Name Date Time

STUDY LINK 10•7

Unit 11: Family Letter

3-D Shapes, Weight, Volume, and Capacity

Our next unit introduces several new topics, as well as reviewing some of the work with geometric solids from previous grades and some of the main ideas your child has been studying this past year.

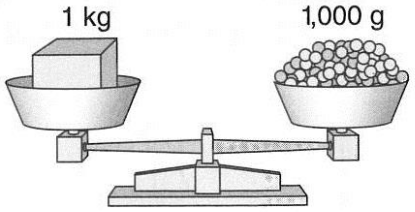
We begin with a lesson on weight and mass, focusing on grams and ounces. Students handle and weigh a variety of objects, trying to develop "weight sense" so that they can estimate weights effectively. The class participates in creating a Gram & Ounce Museum by displaying everyday objects labeled with their weights.

As part of a review of the properties of 3-dimensional shapes (prisms, pyramids, cylinders, and cones), your child will construct models of geometric solids using straws and paper patterns. They will use these models as they discuss vocabulary such as *face, edge,* and *vertex* and compare features of geometric solids.

By experimenting with cubes, the class will develop and apply a formula for finding the volumes of rectangular prisms (solids that look like boxes).

We will consider units of capacity (cups, pints, quarts, gallons, liters, milliliters) and the relationships among them. The class participates in creating a Liter & Milliliter Museum by displaying everyday objets labeled with their capacities.

Your child will also explore subtraction of positive and negative numbers by playing a variation of the *Credits/Debits Game* introduced in Unit 10.



In Lesson 11-1, a pan balance is used to measure weight in grams.

Please keep this Family Letter for reference as your child works through Unit 11.

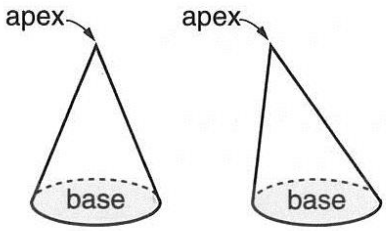
HOMEWORK PACK DUE: 23 MAY

Vocabulary

Important terms in Unit 11:

capacity (1) The amount of space occupied by a 3-dimensional shape. Same as *volume.* (2) Less formally, the amount a container can hold. Capacity is often measured in units such as quarts, gallons, cups, or liters. (3) The maximum *weight* a scale can measure.

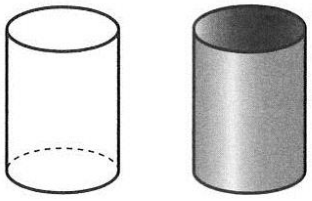
cone A 3-dimensional shape that has a circular base, a *curved surface,* and one vertex, which is called the apex. The points on the curved surface of a cone are on straight lines connecting the apex and the circumference of the base.



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

curved surface A 2-dimensional surface that is rounded rather than flat. Spheres, *cylinders,* and *cones* each have one curved surface.

cylinder A 3-dimensional shape that has two circular or elliptical bases that are parallel and congruent and are connected by a *curved surface.* A can is shaped like a cylinder.

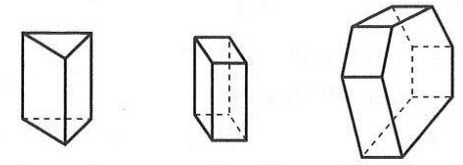


dimension A measure along one direction of an object, typically length, width, or height. For example, the dimensions of a box might be 24 cm by 20 cm by 10 cm.

formula A general rule for finding the value of something. A formula is often written using letters, called variables, that stand for the quantities involved.

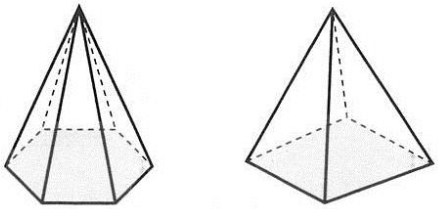
geometric solid The surface or surfaces that make up a 3-dimensional shape, such as a *prism, cylinder, cone,* or sphere. Despite its name, a geometric solid is hollow; it does not contain the points in its interior.

prism A 3-dimensional shape with two parallel and congruent polygonal regions for bases and lateral faces formed by all the line segments with endpoints on corresponding edges of the bases. The lateral faces are all parallelograms.



