

Muddy, Muddy Mess

A book about 3D objects and 2D shapes





Aim

Muddy, Muddy Mess introduces 2D shapes that can be seen on the surfaces of basic 3D objects.

These whole-class activities provide students with the opportunity to:

- listen to a story about 2D prints of 3D objects
- sort 3D objects by surface shape
- use materials to act out the story
- use the *Teaching Tool* to act out the story
- trace the surface of 3D objects
- use the *Teaching Tool* to match 3D objects with 2D shapes

Activities

1. Listening to the story
2. Reviewing 2D shapes
3. Comparing surfaces of 3D objects
4. Sorting surfaces of 3D objects
5. Making prints
6. Using materials to act out the story
7. Using the teaching tool to act out the story 
8. Drawing the faces of 3D objects
9. Investigating the faces of a rectangular-based prism
10. Using the teaching tool to match 3D objects with 2D shapes 
11. Predicting shadows of 3D objects

1. Listening to the story

Resources

- *Muddy, Muddy Mess*

Activity

Show the cover of *Muddy, Muddy Mess* to the students and read the title aloud. Talk about the different objects on the cover, and then read the story. Ask, **How many shapes crept out of the muddy puddle? Which shape made each print? How do you know?** Read the story again, pointing to and identifying the characteristics that define each shape. Encourage students to describe the surfaces of each 3D character pictured.

2. Reviewing 2D shapes

Resources

- Art paper
- Crayons

Activity

Ask, **What 2D shapes do you know? What do the sides of the shape look like? How many sides does the shape have?** Ask the students to use their fingers to draw the outline of each shape suggested in the air. Then give each student some paper and have them draw their shapes. Use this opportunity to introduce the term “oblong.” Without making the discussion too involved, explain that squares and oblongs are both types of rectangles. That is, they share many of the same features, but only the square has sides all the same length. It may be helpful to make the comparison that cars and trucks are different types of vehicles, or cows and sheep are different types of animals. Reinforce the students’ understanding by drawing a variety of shapes on the board and having students say the name of each shape.



3. Comparing the surfaces of 3D objects

Resources

- Large cube
- Large sphere

Activity

Hold up a cube. Talk about the surface of the cube. Have the students describe the six 2D shapes that make the surface and bring out that they are all identical. Compare the surface of the cube with the surface of a sphere. Ask, **What is the difference between the surfaces?** Encourage a confident volunteer to explain that the surface of the sphere is curved and the surface of the cube is flat. Next, have the students find different classroom objects that have flat surfaces and some that have curved surfaces. Draw a two-column table on the board. Label one column *flat surface* and the other *curved surface*. Tally the number of shapes that the students find. For the objects that have flat surfaces, discuss the shape and number of each face.

4. Sorting surfaces of 3D objects

Resources

- 2 large hoops
- Platonic solids
- Everyday objects

Activity

Overlap the hoops on the floor at the front of the class to create a Venn diagram. Have the students use the hoops to sort different classroom and everyday objects. For example, have the students place objects that have a curved surface inside one hoop and those with only flat faces in the other. Objects that have both such as cylinders can be placed in the section where the hoops overlap. Repeat this activity several times using different features, e.g. objects that have oblong faces and square faces.



5. Making prints

Resources

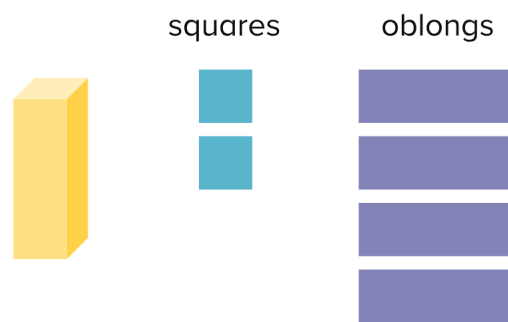
- Various everyday 3D objects
- Art paper
- Paint in shallow dishes
- Permanent markers

Preparation

Each group of students will need various different objects (use quite small objects that can be thrown away and avoid spheres), shallow dishes of paint, art paper, and a felt marker.

