2017-2018	Grade 5 Go Math! Quarter 3 Planner Chapter 6 Add and Subtract Fractions with Unlike Denominators	14-15 Days

BIG IDEA:

1. As fifth graders begin to add fractions with unlike denominators, they use visual models, including area models, fraction strips, and number lines. Students understand the need for like denominators in addition and subtraction by examining situations using concrete models, progressing to pictorial models, and making explicit connections to writing it with numerals. No matter which strategy students use, it is important for students to have many experiences to understand why a strategy works. When students transition from concrete to abstract ways of adding and subtracting fractions they are reasoning abstractly and quantitatively (Math Practice 2). Students are able to contextualize problems presented abstractly during the solution process by drawing pictures, using manipulatives, or thinking about real-world contexts to support the computation as needed to help make sense of the process.
2. Presenting problems in contexts will promote the use of models to support students' thinking. Through context, students can determine the meaning of the situation and better evaluate the reasonableness of their answers.
3. Facilitate class discussions in which students model and explain their reasoning, justifying why their answer is reasonable –especially when misconceptions such as adding unlike denominators as part of the solution process need to be addressed.
4. The standard does not require the simplified form of a fraction; however, students should fluently find equivalent fractions.

Adapted from The Common Core Math Companion (Gojak & Miles, 2015, Pg. 153) and Go Math: Teaching for Depth, Pg. 251E

Professional Development Videos:
HMH PD Video: Understand Fractions
HMH PD Video: Add and Subtract Fractions
HMH PD Video: Add and Subtract Using the Set Model
HMH PD Video: Fractions in Real Life
The Progression of Fraction by Graham Fletcher Video

Quarter 3 Fluency Resources:
Fluency Resources in Go Math
Building Fluency Through Word Problems
Building Fluency Through Number Talks

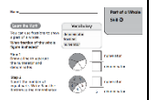
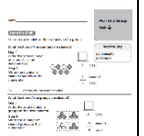
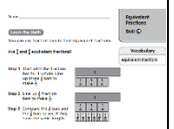
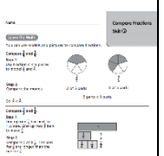
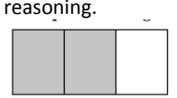
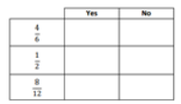
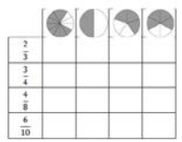
Critical Area Projects:
Go Math Critical Area - The Rhythm Track
Go Math Critical Area - Designing Backpacks

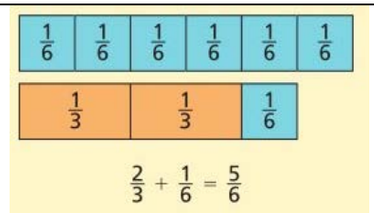
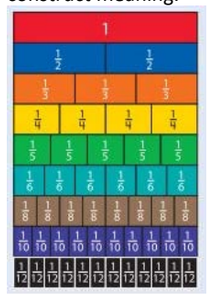
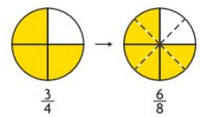
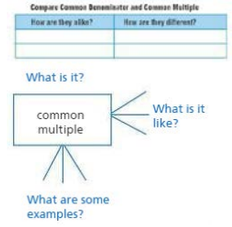
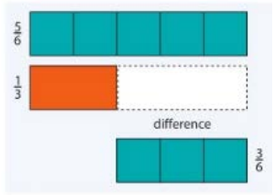
ESSENTIAL QUESTION: How can you add and subtract fractions with unlike denominators?
STANDARDS: 5.NF.1, 5.NF.2, 5.OA.2.1

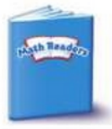
ELD STANDARDS:

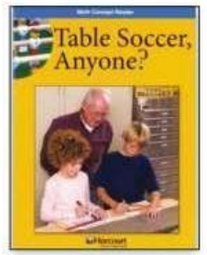
ELD.PI.5.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.5.3-Offering opinions and negotiating with/persuading others.
ELD.PI.5.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.5.9- Expressing information and ideas in oral presentations.
ELD.PI.5.11- Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
ELD.PI.5.12-Selecting and applying varied and precise vocabulary.

Lesson		Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G5	Connections	Vocabulary	Academic Language Support	Journal
6.0	**Suggested Introductory Lesson –	Foundational for 5.NF.1 5.NF.2	How can you write, understand and model	To add or subtract fractions with unlike denominators, students need to understand how to create equivalent fractions with the same	Fraction Strips	*Write the fraction 4/6 on the board.	Sum of two fractions, denominator,	**ELD Standards** • ELD Standards	Figure A has 2/3 of its whole shaded gray. Decide whether each

