Home Link 2-14

NAME DATE TIME

Fractions and Decimals

Of the different types of numbers that elementary school students are required to understand, fractions can be the hardest. To succeed with fractions, students must build on their understanding of whole numbers, but they also have to understand how fractions differ from whole numbers.

This unit focuses on three big ideas about fractions: recognizing equivalent fractions, comparing fractions, and representing or showing fractions in different ways.

Fraction Equivalence

Equivalence, or equality, is one of the biggest ideas in mathematics. Much of arithmetic, for example, is really just rewriting numbers in equivalent forms. When we ask students to solve 850 + 125, we are asking for a single number, 975, that is equivalent to 850 + 125.

Students were introduced to equivalent fractions in third grade. They reasoned about equivalent fractions by thinking about sharing ($\frac{1}{2}$ is a fair share when 1 whole is shared 2 ways), division ($\frac{3}{4}$ is the result of dividing 3 wholes into 4 parts), and measurement ($\frac{1}{2}$ of an inch and $\frac{2}{4}$ of an inch name the same length).

In fourth grade students learn a multiplication rule for making equivalent fractions: *To make a fraction equivalent to a given fraction, multiply the numerator and denominator by the same number* (*so long as that number is not 0*). For example, to make a fraction equivalent to $\frac{3}{4}$, we can multiply the numerator and denominator by 2: $\frac{3 * 2}{4 * 2} = \frac{6}{8}$.

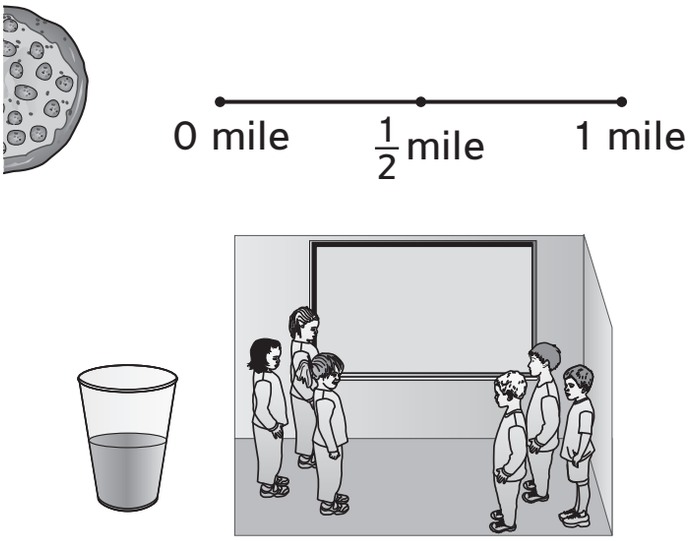
Comparing Fractions

When students compare fractions with the same denominator or numerator, they are also building on previous work by thinking about how familiar things are divided and shared. In third grade students reasoned that $\frac{3}{5}$ is less than $\frac{3}{4}$ because sharing 3 pizzas among 5 people means less pizza for each person compared to sharing the same 3 pizzas among only 4 people.

In fourth grade students continue work with fractions based on visual models and reasoning about sharing. They also learn to use benchmark fractions, such as 0, $\frac{1}{2}$, and 1. Students reason that $\frac{3}{5}$ is more than $\frac{1}{3}$ because $\frac{3}{5}$ is more than $\frac{1}{2}$ and $\frac{1}{3}$ is less than $\frac{1}{2}$.

Representing Fractions

One reason fractions can be hard to understand is that the same number can be shown in so many different ways. For example, $\frac{1}{2}$ can be written as $\frac{2}{4}$, $\frac{3}{6}$, or an infinite number of equivalent fractions. It can also be written as 0.5, 0.50, or an infinite number of other equivalent decimals. And the number $\frac{1}{2}$ can represent half the amount of different whole units.



Different representations of $\frac{1}{2}$

In this unit students work with fractions and decimals represented in many different ways, using concrete objects like fraction circle pieces, base-10 blocks, and strips of paper; hundred grids and number lines; drawings of circles and rectangles; and rulers and other measuring tools. For example, they might show that $\frac{3}{4}$ is greater than $\frac{5}{8}$ using fraction circle pieces, folding paper strips, pointing to marks on a ruler, or finding equivalent fractions with a common denominator or common numerator.

In this way students build a network of ideas that help them develop a solid conceptual understanding of fractions and decimals, which will support work in later units and grades that is focused on more formal rules and procedures.

