

## Unit 4: Family Letter



### Rational Number Uses and Operations

One reason for studying mathematics is that numbers in all their forms are an important part of our everyday lives. We use decimals when we are dealing with measures and money, and we use fractions and percents to describe parts of things.

Students using *Everyday Mathematics* began working with fractions in the primary grades. In *Fifth Grade Everyday Mathematics*, your child worked with equivalent fractions, operations with fractions, and conversions between fractions, decimals, and percents.

In Unit 4, your child will revisit these concepts and apply them. Most of the fractions with which your child will work (halves, thirds, fourths, sixths, eighths, tenths, and sixteenths) will be fractions that they would come across in everyday situations—interpreting scale drawings, following a recipe, measuring distance and area, expressing time in fractions of hours, and so on.

Students will be exploring methods for solving addition and subtraction problems with fractions and mixed numbers. They will look at estimation strategies, mental computation methods, paper-and-pencil algorithms, and calculator procedures.

Students will also work with multiplication of fractions and mixed numbers. Generally, verbal cues are a poor guide as to which operation (+, −, \*, /) to use when solving a problem. For example, *more* does not necessarily imply addition. However, *many of* and *part of* generally involve multiplication. At this point in the curriculum, your child will benefit from reading and understanding  $\frac{1}{2} * 12$  as *one-half of 12*, rather than *one-half times 12*; or reading and understanding  $\frac{1}{2} * \frac{1}{2}$  as *one-half of one-half*, rather than *one-half times one-half*.

Finally, students will use percents to make circle graphs to display the results of surveys and to learn about sales and discounts.

#### Jambalaya Recipe

4 ounces each of chicken and sausage

4 cups peppers

$\frac{3}{4}$  cup rice

$1\frac{2}{3}$  cups chopped onions

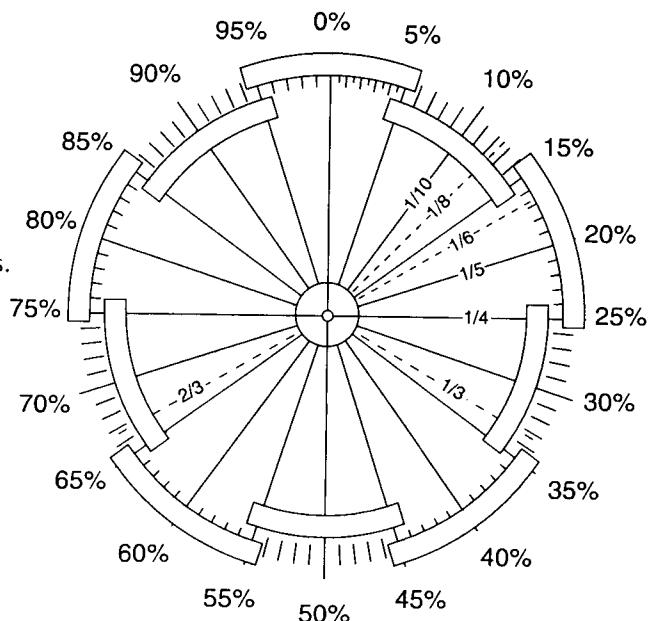
$1\frac{1}{2}$  tablespoons chopped thyme

$\frac{1}{8}$  teaspoon salt

**Please keep this Family Letter for reference as your child works through Unit 4.**

## Math Tools

The **Percent Circle**, on the Geometry Template, is used to find the percent represented by each part of a circle graph and to make circle graphs. The Percent Circle is similar to a full-circle protractor with the circumference marked in percents rather than degrees. This tool allows students to interpret and make circle graphs before they are ready for the complex calculations needed to make circle graphs with a protractor.



## Vocabulary

Important terms in Unit 4:

**common denominator** A nonzero number that is a multiple of the denominators of two or more fractions. For example, the fractions  $\frac{1}{2}$  and  $\frac{2}{3}$  have common denominators 6, 12, 18, and other multiples of 6. Fractions with the same denominator already have a common denominator.

