Fraction Review

**Objectives**
To review key fraction concepts; to provide practice with solving parts-and-whole problems and finding fractional parts of whole numbers; and to interpret a fraction as division.

**Advance Preparation**
For Part 1, prepare a display area for the classroom Fractions, Decimals, and Percents Museum.
For Part 2, students will need to cut out and store the Fraction Cards from Math Masters, pages 462 and 463.

**Key Concepts and Skills**
- Find fractions of a set and find the whole based on a known fraction of a set. [Number and Numeration Goal 2]
- Find equivalent names for a fraction of a set. [Number and Numeration Goal 5]
- Interpret a fraction as division of the numerator by the denominator. [Operations and Computation Goal 3]
- Identify and use unit fractions to solve problems. [Operations and Computation Goal 7]

**Key Activities**
Students review the uses of and notations for fractions, solve parts-and-whole problems, and find fractional parts of whole numbers. They identify fractions around them in the classroom and create displays for the Fractions, Decimals, and Percents Museum.

**Ongoing Assessment:**
- **Informing Instruction** See page 293.

**Key Vocabulary**
whole (ONE, or unit)  
denominator  
numerator  
unit fraction

**Materials**
Math Journal 1, pp. 121–122
Student Reference Book, pp. 57, 58, 78C, 78D, and 102–105  
Math Masters, p. 414
slate  
Class Data Pad  
per partnership: 20 counters

**Playing Fraction Top-It**
Student Reference Book, p. 316
Math Journal 2, Activity Sheets 5–7
scissors  
envelope (optional)
Students practice comparing fractions.

**Math Boxes 5-1**
Math Journal 1, p. 123
Students practice and maintain skills through Math Box problems.

**Study Link 5-1**
Math Masters, p. 125
Students practice and maintain skills through Study Link activities.

**Differentiation Options**

**READINESS**
Reviewing Whole-Number Relationships in Number Stories
Math Masters, p. 126
Students explore relationships between fractions of a set and a whole to solve number stories.

**ENRICHMENT**
Exploring Relationships in Number Stories
Math Masters, p. 126
Students identify whole-number, fraction, and mixed-number relationships to solve a number story.

**ELL SUPPORT**
Discussing the Fractions, Decimals, and Percents Museum
Students select items from the display and describe what they represent or how they use numbers.

**Teaching the Lesson**

**Ongoing Learning & Practice**

**290** Unit 5 Fractions, Decimals, and Percents
Getting Started

Mental Math and Reflexes
- An hour is what fraction of a day? \( \frac{1}{24} \)
- A minute is what fraction of an hour? \( \frac{1}{60} \)
- A second is what fraction of a minute? \( \frac{1}{60} \)
- \( \frac{1}{2} \) hour is how many minutes? 30
- \( \frac{3}{4} \) of an hour is how many minutes? 45
- \( \frac{1}{3} \) of an hour is how many minutes? 20
- \( \frac{1}{6} \) of an hour is how many minutes? 10
- \( \frac{1}{5} \) of an hour is how many minutes? 12
- Four days is what fraction of a week? \( \frac{4}{7} \)
- 11 months is what fraction of a year? \( \frac{11}{12} \)

Math Message
Work with a partner. Describe 2 situations in which you would use fractions.

1 Teaching the Lesson

Math Message Follow-Up

Partners share their situations. List them on the Class Data Pad. Use follow-up questions to highlight basic fraction ideas.

- Fractions were invented to express numbers that are between whole numbers.
- Fractions can show measures between whole numbers on rulers and scales.
- Fractions can name part of a whole object (for example, part of a cake or pizza).
- Fractions can name part of a collection of objects (for example, part of the eggs in a carton).
- Most fractions are fractions of something. That something is referred to as the whole, the ONE, or with measurements as the unit.

Pose the following situation to the class: If I give you half of my CD collection, how many CDs will I have left? Most students will recognize that there is not enough information to answer the question. Emphasize that when fractions name parts of something, their meaning depends on the whole. You can understand a fraction only if you can identify the whole. The answer to the question posed above depends on how many CDs are in the whole collection.

Use the “whole box” as a reminder of the whole, or the ONE, while students are working with fractions. To support English language learners, write whole on the board and provide some examples.
Fractions are used to name a part of a whole. The fraction divided by line that are between points named by 1 and 2, between whole-number measures.

