Home Link 1-1

NAME DATE TIME

Introduction to *Fifth Grade Everyday Mathematics*

Welcome to *Fifth Grade Everyday Mathematics*®. This curriculum was developed by the University of Chicago School Mathematics Project to offer students a broad background in mathematics.

The features of the program are described below to help familiarize you with the structure and expectations of *Everyday Mathematics.*

A problem-solving approach based on everyday situations Students learn basic math skills in a context that is meaningful by connecting their own knowledge and experience with mathematical concepts.

Frequent practice of basic skills Students practice basic skills in a variety of engaging ways. They complete mental math and fluency exercises on a daily basis, and they play games specifically designed to help them develop and practice basic skills.

An instructional approach that revisits concepts regularly Lessons are arranged to take advantage of previously learned concepts and skills and to build on them throughout the year.

A curriculum that explores mathematical content beyond basic arithmetic
Mathematics standards in the United States and around the world tell us that basic arithmetic skills are only the beginning of the mathematical knowledge students need to become mathematically proficient adults and critical thinkers. *Fifth Grade Everyday Mathematics* develops concepts and skills in topics covering a broad range of mathematics, including operations and algebraic thinking, number and operations in base ten, number and operations with fractions, measurement and data, and geometry.

Everyday Mathematics provides you with ample opportunities to monitor your child's progress and participate in your child's mathematical experiences. Throughout the year you will receive Family Letters to keep you informed of the mathematical content your child is studying in each unit. These letters include helpful information, such as a vocabulary list, Do-Anytime Activities suggested for you and your child, and answer guides to selected Home Link (homework) activities.

Please keep this Family Letter for reference as your child works through Unit 1.

Following the recommendations of the Common Core State Standards, *Fifth Grade Everyday Mathematics* emphasizes the following content:

Operations and Algebraic Thinking Understand and evaluate numerical expressions with grouping symbols (parentheses, brackets, and braces); write expressions that represent real-world situations; analyze patterns and describe relationships between numbers.

Number and Operations in Base 10 Understand the meanings, uses, and representations of numbers in our base-10 place-value system; understand and perform operations with multidigit numbers and decimals.

Number and Operations—Fractions Add and subtract fractions with unlike denominators; multiply fractions and mixed numbers; divide whole numbers by unit fractions and unit fractions by whole numbers; solve real-world problems that involve fractions and computation with fractions.

Measurement and Data Create and interpret line plots to represent fractional data; convert between measurement units and use conversions to solve real-world problems; understand concepts of volume; find the volume of rectangular prisms.

Geometry Use and understand a coordinate grid to graph and solve real-world and mathematical problems; understand categories and subcategories of shapes; classify 2-dimensional shapes based on their properties.

Unit 1: Area and Volume

Students begin Unit 1 by exploring the Grade 5 *Student Reference Book*. They review how to interpret parentheses in mathematical expressions, and they review area and develop strategies for finding the area of rectangles in which the length of one side is a fraction. Students then begin to explore the concept of volume. They measure how much a container can hold by packing it with small items like beans or popcorn kernels, and then they move to a more standard unit: the unit cube. Students learn to measure volume in increasingly sophisticated ways. They start by counting individual cubes. Then they work with layers of cubes. Finally, students discover two mathematical formulas for volume. They use their understanding of volume measurement to solve real-world problems about the volume of boxes, cases, and other containers.

As your child works through Unit 1, Home Links will provide many opportunities to explore the volume of everyday objects at home. While Unit 1 lessons focus on the volume of rectangular prisms (boxes), it is important to remember that all 3-dimensional objects have volume.

