# CONSTRUCTING/PERFORMANCE TASK: Day At The Museum

*Approximately 2 days*

## STANDARDS FOR MATHEMATICAL CONTENT

**MCC1.G.1** Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

**MCC1.G.2** Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.

## STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## BACKGROUND KNOWLEDGE

Students will have some background knowledge on what defines two dimensional or three dimensional shapes, but they may need additional assistance and guidance as you work through the task.

## ESSENTIAL QUESTIONS

- Where can we find shapes in the real world?
- How can a shape be described?
- What is a 2-dimensional shape?
- What is a 3-dimensional shape?

## MATERIALS

- Geometric solid models for: cylinder, cone, and rectangular prism
- Modeling clay or play dough
- Connecting cubes
- *Captain Invincible and the Space Shapes* by Stuart J. Murphy
- Before reading, prepare a chart/organizer to record characteristics of the three dimensional figures while you read the story.
- File folders cut in half or half sheets of contruction paper (See Part IV)
- Pictures of 2-D shapes (see Part IV)

## GROUPING

Small Group

## TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION

**Part I**
Read *Captain Invincible and the Space Shapes* by Stuart J. Murphy or other book about 3D shapes. Prepare a chart/graphic organizer to record the characteristics of the three-dimensional figures as you read the story. Pass around solid 3D shapes (cube, right rectangular prism, right circular cone, right circular cylinder) and ask students to describe how each one looks and feels and record these characteristics in the graphic organizer. Ask the students, "How are these different from the shapes we have been using?" Allow students to engage in the conversation that defines the difference between 2D and 3D. More than likely students will identify the obvious characteristics. The teacher may guide the conversation if needed. Add any additional information to the chart created above if needed.

One way to describe a 2D shape is to explain that it only has 2 dimensions such as, width and height, but no thickness. Then, show students examples of 2D shapes such as a triangle, a circle, a rectangle, etc. Then, compare the 2D shape to a 3D shape and guide students to an understanding that a 3D shape has height, width, *and* depth. Describe the components of a 3D shape by pointing out the faces, vertices, and sides.

It is natural for students to initially talk about the faces as "sides" but as you talk about them make sure to use the word faces not sides.
Gradually the students will pick up on this and will start calling the "sides" face. This is important because "side" actually refers to a two dimensional shape. When you are talking about a three-dimensional shape, for instance a cube, it has 6 faces but 12 edges. Each face has four sides.

**Part II**
Have students work at their seats for the next activity. Give students connecting cubes and ask, *What shape does each connecting cube remind you of? What shapes can be made using these connecting cubes?* Allow students to work with the cubes to create other 3D shapes, share their creations, and have a class discussion of each.

**Part III**
After a class discussion on the differences between three dimensional and two dimensional shapes, explain to students that they will go on a shapes hunt in the school to identify 2D and 3D shapes found within their environment. Tell them that they will work with members of a group to locate specific items on a list and bring them back or take a picture of the items to include in a "Shapes Museum".

Divide students in to groups and assign them each a specific list of items to locate, such as:
- Two or more shapes that make another shape
- Solids that are like a box, a cylinder, a pyramid, a cone
- Five shapes that are alike in some way

Give students the option to take a picture with a digital camera, draw a picture, collect the items, or make the shapes using clay, to display in a "Shapes Museum" in the classroom.

**Part IV**
Students will work with a partner to play, "What's My Shape" (Van de Walle, Activity 7.2, page 195). Make a set of 2-D shapes on paper. Cut out a third of the shapes and paste each inside a folded half-sheet of construction paper to make "secret shape" folders. One student will be the leader and the other will hold the secret shape folder. The leader will ask yes or no questions about the shape to lead to a correct guess.

## FORMATIVE ASSESSMENT QUESTIONS

- Is this object exactly like our model? How is it the same? How is it different?
- Which solid is the hardest to find in the classroom? Why?
- What do you notice about the faces of objects?
- Where would you find _____ at your house?
- How are the students describing the shapes they are finding?
- Tell me about the shape you are looking for? The shape you found? (What attributes are the students using to describe the shape?)

## DIFFERENTIATION

### Extension

- Students could determine attributes and then use that information to graph objects from the "Shape Museum".
- A home connection could be made by sending a parent letter asking for students to search for solids they could bring back to school to add to the "Shape Museum" or to share during show and tell.

### Intervention

- Give students who struggle cards with examples of 3-D solids that can be used when they are looking for objects for the "Shape Museum."