Lesson 1-1

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

1 Write the ratios of males to family members, and females to family members, in your household in simplest form. Use the form $\frac{a}{b}$. Then, write the ratios in three other ways.

▶ Definition Review

A **ratio** is a comparison of two numbers by division.

Match each group with the correct ratio.

2 The ratio of ladybugs to butterflies is 2 to 5.

3 The ratio of ladybugs to butterflies is 2 to 3.
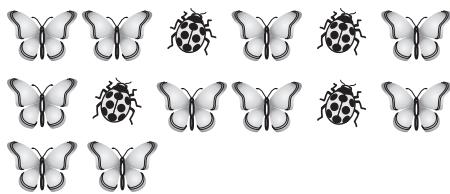
4 The ratio of ladybugs to butterflies is 3 to 4.

▶ Application

Finding Ratios

- Students work individually.
- Students observe their classmates to find the following ratios:
  - The ratio of girls to boys in the class.
  - The ratio of boys to the total number of students in the class.
  - The ratio of students wearing red to students wearing blue.
  - The ratio of students with blond hair to students with black hair.
  - The ratio of students who do not have brown hair to the total number of students in the class.

Lesson 1-2

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Circle the product with the lower unit cost in each group.

1

Parmesan Cheese — Made from real cheese — **6 oz.** — $3.99

Parmesan Cheese — Made from real cheese — **4 oz.** — $2.48

2

$2.50 — Veggie Juice — 46 ounces

$1.45 — Veggie Juice — 36 ounces

3

Parmesan Cheese — 6 ounces — $3.99

Parmesan Cheese — 4 ounces — $2.48

4

Contains 6 rolls — $0.99

Contains 8 rolls — $1.25
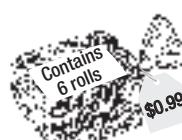
▶ Definition Review

A **rate** is a ratio of two measurements or amounts with different units. A **unit rate** describes how many units of the first type of quantity are equal to one unit of the other type of quantity.

Draw a line to match each rate to its unit rate.

|		
5	18 miles in 3 hours	20 miles per hour
6	64 miles in 4 hours	60 miles per hour
7	300 miles in 15 hours	6 miles per hour
8	120 miles in 2 hours	16 miles per hour

▶ Application

Complete the graphic organizer.

Ratio	Rate
Examples	Examples
Unit Rate	**Unit Cost**
Examples	Examples

Lesson 1-3 Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

You and your friends are playing a board game using the spinner below. Use the spinner to find each probability.

1 $P(12)$ _____
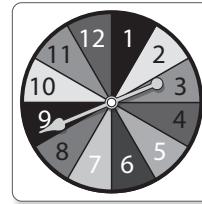
2 $P(\text{even number})$ _____

3 $P(\text{a number } not \text{ divisible by 4})$ _____

4 $P(\text{a number greater than 5})$ _____

5 $P(\text{a number less than or equal to 3})$ _____

▶ Definition Review

Probability is a number between 0 and 1 that measures the likelihood of an event happening. A **ratio** is the comparison of two numbers by division.

A bag contains packets of different salad dressings: 3 Ranch, 8 Italian, 15 French, and 4 Thousand Island. One packet is picked without looking. Match each probability to the correct ratio.

6 $P(\text{Ranch})$ $\dfrac{11}{15}$

7 $P(not \text{ Italian})$ $\dfrac{0}{30}$

8 $P(\text{French or Italian})$ $\dfrac{1}{10}$

9 $P(\text{Vinaigrette})$ $\dfrac{23}{30}$

▶ Application

Find the experimental probability of an event.

- What is the theoretical probability of getting a 3 when you roll a 6-sided number cube with the numbers 1–6?
- Roll a number cube 36 times and record the result each time.
- What is the ratio of the number of times a 3 was rolled to the total number of times the number cube was rolled?
- Was the experimental probability equal to the theoretical probability? Explain.

Lesson 2-1

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Complete each sentence.

The word "percent" is made from two parts: "per-" which means "out of" or "for every," and "-cent," which means "hundred." What other words do you know that uses "cent" to mean "hundred"?

1 There are 100 years in a _____ .

2 There are 100 _____ in one dollar.

3 There are 100 _____ in one meter.

▶ Definition Review

Use the following words to complete each sentence.

equivalent   ratio   percent

1 A _____ is a ratio that compares a number to 100.

2 A comparison of two numbers by division is a _____ .

3 Fractions that name the same number are _____ .

▶ Application

Complete each web.