**common factor** A factor of two or more counting numbers. For example, 4 is a common factor of 8 and 12.

**discount** The amount by which a price of an item is reduced in a sale, usually given as a fraction or percent of the original price, or a percent off. For example, a \$4 item on sale for \$2 is discounted by 50%, or  $\frac{1}{2}$ . A \$10.00 item at “10% off!” costs \$9.00, or  $\frac{1}{10}$  less than the usual price.

**equivalent fractions** Fractions with different denominators that name the same number.

**greatest common factor (GCF)** The largest factor that two or more counting numbers have in common. For example, the common factors of 24 and 36 are 1, 2, 3, 4, 6, and 12, and their greatest common factor is 12.

**improper fraction** A fraction whose numerator is greater than or equal to its denominator. For example,  $\frac{4}{3}$ ,  $\frac{5}{2}$ ,  $\frac{4}{4}$ , and  $\frac{24}{12}$  are improper fractions.

In *Everyday Mathematics*, improper fractions are sometimes called top-heavy fractions.

**interest** A charge for the use of someone else’s money. Interest is usually a percentage of the amount borrowed.

**least common denominator (LCD)** The least common multiple of the denominators of every fraction in a given collection. For example, the least common denominator of  $\frac{1}{2}$ ,  $\frac{4}{5}$ , and  $\frac{3}{8}$  is 40.

**least common multiple (LCM)** The smallest number that is a multiple of two or more given numbers. For example, common multiples of 6 and 8 include 24, 48, and 72. The least common multiple of 6 and 8 is 24.

**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  $2 + \frac{1}{4}$ .

**percent (%)** Per hundred, for each hundred, or out of a hundred.  $1\% = \frac{1}{100} = 0.01$ . For example, *48% of the students in the school are boys* means that out of every 100 students in the school, 48 are boys.

**proper fraction** A fraction in which the numerator is less than the denominator. A proper fraction is between  $-1$  and  $1$ . For example,  $\frac{3}{4}$ ,  $-\frac{2}{5}$ , and  $\frac{21}{24}$  are proper fractions. Compare to *improper fraction*. *Everyday Mathematics* does not emphasize these distinctions.

**quick common denominator (QCD)** The product of the denominators of two or more fractions. For example, the quick common denominator of  $\frac{3}{4}$  and  $\frac{5}{6}$  is  $4 * 6$ , or 24. In general, the quick common denominator of  $\frac{a}{b}$  and  $\frac{c}{d}$  is  $b * d$ . As the name suggests, this is a quick way to get a *common denominator* for a collection of fractions, but it does not necessarily give the *least common denominator*.

**simplest form of a fraction** A fraction that cannot be renamed in simpler form. Also called

“lowest terms.” A mixed number is in simplest form if its fractional part is in simplest form. Simplest form is not emphasized in *Everyday Mathematics* because other equivalent forms are often equally or more useful. For example, when comparing or adding fractions, fractions with a common denominator are likely to be easier to work with than fractions in simplest form.

## Do-Anytime Activities

Try these ideas to help your child with the concepts taught in this unit.

1. Consider allowing your sixth grader to accompany you on shopping trips when you know there is a sale. Have him or her bring a calculator to figure out the sale price of items. Ask your child to show you the sale price of the item and the amount of the discount. If your child enjoys this activity, you might extend it by letting him or her calculate the total cost of an item after tax has been added to the subtotal. One way to calculate the total cost is simply to multiply the subtotal by 1.08 (for 8% sales tax). For example, the total cost of a \$25 item on which 8% sales tax is levied would be  $25 * 1.08 = 25 * (1 + 0.08) = (25 * 1) + (25 * 0.08) = 25 + 2 = 27$ , or \$27.
2. On grocery shopping trips, point out to your child the decimals printed on the item labels on the shelves. These often show unit prices (price per 1 ounce, price per 1 gram, price per 1 pound, and so on), reported to three or four decimal places. Have your child round the numbers to the nearest hundredth (nearest cent).
3. Your child’s teacher may display a Fractions, Decimals, Percents Museum in the classroom and expect students to contribute to this exhibit. Help your child look for examples of the ways in which printed advertisements, brochures, and newspaper and magazine articles use fractions, decimals, and percents.