Activity

Provide each group with different 3D objects. Have the students take turns dip each face of an object in paint and print the face onto paper (one sheet for each object). When the prints are dry, have the students write the names of the 2D shapes that were printed for each 3D object. Collect the prints and discuss each as a class, asking, **What 3D object made these prints? How do you know?** Afterward, collate the prints into a classroom book about 3D objects.



6. Using materials to act out the story

Resources

- *Muddy, Muddy Mess*
- Set of classroom 3D objects

Activity

Read *Muddy, Muddy Mess*. From pages 2–7 have students identify the shapes that can be seen on the surfaces of the objects in the storybook. Point to each object and ask students to identify the shape of each face, for example the triangular-based prism has faces that are triangles and rectangles. Next, read pages 8–15 and have the students match the prints left by each 3D object with faces on 3D objects in the classroom. Show a classroom object and compare the shape of its faces with the prints in the picture spread.



7. Using the teaching tool to act out the story



Resources

- *Teaching Tool*
- *Muddy, Muddy Mess*

Activity

Ensure that all the students can see the *Teaching Tool*. Read pages 8–9 of *Muddy, Muddy Mess* and discuss the shape of the prints left by the 3D object. Next, select a volunteer to drag the matching 2D shapes (four oblongs and two triangles) onto the work area of the *Teaching Tool*. Allow students time to look at the shapes before pointing to the 3D objects on the *Teaching Tool* and asking, **Which object would make these prints? How do you know?** Repeat this process for the remaining pages of *Muddy, Muddy Mess*.

8. Drawing the faces of 3D objects

Resources

- Collection of everyday 3D objects
- Large sheets of paper
- Pencils

Preparation

The collection of everyday 3D objects can be quite large. Do not include spheres. Each group of students will need one object, a large sheet of paper and pencils.

Activity

Guide the students to lay their object on the paper, draw around that face, then turn the object to draw around each other face. Ask the groups to describe the shapes that they have made with their tracings, for example “We made 4 oblongs and 2 squares.” When all the groups have finished, collect the tracings and discuss these as a class. Challenge students from other groups to identify the object that each group traced around. Ask questions such as, **What shapes are these? What 3D objects have some of these shapes as faces? Which 3D object has only these shapes as face? How do you know?**



9. Investigating the faces of a rectangular-based prism

Resources

- Empty matchboxes
- Art paper
- Scissors
- Sticky tape

Preparation

Each group of students will need one empty matchbox, art paper, scissors and sticky tape.

Activity

Have the students in each group take turns to first count the faces of their matchbox, then draw around each face, then number each shape they drew. Ask, **If we cut out each of the shapes that we traced and taped them together, what object would we make? How do you know?** Ask each group to carefully cut out their tracings and guide them to tape the shapes together to form a net for a rectangular-based prism. Then use tape and one student's net to demonstrate how it can be used to remake a matchbox shape.

10. Using the teaching tool to match 3D objects with 2D shapes



Resources

- *Teaching Tool*

Activity

Ensure that all the students can see the *Teaching Tool*. Click and drag the 2D shapes that make the surface of a 3D object onto the work area. For example, for a cube drag six squares onto the work area. Next, select a volunteer to drag the matching 3D object onto the work area. Ask the remaining members of the class, **Is this the correct object? How do you know?** Repeat for other 3D objects.



II. Predicting shadows of 3D objects

Resources

- Projector
- Scissors
- Large classroom 3D objects

Activity

Position the projector carefully so that the objects will not be distorted. Demonstrate a shadow by placing scissors on the projector. Discuss features that can be clearly seen, for example size and shape, and those that cannot be seen, for example colour and which blade is on top. Show the large cube. Ask, **What do you think the cube's shadow will look like?** Elicit several responses and then place the cube on the projector to test the students' predictions. The shadow should clearly be a square. Ask, **Can we change the shadow?** Reposition the cube to check the students' predictions. Repeat for other 3D objects with flat faces.