Fraction in simplest form — 78% — Decimal form

78% — Word form

Percent — $\frac{4}{5}$ — Decimal form

$\frac{4}{5}$ — Word form
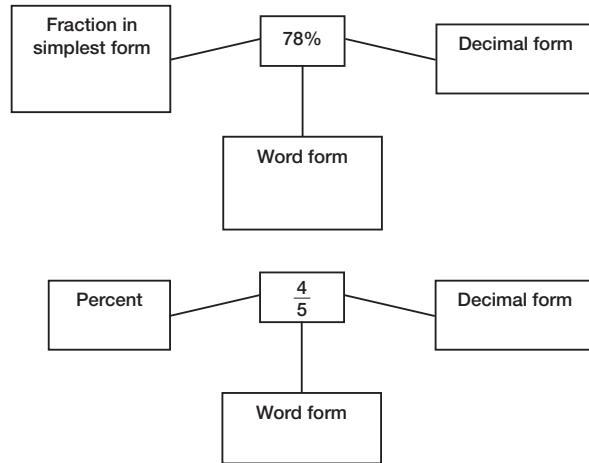
Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

1 Draw a line to connect the percentage on the left with the correct fraction or decimal on the right.

Percent	Fraction or Decimal
56%	0.08
80%	$\frac{14}{25}$
12%	0.8
8%	$\frac{3}{25}$

▶ Definition Review

An **estimate** is a number close to an exact value; an estimate indicates *about* how much.

Fill in the blanks.

2 A percent is a ratio that compares a number to _____.

3 A _____ is an object or number used as a guide to estimate or reference.

4 A number close to an exact value is called an _____.

▶ Application

- Students work in groups of 4 or 5. Each group chooses a letter name (Group A, Group B, etc…).
- Each group writes six problems involving percents; three skill problems (find 30% of 50); and three application problems (A customer wants to leave a 20% tip. . .).
- Each group should make an answer key and give it to the teacher.
- Students then rotate around the classroom to answer the questions created by the other groups. Students work together as a group to answer each set of problems.
- Once the students are on their last set of problems, have one group at a time put the answers on the board so that all students may check their answers.

Lesson 2-3 Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

1 Complete the table.

Ratio	Fraction	Decimal	Percent
6 to 8			
	$\frac{20}{25} =$		
		0.55	
			33%

▶ Definition Review

To **compare** is to look closely at numbers or objects to find similarities and differences.

To **order** is to arrange numbers so they ascend from least to greatest, or descend from greatest to least.

Complete each sentence.

2 Numbers arranged from least to greatest or greatest to least are in _____.

3 Numbers are more easily _____ when they are written in the same form.

4 Fractions are more easily compared when they have a _____.

▶ Application

- Students work in groups of 3 or 4.
- Each group writes a question that they can survey the class about, such as how many siblings, what kind of pets, how they get to school, etc.
- Students then ask their question to their classmates and record the data.
- Students then find the probability of each response, and write the probabilities in order from greatest to least.
- Each group reports their findings to the class.

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Complete the table to find your weight on other planets. Round weights to the nearest pound if needed.

	Planet	Earth Weight	Percent of Earth Weight	Planet Weight
1	Mercury		38%	
2	Jupiter		254%	
3	Uranus		80%	

- Between which two planets is the difference the greatest?

_____

▶ Definition Review

Percents can be less than 1% or more than 100%. A percent that is less than 1% is written as a fraction or decimal. A percent more than 100% contains more than 1 whole.

Fill in the blanks with the correct vocabulary word.

4   The percent equation is _____ × _____ = _____.

5   A _____ is a comparison of two numbers by division. The figure shows red squares and blue squares.

6   Write this comparison of red squares to blue squares in three different ways:

_____

7   When the comparison uses hundredths, it is called a _____.

▶ Application

Follow the directions for the activity.

- Students work in pairs.
- Refer to the information in the table above.
- Find the Earth weight of an object that weighs 20 pounds on each planet. Round to the nearest pound.

Lesson 3-2

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Find the amount paid

Casey bought a pair of jeans and 2 T-shirts. Sales tax is $8\frac{1}{4}$%.

$29.99

$9.99

SALE
25% off
everything!

1 What is the total cost of the jeans and 2 T-shirts before the savings? _____

2 What is the total cost of the jeans and 2 T-shirts after the savings? _____

3 What is the final cost of Casey's purchase, including sales tax? _____

▶ Definition Review

A **ratio** is a comparison of two numbers by division
A **percent** is a ratio that compares a number to 100.

Application

Follow the directions to create a circle graph.

- Students work in pairs. Student pairs examine the data below.

-
Student Hair color			
Total number of students in class: 24			
Hair color:	6 blonde	6 brown	3 red	9 black

- Write the fraction of students with each hair color. _____
- Draw a large circle. Draw lines to divide the circle into eights.
- Color and label the sections of the circle based on the fractional values.
- Calculate the percent of students with each hair color and add this information to the graph.
- Discuss and compare your graph with others..

