

CHAPTER 5: Foundations of Geometry

MINI-MODULE A

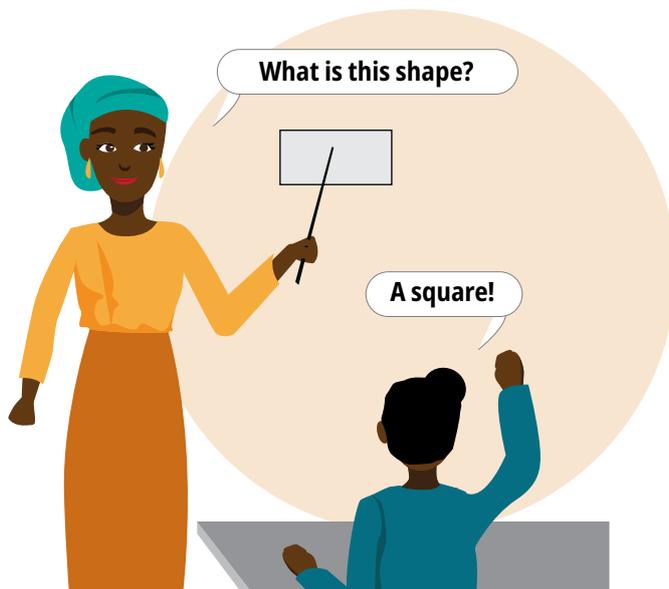
Two-Dimensional (2D) Shapes

Objectives

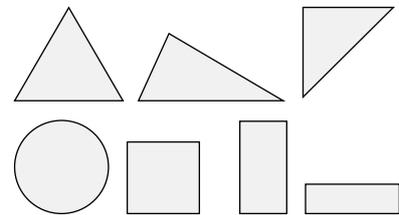
This mini-module aims to help teachers:

- Explain and demonstrate the properties of 2D shapes.
- Teach 2D shapes using cutouts, drawings, and everyday objects.
- Practice a new teaching activity.

Illustration of Teaching



Recommended Materials



Paper cutouts

REFLECT:



- What mistake did the student make?
- Why do you think the student has misunderstood this shape?
- What questions could you ask this student to help them understand?
- What materials could you use to address this misunderstanding?

Ideas to Consider

The student made a mistake by identifying a rectangle as a square. Rectangles and squares share some properties—they both have four sides and four angles. It seems that the student has correctly identified some of the features but has not discovered what makes a rectangle different from a square. The teacher could ask the child to describe the shape they are holding. They could show the student another cutout shape of a square and ask the student to compare the two shapes. Then the teacher could explain the properties of a square and rectangle, using the cutout shapes to demonstrate.

In this mini-module, you will explore ways to support children as they learn about 2D shapes.



ACTIVITY: IDENTIFY AND COMPARE 2D SHAPES

This activity can be completed alone, in pairs, or with a group of teachers. If you have colleagues to work with, take turns holding up two shapes while others comment on the similarities and differences. Discuss your responses to the questions.

Purpose: Practice describing and comparing shapes in your own words.

Materials needed: Paper cutout shapes (e.g., triangle, square, rectangle, circle).

Instructions

- Hold up one paper shape.

Example: 

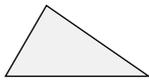
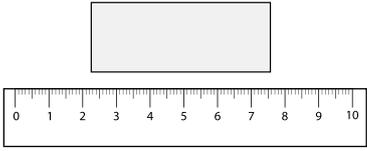
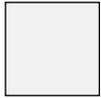
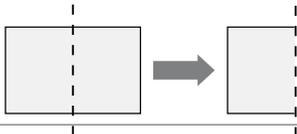
- What is this called? How do you know?**
- Take turns describing the shape in different ways.
- Hold up two different paper shapes.

Example: 

- What is the same about these shapes? What is different? How do you know?**
- Take turns describing what is the same and what is different between the shapes. You may note differences in their properties, size, color, or any other feature.
- Repeat with two different shapes if there is time.

What Do Children Learn about 2D Shapes?

In the early primary grades, children learn how to sort, draw, identify, and compare simple shapes, including circles, triangles, squares, and rectangles. With practice, they gain a good understanding of the properties that define a shape. For example, these are the properties of a triangle: three sides that are straight lines, and three angles. Triangles can have other features—such as being red or green, or big or small—but those are not properties that define them. Children can be encouraged to describe all of the features of shapes but should be guided to understand which features are its properties and how to identify a shape.

Children should be able to . . .	What does this mean?	Example
Flexibly sort 2D shapes according to different properties	Group 2D shapes based on their properties (e.g., number of sides, shapes that look alike, rectangles).	A group of shapes with four sides: 
Name shapes	Identify 2D shapes by name.	This is a square: 
Draw 2D shapes	Draw a 2D shape according to its properties.	When told to draw a triangle, the child draws a shape with three sides and three angles. 
	Use a ruler to draw a shape neatly (e.g., make straight lines).	A child uses a ruler to draw a rectangle with straight lines: 
Describe the properties of 2D shapes	Describe 2D shapes based on properties such as number of sides, lengths of sides, and number of angles.	Q: How do you know this is a square?  A: It has four corners and four sides all the same length.
Compare 2D shapes based on their features and properties	Describe how 2D shapes are alike and how they are different.	 Q: How are they the same? A: They have straight lines and angles. The bottom line is long. Q: How are they different? A: The triangle has a sharp angle. The rectangle has more sides.
Identify lines of symmetry with simple shapes	Identify lines of symmetry in 2D shapes, which divide the shape into two mirror images.	Fold a shape in half on a line of symmetry, showing that the two sides overlap: 

Reflection

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

- Imagine that you ask your students to compare a rectangle and a square.
 - What are some new things that they might notice?
 - How does this help them better understand the properties of shapes?
 - How can comparing shapes help students in everyday life?
- How could you use stories or examples to bring 2D shapes to life for students?

Teaching Practice

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



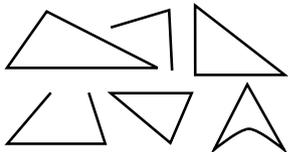
ACTIVITY: DESCRIBE AND DRAW TRIANGLES

Purpose: Describe the properties of triangles and draw triangles.

Materials needed: A triangle cutout; shapes drawn on the board, including triangles of different shapes and sizes, and shapes that look like triangles but are not (see examples below).

Instructions

- Hold up a triangle cutout. 
- Say: **A farmer built a fence for his goats to stay in. This is the shape of his goat fence.**
- Discuss: **What is this shape? How do you know?**
- Show children the shapes that you have drawn on the board.



- Point to each shape and discuss: **Is this a triangle? How do you know?**
- Invite different students to explain why each shape is a triangle, or not, in their own words.



This is a triangle because it has three sides and three angles.



This is not a triangle because it only has two angles.



This is not a triangle because one side is not a straight line.

- Say: **A triangle has three sides that are straight lines. It has three angles. It must be closed with no openings. If the farmer's fence had openings, his goats would escape!**
- Ask children to draw three different triangles on their paper.
- Walk around to check for understanding.
- Repeat with other 2D shapes if there is time.



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