Vocabulary

Important terms in Unit 1:

area The amount of surface inside a 2-dimensional figure. Area is often measured in *square units,* such as square inches or square centimeters, or other units, such as acres.

cubic unit A unit such as a cubic centimeter or a cubic foot used in measuring *volume.*

expression A mathematical phrase made up of numbers, operation symbols, and other symbols. An expression does *not* include relation symbols (=, >, <, and so on). $3 + 4$; $5 * (7 - 3)$; and $6 * 9 + 2$ are all expressions.

grouping symbols Symbols such as parentheses ( ), brackets [ ], and braces { } that determine the order in which operations in an expression are to be done.

rectangular prism A prism with rectangular bases. A shoebox is a rectangular prism.

square unit A unit such as square centimeter or square foot used in measuring *area*.

3-dimensional (3-D) Having *volume*.

volume A measure of how much space something takes up. Volume is often measured in *cubic units*, such as cm^3, or other units, such as gallons.

Do-Anytime Activities

To help your child develop concepts about volume, try these activities:

1. Explore various containers around your home. Ask questions like these: *Which container holds the most? How can you tell?*
2. Find a box and ask your child to show you how to use a formula to calculate its volume.

Building Skills through Games

In Unit 1 your child will practice operations, computation, and geometric measurement skills by playing the games listed here. Detailed instructions for each game are in the *Student Reference Book*. Many of them can be played at home with a regular deck of playing cards. Just remove the face cards and use the ace to represent 1.

Baseball Multiplication See *Student Reference Book*, page 292. Two teams of one or more players need 4 each of number cards 1–10, counters, a game mat, and a calculator to play. *Baseball Multiplication* builds fluency with multiplication facts and strengthens mental arithmetic skills.

Buzz See *Student Reference Book*, page 294. This is a game for five to ten players. *Buzz* provides practice finding multiples of a number and common multiples of two numbers.

Name That Number See *Student Reference Book*, page 315. Two or three players need a deck of number cards to play. *Name That Number* provides practice with computation and strengthens skills related to number properties.

Prism Pile-Up See *Student Reference Book*, page 319. Two players need a set of *Prism Pile-Up* cards to play. *Prism Pile-Up* provides practice calculating and comparing the volumes of rectangular prisms.

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 1-2

1. $8\frac{4}{5}$ **2.** 13 **3.** 3 **4.** 7 **5.** 10 **6.** 6

Home Link 1-3

1. 3 cm^2 **2.** $7\frac{1}{2}$ cm^2

3. 3 **4.** 60 **5.** $1\frac{1}{2}$ **6.** 6

Home Link 1-4

1. 4 **2.** 9 **3.** 16 **4a.** 24 **4b.** $1\frac{1}{2}$

5a. 60 **5b.** 3 **6a.** 1 **6b.** 4,000

Home Link 1-5

1–3. Answers vary. **4.** 28 **5.** $23\frac{1}{3}$

Home Link 1-6

1. bar of soap; baseball; empty crayon box; bucket; swimming pool; cereal box; kitchen sink

3. 350 **4.** 230 **5.** 604 **6.** 0

Home Link 1-7

1. 140; 140 **2.** 216; 216 **3.** 120; 120

4. 88 **5.** 74 **6.** 240 **7.** 20

Home Link 1-8

1a. 96 **1b.** No. **2a.** 108 **2b.** Yes.

3a. 105 **3b.** Yes. **4.** $14 + 2 = 6 + 2 * (3 + 2)$

5. $(16 - 5) * 4 = 22 * 2$

6. $16 \times 10 = (100 + 220) \div 2$

7. $3 * (56 - 4) = 128 + 28$

Home Link 1-9

1. Set 1: 40 $units^3$; 40 $units^3$; 36 $units^3$

2. Set 2: 16 cm^3; 18 cm^3; 18 cm^3

3. 9 cm^2 **4.** $17\frac{1}{2}$ $in.^2$

Home Link 1-10

1. cubic meters **2.** cubic inches

3. cubic miles **4.** cubic meters

5. Sample answer: The unit that is the longer length is the larger volume unit, because the volume unit is a cube that has the length, width, and height of that length unit.