triangular prism | rectangular prism | hexagonal prism

pyramid A 3-dimensional shape with a polygonal region for a base, a point (apex) not in the plane of the base, and all of the line segments with one endpoint at the apex and the other on an edge of the base. All faces except the base are triangular.



hexagonal pyramid | rectangular pyramid

3-dimensional (3-D) shape A shape whose points are not all in a single plane. Examples include *prisms, pyramids,* and spheres, all of which have length, width, and height.

volume The amount of space occupied by a 3-dimensional shape. Same as *capacity.* The amount a container can hold. Volume is often measured in cubic units, such as cm^3, cubic inches, or cubic feet.

weight A measure of the force of gravity on an object. Weight is measured in metric units such as grams, kilograms, and milligrams and in U.S. customary units such as pounds and ounces.

Do-Anytime Activities

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

1. Have your child compile a list of the world's heaviest objects or things. For example, which animal has the heaviest baby? What is the world's heaviest human-made structure? What is the greatest amount of weight ever hoisted by a person?
2. Have your child compile a portfolio of 3-dimensional shapes. Images can be taken from newspapers, magazines, photographs, and so on.
3. Encourage your child to create his or her own mnemonics and/or sayings for converting between units of capacity and weight. One such example is the old English saying "A pint's a pound the world around." (1 pint = 16 oz = 1 lb)

Building Skills through Games

In Unit 11, your child will play the following games. For detailed instructions, see the *Student Reference Book.*

Chances Are See *Student Reference Book,* page 236.
This game is for 2 players and requires one deck of *Chances Are* Event Cards and one deck of *Chances Are* Probability Cards. The game develops skill in using probability terms to describe the likelihood of events.

Credits/Debits Game See *Student Reference Book,* page 238.
This is a game for 2 players. Game materials include 1 complete deck of number cards and a recording sheet. The *Credits/Debits Game* helps students practice addition of positive and negative integers.

***Credits/Debits Game* (Advanced Version)** See *Student Reference Book,* page 239.
This game is similar to the *Credits/Debits Game* and helps students practice addition and subtraction of positive and negative integers.

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 this unit's Study Links.

Study Link 11•1

1. 59 **2.** 96,640

3. Bagel and pumpkin; or taco and gingerbread man

4. Pasta, Chocolate bar, Hamburger, Ice cream sundae

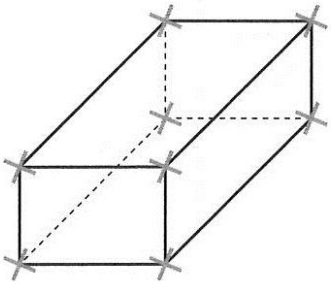
6. −$50 **7.** −$75 **8.** $0

9. $30

Study Link 11•2

1. **a.** square pyramid **b.** cone
c. sphere **d.** cylinder
e. rectangular prism **f.** triangular prism

2.



3. 6 **4.** 7,000; 63,560; and 91

5. 24; 120; 600

Study Link 11•3

1. cone **2.** square pyramid

3. hexagonal prism **4.** octahedron

6. $10 **7.** −$70

8. −$15 **9.** −$100

10. −$55 **11.** −$400

Study Link 11•4

4. 24 **5.** 17 R1, or $17\frac{1}{5}$

6. 29 **7.** 89 R2, or $89\frac{2}{4}$

Study Link 11•5

1. **a.** 39 **b.** 30

2. **a.** $(3 * 3) * 6 = 54$; 54
b. $(2 * 5) * 9.7 = 97$; 97

3. **a.** 150 **b.** 150

4. −49 **5.** −40 **6.** 29 **7.** 73

Study Link 11•6

1. −110 **2.** −8 **3.** −8

4. 15 **5.** 14 **6.** −19

7. −70 **8.** 18

11. < **12.** < **13.** >

14. > **15.** > **16.** >

17. −14, −2.5, −0.7, $\frac{30}{6}$, 5.6, 8

18. −7, $-\frac{24}{6}$, $-\frac{3}{5}$, 0.02, 0.46, 4

19. 2,652 **20.** 44,114 **21.** 158

22. 106 R4, or $106\frac{4}{7}$

Study Link 11•7

Answers vary for Problems 1–4.

