# 3-D Detective

Unit 4: Plane and Solid Figures

## Grade Level

Grade 2

## Overview

In this task, students will identify, describe, and illustrate plane and solid figures according to geometric properties.

## Key Standards

**M2G1. Students will describe and classify plane figures (triangles, square, rectangle, trapezoid, quadrilateral, pentagon, hexagon, and irregular polygonal shapes) according to the number of edges and vertices and the sizes of angles (right angle, obtuse, acute).**

**M2G2. Students will describe and classify solid geometric figures (prisms, cylinders, cones, and spheres) according to such things as the number of edges and vertices and the number and shape of faces and angles.**

  a. Recognize the (plane) shapes of the faces of a geometric solid and count the number of faces of each type.

## Possible Materials

- one small paper bag for each team of three students
- solid figures (cylinder, cube, rectangular prism, cone, sphere, pyramid, triangular prism) to place in the bag (only place one figure in each bag)

## Task

Hand out one bag with one geometric solid in it to each group of three students. Tell the students to…

- Peek at the geometric figure in their bag. Do not to let other tables/teams see the solid!

- Write down as many of your figure’s attributes as you can. For example, number of edges, vertices, and angles. Then use those to write clues about your solid figure. For example, for a cube you could say…

  "Some of my faces are squares; It can be stacked but not rolled; None of my faces are circles; I have lots of right angles; etc…"
• You can look back at the figure as many times as necessary.

• When you and your partners are finished writing your 3-5 clues/descriptions, take turns reading your descriptions to each other. Make sure that the clues/descriptions are accurate.

• We will take turns sharing our clues with the whole class. Other teams will try to guess what figure your team has in the bag and each team that guesses correctly will gain a point!

  Encourage students to try to draw the figure that the other groups are describing.

**This lesson description is a variation to the 3-D Detective lesson that is written up in the frameworks. The above task has the students working in groups of 3 rather than individually with a partner as suggested in the original lesson. The change was made in order to encourage more math talk among the students.**

### Sample Questions

• If your students are having difficulty coming up with clues, you can provide the following list of questions to help them focus on the characteristics of their figure and guide their clue writing.
  • How many edges does your figure have?
  • What shape are the faces of your figure?
  • Can your figure roll easily?
  • Does your figure stack easily?
  • What shapes are not on your figure?
  • Are there any right angles on your figure?
  • What objects in everyday life are shaped like your figure?
  • How many vertices does your figure have?
  • Are there more than four angles on your figure?
  • Are there less than four angles on your figure?

### Assessment Ideas

**Performance Assessment**

Students’ written descriptions/clues and drawings will reflect levels of understanding. Keep in mind that describing and drawing three-dimensional figures is extremely challenging to 2nd grade students. It is common for students to miscount faces, edges, and vertices if they do not have a systematic method of counting without skipping parts or counting parts more than once, so be sure to model counting the parts of a space figure when introducing and exploring space figures.

You can have each student build models of the three dimensional shapes by using toothpicks and mini marshmallows (or clay).