6-2: Comparing Bits and Pieces
Unit Goals, Focus Questions, and Mathematical Reflections

Unit Goals

Fractions as numbers. Understand fractions and decimals as numbers that can be located on the number line, compared, counted, partitioned and decomposed.

- Expand interpretations of a fraction to include, expressing fractions as a part-whole relationship, as a number, and as an indicated division.
- Reason about the roles of numerator and denominator in each of the interpretations of a fraction.
- Use multiple interpretations of proper fractions, improper fractions and mixed numbers.
- Use decimals to represent fractional quantities, with attention to place value.
- Recognize that the set of positive and negative fractions is called rational numbers and recognize rational numbers as points on the number line.
- Use the number line to reason about rational number relationships.
- Use benchmarks to estimate the size of fractions (and decimals), to compare and order fractions (and decimals).
- Recognize that fractions (both positive and negative) can represent both locations and distances on the number line.
- Recognize that a number and its opposite are equal distances from zero on the number line. The opposite of a is –a and the opposite of –a is a.
- Understand that the *absolute value* of a number is its distance from 0 on the number line and use it to describe real-world quantities.
- Introduce percents as a part-whole relationship where the whole is not necessarily out of 100, but is scaled or partitioned to be "out of 100" or "per 100."
- Apply a variety of partitioning strategies to solve problems.

Ratios as comparisons. Understand ratios as comparisons of two numbers.

- Use ratios and their associated rates to compare quantities.
- Distinguish between difference (additive comparison) and ratio (multiplicative comparison).
- Distinguish between fractions as numbers and ratios as comparisons.
- Apply a variety of scaling strategies to solve problems involving ratios and unit rates.
- Understand that a unit rate is a ratio in which one of the quantities being compared has a value of 1; use rate language in the context of a ratio relationship.
- Scale percents to predict new outcomes.

Equivalence. Understand equivalence of fractions and of ratios, and use equivalence to solve problems.

- Understand that equivalent fractions represent the same amount, distance or location; develop strategies for finding equivalent fractions.
- Understand that comparing situations with different-sized wholes is difficult unless we use some common basis of comparison.
- Use partitioning and scaling strategies to generate equivalent fractions and ratios, and to solve problems.
- Develop meaningful strategies for representing fraction amounts larger than one or less than zero as both mixed numbers and improper fractions.
- Understand that equivalent ratios represent the same relationship between two quantities; develop strategies for finding and using equivalent ratios.
- Build and use rate tables of equivalent ratios to solve problems.

6-2 Comparing Bits and Pieces: Focus Questions (FQ) and Mathematical Reflections

Investigation 1 Making Connections	Investigation 2 Connecting Ratios and Rates	Investigation 3 Extending the Number Line	Investigation 4 Working With Percents
Problem 1.1 Fundraising: Comparing With Fractions and Ratios FQ:: What are two ways to compare a $500 fundraising goal to a $200 fundraising goal? Problem 1.2 Fundraising Thermometers: Introducing Ratios FQ: How does a "for every" statement show a ratio comparison? Problem 1.3 Equivalent Fractions on the Line FQ: When you fold fraction strips, what relationships do you see emerge that show how the numerator and denominator change to make equivalent fractions? Problem 1.4 Measuring Progress: Finding Fractional Parts FQ: How can fraction strips help you find part of a number? Problem 1.5 Comparing Fundraising Goals: Using Fractions and Ratios FQ: What does it mean for two fractions to be equivalent? What does it mean for two ratios to be equivalent?	Problem 2.1 Equal Shares: Introducing Unit Rates FQ: What does a unit rate comparison statement tell us? Problem 2.2 Unequal Shares: Using Ratios and Fractions FQ: How are part-to-part relationships related to part-to-whole fractions? Problem 2.3 Making Comparisons with Rate Tables FQ: How do rate tables help us find equivalent ratios?	Problem 3.1 Extending the Number Line: Integers and Mixed Numbers FQ: How can the number line help you think about fractions greater than 1 and less than 0? Problem 3.2 Estimating and Ordering Rational Numbers: Comparing Fractions to Benchmarks FQ: When comparing two relational numbers, what are some useful strategies for deciding which is greater? Problem 3.3 Sharing 100 Things: Using Tenths and Hundredths FQ: How does what you know about fractions help you understand decimals? Problem 3.4 Decimals on the Number Line FQ: How do we use what we know about fractions to estimate and compare decimals? Problem 3.5 Earthquake Relief: Moving from Fractions to Decimals FQ: Why does it make sense to divide the numerator of a fraction by the denominator to find an equivalent decimal representation?	Problem 4.1 Who is the Best? Making Sense of Percents FQ: How is a percent bar useful in making comparisons with decimals? Problem 4.2 Genetic Traits: Finding Percents FQ: How can partitioning be used to express one number as a percent of another number? Problem 4.3 The Art of Comparison: Using Ratios and Percents FQ: In what way is a percent like a ratio and like a fraction?
Mathematical Reflections 1a. Write three comparison statements about the same situation, one using difference, one using a fraction, and one using a ratio. 1b. Explain what you think a ratio is. 2a. What does it mean for two fractions to be equivalent? For two ratios to be equivalent? 2b. What are some useful ways of finding equivalent fractions and equivalent ratios?	Mathematical Reflections 1a. How can you determine a unit rate for a situation? 1b. Describe some ways that unit rates are useful. 2a. What strategies do you use to make a rate table? 2b. Describe some ways that rate tables are useful. 3. How are your strategies for writing equivalent ratios the same as or different from writing equivalent fractions?	Mathematical Reflections 1a. Not every fraction refers to a quantity between 0 and 1. Give some examples of numbers that are greater than 1 or less than 0. 1b. How is a number and its opposite represented on a number line? 2a. What are some strategies for deciding which of two numbers is greater? Give examples. 2b. When comparing two positive whole numbers with different numbers of digits, such as 115 and 37, the one with more digits is greater. Does this rule work for comparing decimals?	Mathematical Reflections 1. Describe strategies for finding a percent of a known quantity. 2. What strategies can you use to find the percent of one quantity to another quantity? 3. How are percents used to make a comparison? 4. Describe other strategies that you can use to make comparisons.