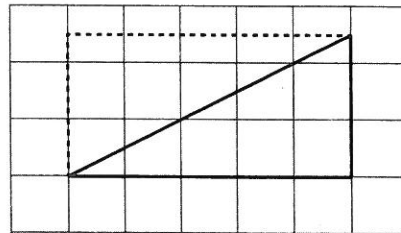


Applications of Measurement, Computation, and Graphing

Unit 8 provides opportunities for your child to review and apply in engaging, real-world contexts many of the mathematical skills and concepts learned during the school year.

At the beginning of the unit students apply their knowledge of area to find areas of playing surfaces for different sports and to make a plan for an athletic center. They also explore the rectangle method, which is a way of using the area formula for a rectangle to find the areas of other figures. Students do not learn area formulas for other figures, but this work will prepare them for using formulas to find areas of other figures in future grades.

For example, to find the area of the triangle at the right using the rectangle method, students draw a rectangle around it as shown by the dotted lines. The area of the rectangle is $5 \times 2\frac{1}{2} = 12\frac{1}{2}$ square units, and the triangle is half of the rectangle. Therefore, the area of the triangle is $12\frac{1}{2} \div 2 = 6\frac{1}{4}$ square units.



In Lesson 8-3 students use their knowledge of length, area, and volume, as well as guidelines about the amount of space and oxygen that fish need to be healthy, to choose an aquarium and the fish that will live in it. In Lesson 8-4 they apply similar skills to explore how the height of a fixed volume of water will change as the length of a room changes.

The middle of the unit focuses on applications of whole-number and decimal computation and unit conversions. In Lesson 8-5 students develop a plan for how they would spend \$1,000,000 to open and operate an animal shelter. In Lessons 8-6 and 8-7 they calculate how long it would take to earn \$1,000,000 and to pay off the national debt. In Lesson 8-8 they use the length of one step to calculate how many steps they would take to walk to a specific destination and how much time the trip would take.

In the last part of the unit students collect data and learn how graphs can be used to illustrate how one variable affects another. In Lessons 8-9 and 8-10 they explore how exercise affects their heart rates and cardiac output. In Lessons 8-11 and 8-12 they investigate how different features of a pendulum, such as its length or the size of its arc, affect the length of time it takes the pendulum to swing back and forth.

The lessons in this unit are a culmination of the hard work students have done in mathematics in fifth grade. We hope your child enjoys learning how his or her mathematical skills can be used to solve engaging, real-world problems.

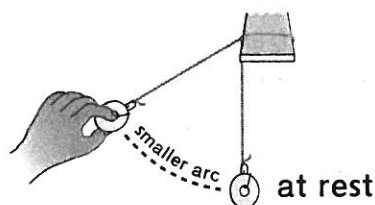
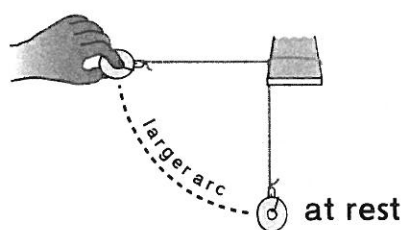
Vocabulary

Important terms in Unit 8.

acre A unit of area equal to 43,560 square feet. Acres are often used to measure land. One acre is roughly the size of one football field.

arc of a pendulum The curved path that the *bob* of a *pendulum* follows as it swings back and forth.

arc size A measure of the *arc* created by a *pendulum* swing. In Lesson 8-12 students measure arc size according to the angle made by the pendulum's string when the *bob* is at its highest point and when the pendulum is at rest.



bob The object at the end of a *pendulum*.

cardiac output The amount of blood pumped by a person's heart in one minute.

debt An amount of money that one person or institution owes to another.

heart rate The number of times a person's heart beats in a given amount of time. For example, a typical heart rate for a fifth grader is about 90 beats per minute.

heart-rate profile A graph that shows changes in *heart rate* according to amount of exercise, intensity of exercise, or some other variable.

national debt The total amount of money that a national government owes.

pendulum An object, called the *bob*, suspended from a fixed support by a string or wire so that the object can swing freely back and forth.

pulse The regular throbbing of the arteries caused by the heart pushing blood through the body. The pulse can usually be felt along the wrist and jawline.

rectangle method A method for finding area in which rectangles are drawn around a figure or parts of a figure. The area of the original figure can be found by adding or subtracting the areas of rectangles or triangular halves of rectangles.

unit conversion A fixed relationship, such as $1 \text{ yard} = 3 \text{ feet}$, that can be used to convert measurements within or between systems.

unit cost The cost per item or per unit of measure. For example, if dog collars cost \$3.99 each, the unit cost for a dog collar is \$3.99. If a 10-pound bag of dog food costs \$12.50, the unit cost is \$12.50 per bag or \$1.25 per pound.

Do-Anytime Activities

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

1. Have your child look up the dimensions of his or her favorite sport's playing surface and calculate the area. Then have him or her convert the area to a different unit.
2. Have your child look up the price of something he or she wants to buy. Suggest an hourly wage and have your child calculate how many hours he or she would have to work to earn the money for the item.
3. Have your child take his or her pulse before and after different types of exercise and analyze the effects of the exercise on heart rate.

