

Sketching Faces

Goal

Describe relationships between 3-D shapes and their 2-D faces.

- Try to find an item with each shape around your home. Name each item. Answers will vary.
 - rectangle-based prism many types of boxes, refrigerator, some furniture
 - triangle-based prism specialty boxes, specialty equipment
 - square-based pyramid specialty boxes, candles, and other decorative items
- Record the shapes that you found in Question 1 in the chart below.
 - Choose 1 item. Count the edges of your shape. Record the number in the chart.
 - Trace each face of your shape. Find the total number of sides of all its faces.
 - If you found any other shapes, repeat parts b) and c) for each one.
Answers will vary. For example:

3-D shape	Total number of edges of 3-D shape	Total number of sides of 2-D faces
rectangle-based prism	12	24
triangle-based prism	9	18
square-based pyramid	8	16
triangle-based pyramid	6	12

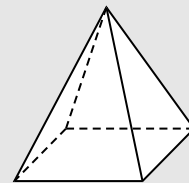
- How is the total number of sides of the faces related to the number of edges? The total number of sides of the faces is twice as many as the number of edges.

At-Home Help

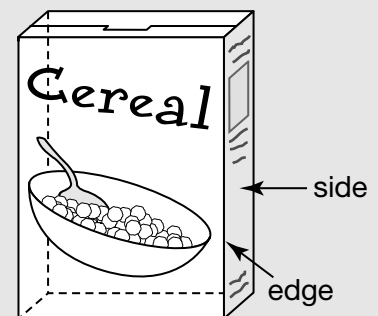
A **prism** has 2 bases.



A **pyramid** has 1 base.



Prisms and pyramids are named by the shape of their bases. This box is a **rectangle-based prism**.



Building 3-D Shapes with Congruent Faces

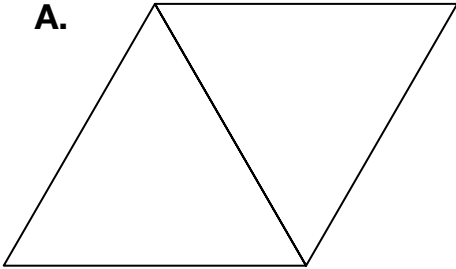
Goal

Build 3-D shapes and describe relationships between faces and vertices.

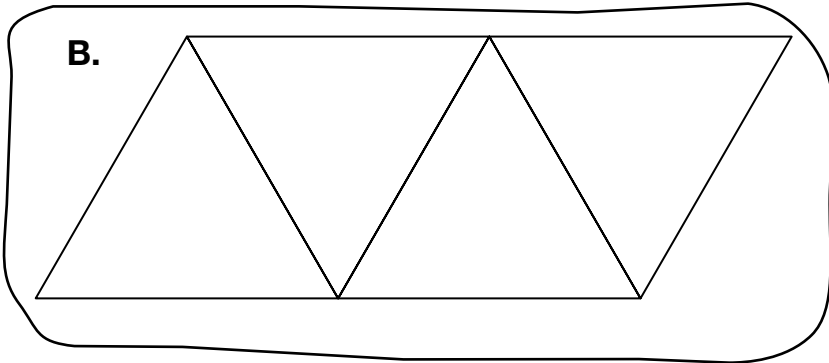
You will need scissors and tape.

1. Circle the letter of the shape that could be a net for a 3-D shape.

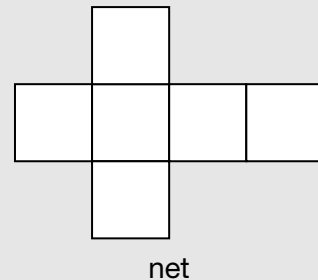
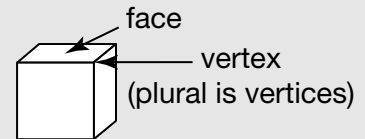
A.



B.



At-Home Help



2. Trace the shape that could be a net onto a sheet of paper. Cut out and fold the net. Tape it together. Circle the letter of the 3-D shape you made.

C. sphere

E. triangle-based pyramid

D. triangle-based prism

F. cube

3. a) How many faces does the shape have? 4

b) How many vertices does the shape have? 4

c) How many faces meet at each vertex? 3

Making Skeleton Models

Goal

Build 3-D skeletons and describe relationships between edges and vertices.