6–8. Answers vary. **9.** 80 **10.** 100

Home Link 1-11

1. 128; Sample answer: a microphone

2. 270; Sample answers: a couch, two stairs

3. 122; Sample answers: a cup, a vase

Home Link 1-12

Round 1 25; 50; Sample answer: $20 + 20 + 5 + 5 = 50$

Round 2 42; 36; Sample answer: $2 * 7 * 3 = 42$

Round 3 48; 40; Sample answer: $6 * 4 * 2 = 48$

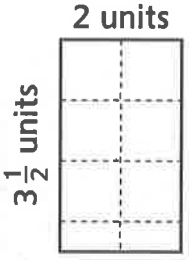
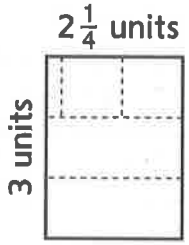
Strategies for Finding Area

Home Link 1-2

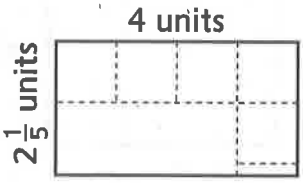
NAME DATE TIME

SRB 221, 224-225

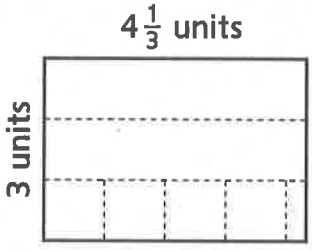
Here are two strategies you can use to find the area of a rectangle.

Divide the rectangle into unit squares. Count the squares and partial squares.	Think about using copies of a row or column to fill up the rectangle.
	
6 whole squares plus 2 partial squares that are each $\frac{1}{2}$ square makes 7 squares in all.	There are $2\frac{1}{4}$ squares in each row and 3 rows. $2\frac{1}{4} + 2\frac{1}{4} + 2\frac{1}{4} = 6\frac{3}{4}$ squares in all.
Area = 7 square units	Area = $6\frac{3}{4}$ square units

Find the area of each rectangle.

① 

Area = _____ square units

② 

Area = _____ square units

Practice

Solve.

③ $14 - (9 + 2) =$ _____

④ $(14 - 9) + 2 =$ _____

⑤ $8 + (6 / 2) - 1 =$ _____

⑥ $(8 + 6) / 2 - 1 =$ _____

Finding the Area of Rectangles

Home Link 1-3

NAME DATE TIME

Find the area of the rectangles below. Write a number sentence for each problem and explain how you found the area.

1 cm

1 cm²

① $1\frac{1}{2}$ cm

cm

Area = _____

Number sentence: _____

Explanation:

② 3 cm

$2\frac{1}{2}$ cm

Area: _____

Number sentence: _____

Explanation:

Practice

Solve.

③ 36 inches = _____ feet

④ _____ inches = 5 feet

⑤ 18 inches = _____ feet

⑥ $\frac{1}{2}$ foot = _____ inches

How Many Fields?

Home Link 1-4

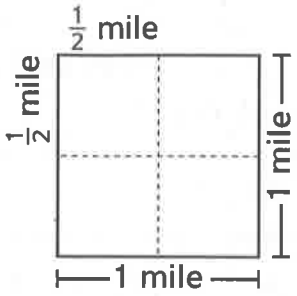
NAME DATE TIME

SRB 226

A farmer has one square mile of land.

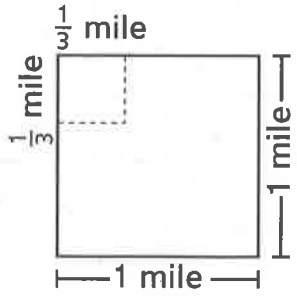
① If he divides his land into square fields that are $\frac{1}{2}$ mile long and $\frac{1}{2}$ mile wide, how many fields will he have?

_____ fields



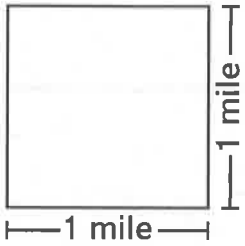
② If he divides his land into square fields that are $\frac{1}{3}$ mile long and $\frac{1}{3}$ mile wide, how many fields will he have?

