

# CHAPTER 5: Foundations of Geometry

## MINI-MODULE B

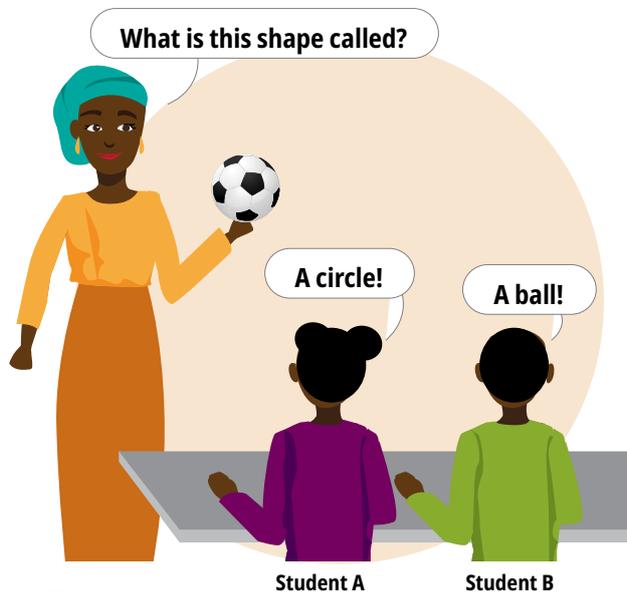
# Three-Dimensional (3D) Shapes

### Objectives

This mini-module aims to help teachers:

- Explain and demonstrate the properties of 3D shapes.
- Teach 3D shapes using 3D models, including everyday objects (e.g., a box, a ball).
- Practice a new teaching activity.

### Illustration of Teaching



#### REFLECT:

- Do you think these students made mistakes? What mistakes?
- What could you do to help the students understand this shape?

### Recommended Materials



## Ideas to Consider

The teacher is using an everyday object (a ball) to teach about spheres. Student A says that the shape is a circle. That is not correct because a circle is a flat, 2D shape. The student is probably more familiar with 2D shapes and their language and does not understand 3D shapes yet. The teacher may note that the object looks like a circle, but a circle is flat. This ball is an object that can be picked up, turned around, and seen from different sides. It is called a sphere. Student B called the sphere a “ball,” which is an example of everyday language that students might use to describe 3D shapes. The teacher could tell them that this is a ball, and a ball is an example of a sphere. The teacher should show students different examples of a sphere (e.g., a globe, marble, other balls) so that they can understand its properties.

In this mini-module, you will explore ways to support children as they learn about 3D shapes.



### ACTIVITY: IDENTIFY 3D SHAPES IN THE ENVIRONMENT

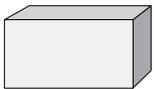
This activity can be completed alone, in pairs, or with a group of teachers. Discuss your responses to the questions.

**Purpose:** Explore the properties of a 3D shape.

**Materials needed:** Everyday objects in your space.

#### Instructions

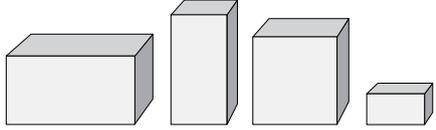
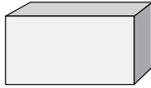
- **What are some cuboids here in our environment?**



- Identify all of the cuboids you can find in the environment (e.g., brick, book, door, box).
- **What are the features of a cuboid?**
- Discuss and list all of the features you can think of (e.g., it has three dimensions, six rectangular/square faces, eight vertices or corners).
- **Are there any objects around that are almost cuboids, but not quite? What features make them not a cuboid?**
- Identify and discuss the features that make these objects not cuboids (e.g., a door whose face is not flat, a book with rounded edges).

## What Do Children Learn about 3D Shapes?

In the early primary grades, children learn how to sort, identify, and describe some simple 3D shapes, including cuboids, cylinders, and spheres. When learning about the properties of 3D shapes, it is important to have real 3D models that students can hold. They can turn the shape and examine it in different ways to see all of its faces, edges, curves, and corners. Drawings of 3D shapes can be confusing for young children and do not help them understand the properties of 3D shapes very well.

Children should be able to ...	What does this mean?	Example
<b>Flexibly sort 3D shapes according to their properties</b>	Group 3D shapes based on their properties (e.g., number of faces, shapes of faces).	A group of shapes with rectangular faces: 
<b>Identify 3D shapes</b>	Identify 3D shapes (including in everyday objects) by name.	This is a cylinder: 
<b>Describe the properties of 3D shapes</b>	Describe 3D shapes based on properties such as number of faces and shape of faces.	<p>Q: <b>How do you know this is a sphere?</b></p>  <p>A: It is smooth and round, without any edges or corners.</p> <p>Q: <b>How many faces does this cuboid have?</b></p>  <p>A: 6</p>
<b>Compare 3D shapes</b>	Describe how 3D shapes are alike and how they are different.	 <p>Q: <b>How are these objects the same?</b></p> <p>A: They both have some flat faces. They are both containers.</p> <p>Q: <b>How are they different?</b></p> <p>A: The can has circular faces, and the box has rectangular faces.</p>

## Reflection

Write your responses down or discuss your ideas with your colleagues:

- What are some everyday objects from your community that you could use to help your students identify the properties of a cylinder? And a sphere?
- Why do you think it might help to use a variety of different objects?
- Why do you think it is important to identify and describe 3D shapes? How might this help students in their everyday lives?

## Teaching Practice

This practice activity may be completed by teachers with their own class or with a smaller group of students.



### ACTIVITY: SORT AND DESCRIBE CUBOIDS

**Purpose:** Sort and describe 3D objects based on their properties.

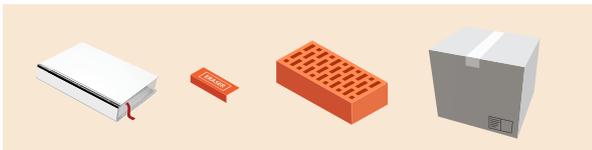
**Materials needed:** A collection of everyday objects, some of which are cuboids and some of which are other shapes (e.g., sphere, cylinder, other random shapes).

#### Instructions

- Show students the collection of objects that you brought to class.



- Show students one of the cuboids (e.g., a box, book, eraser, block).
- Discuss: ***Is there anything else that has a shape like this? Which objects have a similar shape?***
- Invite students to identify other cuboids in your collection of objects. Invite them to put all of these objects together in a group.



- Discuss: ***What do these shapes look like? What do they all have in common?***
- Show students one of the cuboids in the group. Turn it around so they can see all sides.
- Say: ***These objects are called cuboids. A cuboid looks like a block or box. It has six flat faces. All six faces are shaped like rectangles or squares.***
- Count the faces on a cuboid.
- Invite students to identify other cuboids in the environment around them (e.g., door, bricks in the wall, boards in the desk).



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