**I can read complete some or all of the level 2 skills with teacher assistance.**	

Interdisciplinary Connections

The *A Growing Nation* Real-World Problem Solving Reader gives students an opportunity to read informational text and answer mathematical questions relating to the text. Some of the real-world problems in this text related to this unit include: changing percents from a circle graph to simplified fractions, finding the fraction of the day that factory workers spent at work, and writing mixed numbers to describe speed in of a steamboat in miles per hour.

LA.RF.5.4.A	Read grade-level text with purpose and understanding.
MA.5.NF.B.3	Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.
SOC.6.1.8.4	Expansion and Reform (1801-1861)
SOC.6.1.8.CS4	Expansion and Reform: Westward movement, industrial growth, increased immigration, the expansion of slavery, and the development of transportation systems increased regional tensions.
	For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?