

Grade 5

Unit 2.2	Unit Title Multiplyig Fractions (Note: There have been changes to the scope and sequence of units 2.2 and 2.3)	Lesson 1 of 4	Day 1 - 4
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>5.NF.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 $a \times q \div b$. For example, use a visual fraction $(2/3) \times 4 = 8/3$, and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$. In general, $(a/b) \times (c/d) = ac/bd$.</p>	<ul style="list-style-type: none"> •Model to find the fractional part of a group. •Model the product of a fraction and a whole number. •Multiply a fraction by a whole number. •Reading “x” as “of”. <p><i>For example, $2/3 \times 12$ is read $2/3$ of 12.</i></p>	<p>SMP2 Reason abstractly and quantitatively.</p> <p>SMP6 Attend to precision.</p> <p>SMP8 Look for and express regularity in repeated reasoning.</p>	<ul style="list-style-type: none"> •How can you use a model to show the product of a fraction and a whole number? •How can you find a fractional part of a group? • How can you find the product of a fraction by a whole number without a model?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Multiply whole numbers. •Write fractions greater than one as whole or mixed number. •Write fractions in simplest form. •Write a whole number a as the fraction $\frac{a}{1}$. 	<p>numerator denominator mixed number simplest form</p>	<ul style="list-style-type: none"> •Expecting the product to be larger just because you are multiplying. •Think that $2/4 \times 12$ means to multiply $2/4$ twelve times. 	<p>OnCore Lessons 64 Student pages 127 & 128</p> <p>OnCore Lesson 65 – 66 Student pages 129 – 132</p> <p>Investigatoins Snap-ins: Unit 4 Session 4A.1 Student pages C20-23</p> <p>http://www.math-aids.com/Fractions/</p> <p>(Multiplying Fractions with Whole Numbers Worksheet)</p>

Instruction

9. Instruction Practices (What are the teachers doing)

Teachers will use the OnCore lessons, Investigations Snap-ins, and Math-Aides.com worksheets to:

- model for students how to find the fractional part of a group, and the product of a fraction by a whole number.
- encourage students to read $\frac{2}{4} \times 12$ as “ $\frac{2}{4}$ of 12” to clarify for students that you are not multiplying $\frac{2}{4}$ twelve times but are finding a fractional ($\frac{2}{4}$) part of 12.
- review how to write a fraction to represent equal parts of a shape.
- remind students that the denominator shows the total number of equal parts while the numerator shows the number of parts that are shaded.
- review how to convert an improper fraction to a mixed number and insure fractions are written in simplest form.

10. Learning Practices (What are the students doing)

Students will utilize the OnCore, Investigations Snap-ins and Math-aides.com worksheets student pages to practice:

- finding the fractional part of a group,
- product of a fraction by a whole number,
- reading x as “of”,
- writing a fractions in simplest form, and
- converting an improper fraction to a mixed number.

Grade 5

Unit 2.2	Unit Title Multiplying Fractions	Lesson 2 of 4	Day 5 - 7
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>5.NF.4a. ... Do the same with $(2/3) \times (4/5) = 8/15$. In general, $(a/b) \times (c/d) = ac/bd$.</p> <p>5.NF.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 it would be found by multiplying the side lengths. Multiply fractional side lengths to find the areas of rectangles, and represent fraction products as rectangular areas.</p>	<ul style="list-style-type: none"> •Find the area of a rectangle with fractional sides. •Calculate the area of a rectangle with fractional sides by multiplying the fractional side lengths. •Using arrays/area models to represent multiplication of fractions. 	<p>SMP2 Reason abstractly and quantitatively.</p> <p>SMP4 Model with mathematics.</p> <p>SMP6 Attend to precision.</p>	<ul style="list-style-type: none"> •How do you find the area of a rectangle with fractional sides? •How can using an array help you represent multiplication of fractions?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Finding the area of rectangles with whole number length sides. •Multiplication of whole numbers by fractions. 	<p>area model/arrays</p> <p>Note: There are conflicting definitions of arrays and area models. For most purposes an array is a rectangular model of discrete objects. Area models represent the entire “area” of the objects, or space within. An area model does not have to be made up of equal sized parts.</p>	<ul style="list-style-type: none"> •Expecting the product to be larger just because you are multiplying. •Understanding the difference between array (discrete objects) and area model. Refer to the modeling of multiplication as area model. 	<p>OnCore Lesson 68 Student pages 135&136 Investigations Snap-in Unit 4 Session 4A.6 (Arrays/Area Models) Student pages C36 – 37</p>

Instruction

9. Instruction Practices (What are the teachers doing)	10. Learning Practices (What are the students doing)
<p>Teachers will use OnCore lesson 68 and Investigations snap-in 4.A.6:</p> <ul style="list-style-type: none"> •to model the area of a rectangle with fractional sides using rectangles (arrays), •using area models to represent multiplication of fraction, and •calculate the area of a rectangle with fractional sides by multiplying the fractional side lengths. Area = length x width 	<p>Students will practice</p> <ul style="list-style-type: none"> •practice modeling the area of a rectangle with fractional sides with rectangular (arrays), •use area models to represent multiplication of fractions, and •calculate the area of a rectangle with fractional sides by multiplying the fractional side lengths. Area = length x width

