Plane and solid shapes

Lesson plan and teacher's notes · Grade 2 Mathematics · 2 periods of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Grade 2
Subject	Mathematics	**Enrolment**	Boys ___ Girls ___ Total ___
Time	80 minutes	**Topic**	Plane and solid shapes

Learners hunt for solid shapes in the classroom, find corners, count faces, corners and edges, name shapes through riddles and make shapes from nets, sticks and clay. Two periods.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Group solid shapes by their features
2. Identify faces, corners and edges
3. Name cube, cuboid, sphere, cylinder and cone
4. Make a solid shape from simple materials

Prior knowledge

- Learners can count to 20
- Learners can sort objects into groups
- Learners know a box, a ball and a tin

Teaching and learning materials

- Shape models, empty boxes, tins, balls and bottles
- Soft wire, straws or sticks, clay or plasticine
- Manila paper or carton pieces with nets drawn
- Scissors and glue
- Flip chart or board with pictures of solid shapes
- Worksheet table: object, faces, corners, edges

References

Ministry of Education (CDC) Grade 2 Mathematics syllabus and module; 25Schools learners' note: Plane and solid shapes.

Lesson development

Stage and time	Teacher activities	Learner activities
P1 Shape hunt 12 min	Before the lesson put solid shapes in different places in the classroom. Ask: How do solid shapes look. Let learners find and collect shapes and display them on a table. Do not name the shapes yet.	Search, collect and display.
P1 Sort the shapes 12 min	Ask learners to sort the shapes into groups with something in common and to ignore colour. Ask them to explain. Build on their ideas: flat faces, curved surfaces, pointed ends, corners and round shapes. Ask for things at home, school and the market with the same shape.	Sort, explain and give examples.
P1 Corner walk 12 min	Give each group a cuboid and a sphere. Ask: Which has corners. Can you point at them. Explain that a corner is where two lines meet. Let learners walk and point at corners on a desk, door, window, book and box. Ask: How many corners can you see.	Touch, point and count.
P1 Conclusion 4 min	Give the worksheet table. Summarise: some shapes have corners and some do not.	Fill in the table.
P2 Faces, corners and edges 14 min	Show a cube model and a flip chart picture with the parts unlabelled. Ask: Which of A, B and C is the face, the edge and the corner. Build on their ideas, label the picture and ask learners to show faces, corners and edges one at a time. Let them look at a tin and a ball and record in a table: box has many flat faces, corners and edges; ball has one curved face, no corners or edges; tin has two flat faces, no corners and two edges.	Show the parts, count and record.
P2 Riddle game 12 min	Display shapes without names. When you read a riddle, learners pick the shape that matches. Read each riddle twice. Then reveal the name and ask for things in the environment with that shape. Cover cuboid, sphere, cube, cylinder and cone. Display the flip chart and let learners draw the shapes and write their names.	Listen, pick the shape and name it.

P2 Make shapes 8 min	Give each group a drawn net on manila paper or carton. Let them cut, fold and glue. Ask: How many faces. How many corners. Show how to make a cylinder by rolling paper round a tube and adding two circles. Let them also use sticks and clay to make a frame and count edges and corners. Give homework to make shapes from clay.	Cut, fold, glue, count and share.
P2 Conclusion 6 min	Ask learners to share their work and tell what shape it is and how they made it. Summarise the names and features.	Share and name the shapes.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

Sorting solid shapes

Solid shapes have flat faces (cube, cuboid), curved surfaces (cylinder, cone), pointed ends (cone, pyramids), corners (cube, cuboid) or are round (sphere). It is not necessary to name them at first.

Corners

A corner is formed when two lines meet. A cuboid has corners and a sphere has none.

Faces, corners and edges

Learners count the faces, corners and edges of solid shapes. A box has many of each. A ball has one curved face and no corners or edges. A tin has two flat faces, no corners and two edges.

Naming and making shapes

Cuboid and cube have 6 faces. A sphere has one curved face. A cylinder has two circular faces and one curved side. A cone has one flat face, one curved side and one point. Learners make shapes from nets, sticks and clay.

Questions to ask during the lesson

Question	Expected answer
The teacher gives a group a cuboid and a sphere and asks them to feel both. They are asked about corners. (a) Which one has corners. (b) Which one has none. (c) What is a corner.	(a) The cuboid. (b) The sphere. (c) A place where two lines meet.
The class plays a riddle game. The teacher says: I have two faces that are circles and one curved side that goes around. A learner must pick the shape. (a) What is the shape. (b) Name something like it. (c) Does it have corners.	(a) A cylinder. (b) A tin or a drum. (c) No.