	AC Option Companion Pg.153-154		equivalent fractions?	denominators before adding or subtracting, a concept learned in 4th grade. HMH PD Video: Understand Fractions Use the following linked lessons from Go Math Tier 3 (online) to build coherence with foundational fractional concepts. GoMath Fraction Intro Lessons (Skill 26-32) Skill #26 Understand-Model Fractions  Skill #27 Understand Fractions as Part of Groups  Skill #28: Understand/Model Equivalent Fractions – You can also use Equivalent Fractions  Skill #29: Compare Fractions using fraction bars & number lines 	Fraction Benchmark Number Lines Fraction number lines Pattern Blocks	Ask students to describe and model the fraction naming the numerator and denominator. Have students build 4/6 using counters. Have students draw a picture/ representation of 4/6. Have students show the fraction on a number line and describe its relationship to 0, ½, or 1 whole. Have students write a fraction that is less than 4/6 and greater than 4/6 and place it on their number line. Have students provide a real world example for the fraction. Have students generate expressions that are equal to 4/6. Ex. 2/6 + 2/6; 6/6 – 2/6	simplest form, difference between	• ELA/ELD Framework • ELPD Framework • ELL Math Instruction Framework • Integrating the ELD Standards into Math **Access Strategies** • Organizing Learning for Student Access to Challenging Content • Student Engagement Strategies • Problem Solving Steps and Approaches **Equitable Talk** • Accountable Talk Simply Stated • Equitable Talk Conversation Prompts • Accountable Talk Posters • Five Talk Moves Bookmark • Effective Math Talks **Cooperative Learning** • Cooperative Learning Role Cards • Collaborative Learning Table Mats • Seating Chart Suggestions **Math Word Wall - Grades 3-6** **Math Talk** Why are ___, ___, ___ called equivalent fractions? How many fractions could you write that are equivalent to ___?	fraction is equal to 2/3. Write Yes or No for each and Justify your reasoning.  **Figure A**  A fractions of the whole is shaded in each model. Put a check to match each fraction that shows an equivalent fraction. 
6.1	Investigate • Addition with Unlike denominators	5.NF.1 5.NF.2 MP 5 MP 6 MP 7 Companion Pg.153-154	How can you use models to add fractions that have different denominators?	In this lesson students use fraction strips to compare fractions, find equivalent fractions, and add and subtract fractions. Fraction strips are concrete representations that help build students' conceptual understanding. Have students ESTIMATE sums by using benchmark numbers (0, ½, 1). This will help students to determine whether their answer is reasonable. What other fraction strips with the same denominator fit under the fraction strips for both ____ and ____?	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks Area Model	Have students use the fraction strips to generate equivalent fractions for: 1 = 2/2 = 3/3… 1/2 = 2/4 = 3/6… 1/3 = 2/6 = 3/9 1/4 = 2/8 = 3/12 2/3 = 4/6 = 3/4 = 6/8 Have students discuss the pattern and make connections to the multiplication chart and what happens when we multiply any number by 1.	Sum of two fractions, denominator, simplest form, difference between		Julissa ran $\frac{5}{8}$ of a mile. Alejandro ran $\frac{1}{4}$ of a mile. How many miles did they run altogether? Justify your answer using a diagram.

				 HMH PD Video Add and Subtract Fractions HMH PD Video Add and Subtract Using the Set Model		Next, have students find the following sums using fraction strips. Find all possible equivalent fractions. $\frac{1}{8} + \frac{5}{8} =$ $\frac{2}{10} + \frac{3}{10} =$ $\frac{1}{12} + \frac{3}{12} =$ $\frac{1}{4} + \frac{5}{4} =$		Match the words simple, simpler, simplest to 3/9 = 1/3 = 6/18 Use fraction models to construct meaning.    **Vocabulary Strategy** Visualize It – Pg. 251H  	
6.2	Investigate • Subtraction with Unlike Denominators	5.NF.2 MP 1 MP 5 MP 8 Companion Pg.154	How can you use models to subtract fractions that have different denominators?	Strips for the fraction they are subtracting are placed below strips for the fraction from which they are subtracting. The difference is shown by the length of the fraction strips.  Encourage students to discover other equivalent solutions. ESTIMATE differences by using benchmark numbers (0, ½, 1). This will help students to determine whether their answer is reasonable. HMH PD Video Add and Subtract Fractions HMH PD Video Add and Subtract Using the Set Model	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks Area Model	Have students use fraction strips and their understanding of equivalence to solve the following: 1/2 + 1/4 = 3/4 – 1/2 = 1/3 + 1/6 = 2/3 – 1/6 = 1/2 + 3/8 = 1/2 – 1/8 =	Difference, same denominator, simplest form, unlike denominators		A meatloaf recipe calls for $\frac{7}{8}$ cup of bread crumbs for the loaf and the topping. If $\frac{3}{4}$ cup is used for the loaf, what fraction of a cup is used for the topping? Draw a diagram to justify your answer.
6.3	Estimate Fraction Sums and Differences (AC Option: Start chapter with this lesson after your Intro Lesson to Fractions)	5.NF.2 MP 1 MP 7 Companion Pg.154	How can you make reasonable estimates of fraction sums and differences?	Benchmarks are used to make an estimate of a sum or difference. Benchmarks may be consecutive whole numbers such as 0, 1, and 2 or consecutive halves such as 0, ½, and 1. Students might ask themselves is it closer to 0, ½ or 1 or which whole number is it closest to in order to estimate and make sense of responses.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Mental Math	Determine if the following fractions are closer to 0, ½ or 1. Use counters to check your answer. 2/5 5/7 3/6 2/3 2/7	Benchmark, numerator, denominator, number line, sums and differences, estimate		Esther bought a package with $2\frac{9}{16}$ pounds of ground meat to make hamburgers. He has $\frac{2}{5}$ pound of ground meat left. About how many pounds of ground meat did he use for hamburgers?
6.4	Factors	5.OA.2.1 MP 1 MP 2 MP 7	How can you write a whole number as a product of its prime factors?	The use of tree diagrams as a visual representation of prime factorization can deepen students' understanding of prime and composite numbers as well as give them a means of organizing their work.	List multiples of a number, counters Diagram (factor tree)	Have students build rectangles to generate all the possible factors for the following numbers:	Factors, tree diagram, prime factors		What is 50 written as the product of its prime factors?

