

# 5.2

## Nets of Three-Dimensional Objects

### Focus on...

After this lesson, you will be able to...

- determine the correct nets for 3-D objects
- build 3-D objects from nets
- draw nets for 3-D objects

### rectangular prism

- a prism whose bases are congruent rectangles

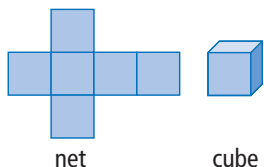


### Materials

- grid paper
- scissors
- clear tape
- rectangular prisms (blocks of wood, cardboard boxes, unit blocks)

### net

- a two-dimensional shape that, when folded, encloses a 3-D object



Shipping containers help distribute materials all over the world. Items can be shipped by boat, train, or transport truck to any destination using these containers. Shipping containers are right **rectangular prisms**. Why do you think this shape is used?

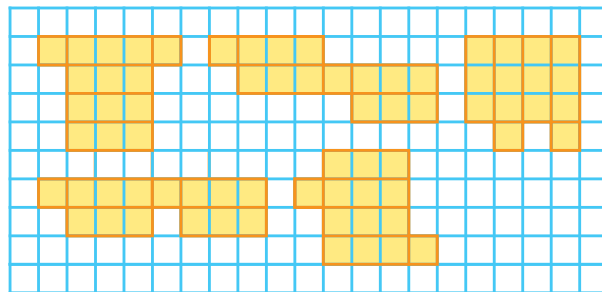
### Explore the Math

#### How do you know if a net can build a right rectangular prism?

Here are a variety of possible **nets** for a right rectangular prism.



rectangular prism



1. Draw each net on grid paper.

### Literacy Link

A *right prism* has sides that are perpendicular to the bases of the prism.

2. Predict which nets will form a right rectangular prism.
3. Cut each net out along the outside edges and fold along the inside edges, taping the cut edges to try to form a right rectangular prism.
4. Do all the nets create right rectangular prisms?
5. Place a right rectangular prism (such as a small cardboard box) on a piece of blank paper. “Roll” the prism onto its faces, trace each face, and try to draw another correct net. Your net should be different from the examples you have already made.

### Reflect on Your Findings

6. a) Compare the net you drew with those of three of your classmates. What is the same and different about your nets?
- b) Is there more than one way to draw a net for a 3-D object? Explain your answer.

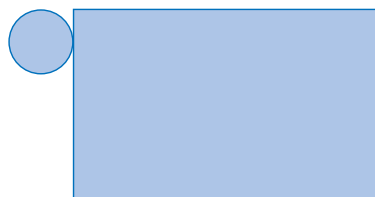
### Example 1: Draw a Net for a Three-Dimensional Object

A company asks you to create an umbrella stand for large beach umbrellas. Draw the net for the umbrella stand.



#### Solution

Visualize what the umbrella stand would look like if you could cut it open and flatten it. The net has one circle and a rectangle. When the rectangle is curved around the circle, the net will form a cylinder with an open top. The width of the rectangle is equal to the circumference of the circle.

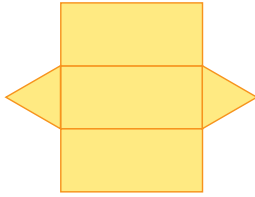


#### Show You Know

Draw a net for an unopened soup can.

## Example 2: Build a Three-Dimensional Object From a Given Net

Before going to leadership camp, your group needs to put a tent together. Can this net be folded to form the shape of a tent?