_____ fields



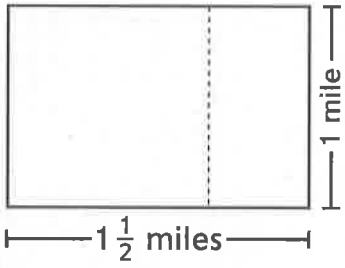
③ If he divides his land into square fields that are $\frac{1}{4}$ mile long and $\frac{1}{4}$ mile wide, how many fields will he have?

_____ fields



④ **a.** Suppose the farmer buys another $\frac{1}{2}$ square mile of land and divides all his land into square fields $\frac{1}{4}$ mile long and $\frac{1}{4}$ mile wide. How many fields will he have?

_____ fields



b. What is the total area of his land in square miles?

_____ square miles

Practice

⑤ **a.** _____ min = 1 hr **b.** 180 min = _____ hr

⑥ **a.** 1,000 g = _____ kg **b.** _____ g = 4 kg

Comparing Volumes of Everyday Objects

Home Link 1-5

NAME DATE TIME

SRB 230

Find these (or similar) items in your house:

a cereal bowl a drinking glass a coffee mug

1. Which item has the greatest volume? _____
2. Which item has the smallest volume? _____
3. Explain your answers to Problems 1 and 2.

_____

_____

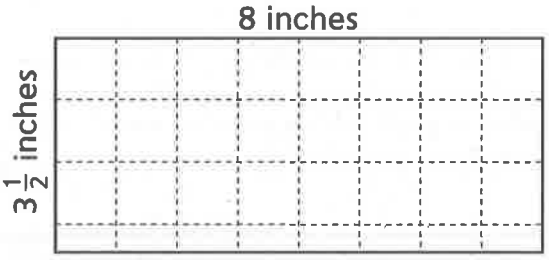
_____

_____

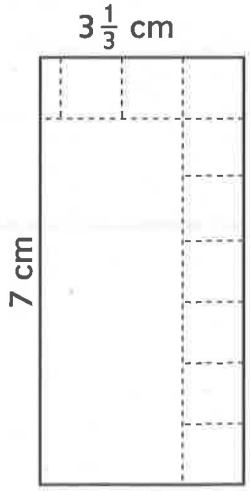
_____

Practice

Find the area of each rectangle.

4. 

Area = _____ square inches

5. 

Area = _____ $in.^2$

Volume Measurement

Home Link 1-6

NAME DATE TIME

Volume is the measure of the amount of space a 3-dimensional object takes up. When we talk about the volume of a container (for example, a vase, a can, a glass, a bowl, a bucket, a box), we are talking about the amount the container can hold.

SRB 230

Only 3-dimensional objects take up space and have volume. Two-dimensional shapes have other attributes that we can measure, such as length and area. But 2-dimensional shapes do not have volume.

(1) Circle each item below that has **volume.**

a wiggly line drawn on paper

a bar of soap

a circle

a baseball

an empty crayon box

a drawing of a tree

a blue rectangle

a bucket

a swimming pool

a drawing of a flower pot

a cereal box

the kitchen sink

(2) Choose one of the items you circled. Describe one way you could measure the volume of that item. Be sure to tell what unit you would use and why.

_____

_____

_____

Practice

Solve.

(3) $(30 + 40) * 5 =$ _____

(4) $30 + (40 * 5) =$ _____

(5) $(694 - 95) + (2 + 3) =$ _____

(6) _____ $= 15 - (12 + 6 - 3)$

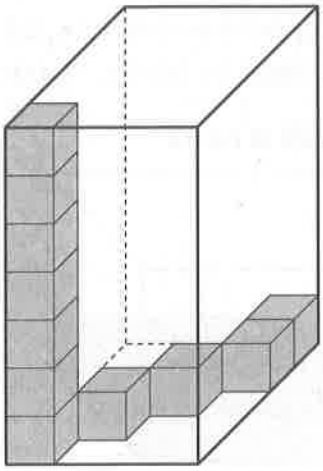
More Cube-Stacking Problems

Home Link 1-7

NAME DATE TIME

SRB 231

The cubes in each rectangular prism are the same size. Each prism has at least one stack of cubes that goes up to the top. Find the total number of cubes needed to completely fill each prism. Then find the volume of each prism.