		*CA Standard				24; 28; 36; 40; 42; 56; 60			
6.5	Common Denominators and Equivalent Fractions	5.NF.1 MP 1 MP 2 Companion Pg.153	How can you rewrite a pair of fractions so that they have a common denominator?	By writing equivalent fractions using a common denominator, students will later be able to add and subtract fractions with unlike denominators.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks	Have students generate equivalent fractions for the following using fraction strips: 2/5, 3/4, 2/3, 1/2, 5/6, 4/12, 4/9, 4/8	Common denominator, common multiples, equivalent fractions	***Literature*** ***Fossil Hunters***  Students read the book and use facts about fossils to add and subtract fractions. ***Games*** ***What's the Difference?***  Students use number cards to make two fractions with the least possible difference. ***Activities*** ***Prime Figure***  Students complete blue Activity Card 3 by identifying a figure by the number of its sides and then identifying that number as prime or composite. ***Activities*** ***Pattern Block Mix-Up***  Students complete purple Activity Card 8 by writing and solving addition equations with fractions and mixed numbers. **Literature Connection** 	Eva bought 2/3 pound of raspberries and 5/9 pound of blueberries. Select the pairs of fractions that are equivalent to the amount that Eva bought. A. $\frac{5}{9}=\frac{10}{18}$ B. $\frac{54}{81}=\frac{40}{81}$ C. $\frac{18}{27}=\frac{15}{27}$ D. $\frac{5}{9}=\frac{6}{9}$
6.6	Add and Subtract Fractions	5.NF.1 MP 1 MP 2 MP 6 Companion Pg.153	How can you use a common denominator to add and subtract fractions with unlike denominators?	Students make connections from the concrete models (fraction strips) to equivalent fractions and symbols to begin solving fraction problems abstractly. Students write the equation, manipulate the fractions to write equivalent fractions. In the process students conceptualize what the symbols mean without having to use models. Students should explain their thinking and consider the reasonableness of their solutions. Relating the fractions to benchmark numbers (0, ½, 1) will help students determine whether their answer is reasonable.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks	Fluency Builder Have students come up with an equivalent fraction for: 2/5, 3/4, 6/15, 3/10, 1/6, 3/21, 16/32, 15/24, 3/7, 1/4	Simplest form, common denominators, equivalent fractions, least common denominator, sum or difference, unknown number		Stephen walked $\frac{1}{3}$ mile on Monday and jogged $\frac{3}{4}$ Mile on Tuesday. How far did he walk and jog on Monday and Tuesday combined? Draw a diagram to justify your answer.
6.7	Add and Subtract Mixed Numbers	5.NF.1 MP 1 MP 2 MP 6 Companion Pg.153	How can you add and subtract mixed numbers with unlike denominators?	Students find common denominators and use it to write equivalent fractions with like denominators. Students should explain their thinking and consider the reasonableness of their solutions. Relating the fractions to benchmark numbers (0, ½, 1) will help students determine whether their answer is reasonable.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks	Have students use pattern blocks to add and subtract mixed numbers. Add & Subtract with Pattern Blocks	Mixed numbers, is your answer reasonable, equivalent fractions, difference, common denominator		Sara has $1\frac{3}{4}$ feet of cloth. She used $\frac{1}{3}$ foot to make a bow. Which expression could be used to correctly determine the amount of cloth, in feet, that remains? A. $1-\frac{3}{12}-\frac{1}{12}$ B. $1-\frac{9}{12}-\frac{4}{12}$ C. $1+\frac{3}{12}-\frac{1}{12}$ D. $1+\frac{9}{12}-\frac{4}{12}$
6.8	Subtracting with Renaming	5.NF.1 MP 1 MP 2 Companion Pg.153	How can you use renaming to find the difference of two mixed numbers?	Write equivalent fractions using a common denominator. Use multiplication and addition to rename each mixed number as a fraction greater than 1. Students should explain their thinking and consider the reasonableness of their solutions. Relating the fractions to benchmark numbers (0, ½, 1) will help students determine whether their answer is reasonable.	Renaming Pattern Blocks Renaming with Pattern Blocks Pattern Blocks +/-	Have students build mixed numbers using pattern blocks and show all the ways to rename the mixed numbers. Renaming with Pattern Blocks	Mixed number, subtraction with renaming, difference, estimates, simplest form, equivalent fraction		Shannon needs $7\frac{1}{6}$ cups of flour to make a batch of pizza dough for the pizzeria. He only has $4\frac{5}{8}$ cups of flour. How much more flour does he need to make the dough?

6.9	Algebra • Patterns with Fractions **AC Option to Skip Lesson)	5.NF.1 MP 5 MP 7 MP 8 Companion Pg.153	How can you use addition or subtraction to describe a pattern or create a sequence with fractions?	Students look for differences between consecutive terms and write a rule to find an unknown term in the sequence. Students are given a rule and a starting number and must give the next few terms in the sequence.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Pattern Blocks	Build with pattern blocks, give the next 4 terms, and determine the rule for the pattern? 2/3, 1 1/3, 2, 2 1/3… 1 2/6, 2 4/6, 4… 1 ½, 2, 2 ½, 3…	Terms in a sequence, equivalent fractions, rule of the sequence, increasing or decreasing, unknown term	**Literature** 	Jaime biked $5\frac{1}{4}$ miles on Monday, $6\frac{7}{8}$ miles on Tuesday, and $8\frac{1}{2}$ miles on Wednesday. If he continues the pattern, how many miles will he bike on Friday?
6.10	Problem Solving • Practice Addition and Subtraction	5.NF.2 MP 1 MP 2 Companion Pg.154	How can the strategy *work backward* help you solve a problem with fractions that involves addition and subtraction?	Students can write an equation to present the problem, and then work backward to solve for the unknown using the inverse operation.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines *Work backward*	Tony has camping gear packed into four bags that weigh $7\frac{5}{8}$ lb, 8 1/4lb, 15 1/2lb, and 8 7/8lb. He is limited to 25lb of gear. Which bags will he be able to take?	Work backward, rewrite the equation		Rodrigo practiced playing the guitar $15\frac{1}{3}$ hours over the past 3 weeks. He practiced for $6\frac{1}{4}$ hours during the first week and $4\frac{2}{3}$ hours during the second week. How much time did Rodrigo spend practicing during the third week?
6.11	Algebra • Use Properties for Addition	5.NF.1 MP 2 MP 7 MP 8 Companion Pg.153	How can properties help you add fractions with unlike denominators?	Students can use the commutative property to rearrange the fractions so that the fractions with like denominators are next to each other. Students can use the associative property to group fractions with like denominators.	Associative property, Commutative property. Mental math	Are these two expressions equal? $(8.25 + 3.03) + 2.5$ and 8.25 +(3.03 + 2.5) Evaluate: $5.75 + $3.39 + $2.25 $7.01 + $4.49 + $2.99	use properties of addition, commutative property, associative property, simplest form		Leticia has $7\frac{1}{6}$ yards of yellow ribbon, $5\frac{1}{4}$ yards of orange ribbon, and $75\frac{1}{6}$ yards of brown ribbon. How much ribbon does she have altogether?