Grade 5

Unit 2.2	Unit Title Multiplying Fractions	Lesson 3 of 4	Day 8 - 12
Lesson Focus			
1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>5.NF.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 $a \times q \div b$. .. Do the same with $(2/3) \times (4/5) = 8/15$. In general, $(a/b) \times (c/d) = ac/bd$.</p>	<ul style="list-style-type: none"> •Apply and extend previous understanding of multiplication and multiplying a fraction by a whole number to multiply fraction by a fraction. •Understand the relationship between the denominator of the factors and denominator of the product. •Developing an algorithm for multiplying fractions. •Cross simply before multiplying. 	<p>SMP2 Reason abstractly and quantitatively. SMP6 Attend to precision. SMP8 Look for and express regularity in repeated reasoning</p>	<ul style="list-style-type: none"> •How would you use and area/array model to represent multiplication of fractions? •How can you find the product of a fraction by a fraction without a model? •How do you multiply fractions? •What is the relationship between the denominator of the factors and the denominator of the product?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Multiply whole number by a fraction. •Write fractions greater than one as whole or mixed number. •Write fractions in simplest form. 	<p>numerator denominator simplest form</p>	<p>Expecting the product to be greater just because you are multiplying.</p>	<p>Oncore Lesson 67 Student pages 133 – 134</p> <p>Investigations Snap-ins Unit 4 4A.4, 4.A5 Student pages C29-32, C36-39</p> <p>http://www.math-aids.com/Fractions/</p> <p>(Multiplying Fraction by Fraction and Multiplying Fractions with Cross Cancelling Worksheets)</p>

Instruction

9. Instruction Practices (What are the teachers doing)

Teachers will guide students to apply and extend previous understanding of multiplication of fraction by whole number to help students learn to multiply a fraction by fraction. Teachers will help students to recognize the relationship between the numerator/denominator of the factors and the n/d of the product. Together with the students they will develop an algorithm for multiplying fractions using OnCore Lesson 67 along with the Investigations Snap-ins 4A.4 and 4.A.5. Introduce the cross simplification method that helps reduce the need to simplify the product. See Math-Aides.com for multiplication of fractions worksheets.

10. Learning Practices (What are the students doing)

Students will apply and extend their previous understanding of multiplication of whole number and fractions to multiply a fraction by a fraction. They will understand that when you multiply the two numerators/denominators of the factors the result will be the numerator/denominators of the product. They will continue to develop their understanding of multiplication using area models. Along with their teacher they will develop an algorithm for multiplying fractions using OnCore and the Unit 4 Investigations Snap-ins. Students will learn to cross simplify fractions before performing the operation. See Math-Aides.com for practice worksheets.

Grade 5

Unit 2.2	Unit Title Multiplying Fractions	Lesson 4 of 4	Day 13 - 15
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Lesson Focus

1. Standards Addressed	2. Content to be Learned	3. Mathematical Practices	4. Essential Question
<p>5.NF.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 it would be found by multiplying the side lengths. Multiply fractional side lengths to find the areas of rectangles, and represent fraction products as rectangular areas.</p>	<ul style="list-style-type: none"> •Use an area model to multiply two mixed numbers and find the area of a rectangle. •Use a grid model to find the area. •Multiply mixed numbers. •Multiply mixed numbers using the Distributive Property. 	<p>SMP2 Reason abstractly and quantitatively. SMP4 Model with mathematics. SMP6 Attend to precision.</p>	<ul style="list-style-type: none"> •How can you use an area model to multiply mixed numbers? •How can you use a grid to multiply mixed numbers? •How does the distributive property help you with multiplication of mixed numbers? •How do you multiply mixed numbers?
5. Prerequisite Knowledge	6. Essential Vocabulary	7. Possible Misconceptions	8. Necessary Materials
<ul style="list-style-type: none"> •Find the area of a rectangle with whole numbers and proper fractional side lengths. •Multiply whole numbers and fractions. •Know how to use the distributive property. 	<p>area model mixed number</p>	<p>Difficulty understanding that an area model for multiplication results in the same answer as finding the area of the model.</p>	<p>OnCore Lesson 69 & 73 Student pages 137,138,145,&146</p> <p>http://www.math-aids.com/Fractions/</p> <p>(Multiplying Mixed Number Fractions)</p>

Instruction

9. Instruction Practices (What are the teachers doing)

Teachers will guide students to use an area model and grid model to show multiplication of two mixed numbers. They will model multiplication using the distributive property by breaking up the mixed number into a whole number and a fraction. They will remind students to write their products in simplest form. Teachers will use OnCore Lessons 69 & 73 as a guide for student practice.

10. Learning Practices (What are the students doing)

Students will practice multiplication of mixed numbers using grids, area models and the distributive property. They will find the area of rectangles with side lengths of mixed numbers. They will model the distributive property by breaking about the whole number and fraction of a mixed number. Students will write products in simplest form. Students will practice multiplication of mixed numbers using OnCore students pages listed above.