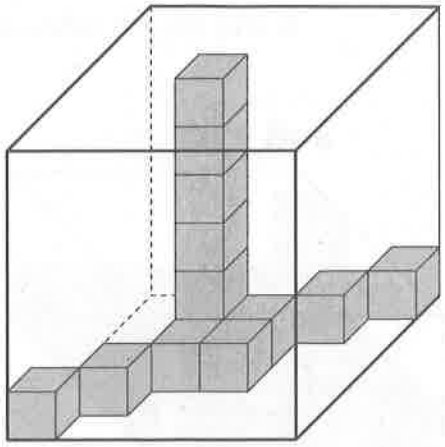
① 

Prism A

Cubes needed to fill Prism A:

_____ cubes

Volume of Prism A: _____ units^3

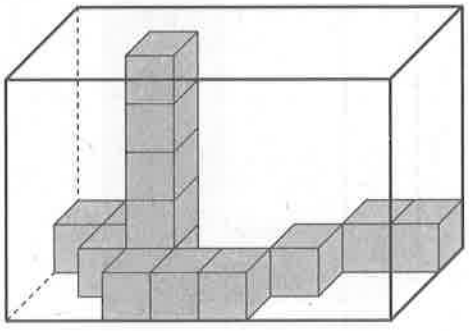
② 

Prism B

Cubes needed to fill Prism B:

_____ cubes

Volume of Prism B: _____ cubic units

③ 

Prism C

Cubes needed to fill Prism C:

_____ cubes

Volume of Prism C: _____ cubic units

Practice

Solve.

④ $(14 + 30) * 2 =$ _____

⑤ $14 + (30 * 2) =$ _____

⑥ _____ $= (68 - 58) * (8 + 8 + 8)$

⑦ $(15 - 10) + (4 * 5) =$ _____ $+ 5$

Packing Boxes

Home Link 1-8

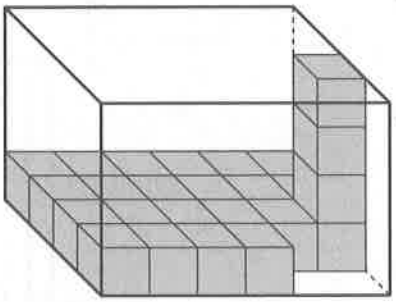
NAME DATE TIME

SRB 232

A fifth-grade class raised money to buy math tools to send to other schools. Tom, Ed, and Anu are in charge of packing unit cubes. They want each student to receive a box with at least 100 unit cubes.

Tom, Ed, and Anu started packing the boxes. They wonder if each box is big enough to hold at least 100 cubes.

Tom's Box

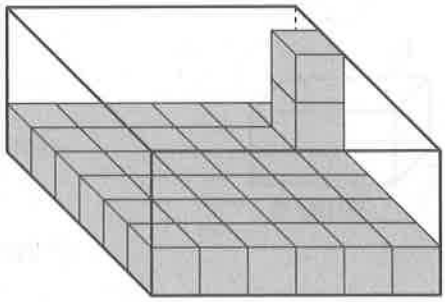


(1) **a.** How many cubes can Tom's box hold?

_____ cubes

b. Is Tom's box big enough? _____

Ed's Box

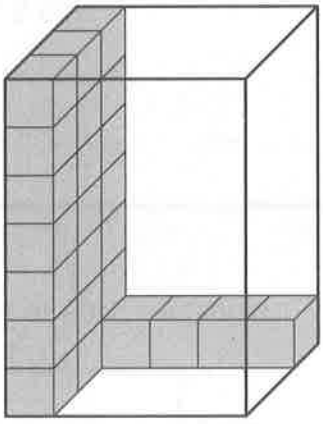


(2) **a.** How many cubes can Ed's box hold?