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

Vocabulary

Important terms in Unit 3:

benchmark A count or measure that can be used to evaluate the reasonableness of other counts, measures, or estimates. For example, a benchmark for land area is a football field, which is about 1 acre.

centimeter A metric unit of length equivalent to 10 millimeters, $\frac{1}{10}$ of a decimeter, and $\frac{1}{100}$ of a meter.

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 so on.

common numerator A nonzero number that is a multiple of the numerators of two or more fractions. For example, the fractions $\frac{3}{4}$ and $\frac{4}{5}$ have common numerators 12, 24, 36, and so on.

denominator The nonzero digit b in a fraction $\frac{a}{b}$. In a part-whole fraction, the denominator is the number of equal parts into which the whole has been divided.

equivalent Equal in value, but possibly represented in a different form. For example, $\frac{1}{2}$, 0.5, and 50% are all equivalent.

Equivalent Fractions Rule A rule stating that if the numerator and denominator of a fraction are multiplied by the same nonzero number, the result is a fraction that is equivalent to the original fraction. This rule can be represented as: $\frac{a}{b} = \frac{(n * a)}{(n * b)}$.

hundredth A single part out of one hundred equal parts that form a whole.

interval The points and their coordinates on a segment of a number line. The interval between 0 and 1 on a number line is the *unit interval*.

meter The basic metric unit of *length* from which other metric units of length are derived. One meter is equal to 10 decimeters, 100 centimeters, or 1,000 millimeters. A meter is a little longer than a yard.

metric The measurement system used in most countries and by virtually all scientists around the world. Units in the metric system are related by powers of 10.

millimeter A metric unit of length equal to $\frac{1}{10}$ of a centimeter or $\frac{1}{1{,}000}$ of a meter.

numerator The digit a in a fraction $\frac{a}{b}$. In a part-whole fraction in which the whole is divided into a number of equal parts, the numerator is the number of equal parts being considered.

reasoning An explanation or justification for how to solve a problem or answer a question.

representation Something that shows, symbolizes, or stands for something else. For example, numbers can be represented using base-10 blocks, spoken words, or written numerals.

strategy A general approach to solving a problem or answering a question.

tenth A single part out of ten equal parts that form a whole.

unit A label used to put a number in context. In measuring length, for example, inches and centimeters are units. In a problem about 5 apples, the unit is apples. In *Everyday Mathematics* students keep track of units in *unit boxes*.

whole An entire object, collection of objects, or quantity being considered in a problem situation; 100%.

Do-Anytime Activities

To work with your child on concepts taught in this unit, try these activities:

1. Have your child look for everyday uses of fractions in grocery stores, shoe sizes, cookbooks, measuring cups, and statistics in newspapers and on television.
2. Encourage your child to express fractions, quantities, and measures, such as a quarter of an hour, a quart of orange juice, or a quarter cup of milk.
3. Encourage your child to incorporate terms such as *whole, halves*, *thirds*, and *fourths* into his or her everyday vocabulary.

Building Skills through Games

In this unit your child will play the following games to develop his or her understanding of fractions and decimals. For detailed instructions, see the *Student Reference Book.*

Fraction Match See *Student Reference Book,* page 263. This game is for 2 to 4 players and requires one set of fraction cards. The game develops skill in naming equivalent fractions.

Fraction Top-It See *Student Reference Book,* page 265. This is a game for 2 to 4 players and requires one set of fraction cards. The game develops skill in comparing fractions.

Decimal Top-It *See Student Reference Book,* page 253. This is a game for 2 to 4 players and requires one set of number cards and a gameboard. The game develops skill in comparing decimals.

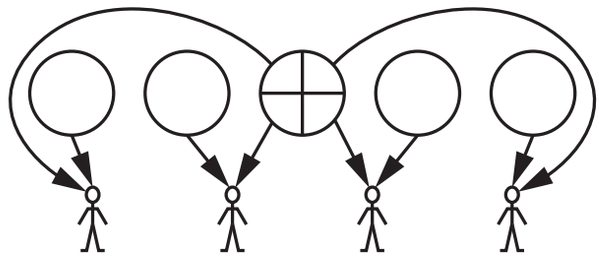
As You Help Your Child with Homework

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

Home Link 3-1

1. $1\frac{1}{4}$, or $\frac{5}{4}$ pizzas

One way:

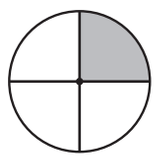


Another way:

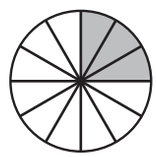
3. 14, 21, 28, 35 **5.** 2, 3

Home Link 3-2

1.



