3 DIMENSIONAL SHAPES

3.20.2019

Subject

Mathematics

Prepared By

[Instructor Name]

Grade Level

5

Overview

This lesson plan covers teaching content for;

1. Classifying solid figures as prisms, cylinders, pyramids, cones, or spheres.
2. Identifying faces, edges, and vertices of solid figures.
3. Describing and classifying faces of solid figures as specific polygons.
4. Identifying patterns and describe relationships among the number of edges, vertices and faces of solid figures.

Objectives

Students should be able to;

1. Classify solid figures as prisms, cylinders, pyramids, cones, or spheres.
2. Identify faces, edges, and vertices of solid figures.
3. Describe and classify faces of solid figures as specific polygons.
4. Identify patterns and describe relationships among the number of edges, vertices and faces of solid figures.

Activity Starter/Instruction

1. 3D shapes: In our day to day life, we see several objects like books, ball, ice-cream cone etc., around us which have different shapes.
2. One thing common to most of these objects is that they all have some length, breadth and height or depth. Therefore they all occupy space and have three dimensions.
3. 3D shape is also known as Polyhedron: A polyhedron is formed by bounding polygons.
4. Attributes of a polyhedron

- Faces: Polygon forming a polyhedron are its faces, e.g. a cube, the 6 flat surfaces that are the skin of the cube are faces.
- Edges: Line segments common to intersecting faces of a polyhedron are its edges, e.g. the 12 line segments that form the skeleton of the cube are its edges.
- Vertices: Point of intersection of edges of a polyhedron.

Teacher Guide

Day 1/ Lesson 1: 20mins

1. Explain to the class that they will be constructing three-dimensional shapes, including a rectangular prism, square pyramid and cube, out of toothpicks and modeling clay.
2. The teacher will place students into groups of two and explain to them that they will have to work together to successfully build their three-dimensional figures.
3. Both members of the group should have the opportunity to build one of the figures.
4. Once in pairs the teacher will give each pair a reference sheet to display a visual model of the shapes the students will need to build.
5. Student pairs will be allowed to begin building the three-dimensional figures listed on their worksheet.
6. The teacher will circulate throughout the classroom assisting students when necessary and asking questions to determine student understanding.
7. Some questions to ask could include:
8. Do you have the correct number of vertices for the figure you are building?
9. How could you make this two-dimensional figure into a three-dimensional figure?
10. Does the three-dimensional figure match the one on your handout?
11. What figure are you building?

Materials Required

- Toothpicks
- Modelling clays
- A model of the figures being built
- White Board
- Marker
-

Additional Resources

- https://static1.squarespace.com/static/53e7dd4fe4b0
  of-2D-3D-Shapes.pdf
- https://www.skillsyouneed.com/num/3d-shapes.html
- https://www.splashmath.com/math-vocabulary/geom
- https://www.ck12.org/book/CK-12-Middle-School-Ma
- https://www.learningstreet.co.uk/articles/what-are-t
-

Additional Notes

5. In a polyhedron, three or more edges meet at a point to form a vertex.
6. Some examples of polyhedron are; cuboid, cube, pyramid, triangular pyramid, and cone.

Guided Practice

Day 2/ Lesson 2: 15 Mins

1. The study of 3-dimensional shapes is a part of geometry. All 3-dimensional figures must have height, width and length.
2. Their flat surfaces are called faces, the sides of which are called lateral faces. Edges are formed where faces meet, and vertices are formed where edges meet.
3. Examine a shape to determine if it meets the criteria for a 3-dimensional shape: height, width and length. A picture of a 3-dimensional shape is 2-dimensional. The actual object we can touch is 3-dimensional.
4. Identify 3-dimensional shapes with curved surfaces. A sphere is a symmetrical, 3-dimensional figure shaped like a ball. It has no flat sides and no corners.
5. Every point on the curved surface of the sphere is equidistant from the center of the sphere.
6. A cone has a flat base that is circular in shape, topped with a rotated, right-angled triangle that results in a curved

12. As the pairs complete building all three models, the teacher will need to review all three models for accuracy of the shape and that the correct number of vertices are visible.
13. Students who are unable to complete the activity successfully can be assisted by the teacher using guiding questions.

Guided Practice

Day 3/ Lesson 3: 20mins

1. Properties of 3D shapes;
2. Cube:
- 6 square faces all the same size.
- 12 edges all the same length.
- 8 vertices.
- Its 2D shape is a square.
3. Cuboid:
- 6 rectangular faces.
- 12 edges.
- 8 vertices.
- Its 2D shape is a rectangle.
4. Sphere:
- A perfectly round 3D shape, like a ball.
- It has only one curved face.
- Its 2D shape is a circle.
5. Cone:
- Has a circle at its base and a pointed vertex.
- Has 2 faces.
6. Cylinder:
- Circular ends of equal size.
- 2 edges.
- 3 faces.
- 0 vertices.
7. Square base Pyramid:
- Has a square base-face 1.

surface ending in a point, called a vertex.

7. Locate shapes with all flat surfaces (or faces). How many are there?
8. A triangular prism is a 3-dimensional shape with three rectangular sides, and two ends that are triangles.
9. A triangular prism has a triangular cross-section all the way along its length.
10. Rectangular prisms have six faces that are all rectangles, with a cross-section that is a square.
11. Cubes are equal in height, width and length. All six faces are square.
12. Rectangular prisms and cubes, which are also prisms, are called cuboids.
13. Look for examples of 3-dimensional shapes in everyday life. Basketballs are spheres. Ice cream cones are cones. A pup tent is a triangular prism. A gift box is a rectangular prism. Dice are cubes.
14. Make paper examples of various 3-dimensional shapes.

- 4 triangular faces.
- 5 faces in total.
- 8 edges.
- 5 vertices.

Summary

1. Ask students randomly about 3D shapes.
2. Teacher go over it with students to assess if they understand fully.

Assessment Activity

Assess if students can;

1. Describe and classify faces of solid figures as specific polygons correctly.