5. 4 **6.** 48 **7.** 2

8. 3 **9.** 3 **10.** 10

11. 4 **12.** −4 **13.** −40

14. −120

Unit 11 Assessment will be on Monday, May 23

The assessment the students will need to be able to:

- Name geometric solids (SRB 101-103)
- Identify pentagonal pyramid faces (SRB 101-103)
- Mark the vertices of a triangular prism (SRB 101-103)
- Identify rectangular pyramid edges (SRB 101-103)
- Name the base of a pyramid (SRB 101-103)
- Describe a triangular prism (SRB 101-103)
- Find the volume of a stack of cm cubes (SRB 137-138)
- Make reasonable weight estimates (SRB 140, 127, 180-184)
- Use probability terms to describe events (SRB 80-86)
- Use a volume formula (SRB 137)
- Add and subtract signed numbers (SRB 60, 197, 211)
- Multiply and divide using decimals (SRB 37, 39-40)

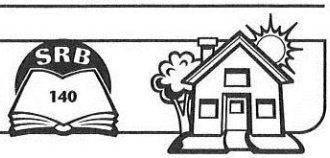
In order to prepare for the assessment, students need to make sure they understand and are able to successfully complete the following exercises:

- Qu 1 – SMJ p289, 297 (qu1)304 (qu1), Study Link 2
- Qu 2-6 – SMJ 293
- Qu 7-10 – SMJ p300-302, Study Link 5
- Qu 11 – SMJ p286, 305, 305A
- Qu 12 – SMJ p307 (qu3)
- Qu 13-14 – SMJ p299 (qu2), 302 (qu6-7), 307 (qu2)
- Qu 15-22 – SL 11.1 (qu6-9), SL 11.3 (qu6-11), SMJ p299 (qu5), 307 (qu5)
- Qu 23-26 – SMJ p298 (qu5-6)

Name Date May 11 Time

STUDY LINK 11•1

The World's Largest Foods



Food	Weight	Date	Location
Apple	3 pounds 11 ounces	October 1997	Linton, England
Bagel	714 pounds	July 1998	Mattoon, Illinois
Bowl of pasta	7,355 pounds	February 2004	Hartford, New York
Chocolate bar	5,026 pounds	March 2000	Turin, Italy
Garlic	2 pounds 10 ounces	1985	Eureka, California
Gingerbread man	372.13 pounds	November 2003	Vancouver, Canada
Hamburger	6,040 pounds	September 1999	Sac, Montana
Ice cream sundae	22.59 tons	July 1988	Alberta, Canada
Pumpkin	1,337 pounds	October 2002	Topsfield, Massachusetts
Taco	1,654 pounds	March 2003	Mexicali, Mexico

Source: www.guinnessworldrecords.com

Use the information in the table to solve the following problems.

1. The largest apple weighed _____ ounces.

2. A typical hamburger weighs about 4 ounces. The largest hamburger weighed _____ ounces.

3. Which 2 foods together weigh about a ton? _____ and _____

4. A kilogram is a little more than 2 pounds. Which 4 foods each weigh more than 1,000 kilograms?

_____

5. On the back of this page, use data from the table to write and solve your own problem.

Practice

6. $-\$75 + \$25 =$ _____

7. _____ $= -\$45 + (-\$30)$

8. _____ $= -\$60 + \$60$

9. $\$55 + (-\$25) =$ _____

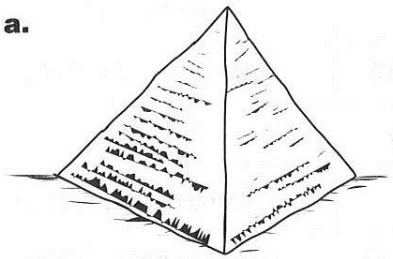
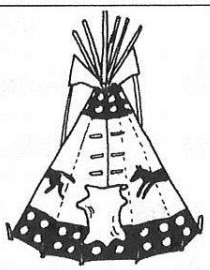
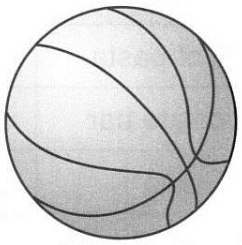
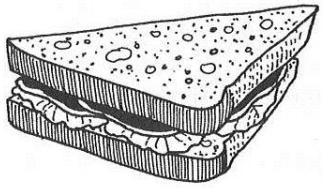
Name Date May 12 Time

