Home Link 2-14

NAME DATE TIME

Fraction Concepts, Addition, and Subtraction

In Unit 3 students extend fraction concepts from prior grades to new fraction topics. They continue to explore and strengthen fraction concepts by working with the fraction circle pieces they used in Grades 3 and 4. Fraction circle pieces are circles divided into equal-size pieces, with each size representing a different unit fraction and all the same-size pieces the same color.

The unit begins with students solving fair share number stories that result in fractions as answers. For example: *There are 5 people who want to share 3 apples equally. How much apple does each person get?* Students use fraction circle pieces and draw pictures to help them solve these types of problems: *Each person gets* $\frac{3}{5}$ *apple.* They use fair share stories to understand the connections between fractions and division. For example, the number story above shows that $\frac{3}{5}$ is the same as $3 \div 5$. Students apply this understanding to report the remainders in whole-number division problems as fractions.

Students also review how to place fractions on a number line and use number lines to help them think about relative sizes of fractions. For example, $\frac{5}{8}$ is a little more than $\frac{1}{2}$, so $\frac{5}{8}$ is a little to the right of $\frac{1}{2}$ on a number line. Developing fraction number sense in this way helps students estimate sums and differences of fractions. For example, since $\frac{5}{8}$ is a little more than $\frac{1}{2}$, $1\frac{1}{2} - \frac{5}{8}$ must be a little less than 1.

Students often struggle learning how to compute with fractions. This is probably because the rules for computing with fractions can seem very different from the rules they use for whole numbers. To help students overcome this challenge, the activities and representations in this unit have students build mental images of fractions. Developing a firm sense of what fractions mean and how they are interrelated helps students make sense of fraction computation procedures and judge the reasonableness of their answers.

In the second half of Unit 3 students explore strategies for adding and subtracting fractions and mixed numbers. They use fraction circle pieces to see how fractions can be put together to form a whole and how wholes can be broken apart into fractions. They also apply their knowledge of equivalent fractions and adding fractions with like denominators to generate strategies for adding fractions with unlike denominators.

Examples:

When I put $\frac{2}{3}$ and $\frac{2}{3}$ together, I can make a group of $\frac{3}{3}$, which is the same as 1. There is 1 more third left, so $\frac{2}{3} + \frac{2}{3} = 1\frac{1}{3}$.

To take away $\frac{3}{4}$ from $1\frac{1}{4}$, I can trade 1 whole for 4 fourths. Now I have 5 fourths. After I take away 3 fourths, 2 fourths are left. So $1\frac{1}{4} - \frac{3}{4} = \frac{2}{4}$.

How can I solve $\frac{1}{4} + \frac{1}{8}$? I know $\frac{1}{4} = \frac{2}{8}$, so $\frac{1}{4} + \frac{1}{8}$ is the same as $\frac{2}{8} + \frac{1}{8}$, which is $\frac{3}{8}$.

Note that the strategies students use to add and subtract fractions in this unit are exploratory and informal. In a later unit students will be introduced to formal rules for adding and subtracting fractions with unlike denominators.

Unit 3 ends with two lessons about solving fraction-of problems like these: *What is $\frac{1}{2}$ of 8*? *What is $\frac{1}{3}$ of 7*? Students use counters and drawings to model and solve the problems in activities that build a foundation for multiplying fractions by whole numbers. In a later unit students will learn that "of" means "times," so the answer to *What is $\frac{1}{2}$ of 8*? is also the answer to the problem $\frac{1}{2} * 8$.

Please keep this Family Letter for reference as your child works through Unit 3.

Vocabulary

Important terms in Unit 3:

argument An explanation that shows why a claim or *conjecture* is true or false using words, pictures, symbols, or other representations. For example, if a student makes a conjecture that $\frac{1}{2} + \frac{3}{5} = \frac{4}{7}$ is not true, the student might support that conjecture by arguing that $\frac{3}{5}$ is more than $\frac{1}{2}$, so the answer to $\frac{1}{2} + \frac{3}{5}$ is greater than 1. Since $\frac{4}{7}$ is less than 1, $\frac{1}{2} + \frac{3}{5} = \frac{4}{7}$ must not be true.

benchmark A number that can be used as a reference point when estimating or evaluating the reasonableness of calculations. The numbers 0, $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2, and so on are useful benchmarks when calculating with fractions. For example, the definition of *argument* given above uses $\frac{1}{2}$ and 1 as benchmarks.

conjecture In mathematics, a claim or prediction that has not been proved. For example, given the number sentence $\frac{1}{2} + \frac{3}{5} = \frac{4}{7}$, a student might make a conjecture that the number sentence is not true using what they know about *benchmarks*.