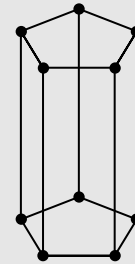
You will need toothpicks and modelling clay, miniature marshmallows, or something else to stick the toothpicks into.

- To build 3-D skeletons, you can use modelling clay or miniature marshmallows to represent _____ vertices _____ and toothpicks to represent _____ edges _____.
- Make as many skeletons of 3-D shapes as you can. Use 4 vertices, 5 vertices, and 6 vertices. Count the edges in each shape. Record each shape in the chart.
Answers will vary. For example:

Shape number	Number of vertices	Number of edges
1	4	6
2	5	9
3	6	9
4	6	10
5	6	12

At-Home Help

A skeleton of a 3-D shape has only edges and vertices.



- For which number of vertices could you make more than 1 shape?

Answers will vary. Should be able to make more with 6 vertices.

- Did any of your shapes have more vertices than edges? no

- Did any of your shapes have the same number of vertices as edges?

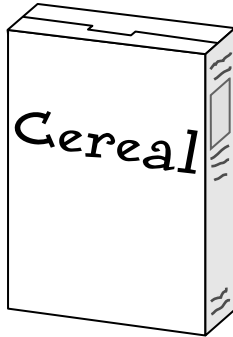
no

Drawing 3-D Shapes

Goal Draw prisms and pyramids.

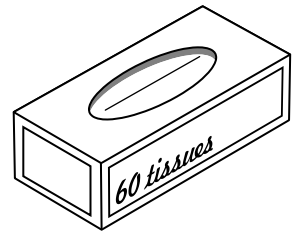
1. Find a rectangle-based prism such as a box.
 - a) Draw the box so that you can see more than 1 face. Mark something on the visible faces to identify them.

Answers will vary.
For example:



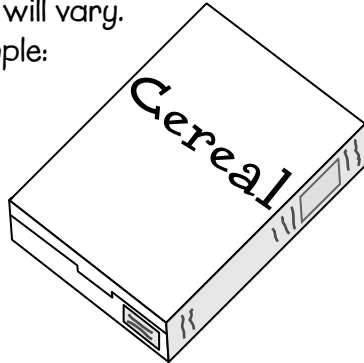
At-Home Help

A drawing of a 3-D shape shows more than 1 face but it can't show all the faces.



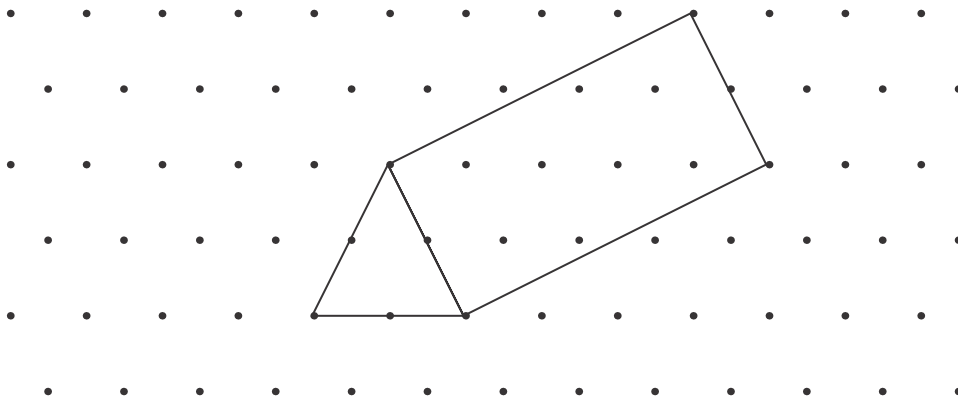
- b) Turn the box a different way. Draw it this way.

Answers will vary.
For example:



2. Draw a triangle-based prism on this triangular dot paper.

Answers will vary. For example:



Communicate an Understanding of Geometric Concepts

Goal

Use math language to show what you know about a 3-D shape.

1. Consider the shape of the building you live in. No matter where you live, the building has at least one 3-D shape. Describe the building.

Answers will vary. For example:

I live in an apartment building. It looks like

3 rectangle-based prisms that are joined to make a \sqcap -shape.

The 2 outside prisms are taller than the middle one.