Fractions are used to compare quantities.

\[ \frac{2}{3} \]

Fractions can name points on a number line. Fractions can name measures that are "in-between" whole-number measures.

**Division**

The fraction is a number way of saying a divided by b.

The division problem 24 divided by 3 can also be written in this way: \[ \frac{24}{3} \]

**Ratio**

Fractions can be used to compare quantities with the same unit. For example, there are 7 girls and 10 boys in a basketball season. The ratio of girls to boys can be written \[ \frac{7}{10} \] since both are compared to the same unit (girls and boys).

We say that the ratio of girls to boys is 7 to 10.

Fractions can be written vertically as \( \frac{a}{b} \), or horizontally as \( a/b \). The number below (or to the right of) the fraction bar is called the denominator. The denominator names the number of equal parts into which the whole is divided. The number above (or to the left of) the fraction bar is called the numerator. The numerator names the number of parts under consideration.

Fractions in which the denominator and the numerator are the same number are equivalent to 1. Ask: Why is this true? The number of equal parts named by the numerator is the same as the number of equal parts named by the denominator that make the whole. Write these key ideas on the board to support English language learners.

**Language Arts Link**

Students may be interested in knowing that the bar separating numerator from denominator is called a vinculum, from the Latin vincī, meaning to bind.

Refer students to pages 57 and 58 in the Student Reference Book and to any relevant situations on the Class Data Pad to list to review additional uses of fractions.

- A fraction may represent division. For example, \( \frac{3}{4} \) is another way of saying 3 divided by 4; 3 \( \div \) 4; 4/3; or 3/4.
- Fractions can express probability. For example, the chance that a die will land with 3 up is 1 out of 6, or \( \frac{1}{6} \).
- Fractions are used to compare two quantities as ratios: 1 out of 2 students in the class is a boy, so \( \frac{1}{2} \) of the students are boys; or rates, the car’s gas mileage is \( \frac{100}{4} \) miles per gallon.

**Reviewing Basic Fraction Ideas**

(Student Reference Book, pp. 57 and 58)

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**Adjusting the Activity**

Use the definitions and examples on pages 102–105 of the Student Reference Book to clarify the use of fractions to represent comparisons in ratios and rates.

**Links to the Future**

Fraction concepts will continue to be developed and practiced throughout the year. Unit 6 further develops fractions and ratios. Unit 12 expands this work to rates and proportions.
**Introducing Fractions as Division**

Read the following problem to students, and ask them to think about how they might solve it.

_**Julia**_ came home from school to find 3 fresh homemade lemon squares. She had 3 girlfriends with her. The 4 friends decided to share the 3 lemon squares equally. How much of a whole lemon square did each girl get to eat?

Have partners discuss and solve the problem. Invite them to draw pictures to help them find a solution.

When most students have finished, have several volunteers share and describe the strategies they used and the pictures they drew. Have students recreate their drawings on the board. Expect that students may draw pictures like those shown in the margin.

As students share their drawings, encourage them to label the fractional parts of the lemon squares and to tell how much of a lemon square each friend will receive. 

Each friend gets \( \frac{1}{2} \) of one lemon square and \( \frac{1}{4} \) of one lemon square. So each friend gets \( \frac{1}{2} + \frac{1}{4} \), or \( \frac{3}{4} \) of a whole lemon square.

**Using Fractions to Solve Division Problems**

_(Math Journal 1, p. 121A; Student Reference Book, pp. 78C and 78D)_

Have students work on journal page 121A. Emphasize that they should draw pictures to show how they are solving each problem. Have them label the fractional parts in their drawings and record number sentences.

When most of the students have finished, bring them together to discuss what they learned about fractions and division from doing the problems. First have students discuss with a partner, and then share with the class how they think fractions and division are related. Have students refer to Student Reference Book, pages 78C and 78D as needed.

**Student Page**

**5-1 Using Fraction Notation for Division**

For each problem below:

- Write each division problem as a fraction.
- Solve the problem.
- Show your work.

