Grade 1 : Parts and Wholes
“Geometric Relationships: Faces of Solids”
(From: Mathology)

In this activity, students explore and describe 2-D faces of 3-D solids using concrete materials. As you cut apart a cereal box to isolate the faces, students identify the shape of each face and glue it to the matching face on an identical box.

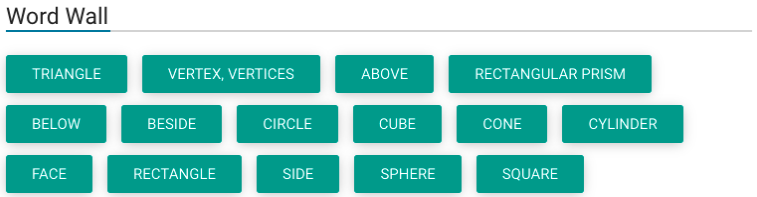
In pairs, students use 3-D solids (cubes, prisms, cones, and cylinders) to build a tower and describe it to their partners, who use the description to try to replicate the tower. Finally, students go on a gallery walk to look at some of the towers and listen to their classmates' descriptions of them.

Big Idea	Curriculum expectations
Describing the 2-D faces of 3-D solids	**E. Spatial Sense** **E1.** Geometric and Spatial Reasoning: describe and represent shape, location, and movement by applying geometric properties and spatial relationships in order to navigate the world around them • **Geometric Reasoning: E1.2** construct three-dimensional objects, and identify two-dimensional shapes contained within structures and objects
Learning Goals	**Success Criteria**
We want students to: ● explore and describe 2D faces of 3D solids using concrete materials ● analyze and classify 2D shapes and 3D solids in different ways by their attributes	I can: ● identify a 3-D solid by describing its 2-D faces. ● use solids to build 3-D towers.

Materials

- Two identical cereal boxes
- Containers/boxes with square and circular faces
- Assortment of 3-D solids *(virtual learners can use the Pearson Mathology Interactive Geometry tool)*
- File folders to act as barriers (one per pair)
- **Line Master 20: Assessment** *(log into Mathology account to access Line Masters)*

Math Language / Vocabulary



Prior Knowledge

Students may benefit from prior experience with:

- sorting 2-D shapes and 3-D solids using a single attribute
- identifying 2-D shapes
- using geometric language to describe 2-D shapes and 3-D solids

KEY CONCEPTS:

- Each face of a three-dimensional object is a two-dimensional shape. Often, a shape is identified by the number of sides it has. Common shapes on faces of three-dimensional objects are triangles, rectangles, pentagons, hexagons, and octagons.
- While the number of sides often determines a shape's name, this does not mean, for example, that all triangles look the same even though they all have three sides. Triangles can be oriented differently and have different side lengths, and yet still be triangles.

Note

- Constructing three-dimensional objects helps build understanding of attributes and properties of two-dimensional shapes and three-dimensional objects.

Minds On

Show students a cereal box. As you turn the box, explain that it has faces. Ask, "What are the shapes of the faces you see?" Cut apart an identical cereal box to isolate the faces. Have volunteers name the shape of each face, then tape it to the matching face on

the box. Repeat with containers that have circular and square faces and trace around the faces each time.

Action!

Give each pair 2 sets of the same 3-D solids (e.g., cubes, prisms, cones, cylinders) and a file folder.

- Set up the folder between you so that you cannot see each other's workspace.
- Player A: Use three to five solids to build a tower. Without naming the solids, describe to your partner how to build the tower. For example, you might say, "Put the solid that has 6 square faces on the bottom."
- Player B: Use your partner's description to build a tower.
- Remove the file folder. Do the towers look the same? Why or why not?
- Switch roles and play again.

Probing Questions:

- *Which solids did you use to build your tower?*
- *Which solid do you think your partner is describing? Why?*
- *Were your partner's descriptions helpful? Why or why not?*
- *How are these two solids alike? How are they different?*

Look-Fors

- Are students using one type of solid to build their towers, or are they using a variety of solids?
- Do students use geometric and spatial language in their descriptions (e.g., "The solid with 4 rectangular faces is on top")?
- Do students use gestures to support their descriptions of the towers?
- Are students using descriptions that differentiate one solid from other solids?

Consolidation

Go on a gallery walk to look at some of the towers. As students are describing them, listen for geometric and spatial language (e.g., faces, rectangles, beside). Watch for students who use gestures to support their descriptions. Ensure that students see the connection between 3-D solids and the shapes of their 2-D faces. For each of the solids used, make a list of the shapes of its faces. Have students find/identify 3-D objects in the world around them that have parts similar to a given 2-D shape (e.g., rectangle:

computer screen; circle: frying pan; square: building block).

Highlight for Students

- We can identify a 3-D solid by describing its 2-D faces.
- We can use solids to build 3-D towers.

Supports for Student Learning

Accommodations: Students use two or three solids that are very different, such as cubes and cylinders.

Extension: Students use a greater number of solids to make the towers.

Combined Grades Extension: Students build more complex structures (e.g., castle, animal), and then describe them for their partners to build.

Independent Tasks / Assessment Opportunities

Assessment tools are available by logging into your Mathology account and searching for Activity Card 11: Geometric Relationships: Faces of Solids - Grade 1.

SEL Self-Assessments (English) and Teacher Rubric

Extension Activities

Log in to your Mathology.ca / Mathologie.ca account to access Intervention and Extension activities, Professional Learning Videos and Assessment tools.

Technology

If you require support logging into your Mathology/Mathologie account, please contact Kerry Stack or Erica Doucet.