3.



6. 25, 30, 35, 40 **8.** 4, 6, 8, 12, 16, 24, 48

Home Link 3-3

1. **a.** $\neq$ **b.** $=$ **c.** $\neq$ **d.** $=$ **e.** $=$

3. *c*, *d*, and *e* should be circled

5. 8,033 **7.** 288

Home Link 3-4

1. 12 **3.** 6 **5.** 2 **7.** 12 **9.** 3

11. Sample answers: $\frac{2}{4}, \frac{4}{8}, \frac{5}{10}, \frac{6}{12}$

13. 1 and 30, 2 and 15, 3 and 10, 5 and 6

Home Link 3-5

1. **a.** $\frac{3}{4}$ **b.** Answers vary.

3. They will get the same amount; $\frac{3}{4}$ and $\frac{6}{8}$ are equivalent fractions.

6. 1 and 75, 3 and 25, 5 and 15

Home Link 3-6

1. They have both read the same amount; Sample answer: $\frac{3}{4}$ is the same as $\frac{6}{8}$.

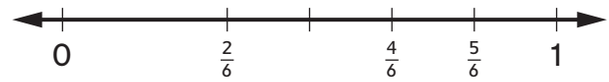
2. Heather; $\frac{5}{8} > \frac{5}{10}$, or $\frac{5}{10} < \frac{5}{8}$

3. Howard's; Sample answers: Jermaine's team won less than half of its games, and Howard's team won more than half; $\frac{2}{5}$ is the same as $\frac{4}{10}$, and $\frac{7}{10} > \frac{4}{10}$.

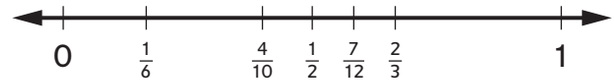
5. F **7.** T

Home Link 3-7

1. $\frac{2}{6}, \frac{4}{6}, \frac{5}{6}$



3. $\frac{1}{6}, \frac{4}{10}, \frac{1}{2}, \frac{7}{12}, \frac{2}{3}$



5. 10,121 **7.** 1,329

Home Link 3-8

1.

Number in Words	Fraction	Decimal
one-tenth	$\frac{1}{10}$	0.1
four-tenths	$\frac{4}{10}$	0.4
eight-tenths	$\frac{8}{10}$	0.8
nine-tenths	$\frac{9}{10}$	0.9
two-tenths	$\frac{2}{10}$	0.2
seven-tenths	$\frac{7}{10}$	0.7

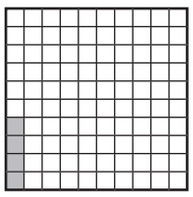
3. 0.5 **5.** 0.9

7. 1, 2, 4, 5, 10, 20, 25, 50, 100

9. 1 and 42, 2 and 21, 3 and 14, 6 and 7

Home Link 3-9

1. $\frac{30}{100}$; 0.30 **3.** $\frac{65}{100}$; 0.65

5. 

7. 3, 9

Home Link 3-10

1. 57; 5; 7 **3.** 4; 0; 4 **5.** 8.4 **7.** 0.05

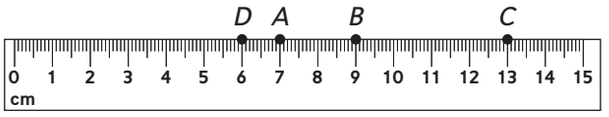
9. 0.04, 0.05, 0.06, 0.07, 0.08, 0.09

11. 46,000

Home Link 3-11

1. 0.02; 0.03; 0.04; 0.05; 0.06; 0.07

3–6.



7. **a.** > **b.** < **c.** > **9.** 13,931 **11.** 1,569

Home Link 3-12

1. Answers vary. **3.** 100; 1.8; 2,360; 572; 65

5. 1 and 60, 2 and 30, 3 and 20, 4 and 15, 5 and 12, 6 and 10

Home Link 3-13

1. < **3.** > **5.** > **7.** =

9. hundredths; 0.09 **11.** 6.59, 6.60, 6.61

13. 4.4 **15.** 8.1

17. 56,230 **19.** 15,379