



## **AERO:SBC Basic Unit Template**

Subject/Course:	Pre-Algebra
Grade Level:	6
Topic/concept:	Multiplication & Division of Fractions
Estimated Time Required:	8-10 days

### **Desired Results:**

#### **1. What do we want students to know or be able to do? List standard(s) and relevant benchmark(s)**

##### *Number Sense*

- J) The learner will be able to explain and use the least common multiple and the greatest common factor
- K) The learner will be able to compute using the four operations (+, -, x, ÷) with real numbers.
- M) The learner will be able to estimate appropriately for a given situation.

##### *Reasoning, Problem Solving and Communication*

- A) The learner will be able to use multiple strategies to create and solve developmentally appropriate problems.
- B) The learner will be able to explain solutions verbally, visually, and with written language.

#### **2. What are the enduring understandings that this unit is built upon?**

Students will compute fluently and make reasonable estimates.  
Students will recognize reasoning and proof as fundamental aspects of mathematics.  
Students will organize and consolidate their mathematical thinking through communication.

#### **3. What essential or unit questions will prompt curiosity and focus?**

Why is it important to be able to multiply and divide fractions?  
How can I use estimation to find approximate costs or amounts when shopping or cooking?

**4. In the context of this unit, what specific knowledge or skills do you want the students to acquire?**

*Students will know how to:*

- multiply and divide with fractions and mixed numbers
- round fractions and mixed numbers in order to estimate products and quotients
- simplify fractions (reduce to lowest terms, change mixed numbers to improper fractions, change improper fractions to mixed numbers)

*Students will be able to:*

- understand specific situations where estimating answers is appropriate
- understand how to communicate their mathematical thinking while solving problems

**Evidence of Learning:**

**How will we know if students have achieved the desired result and can meet the standard(s) and benchmark(s)?**

1. Provide a detailed description of the culminating task (summative assessment):

*Problem of the Week:* Calculating area of an object with mixed number and fraction dimensions. Students must present their answer using our four-step problem solving format.

1. Read and Understand
2. Make a Plan
3. Solve the Problem
4. Look Back

*Written Test: Chapter Test*

*Project: "Recipes"* (McDougal Littell Middle School Math: Course 1)

**Objective:** Determine quantities of ingredients you will need when making more than one batch of a recipe.

**Task:** In recipes, wet and dry ingredients are measured using capacity measures like teaspoons, tablespoons, and cups. Wet ingredients are sold using capacity measures like pint, gallons, but dry ingredients are sold using weight measures like ounces and pounds. As a result, finding out how many cups are in a 5-pound bag of flour can be challenging. The table below shows the relationships between weight and capacity measures for some commonly used dry ingredients.

<i>Ingredient</i>	<i>Weight</i>	<i>Capacity</i>	<i>Ingredient</i>	<i>Weight</i>	<i>Capacity</i>
Flour	1 pound	3 ½ cups	Salt	1 pound	31 <sup>1/3</sup> tablespoons
Sugar	1 pound	2 ¼ cups	Baking Powder	1 ounce	6 teaspoons
Butter	1 pound	32 tablespoons	Baking Soda	1 ounce	6 teaspoons

1. Complete the table below for the standard selling quantities of some dry ingredients:

<i>Ingredient</i>	<i>Quantity</i>	<i>Capacity</i>	<i>Ingredient</i>	<i>Quantity</i>	<i>Capacity</i>
Flour	5 lb bag	_____ cups	Butter	½ lb tub	_____tablespoons
Sugar	5 lb bag	_____ cups	Baking Powder	7 oz can	_____teaspoons
Salt	3 lb box	_____tablespoons	Baking Soda	16 oz box	_____teaspoons

2. Find a recipe for an item that you can easily serve to your class like bread or muffins. How many people does one batch of your recipe serve? How many batches do you need in order for every person in your class to have at least one serving? Note: You should only make a whole number of batches.
3. According to your recipe, how much of each ingredient will you need for all the batches? Give the amount of each ingredient in the unit used in the recipe. For instance, if the recipe calls for 1 cup of flour and you need to make 5 batches, you need  $1 \times 5 = 5$  cups of flour.
4. Determine the number of bags, containers, boxes, etc. you will need for each dry ingredient in your recipe that is mentioned in the table above.
5. Find the selling quantities for the wet ingredients (milk, oil, etc.) in your recipe. Then determine the number of these that you need for your recipe. Common conversions that may be helpful for this step:  
6 teaspoons = 2 tablespoons = 1 fluid ounce

