LESSON 6

Objective

Explore nets.

Common Core State Standards

- **6.G.4** Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

Geometry

Nets

By constructing three-dimensional figures from two-dimensional representations, students see how plane shapes can be related to solid shapes. Identifying the faces, edges, and vertices on both polyhedrons and their nets helps students develop the visualization skills needed to find surface area.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Ask:** *How do you identify the faces in a net?*
- **Ask:** *How do you make a net for a rectangular box?*

Solve It

Reread the problem with students. Display a rectangular prism and explain that it represents a rectangular box. Have students sketch the solid and draw its net. Then have them write a paragraph explaining how Cameron can tell which cardboard piece is a net for a rectangular box.

More Ideas

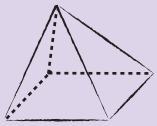
For other ways to teach about nets—

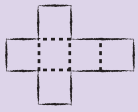
- Have students use Snap Cubes® to build rectangular prisms. Guide them to trace a face; then, without lifting the solid, turn it and trace a different face. Be sure students understand that the faces share edges but do not overlap. Have students cut out the nets and construct the prisms.
- Show students a Relational GeoSolids® rectangular prism. Review what a net is and challenge students to make different nets for the prism.

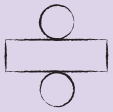
Formative Assessment

Have students try the following problem.

What net can be folded to make this solid?



A. 

B. 

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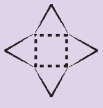
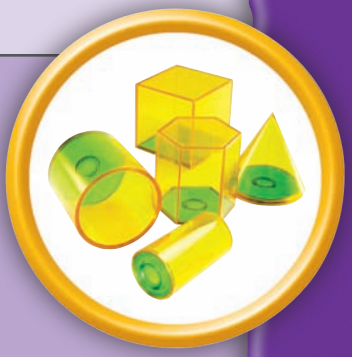
D. 



Try It! 30 minutes | Groups of 4

Here is a problem about nets.

Cameron works for a shipping company. Each shipping carton is stored as a flat cardboard piece that can be assembled when needed. What might the cardboard piece for a rectangular box look like?

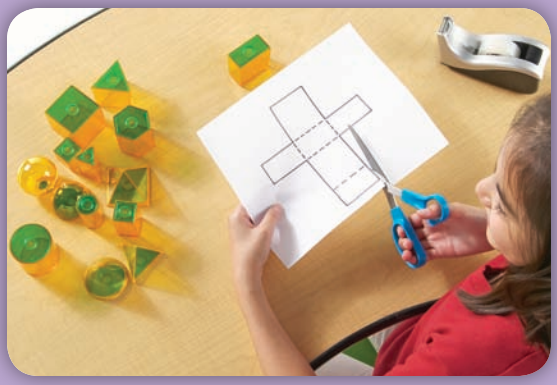
Introduce the problem. Then have students do the activity to solve the problem. Distribute solids, net patterns, paper, pencils, scissors, and tape to students. Explain that a net is a pattern that can be folded to make a three-dimensional object.

Materials

- Relational GeoSolids® (one set per group or two groups can share a set)
- Net Pattern (BLM 13; 1 per group)
- paper (2 sheets per group)
- pencils (1 per group)
- scissors (1 per group)
- tape (1 per group)

1. Have students examine the solids and describe how the shapes differ from two-dimensional shapes, such as rectangles. Display a cube and point out a face, an edge, and a vertex, defining each. **Say:** *Find a solid that has 12 vertices.*

2. Have students look at the net pattern and identify the faces and their shapes, the edges, and the vertices in the net. **Ask:** *Which solid figure has faces that are the same shape as the shapes in the net?* Have students cut out the net and fold it to make a solid.