Assessments:

Go Math Chapter 6 Test

****Common Assignment** - Go Math Chapter 6 Performance Task: Sugar and Spice

SBAC Claim 1 Example Stems

2017-2018	Grade 5 Go Math! Quarter 3 Planner Chapter 7 Multiply Fractions	13 - 15 days

BIG IDEA:

1. Students base understanding of fraction multiplication on their understanding of whole number multiplication. Remind students of the "groups of objects" meaning of multiplication using whole numbers *m* and *n*. For this, *m* x *n* tells how many equal-size groups (*m*) there are of objects (*n*). Extend this to when *m* and *n* are fractions. For example, ½ x 10 tells how many are in half of a group of 10 objects; 6 x 1/3 tells how many are in 6 groups, each containing 1/3 of an object (1/3 + 1/3 + 1/3 + 1/3 + 1/3 + 1/3); $\frac{1}{2} \times \frac{1}{4}$ tells how much ½ of a group of ¼ of the whole is, such as with $\frac{1}{2}$ of $\frac{1}{4}$ of a pizza.
2. Using area models was a focus of work with multiplication of whole numbers in previous grades. Students extend this work to examples with area models that have fractional side lengths. Begin by giving students problem contexts in which they find the area of a rectangle with one side that is a fraction and extend this to problem situations where students need to find the area of rectangles with both sides as fractions or mixed numbers. Ask students to make connections to previous work with area models involving whole numbers.
3. Provide students with real-life contexts and situations that involve multiplication as scaling (resizing). Have students explore a variety of multiplication situations in which they resize one of the factors and consider what happens to the size of the product. Provide students with the opportunity to justify their thinking about the reasonableness of their solutions based on whether or not it makes sense for the product to be less than or greater than the size of its factors.

Adapted from the The Common Core Math Companion (Gojak & Miles, 2015, Pg. 159) and Go Math: Teaching for Depth, Pg. 305E

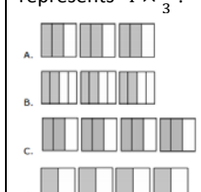
Professional Development Videos:

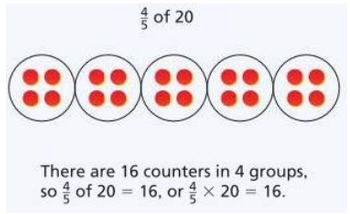
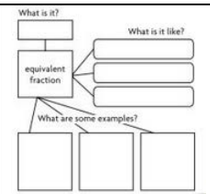
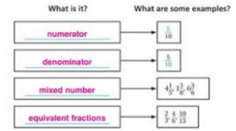
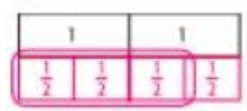
HMH Video Podcast: Multiplying Fractions
HMH Video Podcast: Solve Problems with Fractions
HMH Video Podcast: Multiplication and Division with Fractions Task
HMH Video Podcast: Fractions in Real Life Situations
The Progression of Fraction by Graham Fletcher Video

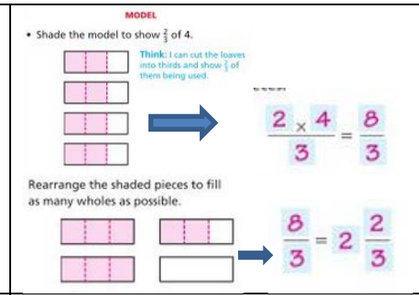
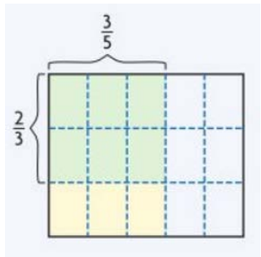
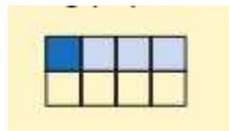
Essential Question: How do you multiply fractions?
Standards: 5.NF.4a, 5 NF.4b, 5.NF.5b, 5.NF.6

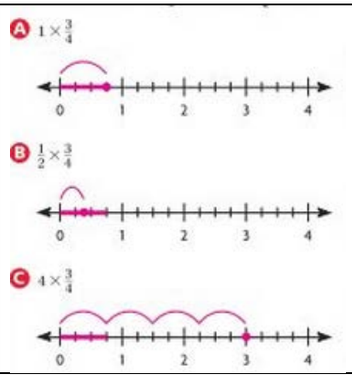
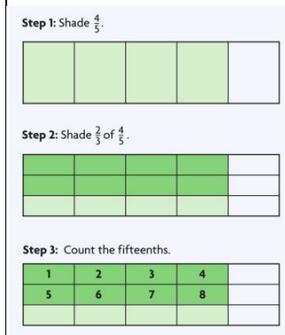
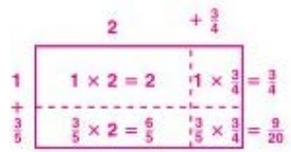
ELD Standards:

ELD.PI.5.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.5.3-Offering opinions and negotiating with/persuading others.
ELD.PI.5.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.5.9- Expressing information and ideas in oral presentations.
ELD.PI.5.11- Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
ELD.PI.5.12-Selecting and applying varied and precise vocabulary.