denominator The number below the line in a fraction. In a fraction representing a whole divided into equal parts, the denominator is the total number of equal parts. In the fraction $\frac{3}{5}$, 5 is the denominator.

equivalent fractions Fractions that name the same number. For example, $\frac{1}{2}$ and $\frac{4}{8}$ are equivalent fractions.

fraction greater than 1 A fraction with a *numerator* that is greater than its *denominator*. For example, $\frac{4}{3}$, $\frac{5}{2}$, and $\frac{24}{12}$ are fractions greater than 1. Fractions greater than 1 are sometimes called "improper fractions," but *Everyday Mathematics* does not use this term.

fraction-of problem A problem that requires finding a fraction of a whole. For example, *What is $\frac{1}{2}$ of 12?* is a fraction-of problem.

mixed number A number that is written using both a whole number and a fraction. For example, $2\frac{1}{4}$ is a mixed number equal to $2 + \frac{1}{4}$.

numerator The number above the line in a fraction. In a fraction representing a whole divided into equal parts, the numerator is the number of equal parts that are being considered. In the fraction $\frac{3}{5}$, 3 is the numerator.

Do-Anytime Activities

To work with your child on the key concepts in this unit, try some of these activities.

1. Help your child find fractions in the everyday world. For example, fractions are often found in advertisements, on measuring tools, in recipes, in sports reports, and so on.
2. Make up simple problems for your child to solve about sharing things equally. For example: *If 4 people share 3 oranges equally, how much orange does each person get?*
3. Tell your child a whole number and ask him or her to find $\frac{1}{2}$ of, $\frac{1}{3}$ of, or $\frac{1}{4}$ of the number.

Building Skills through Games

In Unit 3 your child will practice interpreting exponential notation; comparing, multiplying, and dividing whole numbers; and comparing, estimating with, and adding fractions by playing the following games. Detailed instructions for each game are in the *Student Reference Book*. You can play many of these games at home with a regular deck of playing cards by removing the face cards and having the ace represent 1. You might also consider using index cards to create fraction cards. Gameboards and record sheets can be copied for home use.

Build-It See *Student Reference Book,* page 293. Two players need fraction cards and a gameboard for this game. *Build-It* provides practice with comparing fractions and builds fraction number sense.

Division Dash See *Student Reference Book,* page 301. One or two players need number cards for this game. *Division Dash* provides practice with dividing whole numbers.

Multiplication Top-It: Larger Numbers See *Student Reference Book,* page 325. Two to four players need number cards for this game. *Multiplication Top-It: Larger Numbers* provides practice multiplying larger numbers.

Number Top-It See *Student Reference Book,* page 316. Two to five players need number cards, a game mat, and a record sheet for this game. *Number Top-It* builds understanding of whole-number place value.

Power Up See *Student Reference Book,* page 318. Two players need two 6-sided dice and a record sheet for this game. *Power Up* provides practice converting from exponential notation to standard notation and builds awareness of patterns with powers of 10.

Rename That Mixed Number See *Student Reference Book,* page 321. Two players need number cards and a record sheet for this game. *Rename That Mixed Number* provides practice renaming mixed numbers by trading wholes for fractional parts.

As You Help Your Child with Homework

As your child brings assignments home, you might want to go over the instructions together, clarifying them as necessary. The answers listed below will guide you through this unit's Home Links.

Home Link 3-1

1. $\frac{2}{6}$, or $\frac{1}{3}$, loaf **2.** $\frac{6}{4}$, $1\frac{2}{4}$ or $1\frac{1}{2}$, slices

3. $\frac{3}{2}$, or $1\frac{1}{2}$, fruit bars **4.** 7,794 **5.** 26,271

Home Link 3-2

1. $\frac{4}{24}$, or $\frac{1}{6}$ Number model: $4 \div 24 = \frac{4}{24}$, or $\frac{1}{6}$

2. $\frac{7}{2}$, or $3\frac{1}{2}$ Number model: $7 \div 2 = \frac{7}{2}$, or $3\frac{1}{2}$

3. $\frac{10}{3}$, or $3\frac{1}{3}$ Number model: $10 \div 3 = \frac{10}{3}$, or $3\frac{1}{3}$

4. **a.** 60 **b.** 6 **c.** 60

5. **a.** 4 **b.** 400 **c.** 40

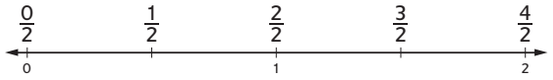
Home Link 3-3

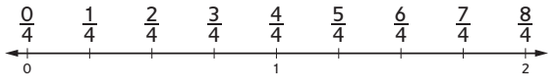
1. Quotient: 4; Remainder: 4; 5

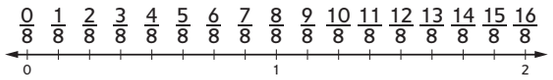
2. Quotient: 1; Remainder: 8; $1\frac{8}{16}$, or $1\frac{1}{2}$

3. 26 **4.** 32 **5.** 2 **6.** 10

Home Link 3-4

1. 

