**Title:** Investigating Triangles

**Grade level:** 1st Grade

**Objectives:**

1. Students will be able to identify triangles and compare their attributes with other shapes.
2. Students will be able to form two-dimensional and three-dimensional triangles using different pattern blocks.
3. Students will be able to identify shapes that can be used to create triangles.

**Common Core Standards Addressed:**

1.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.

1.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.

**Materials:**

Pattern Blocks

Attribute Blocks

Triangle Template (from: http://www.k-5mathteachingresources.com/support-files/pattern-block-triangles.pdf)

Shape Record Worksheet (attached)

**Procedure:**

1. Ask students what they know about triangles (e.g. how many sides does a triangle have, how many corners does a triangle have).
2. Have students look at the attribute blocks and explain to them what an attribute is and that all shapes have defining and non-defining attributes.
3. Group students into partners and have students explain to each other what they think a triangle’s attributes are after they have looked at the attribute blocks. Then have them sort the blocks into groups of triangles and non-triangles together.
4. Discuss as a class what a triangles defining and non-defining attributes are and write student responses on chart paper so that they will have something to refer back to later. Also discuss what an equilateral triangle is so they begin to understand that there are different types of triangles.
5. Explain to them that they are going to use their pattern blocks to create equilateral triangles using 2 or more different shapes, have them use the triangle template worksheet as a guide. Review the names of the pattern block shapes so that the students understand and remember the names when they begin to use them.
6. Students then will work together, or alone if they chose to, and work on building equilateral triangles by thinking about the different shapes that they have and deciding which of their pattern blocks will work and which will not work to create a equilateral triangle. The students will then record the shapes that they use to create their triangles on their Shape Record worksheet.
7. While students are working, ask them assessment questions to check for student understanding and explain any misconceptions.
8. After all students have been given time to work on building their triangles, discuss as a whole group about what shapes the students found worked the best to build their triangles and why other shapes that they tried may not have worked.

**Assessment:**

Collect the Shape Record worksheet to see if the students have completed it and if they understand what shapes can be used to make an equilateral triangle. Have each student explain what a triangle is and how it is different from other shapes verbally while they are working on the activity and before bringing the whole class together for the discussion, make a check mark next to their name on a running record so you know who has mastered the lesson.

**Differentiation:**

For higher-level learners, have students complete the activity of building triangles using the pattern blocks but without using the triangle template sheet as a guide. Tell them to try and fill the entire Shape Record sheet with different shape combinations for building triangles.

For lower-level learners, have students build only two or three triangles with the pattern blocks or have them focus on using only two different shapes to fill their triangles.

**Integration Activities:**

This lesson could be integrated with Language Arts by reading the book *The Greedy Triangle* by Marilyn Burns before starting the lesson so that the students can hear all of the different shape names that they will be using to build their triangles. You could also read this book at the end of the lesson so that the students could point out the shapes that they used to build their triangles.

**Lesson Justification:**

I chose this lesson because it is a way to help students understand the beginning concepts of shapes and how certain shapes can be used to create new shapes. The students will also understand a triangles defining and non-defining attributes by exploring triangles in a different way. Although this lesson’s main focus is on triangles, the students are also beginning to understand other shape names and properties by using them to build their triangles and writing the different shapes that they use on their worksheet.

This lesson also focuses on the NCTM Process Standards of representation, reasoning and proof, and communication. During the activity the students use both the attribute blocks and the pattern blocks to demonstrate/represent what a triangle looks like to show that they understand the properties of a triangle. The students are also using the skill of reasoning and proof because they have to think about which shapes to use to build their triangles and decide which shapes will work and which will not. After they choose which shapes to use they will be able to explain to the class why their shapes worked in their triangles and why other shapes may not have worked.

Shape Record

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| --- | --- |
| Triangle Number | Shape Names & How Many |
| EXAMPLE: Triangle 1 | 3 triangles, 1 hexagon |
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