Lesson 3-3

Practice: Vocabulary and English Language Development

Chapter 3

▶ Activate Prior Knowledge

Compare simple interest and compound interest.

Derek invested $500 at 4% interest. Compare the value of the investment over 10 years, at 4% simple interest and at 4% interest compounded annually.

	Principal	2 years	4 years	6 years	8 years	10 years
Simple	$500.00	$540.00	$580.00	$620.00	$660.00	$700.00
Compound	$500.00	$540.80	$584.93	$632.66	$684.28	$740.12

1 Simple interest is calculated on the original investment. Find the interest earned, adding it to the principal to find its value. Enter the values in the table.

2 Compound interest is calculated on the previous total of principal and interest; the compound interest formula finds the ending value. Find the value of the investment.

3 What conclusion can be drawn from the information in this table?

_____

▶ Definition Review

When you have a savings account, the bank pays you money. This payment is called _____. The amount of money in your savings account is called the _____.

▶ Application

Follow the directions to find effective rate.

The effective rate of an investment is the simple interest rate that would produce an equal amount of interest, in one year, to the given compound interest rate. Students should:

- work in groups of 2 or 3. Paper, pencils, and calculators are needed.
- find the effective rate of 8% compounded quarterly.
- find the value of an investment of $200 at 8% compounded quarterly for one year. Subtract the amount of the original investment to determine the amount of interest earned in that year.
- find the simple interest rate that produces the same amount of interest on $200 in 1 year. This is the effective rate.
- use $100 as the value of the investment. Is the effective rate the same?
- discuss the findings and determine how to find the effective rate if the initial investment is not given.
- find the effective rate for 6% compounded semiannually.

Lesson 3-4 Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Complete the exercise to learn about double discounts.

Brittany is browsing through a sale rack at a clothing store. The items on the rack are marked at 10% off. The sign on the rack says "Take an additional 15% off." Are these two discounts the same as 25% off? Explain. _____

1 Suppose the item Brittany is interested in buying has an original price of $24.00. Find the price if it is marked at 10% off, _____ , 15% off _____ , and 25% off _____

▶ Definition Review

A **percent** of change is a **ratio** that compares a change in quantity to the original amount. An **increase** has taken place when the ending amount is greater than the original amount. A **decrease** has taken place when the ending amount is less than the original amount.

Fill in each blank with the correct term: *increase, decrease, amount of change, original amount.* Some terms will be used more than once.

2 A _____ is when the ending amount is less than the original amount.

3 The _____ is the difference between the new amount and the original amount.

▶ Application

Complete the table and discuss the results.

- Students work in groups of 2 or 3.
- Student groups complete the following table. ($100 chosen for ease in calculating)

Original Price	$100	$100	$100	$100	$100
Percent Increase	5%	25%	100%	150%	275%
Amount of Increase					
New Price					
New Price is What Percent of Original?					

- Students calculate the new price, given the original price and the percent of increase. Write answers in the table.
- For each entry in the table, find what percent the new price is of the original. Write answers in the table.
- Discuss findings within the group. How can the percent in the last row be found and used to find the new price? _____
_____

Lesson 4-1

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Complete the analogies.

1 Sock is to foot as _____ is to hand.

2 Car is to driver as _____ is to pilot.
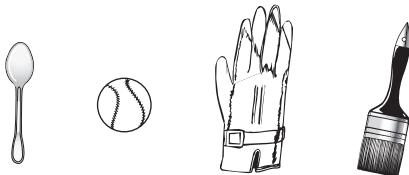
▶ Definition Review

Write the vocabulary word that completes the sentence.

3 To _____ means to find the product of the numerator or one fraction and the denominator of the other fraction.

4 _____ is the ratio of two measurements or amounts made with different units.

Identify each ratio as a *rate* or *unit rate*.

5 25 pages in 2 hours _____

6 142 miles in 1 day _____

7 5 potatoes for $1 _____

8 9 presents with 2 spools of ribbon _____

9 6 sandwiches for 4 children _____

10 12 flowers for 1 bouquet _____

▶ Application Assessment/Engagement

Follow the directions for the activity.

- Organize the class into groups of 4 to 5 students.
- Have each group create a fraction by rolling a number cube twice, picking two numbers out of a bag, or just making it up.
- Instruct each student to write a new fraction that is proportional to the fraction the group created.
- Have the students compare their fractions within their group.
- Are all of the fractions within the group proportional?
- Have the groups repeat the process with new fractions as time allows.

Lesson 4-2 Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Convert the money.