Lesson		Standards & Math Practices	Essential Question	Math Content and Strategies	Models/Tools Go Math! Teacher Resources G5	Connections	Vocabulary	Academic Language Support	Journal
7.1	Find Part of a Group	5.NF.4a MP 5 MP 6 Companion Pg.159	How can you find a fractional part of a group?	This lesson extends what students already know about multiplication to finding a fractional part of a group. When multiplying a whole number by a fraction, students are finding part of a group. Students use models to find 4/5 of 20 by first separating 20 objects into 5 equal groups. To find 4/5 of 20, students count how many objects are in 4 out of 5 of those groups.	Counters, Arrays, Cubes	Use models (such as counters) to find fractions of a group (whole number). Build understanding by strategically providing examples of increasing rigor. For example: Find ½ of a group of 8. Find ¼ of a group of 8. Find 2/4 of a group of 8. Find 3/4 of group of 8.	Denominator, numerator, product	**Vocabulary Strategies** Vocabulary Graphic Organizer Pg305H	Which fraction model best represents $4 \times \frac{2}{3}$? 

				[HMH Video Podcast Multiplying Fractions](#) Students use models to find fractions of a group. 		Find 2/3 of a group of 9. Find ¾ of a group of 12. Find 4/5 of a group of 20.		 **Vocabulary Builder** Pg306 	or Explain how to find $\frac{3}{4}$ of 20 using a model. Include a drawing.
7.2	Investigate, Multiply Fractions and Whole Numbers Companion Pg.159	[5.NF.4a](#) [MP 5](#) [MP 6](#)	How can you use a model to show the product of a fraction and a whole number?	In this lesson, students use models to show the product of a fraction and a whole number. A) First, students use fraction strips to find the fraction of a group such as **3/4 x 2**. They build 2 wholes with fraction bars and figure out how much 3/4 of the 2 bars is equal to. By, breaking the two up into four equal parts and taking three of the four parts, students can determine that the answer is 1 ½ .  B) Next, students use models to figure out groups of a fractional part such as **3 x 3/8**. This can be thought of as 3 groups of 3/8 which equals 3/8 + 3/8 +3/8 or 9/8. 	[Fraction Tiles](#), Fraction Circles, Pattern Blocks	Have students use fraction strips to model the following: ½ of 1 ½ of 2 ½ of 3 ¼ of 1 ¼ of 2 2/4 of 2 ¾ of 2 1 group of ¼ 2 groups of ¼ 3 groups of ¼ 1 group of 2/5 2 groups of 2/5 3 groups of 2/5	Denominator, numerator, product	**Math Talk** Use math talk to focus on students' understanding of how to estimate the product of a whole number and a fraction, using benchmark fractions. Grab & Go! Differentiated Centers Kit ***Activities*** ***Fraction Fix Up***  Students complete orange Activity Card 6 by multiplying a whole number and a fraction. ***Literature*** ***Fruitful Fractions***  Students complete blue Activity Card 6 by multiplying a whole number and a fraction to find recipe measurements.	Mrs. Williams is organizing her office supplies. There are 3 open boxes of paper clips in her desk drawer. Each box has 7/8 of the paper clips remaining. How many boxes of paper clips are left? Draw a model to show how you found your answer.
7.3	Fraction and Whole Number Multiplication Companion Pg.159	[5.NF.4a](#) [MP 2](#) [MP 5](#) [MP 6](#)	How can you find the product of a fraction and a whole number without using a model?	In this lesson students see the connection between the model for fraction and whole number multiplication and how it relates to the algorithm. The numerator and the whole number get multiplied to find the number of shaded parts and the product is written over the denominator, or the number of equal-sized parts. Note: simplest form is based on equivalency, not GCF division.	[Fraction Tiles](#)	Transition from the models using repeated addition: 5 X 3 = 5 +5+5 $4 \times \frac{2}{3} = \frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{8}{3} = \frac{3}{3} + \frac{3}{3} + \frac{2}{3} = 2 + \frac{2}{3}$ Relate commutative Property 2/3 x 4 = 4 x 2/3 Have students build a column table:	Commutative property of addition		Prince bought 15 balloons. Four-fifths of the balloons are purple. How many of the balloons are purple? Draw a model to show how you found your answer.

