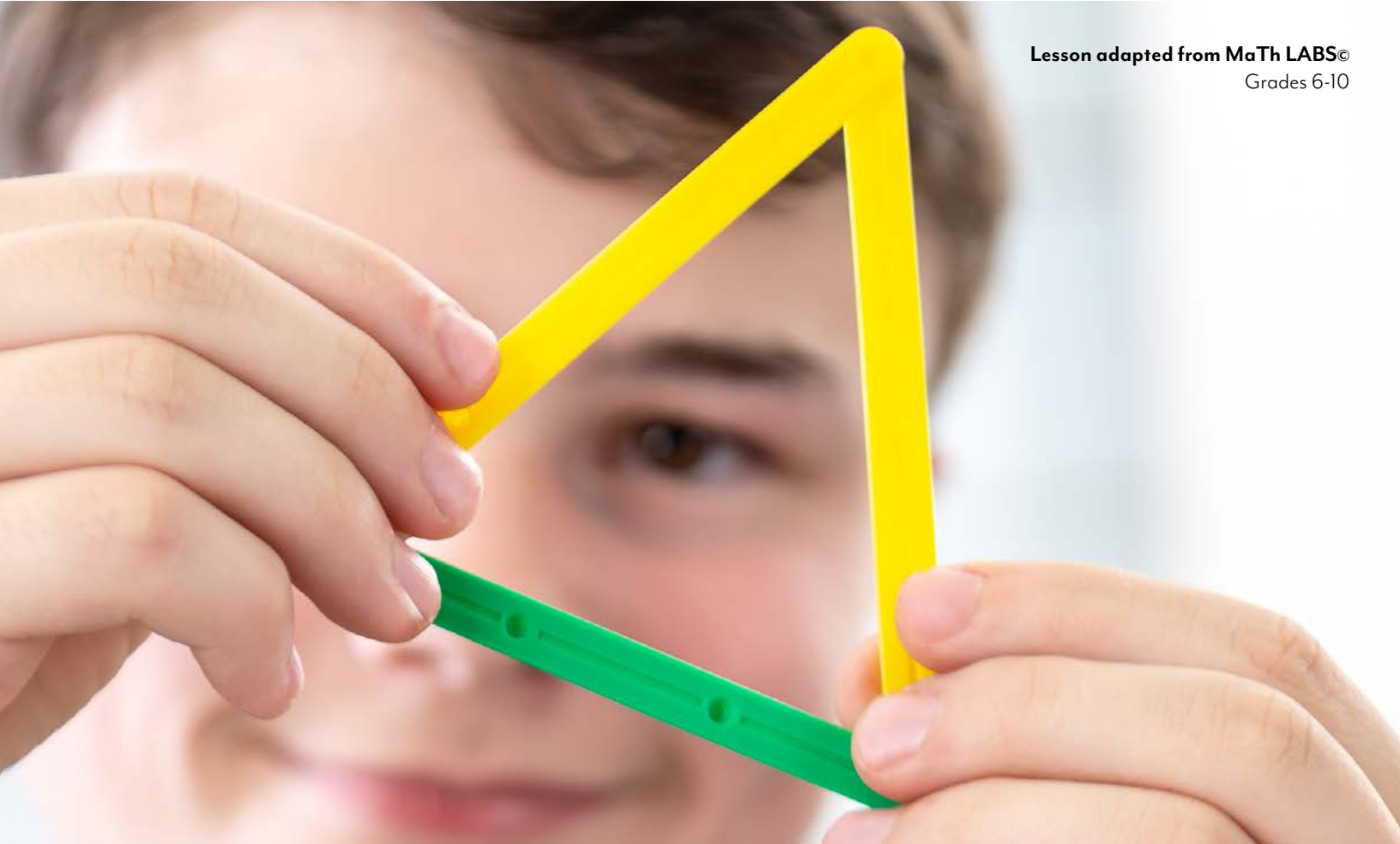## TRIANGLE TANGLE
Volume 35

Lesson adapted from MaTh LABS©
Grades 6-10

Time
Approximately 45 minutes

Background
A common misconception is that larger triangles contain angles that are larger. Therefore some students may not realize that triangles of different size lengths may have the same angles. Also important to note is that students may have a common misconception that the total degrees of a larger triangle are greater than the total degrees of a smaller triangle. This exploration will help students to conceptually understand the angle relationships of triangles.

Objectives
Students will be able to...
- Understand how the angles in a triangle are related
- Find missing angles using algebraic expressions to solve

Materials
- Nasco Geostix (1 pkg. per small group/pairs) with protractor (TB27053)

Common Core State Standards
CCSS.7.G.2, HS — Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
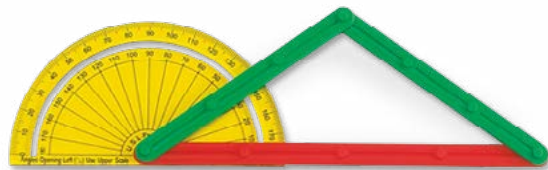
Question

How many degrees are in a triangle and how can you be sure?
(For older students: How can you prove it?)

Launch (6-8 minutes)

Have students look around the room or think of where they have seen a triangle in the real world; such as part of a house; tiles, designs, etc. You may also decide to show some from a Google Search. Show two that are different in size.

Explore Activity (20-25 minutes)

Students will begin by building various triangles with the Geostix. They will use the protractor to measure angles and record their degrees. Students will build equilateral, isosceles and obtuse triangles to discover that each has angles totaling 180°. They will also predict how many degrees are in a quadrilateral after being asked to create two triangles with a common side adjoining the triangles (creating a quadrilateral).

Summarize (8-10 minutes)

As a class, discuss what students noticed and the questions they asked. Spend about 10 minutes discussing their ideas and observations/conclusions.

Check for Understanding

1. Give students a problem with a missing angle they have to find.
2. Have students explain how the total angles in a triangle compare to that of a quadrilateral.
3. Have students share any more ideas they want to investigate.

Extension

Students may want to explore the total degrees in other polygons such as a pentagon, hexagon, etc. This is another exploration, but if students are motivated, have them come up with their own explorations to test their ideas. They may decide to build, measure and look for patterns.

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Name: _____ **Date** _____ **Period** _____

Activity Sheet

1. Use three orange Geostix to create a triangle. Use the protractor to measure each angle.

   Record them here:_____, _____,_____.

2. Use three green Geostix to create a triangle. Use the protractor to measure each angle.

   Record them here:_____, _____,_____.

3. Use two orange and one purple to create a triangle. Use the protractor to measure each angle.

   Record them here:_____, _____,_____.

4. Use any three Geostix to create a triangle. Use the protractor to measure each angle.

   Record them here:_____, _____,_____.

   What do you notice?

   _____

   _____

5. Now create another green triangle and place the two triangles next to one another so they share a
   common side. What shape did it create?_____

6. How many total degrees would the shape (polygon) have?_____

7. Now create another triangle with two orange and one purple Geostix. Place the purple sides together.

   What shape does it create?_____

8. How many total degrees would the shape (polygon) have?_____

9. Use the idea you explored to find the measure of the missing angles.