1 80 nickels = _____ dollars

3 1,000 pennies = _____ dollars

2 3.5 dollars = _____ dimes

4 16 dollars = _____ quarters

▶ Definition Review

Write the vocabulary term that completes the sentence.

5 A rate that describes how many units of the first type of quantity are equal to 1 unit of the other type of quantity is a _____.

6 A(n) _____ is an equation stating that two ratios or rates are equivalent.

Identify each measurement as *customary* or *metric*.

7 pound _____

11 gallon _____

8 yard _____

12 ton _____

9 milligram _____

13 quart _____

10 kilometer _____

14 liter _____

▶ Application

Follow the directions for the activity.

- Allow students to measure their height in inches and write it down.
- Ask students to write down their weight in pounds. (If students do not know their exact weight, allow them to approximate it.)
- Instruct students to convert their height from inches to centimeters and meters.
- Instruct students to convert their weight from pounds to kilograms.
- Ask for volunteers to share how they converted their measurements.
- Discuss real-world examples when we need to be able to convert measurements.

Lesson
4-3 Practice: Vocabulary and English
Language Development

▶ Activate Prior Knowledge

Write a ratio for each picture.

1 _____
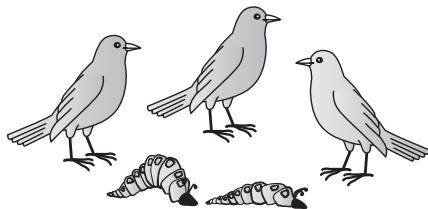
2 _____
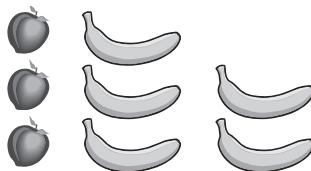
▶ Definition Review

Write the vocabulary word that completes the sentence.

3 A _____ is a rate that describes how many units of the first type of quantity are equal to 1 unit of the other type of quantity.

4 A _____ is a comparison of two numbers by division.

Identify each as a *cost, unit cost, rate,* or *unit rate*.

5 5 bananas for $1.50 _____

6 18 pages in 20 minutes _____

7 55 miles per hour _____

8 5 children for 2 adults _____

9 $48.50 for 1 sweater _____

10 $275.00 for 2 MP3 players _____

▶ Application

Follow the directions for the activity.

- Allow each student to measure their heart rate for 10 seconds.
- Ask students what their heart rate is per minute.
- Discuss how the students were able to convert their 10-second measurement to a one-minute rate.
- Allow students do jumping jacks for 2–3 minutes.
- Have students measure their heart rate again for 10 seconds.
- Ask students what the new rate is per minute.
- Discuss why each heart rate can be thought of as constant, yet, the two heart rates are different.
- Ask students what other rates may vary from one occasion to another.

Math Triumphs

Lesson 4-4

Practice: Vocabulary and English Language Development

▶ Activate Prior Knowledge

Identify each shape.

1
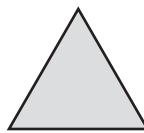
**2**

3

_____   _____   _____
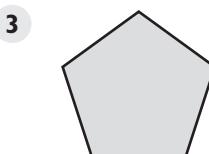
▶ Definition Review

**Write the vocabulary word that completes the sentence.**

4 A _____ is an equation stating that two ratios or rates are equivalent.

5 _____ is the ratio of two measurements or amounts made with different units.

Determine whether the shapes are similar.
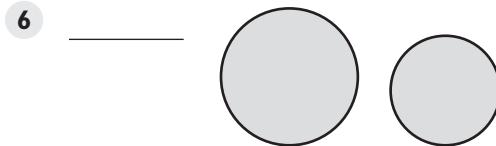
**6** _____

8 _____
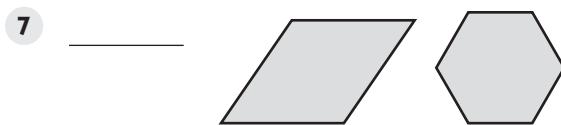
7 _____
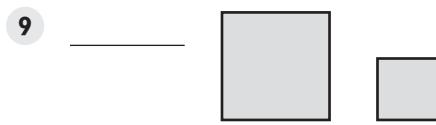
9 _____

▶ Application

Follow the directions for the activity.

- Ask volunteers to bring in city, state, and country maps.
- Organize the class into groups of 3 to 4 students.
- Provide each group with a map.
- Each group should select a central location on their map.
- Have each student select a destination on their map.
- Instruct students to find the distance from the central location to their destination using the scale.
- Discuss how maps are proportional to actual areas.
- Allow groups to trade maps and repeat the activity as time allows.

Math Triumphs