- **Example:** Ms. Sanders has 16 packages of paper to divide equally among 4 classes. How many packages will each class get?
  - Fraction notation: \( \frac{16}{4} \)
  - Solution: \( 4 \) packages

1. Jason made pan-sized pancakes for breakfast. Usually his 2 brothers each eat 5 pancakes. Because Jason made them so big, his 2 brothers equally split 10 pancakes. How many pancakes did each brother eat?
   - Division sentence: \( \frac{10}{2} \)
   - Fraction notation: \( \frac{5}{2} \)
   - Solution: \( \frac{5}{2} \) pancakes

2. Rita was in charge of providing lemonade to sell at the fair. She supplied 19 large containers of lemonade to fill the empty pitchers at 5 lemonade booths. If each booth got the same amount, how many large containers of lemonade did each booth get?
   - Division sentence: \( \frac{19}{5} \)
   - Fraction notation: \( \frac{3}{1} \)
   - Solution: \( \frac{3}{1} \) containers

3. Maurice bought 3 packs of strawberry cakes. He decided to share them with his 3 best friends. How much strawberry cake did each of the 4 boys get?
   - Division sentence: \( \frac{3}{4} \)
   - Fraction notation: \( \frac{3}{4} \)
   - Solution: \( \frac{3}{4} \) of a strawberry cake

**Try This**

4. Daisy has 27 feet of ribbon to make 6 hair ties. If each one was the same length, and there was no ribbon left over, how long was each hair tie?
   - Division sentence: \( \frac{27}{6} \)
   - Fraction notation: \( \frac{9}{2} \)
   - Solution: \( \frac{9}{2} \) feet

[Math Journal 1, p. 121B]
Highlight some of the following points, and record number sentences on the board when appropriate:

- You can write a division problem as a fraction in which the dividend is the numerator and the divisor is the denominator. For example, $3 \div 4$ can also be written as $\frac{3}{4}$.
- You can write a division problem as an improper fraction. For example, $25 \div 3$ can be written as $\frac{25}{3}$.
- The answer to a division problem can be a fraction. For example, when 5 boys equally share 2 pizzas, they each get $\frac{2}{5}$.
- Sometimes it makes sense to answer a division problem with an improper fraction, but sometimes it does not. For example, we might say a cup can hold $\frac{6}{4}$ bottles of juice, but we would not say that it takes $\frac{26}{3}$ hours to hike a trail.
- When you solve division problems with fractions, different pictures can be used to solve the same problem, depending on how you divide or share. For example, 5 boys could equally share 2 pizzas by giving each boy $\frac{1}{5}$ of one of the two pizzas, or each boy could get $\frac{1}{8}$ of each pizza, for a total of $\frac{5}{8}$.

Using Fraction Notation for Division

(Math Journal 1, p. 121B)

Remind students that, in the last unit, they used fractions to show the remainder in some division problems. On journal page 121B, students record division problems using fraction notation and then revisit solving the problems and recording the remainder as a fraction. Have partners compare their answers as they work on journal page 121B.

Solving Parts-and-Whole Problems with Fractions

(Math Journal 1, p. 121)

Distribute about 20 counters to each partnership and explain that there are three types of problems on this journal page.

- In Problems 1 and 2, the whole and a part are given; the fraction needs to be named.
- In Problems 3, 4, and 7, the whole is given, and the fraction is named; the part needs to be found.
- In Problems 5, 6, and 8, a part is given, and the fraction is named; the whole needs to be found.
One important method for solving this third type of problem is to use the concept of unit fractions. When a whole is divided into equal parts, the unit fraction has a 1 as its numerator and names one of those equal parts. To support English language learners, write unit fraction on the board and list examples. Ask volunteers to name the unit fraction if the whole is divided into 10 parts; 12 parts; 75 parts. \( \frac{1}{10}; \frac{1}{12}; \frac{1}{75} \)

The whole (or some other amount) is a multiple of the unit fraction part. Use counters on the overhead to model this example: If \( \frac{1}{10} \) of a set is 2 counters, \( \frac{2}{10} \) is 2 \( \times \) 2, or 4 counters; \( \frac{4}{10} \) is 4 \( \times \) 2, or 8 counters. Ask: How many counters are in the whole set? 10 \( \times \) 2, or 20 counters.

Have partners complete journal page 121. Circulate and assist, noting which ideas need follow-up discussion.