A group makes a frame with sticks and clay for a solid shape. They count the edges and corners and tell the class. The teacher asks them questions. (a) What did they use to join the sticks. (b) What do they count. (c) What shape could it be.	(a) Clay or plasticine. (b) Edges and corners. (c) A cube or a cuboid.

Worked examples for the board

Counting parts of a tin

Step 1: Hold the tin. Step 2: Count the flat faces: top and bottom, two. Step 3: Look for corners: none. Step 4: Count the edges: two.

Naming a shape from a riddle

Step 1: Read: I have one curved face and no corners and I roll. Step 2: Pick the matching shape. Step 3: Say it is a sphere. Step 4: Name a ball or an orange.

Board plan

Write the title. Draw a cube and label face, edge and corner. Write the table of box, ball and tin. Write the five names: cuboid, cube, sphere, cylinder, cone.

Object	Faces	Corners	Edges
Box	Many flat faces	Many corners	Many edges
Ball	One curved face	No corners	No edges
Tin	Two flat faces	No corners	Two edges

The finished board

Mistakes to expect

Learners often think	Put it right
A ball has corners.	Give a cuboid and a sphere. Let learners feel both and say which has corners. A sphere has no corners.
A face is only the face of a person.	Hold a cube and point at each side. Explain that a face is a side of a solid shape.
Shapes are the same if they have the same colour.	Tell learners to ignore colours when sorting. Sort by flat faces, curved surfaces, corners and points.

Differentiation

Learners who struggle

Use only a box, a ball and a tin. Let learners touch each and say which has corners, which rolls and which has flat faces.

Learners who finish early

Ask learners to make a riddle of their own for a shape and let a friend guess it. Ask them to find a shape in a market stall.

Hearing or visual impairment

For learners with a visual impairment, let them handle each shape and feel the corners, faces and edges. For learners with a hearing impairment, face them, show each shape and write the names on the board.

No projector, no printing

Use empty boxes, tins, bottles and stones. Make nets from old cartons. Use clay from the river bank and sticks from the bush.

If time is short

Keep the sorting, the corner walk, the faces-corners-edges table and the riddle game. Move making shapes from nets and clay to the next lesson.

Evaluation

Question or task	A correct answer shows
A teacher puts a ball, a tin and a matchbox on a table. She asks learners to pick up each one. (a) Which one has no corners. (b) Which one has two flat faces and one curved side. (c) Which one is a cuboid.	(a) The ball. (b) The tin. (c) The matchbox.
Chanda describes a shape to her friend: it has one flat face at the bottom, one curved side and one point at the top. Her friend must find it. (a) What is the shape. (b) Name something like it. (c) Does it have corners.	(a) A cone. (b) An ice cream cone or a roof. (c) It has a point at the top.

Homework

Mutale has clay at home and wants to make a ball, a tin shape and a box shape. She counts the corners on each shape. (a) Which shape will have no corners. (b) Which shape will have a curved side and two flat faces. (c) Which shape will have many corners.

Extra practice with answers

Question	Answer
1. Chilufya walks around school and points at a door, a window and a book. Her teacher asks what they have in common. (a) What do they have. (b) What is a corner. (c) Name one more thing with corners.	(a) Corners. (b) Where two lines meet. (c) A desk or a box.
2. A teacher shows a cube and asks learners to point at parts. A boy touches a flat side, another touches a line where two sides meet. (a) What is the flat side called. (b) What is the line called. (c) What is the point where lines meet called.	(a) A face. (b) An edge. (c) A corner.

3. The class cuts out a net from manila paper, folds it along the lines and glues the sides. The teacher asks them about their shape. (a) What do they do with the paper first. (b) What do they do along the lines. (c) How many faces does a cube have.	(a) Cut. (b) Fold. (c) Six.
4. A boy has a tin, a ball and a brick on a table. His sister asks him to put them in groups by corners. (a) Which has corners. (b) Which have none. (c) Which has a curved face only.	(a) The brick. (b) The tin and the ball. (c) The ball.

Answers to the learners' check-yourself questions

1. Which solid shape rolls easily and has no corners.
   A sphere.
2. What do we call the place where two lines meet.
   A corner.
3. Name one thing that is shaped like a cylinder.
   A tin or a drum.
4. Name the solid shape with one flat face, one curved side and one point.
   A cone.
5. Bwalya finds a ball, a brick and a tin in the classroom. His teacher asks him about them. (a) Which one has no corners. (b) Which one has 6 rectangular faces. (c) Which one has two flat faces and a curved side.
   (a) The ball. (b) The brick. (c) The tin.
6. Mwila makes a solid shape from clay. It has one curved face and no edges and no corners. She shows it to her friend, who asks her about it. (a) What is the shape. (b) Name a thing at home with the same shape. (c) Does it have flat faces.
   (a) A sphere. (b) A ball or an orange. (c) No.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: