

Title: Fishing Derby Ad

Brief Overview:

This learning unit involves comparing fractions with unlike denominators. Students will be required to perform various activities using pattern blocks, fraction bars, fraction circles, and paper folding to acquire a solid background in analyzing fractional values. The culminating activity will require students to use this information in determining what ad size to purchase in their local newspaper and write a brief report to their class informing them of the ad size purchased and their reasoning behind their decision.

Links to NCTM 2000 Standards:

- **Standard 1: Number and Operation**

Mathematics instructional programs should foster the development of number and operation sense so that all students understand numbers, ways of representing numbers, relationships among numbers, and number systems.

- **Standard 2: Patterns, Functions, and Algebra**

Mathematics instructional programs should include attention to patterns, functions, symbols, and models so that all students understand various types of patterns and functional relationships; use symbolic forms to represent and analyze mathematical situations and structures; and use mathematical models and analyze change in both real and abstract contexts.

- **Standard 3: Geometry and Spatial Sense**

Mathematics instructional programs should include attention to geometry and spatial sense so that all students analyze characteristics and properties of two-dimensional and three-dimensional geometric objects; select and use different representational systems; and use visualization and spatial reasoning to solve problems both within and outside of mathematics.

- **Standard 6: Problem Solving**

Mathematics instructional programs should focus on solving problems as part of understanding mathematics so that all students build new mathematical knowledge through their work with problems; develop a disposition to formulate, represent, abstract, and generalize in situations within and outside of mathematics; apply a wide variety of strategies to solve problems and adopt the strategies to new situations; and monitor and reflect on their mathematical thinking in solving problems.

- **Standard 7: Reasoning and Proof**

Mathematics instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics so that all students recognize reasoning and proof as essential and powerful parts of mathematics; make and investigate mathematical conjectures; develop and evaluate mathematical arguments and proofs; and select and use various types of reasoning and methods of proof as appropriate.

- **Standard 8: Communication**

Mathematical instructional programs should use communication to foster an understanding of mathematics so that all students organize and consolidate their mathematical thinking to communicate with others; express mathematical ideas coherently and clearly to peers, teachers, and others; extend their mathematical knowledge by considering their thinking and strategies of others; and use the language of mathematics as a precise means of mathematical expression.

- **Standard 9: Connections**

Mathematical instructional programs should emphasize connections to foster an understanding of mathematics so that all students recognize and use connections among different mathematical ideas; understand how mathematical ideas build on one another to produce a coherent whole; and recognize, use, and learn about mathematics in context outside of mathematics.

- **Standard 10: Representation**

Mathematical instructional programs should emphasize mathematical representations to foster an understanding of mathematics so that all students create and use representations to organize, record, and communicate mathematical ideas; develop a repertoire of mathematical representations that can be used purposefully, flexibly, and appropriately; and use representations to model and interpret physical and mathematical phenomena.

Grade/Level:

Grades 5-6

Duration/Length:

This lesson will take approximately 3 class periods (45 minutes each)

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- Basic problem solving skills

- Recognizing and constructing fractions that are parts of a whole and parts of a set
- Reducing fractions to simplest terms
- Adding and subtracting fractions with like denominators

Student Outcomes:

Students will:

- work in cooperative groups and independently.
- identify fractional values.
- compare fractions that have unlike denominators.
- write a brief report explaining how they identified the fractions in a real-life situation.

Materials/Resources/Printed Materials:

- Eating Fractions, by Bruce McMillan
- Fraction Circles (student sets and teacher overhead set)
- Fraction Bars (student sets and teacher overhead set)
- Construction Paper (4" x 5")
- Graham Crackers
- Pre-made Centers (Teacher Resource Sheets 1-2)
- Student Writing Prompt for each student (Student Resource Sheet 2)
- Student Journal Page for each student for each day (Student Resource Sheet 1)

Development/Procedures:

Day 1:

Introduce unit by saying the following, "Over the next couple of days, we will be comparing fractions with unlike denominators in order to make a decision on what ad size to take out in the local newspaper for the upcoming Annual Fishing Derby."

Begin unit by reading the children's book, Eating Fractions, by Bruce McMillan. Initiate a class discussion on the concepts found within the book and how they would apply to the real world.

Review mathematical concepts previously taught by engaging the students in various centers that focus on the fractional skills mentioned in the "Prerequisite Knowledge" of this unit plan (Three center activities are included on Teacher Resource Sheet 1.)

Initiate a discussion that connects the book, Eating Fractions, to the centers.

Students will complete math journal using Student Resource Sheet 1.

Day 2:

Create a web with the class on the board to review yesterday's concepts, both from the book and from the centers.

Model representations of various fractions using fraction circles on the overhead. Begin with a whole representation, then one-half, then a quarter, and finally an eighth. Show the relationship between the large fraction circles and the smaller ones.

Group students. Pass out student fraction circles. Ask them to show a variety of fractional representations ($\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{8}$ etc.,) and to model the relationship between the different fractional sizes.

Have students create a poster of pictures from magazines, newspapers, books, etc...that show fractional values.

- Give each student a piece of construction paper and instruct them to create a fold line down the middle of the paper.
- Assign 2 fractions to each group. For example, Group One- $\frac{1}{2}$ and $\frac{2}{3}$, Group two- a whole and $\frac{3}{4}$, etc...
- Explain to the students that each fraction should be represented in each column.
- Model a poster that you've previously completed and discuss why each picture represents a particular fractional value.
- Display completed posters on bulletin board.

Students complete a math journal using Student Resource Sheet 1.

Day 3:

Explain to students that they can use paper to demonstrate equivalent fractions and that today they are going to make the fraction $\frac{1}{8}$.