Building Skills through Games

In Unit 8 your child will play these games to practice multiplying fractions, multiplying decimals, multiplying and dividing decimals by powers of 10, and drawing and naming figures with given attributes. Detailed instructions for each game are in the *Student Reference Book*. Many of these games can be played with items you likely already have at home. Gameboards and card decks may be copied for home use.

Decimal Domination See *Student Reference Book*, page 295. Two players need number cards 0-9 (4 of each), 4 counters (2 per player), and a coin to play this game. *Decimal Domination* provides practice with multiplying decimals.

Exponent Ball See *Student Reference Book*, pages 303-304. Two players need number cards 1-4 (4 of each), two 6-sided dice, a counter, and the *Exponent Ball* Gameboard from *Math*

Masters, page G28 to play this game. *Exponent Ball* provides practice with multiplying and dividing decimals by powers of 10.

Property Pandemonium See *Student Reference Book*, page 320. Two players need the *Property Pandemonium* Card Deck and Record Sheet from *Math Masters*, pages G32 and G33 to play this game. *Property Pandemonium* provides practice with drawing, naming, and classifying quadrilaterals.

Spoon Scramble See *Student Reference Book*, page 324. Four players need three spoons and the *Spoon Scramble* cards from *Math Masters*, page G30 to play this game. *Spoon Scramble* provides practice with multiplying fractions and multiplying and dividing by powers of 10.

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 8-1

1. Carson: 1,584; 22×8 ; 176. Flanigan: 42×38 ; 1,596; $177\frac{1}{3}$. Salazar: 1,520; $6\frac{1}{3} \times 26\frac{2}{3}$; $168\frac{8}{9}$.
De Marco: 15×106 ; 1,590; $176\frac{2}{3}$.

2a. Flanigan 2b. Salazar

3. 9; Sample explanation: There are 9 square feet in 1 square yard, so it makes sense that an area in square feet would be 9 times the area in square yards.

4. $\frac{21}{4}$, or $5\frac{1}{4}$ 5. $\frac{34}{5}$, or $6\frac{4}{5}$
6. $\frac{99}{12}$, or $8\frac{3}{12}$ 7. $\frac{75}{16}$, or $4\frac{11}{16}$

Home Link 8-2

1. 5 2. $8\frac{1}{4}$ 3. 9 4. $6\frac{3}{4}$ 5. 1.12 6. 11.825

Home Link 8-3

1. 102 2. The Ice Storm
3. $\frac{19}{8}$, or $2\frac{3}{8}$ 4. $6\frac{12}{15}$, or $\frac{102}{15}$

Home Link 8-4

1. 16 centimeters 2. 28 3. 61.2

Home Link 8-5

- 1.-2. Answers vary. 3. $\frac{780}{24}$, or $32\frac{12}{24}$
4. $\frac{1,495}{24}$, or $62\frac{7}{24}$

Home Link 8-6

- 1a. 5 hours 1b. \$10 1c. 20 months, or 100 hours
2. 40 3. $\frac{1}{48}$

Home Link 8-7

1. 6 cars 2a. 8 times 2b. 24 miles
3a. \$5,060 3b. Yes. 4. 4,530
5. 0.00628 6. 29,100,000 7. 73.542

Home Link 8-8

1. 212
2. Answers vary based on step length.
3. $\frac{168}{15}$, or $11\frac{3}{15}$ 4. $\frac{437}{12}$, or $36\frac{5}{12}$

Home Link 8-9

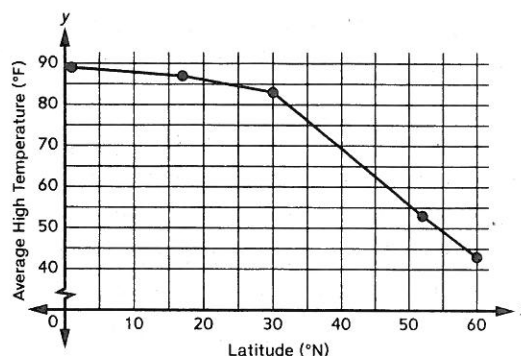
1. 2 cups; 2 pints 2. 75; 150; 300
3. Sample answer: There are 300 blueberries in 1 quart, and a plant produces 4 quarts in 1 year. So a plant would produce 300×4 , or 1,200, blueberries in 1 year.
4. 1,320,000
5a. 24,000 5b. 26,400,000
6. 29.824 7. 169.624

Home Link 8-10

- 1a. 72; 2.4; 172.8 1b. 10,368 1c. 1,296
2a. 135; 0.25; 33.75 2b. 2,025 2c. 253
3. 25.8 4. 9.1

Home Link 8-11

1. (1, 89); (17, 87); (30, 83); (52, 53); (60, 43)



2. About 84°F
3. Yes; Sample answer: As the latitude increases, average high temperature seems to go down. I can tell because as you move to the right on the graph, the points get lower.

Home Link 8-12

1. 207°F 2. 214°F
3. Sample answer: As altitude goes up, the boiling point of water goes down.
4. Sample answer: As the amount of salt goes up, the boiling point of water goes up too.
5. $\frac{1}{24}$ 6. 50