Kindergarten: Mathematics
Unit 1: Exploring Attributes and Shapes – Part 1
Formative Assessment Task – Assessment FOR Learning
Lesson Title: What is a Triangle?

Give assessment	
The assessment task should be one that is likely to highlight key mathematical ideas for students and make visible students' misconceptions, incomplete understandings, and/or strategic solution strategies.	Although students will be familiar with many shapes and will be using pattern blocks and or attribute blocks frequently in the classroom, this lesson focused on triangles for the purpose of connecting these familiar objects to mathematics concepts, specifically identifying the distinguishing geometric characteristics of triangles.

Materials:
• 10 pattern or attribute blocks, 3 of which are triangles
• opaque bag for holding/concealing the blocks
	Task: Find the Triangles
	This is a task a teacher can do with students as they are working in centers.
	• Place 10 pattern block or attribute block shapes, 3 of them triangles, into an opaque bag,.
	• Have students reach in and pull out each of the triangles, without looking into the bag.
	• Have students talk about the attributes of the shapes they pull out of the bag.
	• Pose questions such as
	  - *What makes this a triangle?*
	  - *How did you know that this was a triangle when you reached in the bag?*
	• Keep a record of student thinking to post on chart paper for a follow-up class discussion. Include any misconceptions that surfaced.
	• Listen for the terms *sides, corners, straight.*
	• Listen for possible misconceptions, features that do not define a shape as a triangle:
	  - Students say it's a triangle because it is green (the color of all the pattern block triangles).
	  - Students pull out a different shape
	  - Students say it's a triangle because all the sides are the same length.
	  -
	Have a group discussion about how students could tell when they had found a triangle in the bag.
	• Use the poster you created of what students said about the triangles or other objects in the bag.
	• Be sure to discuss any misconceptions that surfaced.
	  - *Do all triangles have to be green in order to be a triangle?*
	  - *Why is this shape (square, hexagon, etc.) not a triangle?*
	  - *Do all the sides of a triangle need to be the same length?*
	• Tell the class that this activity will be put into a center. They will be able to do the activity with other shapes, as well.

Re-engagement: select and share representative solutions	

Analyze student work for aspects around which to reengage (e.g., common misconceptions or innovative thinking). Select a subset of representative solutions, either correct or incorrect to prompt a conversation with students.
 	
Share with the class a related task and/or student work that you have selected for additional exploration and that will likely support a deepening students' understanding of key mathematical ideas.
 	
Blackline master: Examples/Non-examples of Triangles
	To extend student thinking, engage them in a discussion of examples and non-examples of triangles.
	
	Display the blackline master of examples/non-examples of triangles or reproduce the images on poster paper.
	• *How can we use what we know about triangles to tell which of these shapes is a triangle and which ones are not a triangle?*
	• Call on a student to identify a shape as a triangle or not a triangle.
	   - *Does anyone else think that this is a triangle / that this is not a triangle?*
	   - *What makes it a triangle?*
	   - *Why is it not a triangle?*
	• If students are able, have them turn-and-talk to a pre-arranged shoulder partner about what makes the shape a triangle or why a shape is not a triangle. This will get all students engaged in "constructing a viable argument." Then call on a pair of students to explain.
	• Listen for mathematical language, terms such as *sides, corners, straight, sides that connect or meet at the corners*
	
	This task will elicit all the attributes of a triangle. Closed sides and orientation are attributes that students would not normally note when holding a triangle. They become evident when looking at an image of a triangle.
	   - 3 sides
	   - straight sides
	   - 3 corners
	   - sides connect at corners

Summarize	

Engage the class in a discussion of their findings regarding the selected tasks and prompt students to synthesize their thinking around key mathematical ideas.	Have students summarize what they know about triangles. This is a time to also address common misconceptions that have surfaced during past discussions.
	• *How can you always tell if a shape is a triangle?*
	   - 3 sides
	   - straight sides
	   - 3 corners
	   - sides connect at corners
	   - can be turned in many different ways
	   - position doesn't matter
	   - color doesn't matter
	   - size doesn't matter
	   - length of side doesn't matter

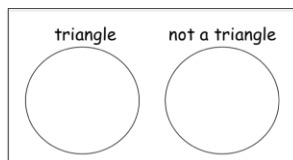| **Independent practice**	

Give students a new mathematical task or set of tasks designed to support the development of lasting understanding.
 	
Geoboard Recording Sheet
http://illuminations.nctm.org/uploadedFiles/Content/Lessons/Resources/preK-2/Shapes-AS-Geoboards.pdf
	Triangle Designs
	• Have students create a variety of triangles on a geoboard. Say to students, *Make a design on your geoboard making only triangles.*
	• If they have the finger dexterity and hand-eye coordination to do so, you may have students copy the designs they make onto geoboard paper (Geoboard Recording Sheet). Otherwise, discuss the work the student has constructed on the geoboard.
	  - *How are your triangles alike?*
	  - *How are they different?*
	  - If a student says that one is smaller than the other, probe, *In what way is it smaller?*
	• Encourage variety.
	  - *Can you make a larger/smaller triangle?*
	  - *Can you make a triangle where one side is longer that the other sides?*
	  - *Can you make a triangle with all three sides the same length?*
	  - *Can you make another triangle that's turned in a different way?*
	
	Shape Sorting
	<u>Center activity:</u>
	Provide a shape sorting mat for sorting a collection of object with different shapes. Have students sort the shapes into *Triangle* and *Not a Triangle* categories.
	
	Build-a-Triangle
	Give students straws cut into different lengths and marshmallows or clay for building triangles. Have students talk about the attributes of their triangles and compare them to triangles other students have constructed.
	
	Kindergarten Geometry
	There are many more activities for independent practice when students are working with more than one shape. The following website is particularly highly recommended.
	    Kindergarten Geometry Activities
	    http://www.k-5mathteachingresources.com/kindergarten-geometry.html
	    Activities are specifically designed around the Common Core State Standards.