						**Build &Draw**: (blank) **Repeated Addition**: 5 +5+5; $\frac{2}{3}+\frac{2}{3}+\frac{2}{3}+\frac{2}{3}$ **Multiplication**: 5 X 3; 4 x 2/3 *Use Fraction strips or pattern blocks to investigate.		**Games** **Fraction Factors**  Students use number cards to multiply fractions with the greatest product. **Literature** 	
7.4	Investigate • Multiply Fractions	5.NF.4a, 5.NF.4b MP 3 MP 5 MP 6 Companion Pg.159-161	How can you use an area model to show the product of two fractions?	In this lesson, students use an area model to show the product of two fractions. The model is helpful for understanding that when multiplying two fractions, the product is a fraction of a fraction, or a part of a part. When modeling the second factor, help students see that they are finding a fraction of the shaded part, not the whole. They relate that amount to the whole when providing their answer. In the model shown, the answer to 2/3 x 3/5 is 6 out of 15 parts or 6/15. 	Area model, Grid paper	Use the area model to multiply 2 x 6 and ½ x 6. Next, Model how to show the following products by folding and shading paper. ½ of 1 ¼ of 1 ½ of ½ ¼ of ½ ¼ x ½ is shown below: 	Area model Equivalent fraction		There is $\frac{5}{8}$ of a pizza left. Josh eats $\frac{1}{4}$ of the left over pizza. How much pizza does Josh eat? Describe how to solve the problem using an area model and draw your model.
7.5	Compare Fractions Factors and Products	5.NF.5a, 5.NF.5b MP 3 MP 4 MP 5 Companion Pg.159-161	How does the size of the product compare to the size of one factor when multiplying fractions?	Students use models to compare the size of the product to the size of a factor when multiplying fractions. When multiplying by 1, the fraction stays the same, so that when you find a part of a part, the product will be less than either part. Finally, when a fraction is multiplied by a number greater than 1, the product will always be greater than the fraction.	Number line	What do you notice? What do you wonder? Compare/Contrast 2 x 0.5= 2 x ½= 1 x 0.5= 1 x ½= 0.5 x 0.5= ½ x ½= 0.25 x 0.5= ¼ x ½= Connecting the above problems to money supports students in reasoning.	Identity Property of Multiplication Less than, smaller than, equal to, same as, greater than, bigger than		What positive value will make this statement true: $5 \times ?\ is\ greater\ than\ 5\ but\ less\ than\ 10.$ Justify your reasoning. OR Trevor saves 2/3 of the money he earns at his after-school job. Suppose Trevor starts saving ¼ as much as he is saving now. Will he be saving less, more, or the same amount? Justify your answer.

						What happened to the size of the product when you multiply by a factor less than 1? What happened when you multiply by a factor greater than 1?			
7.6	Fraction Multiplication	5.NF.4a, 5.NF.5b MP 5 MP 7 MP 8 Companion Pg.159-161	How do you multiply fractions?	In this lesson, students use rectangles to represent fraction multiplication. Students multiply the numerators and denominators together. They then write the product in simplest form, based on equivalency.	Unit squares and rectangles	Review multiplication of decimals and shading decimal squares. 0.3 x 1.2 Multiply 2/3 x 4/5 by shading rectangles. 	Simplest form based on equivalency		In a fifth grade class, $\frac{4}{5}$ of the girls have brown hair. Of the brown-haired girls, $\frac{3}{4}$ of them have long hair. What fraction of the girls in the class have long brown hair? Justify your answer.
7.7	Investigate • Area and Mixed Numbers	5.NF.4b MP 2 MP 4 MP 5 MP 6 Companion Pg.161	How can you use a unit tile to find the area of a rectangle with fractional side lengths?	Using area models and unit tiles helps break down the numbers into manageable parts, and give students a concrete example in which to base their thinking when solving future problems. Make connections with partial products and the area model for multiplication. 1 3/5 x 2 ¾ = (1 + 3/5) (2 + ¾) 	Area model, Grid, Unit Tiles	Use an area model to multiply a.) 23 X 42 b.) 1.3 X 1.7 Have students review how to write a mixed number as an equivalent fraction that is greater than 1. 2 2/3 = 3/3 + 3/3 + 2/3 = 8/3	Mixed number, improper fraction		Shannon needs to find the area of her family room so that she knows how much carpet to buy. The dimensions of the room are $5\frac{1}{4}$ yards long by $3\frac{7}{8}$ yards wide. How much carpet will she need to buy?

<table>
<tr>
<td>7.8</td>
<td>Compare Mixed Number Factors and Products</td>
<td>5.NF.5a, 5.NF.5b
MP 5
MP 6

Companion Pg.162-163</td>
<td>How does the size of the product compare to the size of one factor when multiplying fractions greater than 1?</td>
<td>Knowing the size of a product relative to the factors will give students a basis for determining the reasonableness of their answers. For students having trouble understanding how the size of a fractional factor affects the product, have them replace the multiplication sign with “of.” Reading the problem as “3/4 of” another number makes it easier to see that the product will be less than the other factor. In general:
If the first factor is less than 1, the product will be less than the second factor.
If the first factor is greater than 1, then the product will be greater than the second factor.</td>
<td>Number line, Area Model, Scaling</td>
<td>Multiply
0.002 X 14 = ¼ x ½ =
0.02 X 14 = 3/4 x ½ =
0.2 X 14 = 1 ¼ x ½ =
2 X 14 = 2 x ½ =
What do you notice?</td>
<td>Mixed number, improper fraction</td>
<td></td>
<td>Jenna skis $2\frac{1}{3}$ miles down the mountain. Her instructor skis $1\frac{1}{2}$ times as far. Does Jenna ski a shorter, greater, or the same distance as her instructor? Justify your answer.</td>
</tr>
<tr>
<td>7.9</td>
<td>Multiply Mixed Numbers</td>
<td>5.NF.6
MP 1
MP 2
MP 4
Companion Pg.164</td>
<td>How do you multiply mixed-numbers?</td>
<td>Students learn how to multiply a mixed number by a fraction, by a whole number, or by another mixed number. Present some scenarios in which students might need to multiply a mixed number by a whole number, such as doubling a recipe (2 ¼ cups of flour times 2 batches) or finding the total amount earned after working a fraction of an hour (5 ½ hours at $12 an hour).</td>
<td>Model</td>
<td>Have students complete the tables:

1 batch of cookies takes 2 ½ cups of flour<table><tr><td>Batches</td><td>Cups of Flour</td></tr><tr><td>2</td><td></td></tr><tr><td>3</td><td></td></tr><tr><td>4</td><td></td></tr></table>Jaime gets paid $12 an hour<table><tr><td>Hours</td><td>Pay</td></tr><tr><td>2</td><td></td></tr><tr><td>5 ½</td><td></td></tr><tr><td>3 ½</td><td></td></tr><tr><td>5 ¼</td><td></td></tr></table></td>
<td>Mixed number, improper fraction distributive property, renaming, width, length</td>
<td></td>
<td>A vet weighs two puppies. The small puppy weighs $4\frac{1}{2}$ pounds. The large puppy weighs $4\frac{2}{3}$ times as much as the small puppy. How much does the large puppy weigh?</td>
</tr>
<tr>
<td>7.10</td>
<td>Problem Solving • Find the Unknown Lengths</td>
<td>5.NF.4b, 5.NF.6
MP 1
MP 4
MP 6

Companion Pg.161,164</td>
<td>How can you use the strategy guess, check, and revise to solve problems with fractions?</td>
<td>In this lesson, students are asked to find unknown lengths. Students are asked to use the guess, check, and revise strategy. Students should analyze the results of each guess before adjusting and justify increasing or decreasing the next guess as needed.</td>
<td>Guess, check, and revise</td>
<td>Have students estimate the height of the classroom door by giving a high estimate and a low estimate (what could the height NOT be?). Then use another tool (a student, a chair, etc.) to revise and give a better estimate. Finally, measure the height using a standard measuring tool.</td>
<td>Guess, check, and revise strategy, length, width, dimension</td>
<td></td>
<td>Consuelo’s living room is in the shape of a rectangle and has an area of 360 square feet. The width of the living room is 5/8 its length. What is the length of the living room?</td>
</tr>
<tr>
<td colspan="9">Assessments:
Chapter 7 Test
**Common Assignment - Go Math Chapter 7 Performance Task—Hours of Sound
SBAC Claim 1 Example Stems</td>
</tr>
</table>

2017-2018	Grade 5 Go Math! Quarter 3 Planner Chapter 8 Divide Fractions	8 - 10 Days

BIG IDEA:

1. This is students' first experience with division of fractions. Connect fraction division to whole number division, considering the number of groups and the number in each group. 2 ÷ 1/3 would mean how many groups of 1/3 of the whole are in 2 wholes. Since there are 3 thirds in each whole and you have 2 wholes, there are 6 thirds all together. 1/3 ÷ 2 can be interpreted with sharing by determining how much will be in each group if 1/3 of a whole is shared equally between 2 groups. There would be 1/6 of a whole in each group.
2. Problem situations and visual representations will help students understand what is happening when dividing a fraction by a whole number. They will need many concrete experiences to develop this understanding instead of being given the rule "invert and multiply" that makes no sense to them and can cause misconceptions and errors.

Adapted from the The Common Core Math Companion (Gojak & Miles, 2015, Pg. 153) and Go Math: Teaching for Depth, Pg. 305E

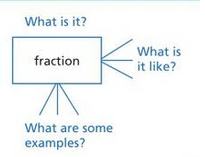
Professional Development Videos:

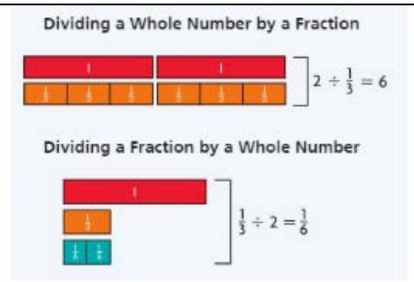
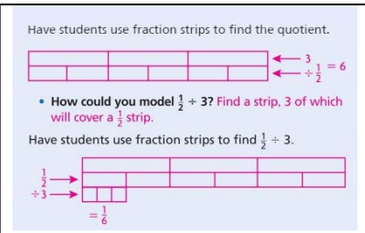
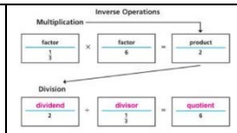
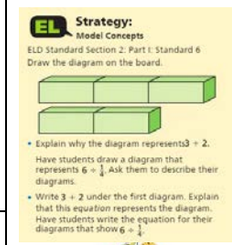
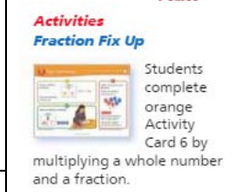
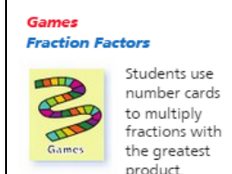
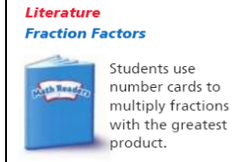
HMH Video Podcast: Divide Fractions Using Models
HMH Video Podcast Multiplication and Division with Fractions Task
HMH Video Podcast: Fractions in Real Life Situations
The Progression of Fraction by Graham Fletcher Video

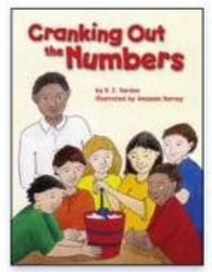
Essential Question: What strategies can you use to solve division problems involving fractions?
Standards: 5.NF.7a, 5.NF.7b, 5.NF.3, 5.NF.7c

ELD Standards:

ELD.PI.5.1-Exchanging information/ideas via oral communication and conversations.
ELD.PI.5.3-Offering opinions and negotiating with/persuading others.
ELD.PI.5.5-Listening actively and asking/answering questions about what was heard.
ELD.PI.5.9- Expressing information and ideas in oral presentations.
ELD.PI.5.11- Supporting opinions or justifying arguments and evaluating others' opinions or arguments.
ELD.PI.5.12-Selecting and applying varied and precise vocabulary.