STUDY LINK 11•2

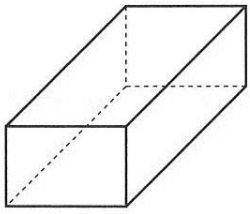
Solids

1. The pictures below show objects that are shaped approximately like geometric solids. Identify each object as one of the following: **cylinder, cone, sphere, triangular prism, square pyramid,** or **rectangular prism.**

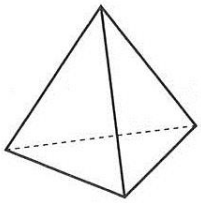
SRB 101 102

a.  Type: _____ _____	**b.**  Type: _____ _____	**c.**  Type: _____ _____
d.  Type: _____ _____	**e.**  Type: _____ _____	**f.**  Type: _____ _____

2. Mark *X*s on the vertices of the rectangular prism.



3. How many edges does the tetrahedron have? _____ edges



Practice

4. Circle the numbers that are multiples of 7. 132 7,000 63 560 834 91

5. Circle the numbers that are multiples of 12. 24 120 38 600 100 75

Name Date May 15 Time

STUDY LINK 11•3

Geometry Riddles

SRB 101–103

Answer the following riddles.

1. I am a geometric solid.
I have two surfaces.
One of my surfaces is formed by a circle.
The other surface is curved.

What am I? _____

2. I am a geometric solid.
I have one square base.
I have four triangular faces.
Some Egyptian pharaohs were buried in tombs shaped like me.

What am I? _____

3. I am a polyhedron.
I am a prism.
My two bases are hexagons.
My other faces are rectangles.

What am I? _____

4. I am a polyhedron.
All of my faces are the same.
All of my faces are equilateral triangles.
I have eight faces.

What am I? _____

Try This

5. Write your own geometry riddle.

_____

_____

_____

_____

_____

_____

_____

Practice

6. $-\$20 + \$30 =$ _____

7. _____ $= -\$35 + (-\$35)$

8. _____ $= \$10 + (-\$25)$

9. $\$0 + (-\$100) =$ _____

10. $-\$15 + (-\$40) =$ _____

11. _____ $= -\$300 + (-\$100)$

Name Date May 16 Time

STUDY LINK 11•4

Volume

Cut out the pattern below and tape it together to form an open box.