1. First, pass out construction paper, 4" x 5" in size.
2. Model the process of folding the paper in half. Fold the paper in half two more times.
3. Have students shade in the block of paper remaining.
4. Open the paper to show students they have just created the fraction $\frac{1}{8}$.

* Note how the eight parts create a whole.

Next, give each student 2 extra pieces of construction paper to repeat the activity. Then, give each group of students a different fraction to make a paper folding representation. Discuss how the appearance of the paper changes in relation to the fractional values.

The students may create a representation of their choice with the remaining piece of construction paper and share it with the class.

Explain to students that you are now going to use overhead fraction bars to model similar and different fractional values and how they relate to one another. Model the reasoning and the visual representation of finding a common denominator between two or more like and unlike fractions by doing the following:

- Using fraction bars, demonstrate $\frac{1}{4}$ plus $\frac{2}{4}$ on the overhead.
- Discuss the similarities and differences between the two fractions.
- Make the following number sentences under the fraction bars, $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$.
- Create $\frac{3}{4}$ on the overhead using $\frac{1}{4}$ and $\frac{2}{4}$ fraction bars.
- Relate each of the fraction bars to each part of the number sentence.
- Repeat this process using at least 3 different sets of fractions that have like denominators.

Now, put a $\frac{1}{4}$ fraction bar and a $\frac{2}{3}$ fraction bar on overhead. Discuss similarities and differences between the two fractions. Emphasize that the difference in the denominators is shown by the difference in the size of the fraction bars.

-Manipulate fraction bars until you find a fraction bar which can represent both $\frac{1}{4}$ and $\frac{2}{3}$. Explain to students that they have just found the common denominator of the two fractions.

-Demonstrate how $\frac{1}{2}$ can represent $\frac{1}{4} + \frac{2}{8}$. Write a number sentence to show this. Repeat this process using at least three different sets of fractions that have unlike denominators.

Separate students into groups. Distribute student fraction bars. Ask them to show a variety of fractional representations and to model the relationship between the different fractional sizes. Make sure students can explain the concept of finding common denominators among unlike denominators and writing a number sentence to show this.

Pass out a graham cracker to each student. Have students list on the chalkboard all the fractional concepts represented in the appearance of the graham cracker. Complete a math journal ([Student Resource Sheet 1](#)). Students may then eat the crackers.

Have students complete a writing prompt ([Student Resource Sheet 2](#)). A scoring rubric ([Teacher Resource Sheet 3](#)) is included.

Performance Assessment:

Throughout this project there will be continuous assessment during all learning activities. Assessments should be based on teacher observation, student discussion, and a brief written report to the class.

Extension/Follow Up:

- Design an ad for the Fishing Derby.
- Manipulate recipes to make smaller and larger servings. This would be great at the end of a unit on The BFG by Ronald Dahl. You can use his Revoltng Recipes book to create snozzcumbers and frobscottle from his novel.
- Fractions with Pattern Blocks- *The Block Exchange*, pp. 79-85, pp. 96-100 by Creative Publications.
- Constructing Ideas about Fractions, *Fractions On The Line* and *Fraction “Do’s” and “Don’ts”* by Creative Publications.
- Fractions and Decimals, *Fractions Line Up* and *Teacher’s Troubles: “Taking It Farther”*(Magic Square) by Scholastic.
- Fractions in Action, pp. 21-23, 27-29, 33, 57-58, 61, 64, and 81-85 by Creative Publications.
- Use a Venn diagram to compare two fractions with unlike denominators, i.e., $\frac{2}{3}$ and $\frac{1}{2}$.

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Math Journal

1. What was your favorite activity today? Why?
2. Draw a model of the concept you just learned. Label its parts.
3. Create a math sentence using your model above.
4. Using an explanation, explain why your math sentence is correct.

Possible Center Activities

- 1. Fraction War** has the same premise as the War card game. Two players divide a deck of cards that are labeled with various fractions. A master for these cards is included on Teacher Resource Sheet 2. Each player turns a card over to “Battle.” The player with the highest fraction card wins. Students may use fraction circles, fraction bars, pattern blocks, or other manipulatives that are appropriate for representing fractions while playing the game. When students master the concept, take away manipulatives.
- 2. Build a Burger:** The premise is to build two burgers (2 whole fraction circles) before your opponent does. Each student gets 2 packs of fraction circles. Students take turns rolling a fraction die and choosing the corresponding fraction piece. Each student uses these pieces to create 2 whole fraction circles or burgers. The first to make the 2 burgers wins.
- 3. Construct a Fraction Tower:** The premise is to build a tower of fraction bars that are equal to 3 wholes. Each student receives 3 fraction bar kits and 2 fraction dice. After each roll of the dice, students will choose a corresponding fraction bar for each die rolled. Students will construct a tower by putting these pieces together to form a tower. The first student whose tower reaches 3 wholes high, wins.

Fraction Cards

$12/12$	$4/8$	$6/8$	$5/10$	$4/10$
$2/8$	$1/4$	$1/5$	$2/4$	$6/12$
$2/10$	$3/4$	$2/5$	$3/12$	$1/3$
$2/3$	$1/2$	$2/2$	$3/6$	$4/4$

FISHING DERBY AD WRITING RUBRIC

3 - Outstanding

- Includes a complete explanation of why the ad they purchased is the largest.
- Math reasoning is clear and correct.
- Uses rich mathematical language.

2 - Satisfactory

- Includes a partial explanation of why the ad they purchased is the largest.
- Math reasoning is clear and mostly correct.
- Adequate amount of mathematical language.

1 - Needs Improvement

- Includes a vague explanation of why the ad they purchased is the largest.
- Some math reasoning is evident.
- Uses a limited amount of mathematical language.

0 - No Observable Progress

- No explanation is given of why the ad they purchased is the largest.
- There is little evidence of math reasoning.
- No mathematical language is used.