Lesson		Standards & Math Practices	Essential Question	Math Content/Strategies	Models/Tools Go Math! Teacher Resources G5	Connections	Vocabulary	Academic Language Support	Journal
8.1	Investigate • Divide Fractions and Whole Numbers	5.NF.7a, 5.NF.7b MP 3 MP 5 Companion Pg.165,166	How do you divide a whole number by a fraction and divide a fraction by a whole number?	Modeling helps students understand the logic of the process. Opening a pathway to the development of the division algorithms later in their study. In this lesson, students model with fraction strips two different ways. Point out the differences, as a way of giving students insights into the meaning of division of and by fractions.	Fraction Strips Fraction Benchmark Number Lines Fraction number lines Fraction Tiles Pattern Blocks	Write 3 ÷ ½ on the board. Ask the students, "How many half-hour TV shows are in 3 hours?" How many groups of ½ are in 3? Use fraction strips or pattern blocks to model 3 ÷ ½. Tell students, "I am sharing half a cake with three people. How much does each person get?" Use fraction strips to find ½ ÷ 3. Have student discuss how these two examples are different.	Fraction Strips	**Vocabulary Builder** The flow may show a sequential relationship among the steps in multiplication and division operations. 	Kaley cuts half of a loaf of bread into 4 equal parts. What fraction of the whole loaf does each of the 4 parts represent? Justify your answer using a model.

				 HMH Video Podcast Dividing Fractions Using Models				      **Literature** 	
8.2	Problem Solving • Use Multiplication	5.NF.7b MP 1 MP 4 MP 5 MP 6 Companion Pg.166	How can the *strategy draw a diagram* help you solve a division problem by writing a multiplication sentence?	In this lesson students are using context to build understanding of division of a whole number by a fraction. Students can sketch a diagram of the quantity being divided, draw lines to show the partitioning of the quantity, and see if the resulting figure suggests a pathway to the solution.	Draw a diagram Bar model, fraction circles Fraction Tiles Pattern Blocks Fraction number lines	Each student gets to eat ½ a candy bar. How many students will be able to eat candy if we have: 1 candy bar 2 candy bars 3 candy bars 3 ½ candy bars What if we gave students ¼ of a candy bar instead?	*Draw a diagram*		Gabriel made 4 small meatloaves. He cut each meatloaf into fourths. How many ¼-sized pieces of meatloaf does Gabriel have? Justify your answer using a diagram.
8.3	Connect Fractions to Division	5.NF.3 MP 2 MP 5 MP 6 MP 7	How does a fraction represent division?	The numerator of the fraction shows the number of items being divided. The denominator shows the number of equal pieces into which the items are being divided. Model and solve division problems in which they interpret the remainder as a fraction and explain their thinking.	Use a drawing Fraction Tiles Pattern Blocks Fraction number lines	Give groups of 4 students 8 post-its to model cookies. Have students figure out how many cookies each student would get given the following: 8 cookies shared by 4 students 7 cookies shared by 4 students 6 cookies shared by 4 students 5 cookies shared by 4 students 4 cookies shared by 4 students 3 cookies shared by 4 students 2 cookies shared by 4 students	Use a drawing		Jason divides 8 pounds of dog food equally among 6 dogs. Draw a diagram and explain how you can use it to find the amount of food each dog receives?
8.4	Fraction and Whole Number Division	5.NF.7c MP 3 MP 5 Companion Pg.168	How can you divide fractions by solving a related multiplication sentence?	When students are dividing a fraction by a whole number, they are dividing a part into	Model Fraction Tiles	Give a multiplication problem and a division problem that relates the number Multiplication / Division 3 X ___ = 21 / 21 ÷ 3 = ____ 7 X ___ = 21 / ___÷7 = 3 / 14 ÷ 2 = _____ 6 X 1/3 = ____ / ____÷3 = 2 3 X 2 = ___ / Discuss the relationship between multiplication and division. OR	Model		I have ½ lb. of chocolate raisins and I want to divide it up to put the same amount of chocolate in each of 3 small bags. How much should each small bag of chocolate raisins weigh?

				more parts and finding a part of a part. **If Students Ask** *How can I write a related multiplication problem for a given division model?* Model: Dividing a fraction by a whole number $\frac{1}{3} \div 2$ Interpretation: You are dividing a part into more parts. Multiplication Problem: You are finding a part of a part. $\frac{1}{3} \div 2 = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$ Model: Dividing a whole number by a fraction $2 \div \frac{1}{3}$ Interpretation: You are dividing each of several whole numbers into a whole number of parts. Multiplication Problem: You are finding a total number of parts. $2 \div \frac{1}{3} = 2 \times 3 = 6$		Jessica served 4 pizzas at her party. Each pizza was divided into 8 pieces, and everyone at the party received 2 pieces. If there were 4 pieces left over, how many people were at the party? OR Use fraction tiles to show the following: 1/2 ÷ 2 1/2 ÷ 3 1/2 ÷ 4 1/3 ÷ 2 1/4 ÷ 3		***Literature*** ***Cranking Out the Numbers***  Students read about multiplying fractions to triple a recipe for ice cream. **Literature**  *Cranking out the Numbers*	
8.5	Interpret Division with Fractions	5.NF.7a, 5.NF.7b MP 2 MP 5 Companion Pg165,166	How can you use diagrams, equations, and story problems to represent division?	Students identify the type of problem and think of a story that reflects the problem type. • A whole number of identical items being divided into equal fractional pieces (5 ÷ 1/3) • A fraction of a single item being divided into a whole number of even smaller and equal pieces ¼ ÷ 3)	Diagrams, equation, story problems Fraction Tiles	Lance bought 12 quarts of lemonade so that everyone who came to his party could have exactly 1/3 quart. How many people did Lance invite to his party?	Diagrams, equation, story problems		Adan has ½ quart of milk. If he pours the same amount of milk into 4 glasses. How much will each glass contain? Justify your answer.

Assessments:
Go Math Chapter 8 Test
Go Math Chapter 8 Performance Task: Trail Teamwork
****Common Assignment** Critical Area 2 Performance Task: Alberto's Fish Tank
SBAC Claim 1 Example Stems