## Building Skills through Games

In Unit 4, your child will work on his or her understanding of rational numbers by playing games like the ones described below.

**Fraction Action, Fraction Friction** See *Student Reference Book*, page 317

Two or three players gather fraction cards that have a sum as close as possible to 2, without going over. Students can make a set of 16 cards by copying fractions onto index cards.

**Frac-Tac-Toe** See *Student Reference Book*, pages 314–316

Two players need a deck of number cards with 4 each of the numbers 0–10; a game board, a 5-by-5 grid that resembles a bingo card; a *Frac-Tac-Toe* Number-Card board; markers or counters in two different colors, and a calculator. The different versions of *Frac-Tac-Toe* help students practice conversions between fractions, decimals, and percents.

## As You Help Your Child with Homework

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

### Study Link 4•1

Sample answers for problems 1–16.

- |   |   |   |                   |
|---|---|---|-------------------|
| 1. $\frac{8}{10}$                                 | 2. $\frac{14}{20}$                                | 3. $\frac{2}{8}$                              | 4. $\frac{4}{6}$  |
| 5. $\frac{10}{8}$                                 | 6. $\frac{4}{4}$                                  | 7. $\frac{3}{4}$                              | 8. $\frac{1}{5}$  |
| 9. $\frac{1}{4}$                                  | 10. $\frac{5}{2}$                                 | 11. $\frac{1}{5}$                             | 12. $\frac{2}{3}$ |
| 13. $\frac{2}{6}, \frac{3}{9}, \frac{4}{12}$      | 14. $\frac{3}{4}, \frac{15}{20}, \frac{150}{200}$ | 15. $\frac{6}{1}, \frac{12}{2}, \frac{18}{3}$ |                   |
| 16. $\frac{24}{10}, \frac{36}{15}, \frac{48}{20}$ | 17. $\frac{1}{2}$                                 | 18. $\frac{2}{3}$                             |                   |
| 19. $\frac{1}{5}$                                 | 20. $\frac{2}{5}$                                 | 21. $\frac{3}{8}$                             | 22. $\frac{2}{7}$ |
| 23. $x = 3$                                       | 24. $y = 12$                                      | 25. $m = 30$                                  |                   |
| 26. $27\frac{1}{4}$                               | 27. $29\frac{1}{5}$                               | 28. $29\frac{2}{7}$                           |                   |

### Study Link 4•2

- |  |           |  |           |
|--|-----------|--|-----------|
| 1. $>$   | 2. $>$    | 3. $<$                                       | 4. $<$    |
| 5. $>$   | 6. $<$    | 7. $\frac{1}{3}, \frac{2}{5}, \frac{12}{25}$ |           |
| 8. $\frac{1}{12}, \frac{1}{5}, \frac{1}{3}, \frac{2}{5}, \frac{7}{14}, \frac{6}{10}, \frac{15}{16}, \frac{49}{50}$ |           |  |           |
| 9. 9.897   | 10. 3.832 | 11. 0.823                                    | 12. 4.357 |

### Study Link 4•3

- |                    |                     |                     |                   |
|--------------------|---------------------|---------------------|-------------------|
| 1. $\frac{1}{2}$   | 2. $1\frac{1}{16}$  | 3. $2\frac{13}{20}$ | 4. $\frac{2}{3}$  |
| 5. $\frac{11}{12}$ | 6. $1\frac{1}{6}$   | 7. $1\frac{8}{45}$  | 8. 2              |
| 9. $\frac{3}{8}$   | 10. $1\frac{4}{15}$ | 11. $\frac{1}{3}$   | 12. $\frac{1}{2}$ |
| 13. $1\frac{3}{4}$ | 14. $\frac{1}{10}$  | 15. 2.7             | 16. 0.58          |
| 17. 1.98           |                     |                     |                   |