2. Provide the scoring guide/rubric for the culminating task (summative assessment).

Criteria	1 - Attempts the standard	2 - Approaches the standard	3 - Meets the standard	4 - Exceeds the standard
Conversion of dry ingredients	The student makes many errors and omissions in the table of conversions.	The student makes many errors when completing the table of conversions.	Student makes the conversions for the dry ingredients in the table, but makes a couple of errors	Student correctly makes the conversions for the dry ingredients in the table
Finds a recipe	The student may not provide a valid recipe.	The student finds a recipe.	The student finds a recipe.	The student finds a recipe.
Determine the number of batches and the amount of each ingredient required.	The student does not correctly find the number of batches needed. The student makes many errors when finding the amount of each ingredient needed.	The number of batches is correctly determined. The student makes errors when finding the amount of each ingredient needed.	The number of batches is correctly determined. The student makes a few errors when finding the amount of each ingredient needed.	The number of batches and the amount of each ingredient needed are correctly determined.
Determine the number of bags, boxes, containers needed for each ingredient.	The student makes many errors finding the number of bags, boxes, containers needed for the ingredients.	The student correctly finds the number of bags, boxes, containers for most ingredients.	The student correctly finds the number of bags, boxes, containers needed of each ingredient according to the amounts of ingredients the student has calculated.	The student correctly finds the number of bags, boxes, containers needed for each ingredient.

### Instructional Plan

Provide a plan of your instructional activities, including time and materials needed. Map out, in steps, how you will get from the introduction of the unit to its conclusion so that by the end, your students can succeed on the culminating task and meet the benchmarks. Be sure to include any formative assessments at the points in the plan when you will need them.

#### *Day 1 (50 minute period)*

1. Review of procedures for adding and subtracting fractions and mixed numbers.
2. Repeated addition activity, and then connect to multiplication.
3. Multiplying fractions by whole numbers – develop and take notes on the steps.
4. Multiplying whole numbers by fractions – make the connection with the commutative property of multiplication. Develop and take notes on the steps.
5. Use verbal models and mental math during class examples.
6. Assign practice questions for homework.

#### *Day 2 (100 minute period)*

1. Review day 1 and demonstrate questions from homework using a step-by-step approach and also using verbal models. (Summative Assessment)
2. Students use tiles to model multiplication of fractions.
3. Students work in pairs to model multiplication of fractions on graph paper.
4. Develop and take notes on the steps for multiplying fractions.
5. Through developing steps, identifying methods to simplify the multiplication by finding common factors of cross numerators and denominators.
6. Assign practice questions for homework.

#### *Day 3 (50 minute period)*

1. Review day 2 and demonstrate questions from homework using step-by-step approach and also verbal and tile models. (Summative Assessment)
2. Review changing mixed numbers to improper fractions and improper fractions to mixed numbers.
3. Using measuring cups, model multiplying a mixed number by a fraction and mixed numbers by mixed numbers. Develop and take notes on the steps.
4. Assign practice questions for homework.

Formative Assessment: Problem of the Week

Using the problem solving format, students will find the area of an object that contains dimensions that are mixed numbers and/or fractions.

#### *Day 4 (50 minute period)*

1. Warm-up review with multiplication of fractions.
2. Define and explain reciprocals. Develop and take notes on steps for dividing fractions and dividing a fraction and whole number.
3. Assign practice questions for homework.

#### *Day 5 (50 minute period)*

1. Review day 4 and go through practice questions in partners. (Summative Assessment)
2. In pairs, create models for finding the quotient of a mixed number divided by a fraction. Discuss and demonstrate as a class after pairs have had a chance to explore on their own.
3. Develop and take notes for dividing a mixed number and dividing by a mixed number.
4. Assign practice questions for homework.

*Day 6 (50 minute period)*

1. Review day 5 and go through practice questions as a class. (Summative Assessment)
2. Review Game: multiplying and dividing with fractions and mixed numbers.

-Game for 2-4 players

-Each group is given a playing board that contains 4 columns that list various multiplication and division questions containing fractions and mixed numbers.

-Each player chooses a column without looking (A, B, C, or D)

-Object: to be the first player to correctly finish all of the problems in his/her column.

3. Introduce Unit Project - Recipes

*Day 7 (100 minute period)*

1. Project work period and review

*Day 8 (50 minute period)*

1. Unit Test

*Day 9 (50 minute period)*

1. Hand in unit project
2. Unit wrap-up