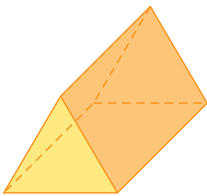


### Strategies

#### Model It

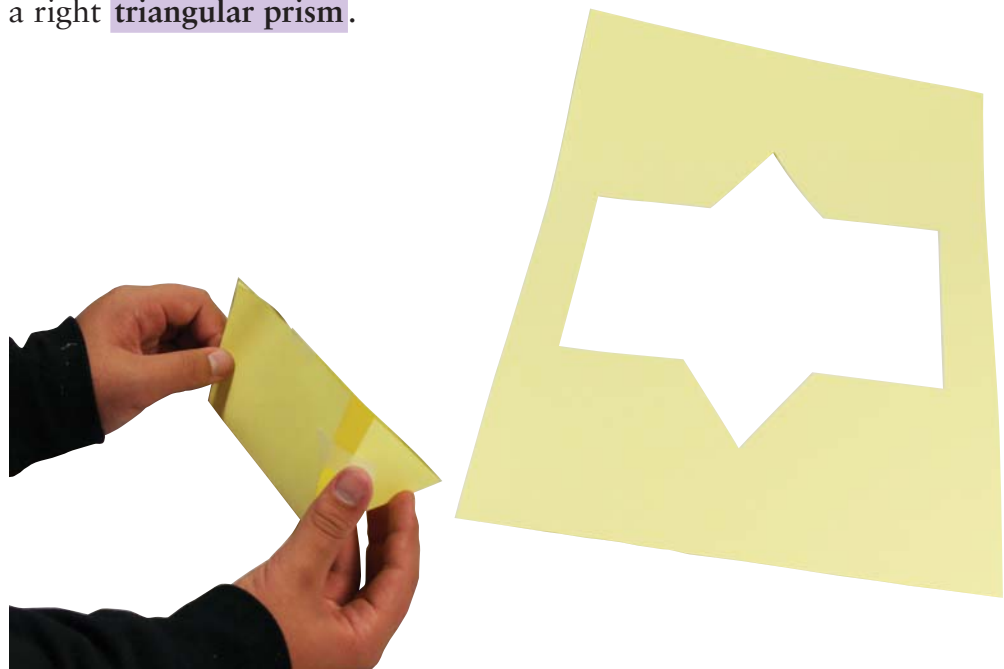
#### triangular prism

- a prism with two triangular bases each the same size and shape



#### Solution

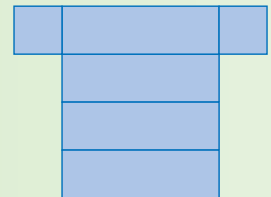
Trace the net onto paper. Cut along the outside edges and fold along the inside edges. Tape the cut edges together to try to build a right **triangular prism**.



The net can be folded to form the shape of a tent.

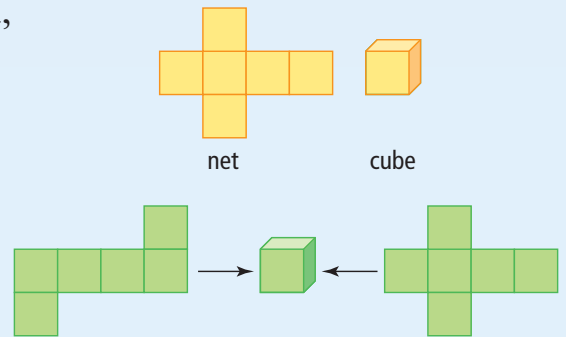
### Show You Know

Build a 3-D object using this net. What object does it make?



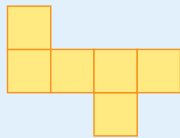
## Key Ideas

- A net is a two-dimensional shape that, when folded, encloses a three-dimensional object.
- The same 3-D object can be created by folding different nets.
- You can draw a net for an object by visualizing what it would look like if you cut along the edges and flattened it out.

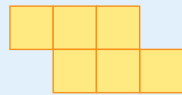


## Communicate the Ideas

1. Both of these nets have six faces, like a cube. Will both nets form a cube? Justify your answer.



Net A



Net B

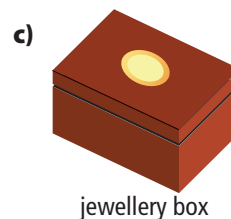
2. Patricia is playing the lead role in the school musical this year. She missed Math class while she was performing. She cannot figure out if a net will build the correct 3-D object, and asks you for help after school. Show how you would help her figure out this problem.

## Check Your Understanding

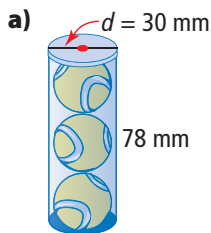
### Practise

For help with #3 to #5, refer to Example 1 on page 171.

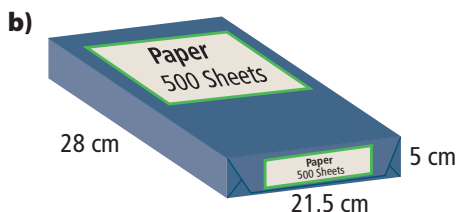
3. Sketch a net for each object.



4. Draw the net for each object. Label the measurements on the net.



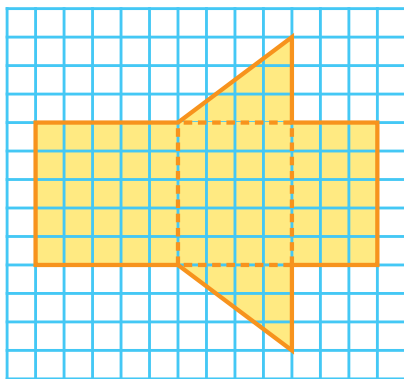
**Did You Know?**  
A ream describes a quantity of approximately 500 sheets of paper.



