# Creating and Describing Shapes

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| In this lesson, students will create and name given shapes. They will use precise mathematical vocabulary describe shapes to partner with enough details for the partner to recreate it accurately. |

Common Core Standard:

**Analyze, compare, create, and compose shapes.**

**NC.K.G.4** Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, attributes and other properties.

Additional/Supporting Standards:

**Identify and describe shapes.**

**NC.K.G.2** Correctly name squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres regardless of their orientations or overall size.

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.

Student Outcomes:

* I understand the name and type of a shape identified by the leader.
* I can create the shape named by the leader on my geoboard.
* I can use mathematical words to describe my shape to a partner with enough details for them to recreate it accurately.

Materials:

* Geoboards and rubber bands for each student
* Mathematical vocabulary, one word per sentence or paper strip such as sides, vertices/angles, sides of equal length, sides of unequal length.

Advance Preparation:

1. Assemble one geoboard with five rubber bands strung on it for each student.
2. Review the description of the Standards for Mathematical Practice that are addressed in this activity and Standard and Clusters in the Geometry Domain.
3. Select the mathematical vocabulary that will be the focus of this activity. Create sentence strips with one word on each of them so that students can connect the written word with the spoken word.
4. Prepare a list of names for working pairs of students.
5. Generate a list of “rules” you think are important for working with geoboards and rubber bands and appropriate consequences.

Directions for Activity:

1. Organize students in pairs.
2. Distribute prepared geoboards
3. Ask students to generate a list of “rules” for working with Geoboards (such as leave your geoboard on the table until directed to use it. Exercise great care in placing rubber bands so as not to hurt yourself or someone else by releasing them before they are placed on pegs. Have students suggest consequences for using the tools inappropriately.)
4. Have students to model how to create a shape with rubber bands. You may wish to use electronic geoboards on the web: <http://www.mathplayground.com/geoboard.html>
5. Have several students describe the shape created. If necessary remind students of vocabulary that enables them to focus on the mathematical properties of the shape, such as sides, vertices/angles, length, width, etc.
6. Give directions for working as partners, such as taking turns so that one partner makes a shape and gives a description for creating it as the other partner creates the shape from the description. Compare the shapes by looking at both simultaneously. Then switch roles. Complete at least three different shapes per partner.
7. Reconvene as a class and have several students share their shapes by naming and describing them. (You might allow students to practice describing with a different partner and then describe for the whole group.)
8. Refer to the shapes created and the vocabulary used to describe them.

Questions to Pose:

* Describe the shape on your geoboard using the “special” mathematical vocabulary we discussed.
* How do you know that the shape is a (square, circle, triangle, rectangle, hexagon)?
* What words did you use to help your partner know which shape to create?
* Where do you find the shape that you created in our classroom, at home, on the playground or at the grocery store?
* If the shape your partner created is different from yours, describe the ways the shapes are alike? Describe the ways in which the shapes are different?

Possible Misconceptions/Suggestions:

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| **Possible Misconceptions** | **Suggestions** |
| Students may not recognize triangles that are not equilateral triangles. | Model a variety of triangles such as, right triangles, acute triangles, obtuse triangles, scalene triangles, isosceles triangles. |
| Students may not recognize shapes in orientations when the base is not parallel with the side of the geoboard. | Show students plane figures resting in different orientations. During your modeling of shapes includes those shapes in various orientations on the geoboard. |
| When squares appear resting on a vertex, students may confuse them with a rhombus and/or call it a diamond. | Show students a square (maybe a pattern block) resting on a side and on a vertex. Then show students a rhombus resting on a side and a vertex. Discuss the appearances in each orientation.  Emphasize the fact that the shape does not change shape because of the orientation. |

**Special Notes:**

Make certain to use various types of triangles and orient shapes in multiple ways.

Encourage the use of appropriate mathematical vocabulary and connect it with reading goals.

Extension: You might wish for students to record on the geodot paper blackline master the shapes they make on the geoboard. (Save these recording for the student’s portfolio as evidence of their learning.)