3. Have students use one of the two rectangular prisms to make a net for a rectangular box. **Say:** *Cut and build your rectangular box from your net.*

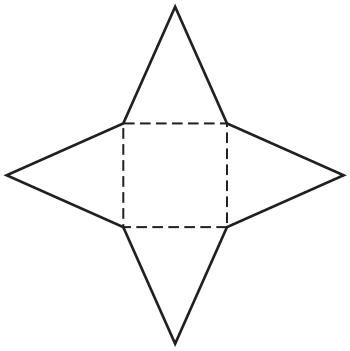
⚠ Look Out!

Some students may be inclined to cut out the faces and tape them together to form a solid. Point out that while this method can be used to create a three-dimensional shape, a net is a single piece that can be folded to make the shape. Instruct students to cut only along the outside of the plane figure.

Answer Key

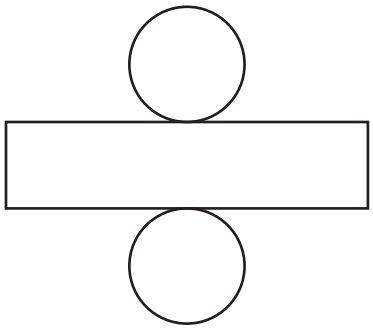
Use Relational GeoSolids to identify the solid for each net that is shown. Name the solid. (Check students' work.)

1.



square pyramid

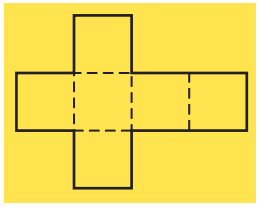
2.



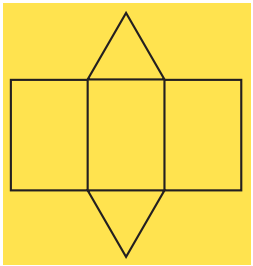
cylinder

Use Relational GeoSolids to help you draw a net for each solid. Sketch the net.

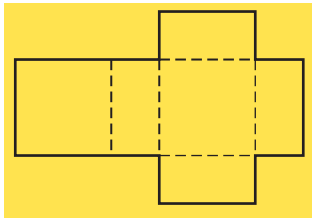
3. cube



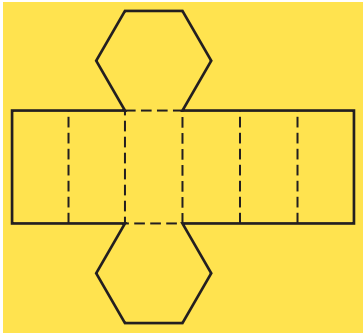
4. triangular prism



5. rectangular prism



6. hexagonal prism



Answer Key

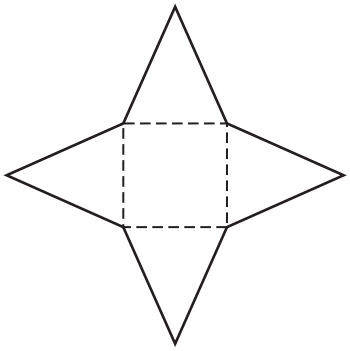
Challenge! How many different nets can you draw for a cube?

Challenge: Check students' drawings. There are 11 different nets for a cube.

Name _____

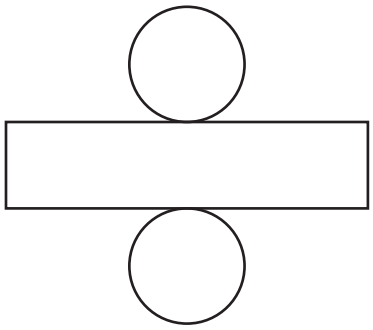
Use Relational GeoSolids to identify the solid for each net that is shown. Name the solid.

1.



_____

2.



_____

Use Relational GeoSolids to help you draw a net for each solid. Sketch the net.

3. cube

4. triangular prism

5. rectangular prism

6. hexagonal prism

Name _____

Challenge! How many different nets can you draw for a cube?

BLM 13

Net Pattern

Name _____