_____ cubes

b. Is Ed's box big enough? _____

Anu's Box



(3) **a.** How many cubes can Anu's box hold?

_____ cubes

b. Is Anu's box big enough? _____

Practice

Insert parentheses to make each equation true.

(4) $14 + 2 = 6 + 2 * 3 + 2$

(5) $16 - 5 * 4 = 22 * 2$

(6) $16 \times 10 = 100 + 220 \div 2$

(7) $3 * 56 - 4 = 128 + 28$

Comparing Volumes

Home Link 1-9

NAME DATE TIME

Today you learned two different formulas to find the volume of a rectangular prism:

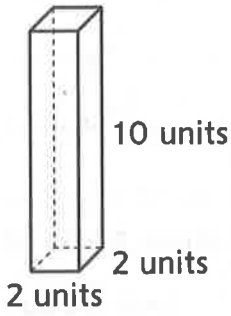
SRB 233

$V = l \times w \times h$ (volume = length × width × height)

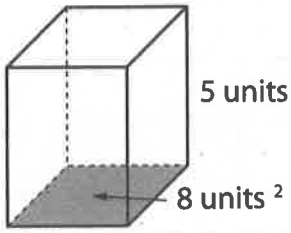
$V = B \times h$ (volume = area of the base × height)

Use the formulas to find the volume of each prism. Be sure to include a unit.
Cross out the prism in each set that has a volume different than the other prisms.

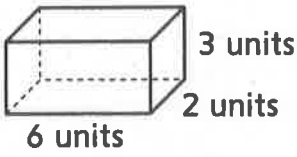
① **Set 1**



Volume = _____

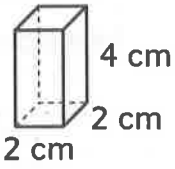


Volume = _____

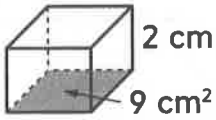


Volume = _____

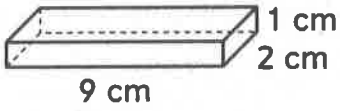
② **Set 2**



Volume = _____



Volume = _____

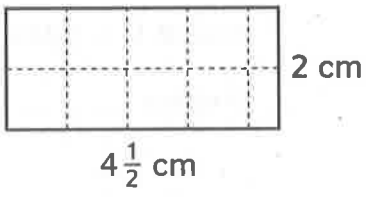


Volume = _____

Practice

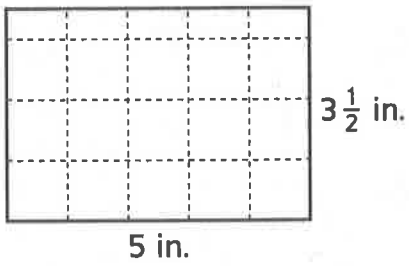
Find the area of each rectangle.

③



Area = _____

④



Area = _____

Comparing Volume Units

Home Link 1-10

NAME DATE TIME

SRB 235

Circle the volume unit that is larger.

1. cubic centimeters cubic meters
2. cubic millimeters cubic inches
3. cubic miles cubic decimeters
4. cubic meters cubic feet
5. Explain how you knew which volume unit was larger in Problems 1–4.

_____

_____

_____

Find an object around your home that you might measure with the given unit.

6. cubic inches

_____

7. cubic meters

_____

8. cubic feet

_____

Practice

Find the volume of a rectangular prism with the given dimensions.