SRB 137 138

1. Find and record two items in your home that have volumes equal to about $\frac{1}{2}$ of the volume of the open box.

_____ _____

2. Find and record two items in your home that have about the same volume as the open box.

_____ _____

3. Find and record two items in your home that have volumes equal to about 2 times the volume of the open box.

_____ _____

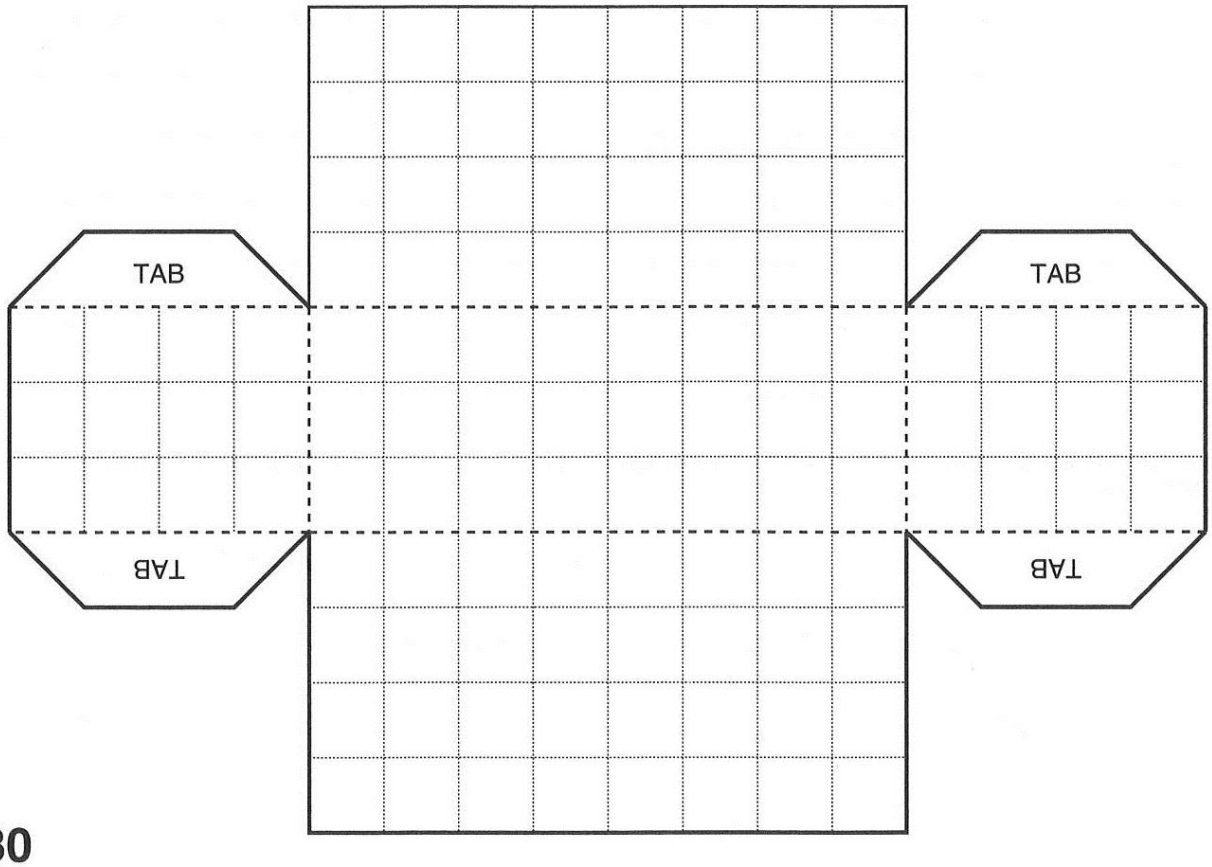
Practice

4. $96 \div 4 =$ _____

5. $86 / 5 =$ _____

6. $\frac{232}{8} =$ _____

7. $4\overline{)358} =$ _____



Name Date May 18 Time

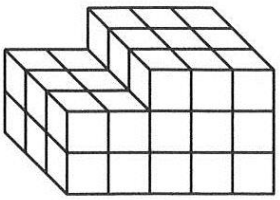
STUDY LINK 11•5

Volume

SRB 137 138

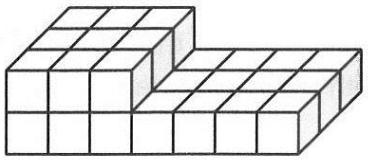
1. Find the volume of each stack of centimeter cubes.

a.



Volume = _____ cm^3

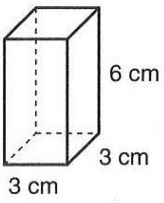
b.



Volume = _____ cm^3

2. Calculate the volume of each rectangular prism.

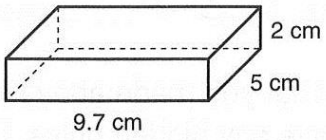
a.



Number model: _____

Volume = _____ cm^3

b.

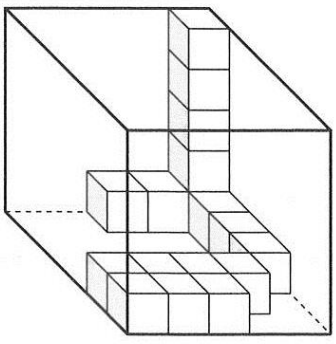


Number model: _____

Volume = _____ cm^3

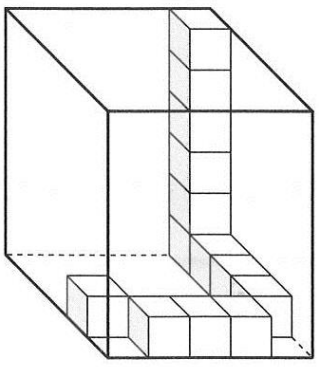
3. What is the total number of cubes needed to completely fill each box?

a.