At-Home Help
Communication Checklist

- Did you explain your thinking?
- Did you use a model?
- Did you use math language?

2. Use the Communication Checklist.

- a) What do you like about your description?

Answers will vary. For example: I used math language.

- b) How could you improve your description?

Answers will vary. For example: I could discuss why I think it is like

3 rectangle-based prisms. I could make a model, a skeleton.

Measuring Mass

Goal Estimate, measure, and record the mass of objects.

1. Shani bought these items at the grocery store.

500 g of potato salad	1 kg of apples
400 g of sliced turkey	750 g of yogurt

- a) Order the masses from least to greatest.

_____ 400 g, 500 g, 750 g, 1 kg _____

- b) What combinations of items have a mass

greater than 2 kg? _____

_____ apples, potato salad, and yogurt _____

_____ apples, sliced turkey, and yogurt _____

- c) Find the total mass of the items. Record the total mass in grams and kilograms.

grams _____ 2650 g _____ kilograms _____ 2.650 kg _____

2. One litre (1 L) of water has a mass of 1 kg.

- a) Locate a light container that holds 1 L. You can use, for example, a 1 L juice or milk carton. If the container is full, it's close enough to 1 kg for estimating. You can also use a 2 L container that is half full.

Answers will vary. For example:

- b) List 6 items that are lighter than 1 kg. _____ spoon, pencil, box of tissues, _____

_____ tube of toothpaste, plastic bowl, sheet of paper _____

- c) List 6 items that are heavier than 1 kg. _____ a person, a TV, a refrigerator, _____

_____ a computer, a chair, a large bag of potatoes _____

- d) Estimate the mass of 1 or 2 of the items in part b). Take the items to school tomorrow to measure their masses.

_____ Answers will vary. _____

At-Home Help

Mass is the measure of matter in an object. The amount of matter determines how heavy the object is.

Mass is measured in grams (g) and kilograms (kg).

1000 g = 1 kg

Measuring Capacity

Goal

Estimate, measure, and record the capacity of containers.

You will need several empty containers that do not have capacity marked in litres or millilitres. Use items like glasses, cups, mugs, bowls, bottles, cartons, cans, and vases.

You will also need a measuring cup marked in millilitres (250 mL or 500 mL).

At-Home Help

Capacity is the amount a container will hold when it is full. Capacity is measured in millilitres (mL) and litres (L).
 $1000 \text{ mL} = 1 \text{ L}$

1. a) Examine your containers. Do not measure. Sort them into 2 groups.

Group 1: containers that will hold less than my measuring cup

Answers will vary.

Group 2: containers that will hold more than my measuring cup

Answers will vary.

b) Which container will hold the least? _____ Answers will vary.

c) Which container will hold the most? _____ Answers will vary.

d) Which container will hold 1 L? _____ Answers will vary.

2. Fill one of your containers with water. Pour the water into your measuring cup, 1 cupful at a time. Record the number of millilitres to the nearest 50 mL. When you have done this for all your containers, check your answers to Question 1.

Container	Capacity to nearest 50 mL
Answers will vary.	Answers will vary.

Using Mass and Capacity

Goal Choose appropriate capacity and mass units.

1. Which unit, grams or kilograms, would be most appropriate for measuring the mass of each item?

a) an ant _____ grams _____

b) an elephant _____ kilograms _____

c) a picnic table _____ kilograms _____

d) a person _____ kilograms _____

e) a pencil _____ grams _____

f) a feather _____ grams _____

g) a bag of apples _____ kilograms _____

2. Which unit, millilitres or litres, would be most appropriate for measuring the capacity of each item?

a) a car's fuel tank _____ litres _____

b) a soup spoon _____ millilitres _____

c) a picnic cooler _____ litres _____

d) a bathtub _____ litres _____

e) a mug _____ millilitres _____

f) a swimming pool _____ litres _____

g) a drinking straw _____ millilitres _____

3. Find an item at home with its mass labelled in grams or kilograms.

Is it labelled in the units you would expect? Explain. _____ Answers will vary. _____

4. Find an item at home with its capacity labelled in millilitres or litres.

Is it labelled in the units you would expect? Explain. _____ Answers will vary. _____