### Study Link 4•4

- Sample answer: They may have added only the numerators.
  - Sample answer: Both fractions are close to 1, so their sum should be close to 2.
- $1\frac{1}{4}$  inches
- Sample answer: He can use three  $\frac{1}{2}$ -cup measures and one  $\frac{1}{4}$ -cup measure.
- $4\frac{1}{2}$
- $1\frac{3}{4}$
- $2\frac{1}{3}$
- $1\frac{7}{4}, \frac{11}{4}$
- 90
- 246
- 432
- 315

### Study Link 4•5

- $8\frac{1}{2}$  in.
  - $1\frac{1}{2}$  in.;  $\frac{1}{4}$  in.
- $2\frac{1}{2}$  bushels
  - 30 quarts
- 4
- $\frac{2}{3}$
- $5\frac{1}{6}$
- $\frac{5}{9}$
- $1\frac{5}{8}$
- 6
- $6\frac{3}{5}$
- $1\frac{5}{12}$
- $2\frac{11}{20}$
- 14
- 17.9
- \$21.99
- 20

### Study Link 4•6

- $\frac{6}{20}$
- $\frac{15}{63}$
- $\frac{15}{8}$  or  $1\frac{7}{8}$
- $\frac{11}{48}$
- $\frac{35}{48}$
- $\frac{21}{100}$
- $\frac{14}{45}$
- $\frac{32}{7}$  or  $4\frac{4}{7}$
- $\frac{96}{11}$ , or  $8\frac{8}{11}$
- $\frac{1}{5}$  of the points
- $2\frac{1}{4}$  cups
- $\frac{7}{12}$  of the sixth graders
- $\frac{1}{2}$  the girls
  - 6 girls
- 9
- 0.1
- 0.1

**Study Link 4•7**

1.  $\frac{9}{5}$       2.  $\frac{18}{6}$       3.  $\frac{17}{3}$       4.  $\frac{7}{2}$   
5. 3      6.  $4\frac{1}{8}$       7.  $2\frac{1}{2}$       8.  $6\frac{2}{3}$   
9. 3      10.  $4\frac{1}{5}$       11.  $2\frac{1}{12}$       12.  $5\frac{4}{9}$   
13.  $7\frac{31}{32}$       14. 20      15. 28      16. 63  
17. 63

**Study Link 4•8**

1.  $\frac{8}{10}$ , 80%      2.  $\frac{75}{100}$ , 75%      3.  $\frac{30}{100}$ ,  $\frac{3}{10}$   
4. 0.5      5. 0.75      6. 0.25      7. 1.8  
8.  $\frac{2}{5}$       9.  $\frac{1}{10}$       10.  $\frac{17}{25}$       11.  $\frac{1}{4}$   
12. 50%      13. 25%      14. 60%      15. 95%  
16.  $\frac{50}{100}$ ,  $\frac{1}{2}$       17.  $\frac{40}{100}$ ,  $\frac{2}{5}$       18.  $\frac{100}{100}$ , 1      19.  $\frac{180}{100}$ ,  $1\frac{4}{5}$

**Study Link 4•9**

1. 65%      2. 33.4%      3. 2%      4. 40%  
5. 270%      6. 309%      7. 0.27      8. 0.539  
9. 0.08      10. 0.60      11. 1.80      12. 1.15  
13. 0.88, 88%      14. 0.42, 42%

**Study Link 4•10**

Problems 1–4 are circle graphs.

**Study Link 4•11**

1. Table entries: 150, 100, 125, 125 students  
2. Table entries: 18, 12, 15, 15 students  
3. a. 3.3      b. 8.8      c. 22