**Ongoing Assessment: Informing Instruction**

Watch for students who experience difficulty arranging counters to find the whole from a given fraction. Model this concept using a unit box to organize the information. For example, in Problem 6 the given denominator is 4. Sketch a unit box divided into four sections. Because \( \frac{3}{4} \) is 12, use 12 counters to fill three of the sections (12 \( \div \) 3 = 4). Filling in the fourth section shows that the whole set has 16 counters.

Ask volunteers to explain their answers for the problems. Use follow-up questions to reinforce identifying the unit fraction.

**Finding a Fraction of a Whole**

*PARTNER ACTIVITY* (Math Journal 1, p. 122)

Have partners work together to solve the journal page problems.

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**Exit Slip**

Use an Exit Slip (Math Masters, page 414) to assess students’ ability to determine the value of a unit fraction. Have students explain how they solved Problem 2 on journal page 122. Students are making adequate progress if their answers demonstrate an appropriate strategy for finding the unit fraction of a set.

[Operations and Computation Goal 7]

Ask volunteers to explain their solutions. Use follow-up questions to reinforce vocabulary and key concepts.
In Problem 1, focus on the unit fraction $\frac{1}{3}$. A set of 141 (votes) must be divided into thirds. Conceptually, this is the same as dividing 15 counters into 3 equal parts.

In Problem 3, $8.75$ (or 875 cents) must be divided into fifths. Focus on finding the unit fraction $\frac{1}{5}$. Students divide $8.75$ into 5 equal shares.

Encourage students to use mental math and friendly numbers strategies to find fractional parts that are easy fractions, such as $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{6}$.

Introducing the Fractions, Decimals, and Percents Museum

Ask students to look for classroom examples of fractions. For example, a full box of crayons might represent $\frac{5}{8}$ and a partial box might represent $\frac{3}{8}$. As fractions or situations are identified, add them to the list on the Class Data Pad. Assign small groups to create displays with labels for the fractions section of the museum. Students might add objects to the museum or draw pictures. They might also create a fractions word wall by making posters of vocabulary words with illustrated examples. Display the fractions usage list from the Math Message Follow-up for student reference.

Playing Fraction Top-It

(Student Reference Book, p. 316; Math Journal 2, Activity Sheets 5–7)

Students practice comparing fractions by playing Fraction Top-It. Students will need to cut out their set of Fraction Cards from Math Journal 2, Activity Sheets 5–7 and write in the missing numerator or denominator on each card for this game. Labeled envelopes can be used to store the cards for future use.

NOTE If available, the Everything Math Deck cards can be used instead of the Fraction Cards.

Math Boxes 5-1

(Math Journal 1, p. 123)

Mixed Practice Math Boxes in this lesson are paired with Math Boxes in Lesson 5-3. The skill in Problem 5 previews Unit 6 content.
If 15 counters are the whole set, how many are of the set?

If 50 counters are the whole set, what fraction of the set is 45 counters?

Explain how you figured out Heather’s portion of the bill.

If 20 counters are the whole set, what fraction of the set is 16 counters?

If 12 counters are of a set, what is the whole set?

If 35 counters are half of a set, what is the whole set?

Jen and Heather went to lunch. When the bill came, Jen discovered that she had $8. Luckily, Heather had enough money to pay the other part, or $12, of the bill. So how much was the total bill?

Gerald and Michelle went on a 24-mile bike ride. By lunchtime, they had ridden 7 miles. How many miles did they have left to ride after lunch?

For her birthday, Alisha got a box containing 36 pieces of candy. The remaining box weighed 61 oz. Each piece of candy weighed 2 oz. What was the weight of the box in oz?

To explore relationships between fractions of a set and a whole, have students solve number story problems. Students use the Data Bank: Whole Numbers to complete Math Masters, page 126. They share their solutions with a partner.

To explore fraction, whole number, and mixed-number relationships and how these relationships can be used to solve number stories, have students use the Data Bank: Fractions and Mixed Numbers to complete Math Masters, page 126. They share their solutions with a partner. Discuss whether there might be more than one way to assign the numbers in this problem and how students decided on their selections.

To provide language support for fractions, decimals, and percents, have students choose two displays from the Fractions, Decimals, and Percents Museum and describe what the numbers represent or how they are used.

Remind students to collect examples for the Fractions, Decimals, and Percents Museum.

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