2. 

3. 

4. **a.** $\frac{3}{8}$ **b.** $\frac{5}{4}$ **c.** $1\frac{5}{8}$

5. **a.** $1\frac{2}{4}$ **b.** $1\frac{1}{2}$ **c.** $1\frac{5}{8}$

6. **a.** $\frac{4}{2}$ **b.** $\frac{14}{8}$ **c.** $\frac{5}{4}$

7. **a.** 300 **b.** 5,000 **c.** 80,000

8. **a.** $9 * 10^2$ **b.** $6 * 10^3$ **c.** $7 * 10^4$

Home Link 3-5

1. $\frac{(\boxed{4}+\boxed{6})}{(\boxed{2}+\boxed{3})} = \frac{10}{5} = 2$ **2.** Answers vary.

3. **a.** 300,000 **b.** 30,000 **c.** 3,000

d. 300 **e.** 30 **f.** 3

Home Link 3-6

1. Answers vary.

2. Josie's answer is more reasonable.

3. Player 1 won. **4.** $6 \times (4 + 1) = 30$

5. $12 \div (3 \times 2) - 1 = 1$ **6.** $(48 \div 6 + 5) \times 3 = 39$

7. $50 / [(10 + 10) / 2] = 5$

Home Link 3-7

1. 2 **2.** less than 2 **3.–5.** Answers vary.

6. 980; Number model: $980 = 14 \times 7 \times 10$

7. 6,300; Number model: $6{,}300 = 525 \times 12$

Home Link 3-8

1–2. Answers vary.

3. $3\frac{5}{8}$ **4.** $1\frac{10}{4}$ **5.** 3,757 **6.** 648

Home Link 3-9

1. $1\frac{1}{4} + 1\frac{3}{4} = p$; 3 **2.** $4 - 1\frac{1}{2} = r$; $2\frac{1}{2}$

3. $1\frac{2}{3} + 1\frac{2}{3} = c$; $3\frac{1}{3}$ **4.** 139 R9 **5.** 141 R6

Home Link 3-10

1b. $\frac{3}{6}$, or $\frac{1}{2}$; $\frac{3}{6}$, or $\frac{1}{2}$ **2a.** $\frac{1}{2} + \frac{1}{4}$ **2c.** 2; $\frac{3}{4}$; $\frac{3}{4}$

3. Answers vary. **4.** $(10 + 16) / 2$

5. $\frac{2}{3} * 2 + \frac{1}{4}$, or $\left(\frac{2}{3} * 2\right) + \frac{1}{4}$

Home Link 3-11

1. $\frac{6}{5}$; $\frac{2}{1}$; $\frac{4}{2}$, or $\frac{6}{3}$; $\frac{5}{2}$; $\frac{2}{6}$, or $\frac{1}{3}$; $\frac{4}{3}$ **2a.** $\frac{1}{6} + \frac{1}{6}$

2b. Sample answer:
$\frac{1}{2} + \frac{1}{2} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

3. $5 \div 4$; $1\frac{1}{4}$ **4.** $16 \div 8$; $1\frac{8}{8}$, or 2

5. $14 \div 3$; Sample answer: $4\frac{2}{3}$ **6.** $17 \div 12$; $1\frac{5}{12}$

Home Link 3-12

1. $\frac{3}{4}$ mile farther **2.** $1\frac{3}{6}$, or $1\frac{1}{2}$, apples

3. $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$ **4.** 150 cm^3

5. 376 ft^3

Home Link 3-13

1. 12 **2.** 8 **3.** 6 **4.** 9 **5.** 4

6. $132\frac{6}{53}$ **7.** $44\frac{8}{67}$

Home Link 3-14

1. $\frac{7}{2}$, or $3\frac{1}{2}$ **2.** $\frac{7}{3}$, or $2\frac{1}{3}$

3. $\frac{7}{4}$, or $1\frac{3}{4}$ **4.** $\frac{15}{4}$, or $3\frac{3}{4}$

5. $\frac{3}{7}$ **6.** 1,715 **7.** 13,167