

TxCETP Course Component:

## **Ratio. Fraction. What's the Difference?**

### **Table of Contents**

Table of contents .....	page 1
Introduction .....	page 2-3
Instructional Directions .....	page 4
Student Worksheet: Ratio, Fraction, or Both?.....	page 5-6
Overhead of Worksheet: Ratio, Fraction, or Both?.....	page 7

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## Introduction

**Objectives:** Due to common notation, students often improperly interchange the ideas of ratio and fraction. Through this lesson students will learn why the two are different ideas and when they actually can overlap.

### Connection to TEKS:

**Underlying processes and mathematical tools:**

1.13, 2.14, 3.17, 4.16, 5.16, 6.13, 7.15, 8.16

**Patterns, relationships, and algebraic thinking:**

6.3, 7.3, 8.3

**Number, operation, and quantitative reasoning:**

8.1

### Connection to ExCET Standards for EC-4 and 4-8:

**Standard I: Number Concepts:**

4-8: 1.15s

**Standard V: Mathematical Processes:**

EC-12: 5.4k, 5.5k, 5.7k, 5.3s, 5.12s, 5.19s, 5.20s, 5.23s, 5.24s

**Standard VII: Mathematical Learning and Instruction:**

EC-12: 7.6k, 7.4s, 7.5s, 7.6s, 7.15s, 7.16s, 7.17s

**Prerequisites:** Students should have a firm grasp of the part to whole relationship in a fraction and they should have already learned some basic concepts regarding ratios.

**Materials:** None.

**Instructional Game Plan:** This activity is intended to start as a teacher-led classroom discussion. Following the discussion, students may either analyze statements during class in small groups or as a homework assignment.

**Estimated Time for the Classroom Discussion:** 30 minutes or 5-10 minutes depending upon whether the 'analysis of statements' is done in class or as homework.

**Activities:** Students list all the ratios appearing in a set and all the fractions appearing in a set. A teacher-led class discussion follows in which the difference between ratios and fractions is emphasized. Students then analyze a set of statements to determine whether ratio, fraction or both concepts are present in the statements. A teacher-led discussion follows to provide closure.

**Assessment:** Journal prompt both prior to and after the activities.

**Citation:** The idea for this activity came out of Tom Bassarear's exposition on ratio and proportion in his text: Mathematics for Elementary Teachers, published by Houghton Mifflin, 1997.

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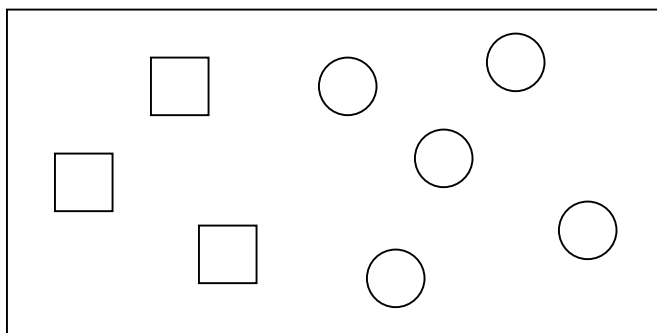
## Instructional Directions

### I. Pre-Assessment

Either the class meeting before the activities or as an email assignment prior to class, ask the students to address the following as a journal prompt. “We sometimes talk about the ratio of  $a$  to  $b$  and other times talk about the fraction  $a/b$ . Are ratios and fractions the same? Explain.”

### II. Teacher-led Classroom Discussion

Draw the following set of objects on the chalkboard.



Ask the students to list all the ratios they see.

Examples: 3 squares : 5 circles, 3 squares : 8 objects

Then ask the students which of the ratios they listed are also fractions and “why”. Discuss the fact that fractions always illustrate a “part to whole” relationship while ratios can be used to illustrate a much larger set of relationships; such as part to part and whole to part.

### III. Analysis of Statements: Ratio, Fraction or Both?

This part of the lesson may be done as a small-group activity followed by a teacher-led “closure” discussion, or it may be assigned as homework and then discussed at the next class meeting. In the classroom discussion students should be asked to “report and support” their views concerning whether each statement involves a ratio, a fraction, or both. NOTE: Problem #6 is the most interesting and will likely create the most discussion.  $\frac{3}{4}$  cup of milk is only a fraction and is not naturally thought of as ratio since it is not a comparison of two quantities.

### IV. Post-Assessment

Either in class or outside of class as an email assignment, ask the students to respond to the following journal prompt. “What is the difference between a ratio and a fraction? Characterize the types of situations where both concepts are appropriate. Characterize the types of situations in which only one of the concepts appropriate.”

## Ratio, Fraction, or Both?

**Directions:** Analyze each of the following statements to determine whether a ratio concept or fraction concept is present. Write down the reasoning behind your answers in the space provided.

1. There are nine women for every two men in this class.  
Circle One:    Ratio    Fraction    Both  
Reasoning:

2. Two out of every five students in this class plan to be middle school teachers.  
Circle One:    Ratio    Fraction    Both  
Reasoning:

3. Brand A orange juice costs 7 cents per ounce while Brand B orange juice only costs 6.5 cents per ounce.  
Circle One:    Ratio    Fraction    Both  
Reasoning:

4. One fourth of the marbles in the jar are blue.

Circle One:    Ratio    Fraction    Both

Reasoning:

5. My average speed while driving to work this morning was 35 mph.

Circle One:    Ratio    Fraction    Both

Reasoning:

6. Jane drank  $\frac{3}{4}$  cup of milk.

Circle One:    Ratio    Fraction    Both

Reasoning:

7. According to the Kool-Aid directions, for each quart of water you should add one scoop of Kool-Aid and 2 scoops of sugar.

Circle One:    Ratio    Fraction    Both

Reasoning:

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