_____ cubes

b.



_____ cubes

Practice

4. −65 + 16 = _____

5. _____ = −21 + (−19)

6. _____ = 84 + (−55)

7. −16 + 89 = _____

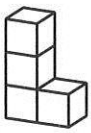
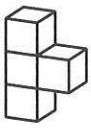
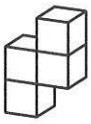
Name Date May 18 Time

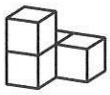
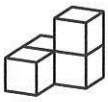
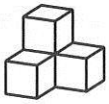
LESSON 11•5

Hidden Cubes

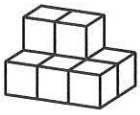
1. The stacks of cubes shown below are called *soma cubes* and were first designed in 1936 by Piet Hein, a Danish poet and scientist.

Use interlocking cubes to build the stacks shown below. Use a small stick-on note to label each stack with the appropriate letter. Then record the number of cubes needed to build each stack.

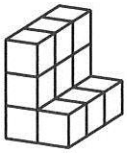
A  ____ cubes **B**  ____ cubes **C**  ____ cubes **D**  ____ cubes

E  ____ cubes **F**  ____ cubes **G**  ____ cubes

Use the cube stacks that you made above to build each of the figures below. The figures do not have any hidden holes. Record the number of cubes needed to build each figure and the cube stacks that you used.

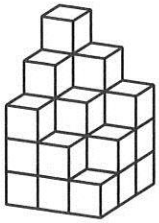
2.  ____ cubes

I used the following cube stacks to build the figure: _____

3.  ____ cubes

I used the following cube stacks to build the figure: _____

Try This

4.  ____ cubes

I used the following cube stacks to build the figure: _____

Name Date May 19 Time

STUDY LINK 11•6

Positive and Negative Numbers

Add or subtract.

1. $-40 + (-70) =$ _____

2. $12 - 20 =$ _____

3. _____ $= -14 - (-6)$

4. _____ $= 10 - (-5)$

5. $15 + (-1) =$ _____

6. $-12 - 7 =$ _____

7. _____ $= 60 + (-130)$

8. _____ $= -2 - (-20)$

9. Write two subtraction problems with an answer of -8.

_____ − _____ $= -8$ _____ − _____ $= -8$

10. Write two addition problems with an answer of -30.

_____ + _____ $= -30$ _____ + _____ $= -30$

Write < or > to make a true number sentence.

11. $0 - 7$ _____ -6

12. -11 _____ $-13 - (-5)$

13. $7 + (-2)$ _____ -8

14. $18 + (-8)$ _____ -18

15. $26 - (-14)$ _____ $27 + (-16)$

16. $9 - (-11)$ _____ $0 + (-20)$

List the numbers in order from least to greatest.

17. $\frac{30}{6}$, 8, -14, -0.7, 5.6, -2.5

_____ _____ _____ _____ _____ _____

least greatest

18. 0.02, $-\frac{3}{5}$, -7, 4, 0.46, $-\frac{24}{6}$

_____ _____ _____ _____ _____ _____

least greatest

Practice

19. _____ $= 34 * 78$

20. _____ $= 46 * 959$

21. $632 \div 4 =$ _____

22. $746 / 7 =$ _____

Name Date May 22 Time

STUDY LINK 11•7

Capacity

Find at least one container that holds each of the amounts listed below.
Describe each container and record all the capacity measurements on the label.

1. Less than 1 Pint

Container	Capacity Measurements on Label
bottle of hot chili sesame oil	5 fl oz, 148 mL

2. 1 Pint

Container	Capacity Measurements on Label
bottle of cooking oil	16 fl oz, 473 mL

3. 1 Quart

Container	Capacity Measurements on Label

4. More than 1 Quart

Container	Capacity Measurements on Label

Complete.

5. 2 quarts = _____ pints

6. 3 gallons = _____ cups

7. _____ pints = 4 cups

8. _____ quarts = 12 cups

9. 6 pints = _____ quarts

10. _____ quarts = $2\frac{1}{2}$ gallons

Practice

11. $-3 + 7 =$ _____

12. _____ $= 3 + (-7)$

13. _____ $= 40 + (-80)$

14. $-60 + (-60) =$ _____