# Polyhedrons/3-Dimensional Figures

**Overview**: ***These tiered assignments provide students with the opportunity to solidify their grasp of polyhedrons and to practice creating polyhedrons.*** Before working on their assigned tasks, introduce students to the names, characteristics, and parts of a variety of polyhedrons. Complete the following introductory activities as a whole group or in smaller, randomly-assigned groups:

- Students explore a variety of 3-dimensional figures as the teacher introduces the term *polyhedron* (many-sided). How are these figures alike? Different?
- Students identify objects in the classroom that represent the polyhedrons they have examined. This can be accomplished through a "Polyhedron Hunt."
- Introduce the parts of common polyhedrons (base, face, edge, vertex) and identify these parts on models of polyhedrons.
- Play a polyhedron guessing game. In this game, blindfold students and give them a polyhedron to hold and feel. What is the name of the polyhedron? What parts can they feel?

**Standards**:

- Recognize the attributes of three-dimensional geometric figures
- Describe and make solid figures

**Objectives:**

The students will **KNOW**

- Names of common polyhedrons (cube, prism, sphere, cylinder, cone, pyramid).
- Names of the parts of polyhedrons ((base, face, edge, vertex).

The students will **UNDERSTAND THAT**

- Geometric figures can be described and named based on their characteristics/parts.
- We can find geometric figures all around us.

The students will **BE ABLE TO**

- Describe polyhedrons.
- Identify the parts of polyhedrons.
- Create polyhedrons.

**Materials:**

- Pattern blocks
- Models of a variety of polyhedrons
- Straws (cut into short segments) and twist ties

**Tier One (**lower readiness)

Students working on this tier work in pairs to create a variety of polyhedrons by stacking pattern blocks. As they work, they ask one another to guess which polyhedrons they have made. Encourage them to make the same polyhedrons in different ways by using different pattern blocks and by combining pattern blocks to create different bases for their polyhedrons.

After they have created several different polyhedrons with the pattern blocks, they remain in their pairs to play a reverse guessing game. One student secretly selects a polyhedron model and describes it to the other student who cannot see it. The second student will try to guess the name of the polyhedron based on the information provided. The pairs can play this game several times, taking turns as they go.

**Tier Two** (higher readiness)

Students in this group work independently to create some of the polyhedrons studied using straws and twist ties (the twist ties connect two straws and can be bent to create vertices). What polyhedron parts do the straws and twist ties represent? Have students create signs/labels for the polyhedrons they create, and display their polyhedrons.

After the students have created two to three common polyhedrons (depending on the pace at which they are able to work with the straws and twist ties), they use straws and twist ties to create original polyhedrons. Have them name their polyhedrons based on their characteristics. For example, a four-sided figure with one base could be named a “quadripyramid” based on its number of bases and faces. Have the students create signs/labels for their creations.

**Closure**: After the students have completed their tasks, review the term *polyhedron* as well as the names and the parts of common polyhedrons. Additional questions for discussion include:

- What is your favorite polyhedron? Why?
- Which polyhedron is the most important? Why?
- Is a sphere a polyhedron? Why or why not?