At-Home Help

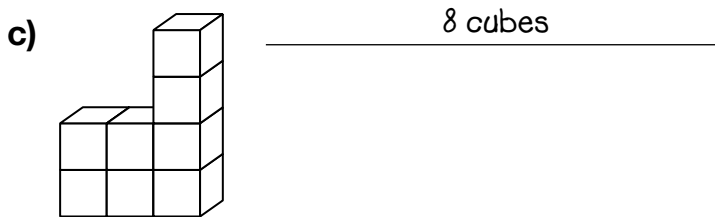
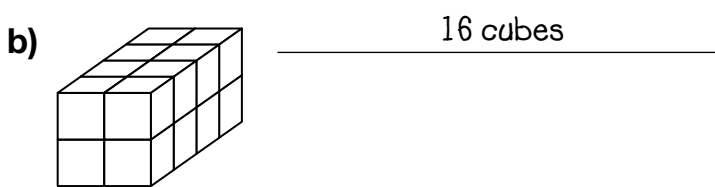
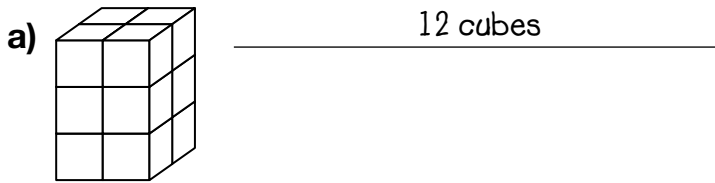
mass: $1000\text{ g} = 1\text{ kg}$

capacity: $1000\text{ mL} = 1\text{ L}$

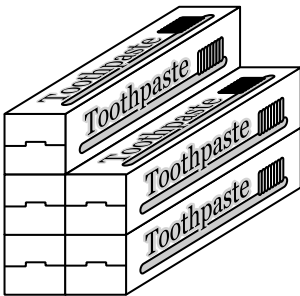
Modelling Volume

Goal Model 3-D shapes to measure volume.

1. What is the volume of each 3-D shape?



2. The volume of this 3-D shape is 5 toothpaste boxes.

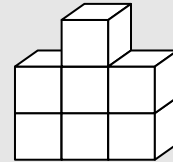


Locate 2, 3, or 4 boxes that are the same size.
Create a 3-D shape using the boxes.

What is the volume of your 3-D shape? _____ *Answers will vary.*

At-Home Help

Volume is the measure of the amount of space taken up by a 3-D shape.



This shape has a volume of 7 cubes.

Test Yourself

Circle the correct answer.

1. Which package shape can you find most often in your kitchen cupboard?

A. a rectangle-based prism

B. a triangle-based prism

C. a square-based pyramid

D. a triangle-based pyramid

2. What shape are the non-base faces of a prism?

E. triangle

F. square

G. rectangle

H. cube

3. What shape are the non-base faces of a pyramid?

A. triangle

B. square

C. rectangle

D. cube

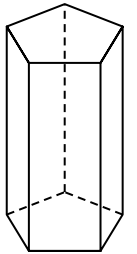
4. What is the name of this shape?

E. square-based prism

G. pentagon-based prism

F. triangle-based pyramid

H. pentagon-based pyramid



5. Which of these descriptions is true for the shape in Question 4?

A. 5 faces, 10 edges, 10 vertices

C. 7 faces, 10 edges, 15 vertices

B. 7 faces, 10 edges, 10 vertices

D. 7 faces, 15 edges, 10 vertices

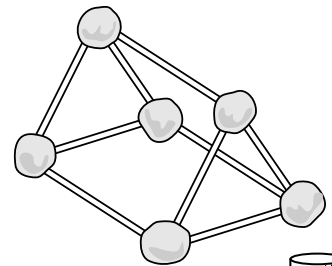
6. What type of shape is this?

E. triangle-based prism skeleton with more edges than vertices

F. rectangle-based prism skeleton with 6 vertices

G. rectangle-based prism skeleton with 9 edges

H. triangle-based prism skeleton with 6 edges and 9 vertices



7. Estimate the amount of water in the bottle.

A. 1 L

B. 500 mL

C. 750 mL

D. 250 mL

8. Which unit would you use to measure the capacity of a soup can?

E. millilitres

F. grams

G. kilograms

H. litres

9. Which unit would you use to measure the mass of a soup can?

A. millilitres

B. grams

C. kilograms

D. litres