5. Draw a net on grid paper for a rectangular prism with the following measurements: length is six units, width is four units, and height is two units.

For help with #6 and #7, refer to Example 2 on page 172.

6. a) Draw the net on grid paper, as shown. Cut along the outside edges of the net and fold to form a 3-D object.

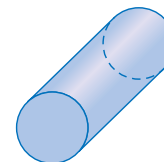


b) What is this object called?

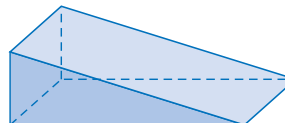
7. Match each solid with its net. Copy the nets, then try to create the 3-D objects.



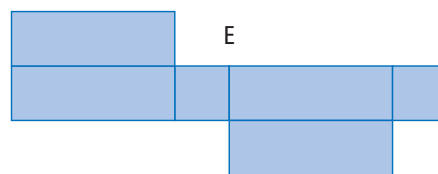
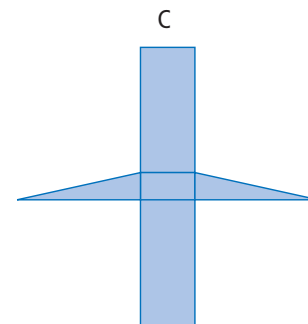
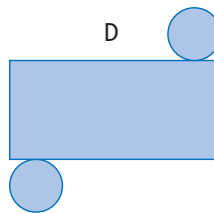
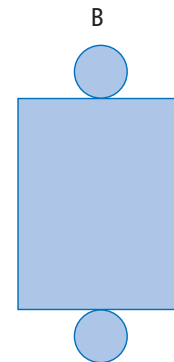
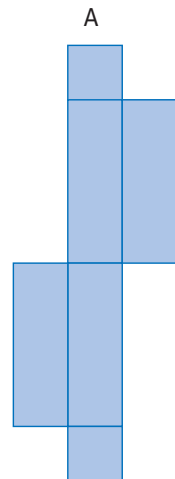
rectangular prism



cylinder



triangular prism

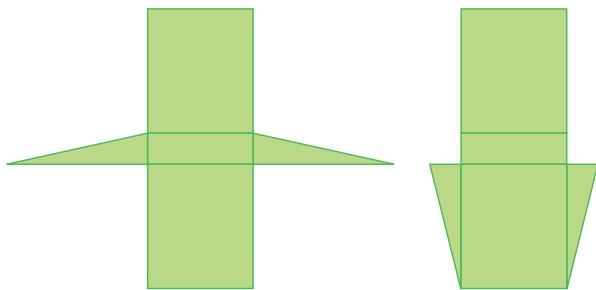


**Apply**

- A box of pens measures 15.5 cm by 7 cm by 2.5 cm. Draw a net for the box on a piece of centimetre grid paper. Then, cut it out and fold it to form the box.
- You are designing a new mailbox. Draw a net of your creation. Include all measurements.

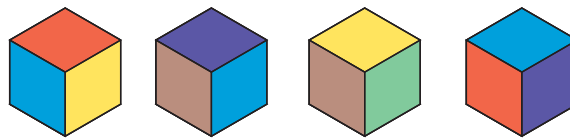


10. Simon designed two nets.



- Enlarge both nets on grid paper, and build the 3-D objects they form.
- What object does each net form?

12. The six sides of a cube are each a different colour. Four of the views are shown below.



What colour is on the opposite side of each of these faces?

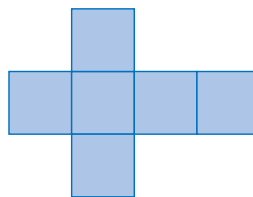
- purple
- blue
- red

### Extend

11. Hannah and Dakota design a spelling board game. They use letter tiles to create words. Tiles may be stacked (limit of four) on top of letters already used for a word on the board to form a new word.

- Draw a 3-D picture of what these stacked tiles might look like.
- Draw a top view that illustrates the stacked tiles for people reading the instructions.

13. How many possible nets can create a cube? Sketch all of them. The first one is done for you.



## MATH LINK

When buildings are designed, it is important to consider engineering principles, maximum and minimum height requirements, and budget.

- Create a 3-D sketch of two buildings for your miniature community, one that is a prism and one that is a cylinder.
- Draw a net of each building, including all possible measurements needed to build your miniature.