9. length = 8 meters
   height = 5 meters
   width = 2 meters
   _____ meters^3

10. area of the base = 25 inches^2
    height = 4 inches
    _____ inches^3

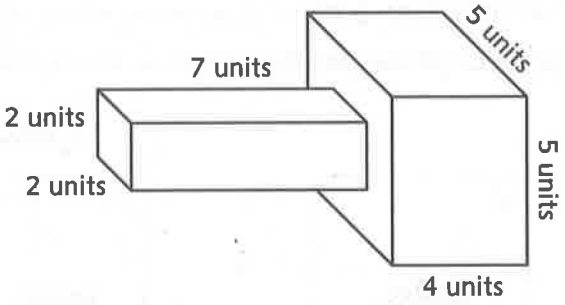
Finding Volumes

Home Link 1-11

NAME DATE TIME

Find the volume of each figure below. Then name at least one real-world object that the figure could model. For example, the figure in Problem 1 could model a flashlight.

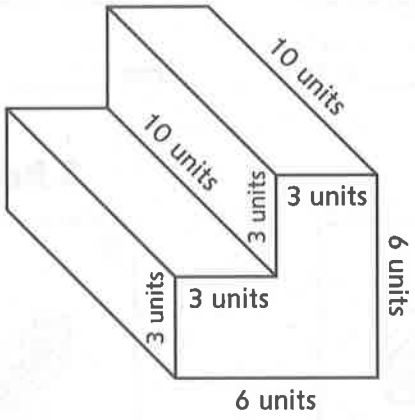
SRB 234

① 

This figure could model ...

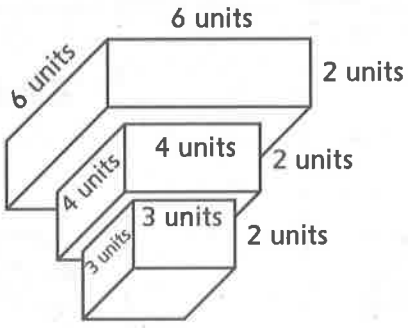
a flashlight

Volume = _____ cubic units

② 

This figure could model ...

Volume = _____ cubic units

③ 

This figure could model ...

Volume = _____ cubic units

Playing *Prism Pile-Up*

Home Link 1-12

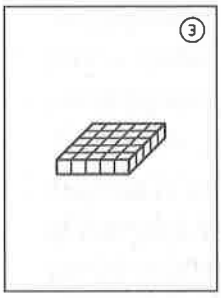
NAME DATE TIME

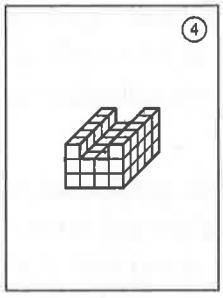
SRB 232-234, 319

Three rounds of *Prism Pile-Up* are shown below. For each round:

- Find the volume of each figure.
- Circle the winning card (the card with the figure that has a greater volume).
- Write one or more number sentences for the winning card.

Round 1





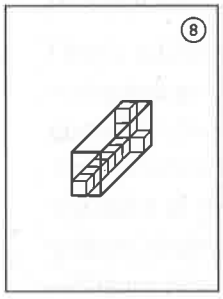
Number sentence(s):

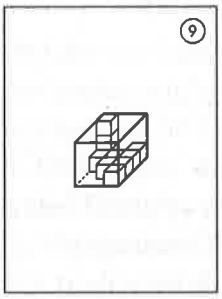
_____

_____

$V =$ _____ cm^3 $V =$ _____ cm^3

Round 2





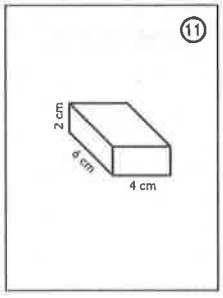
Number sentence(s):

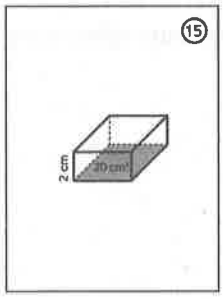
_____

_____

$V =$ _____ cm^3 $V =$ _____ cm^3

Round 3





Number sentence(s):

_____

_____

$V =$ _____ cm^3 $V =$ _____ cm^3