IN AND OUT ANGLES
Volume 33

Adapted from MaTh Labs©
Grades 7-10

Materials
Nasco Geostix (1 pkg. per small group/pairs) w/protractor – TB27053

Time
Approximately 45 minutes

Background
Students may have explored relationships with angles of triangles. In this lesson, they will explore a relationship of the exterior angle and two remote interior angles.

Objectives

Students will be able to...
- Understand how interior and exterior angles of a triangle relate to one another
- Determine unknown angle measures based on the application of their learning.

Common Core State Standards

CCSS.Math.Content.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.

Academic Vocabulary: Exterior Angle, Remote Interior Angles

Question

How is the exterior angle of a triangle related to the two remote interior angles?

Launch (8-10 minutes)

Have students explore the Geostix by creating various triangles that snap together. Have them snap a red Geostix on one side to extend that side creating an exterior angle. Discuss the name as an exterior angle. Don't be concerned with students using the vocabulary just yet. The goal is for them to explore the angles and their relationship. They can say outside angle and two angles furthest away from the exterior angle etc.

Exterior Angle

Remote
Interior
Angle
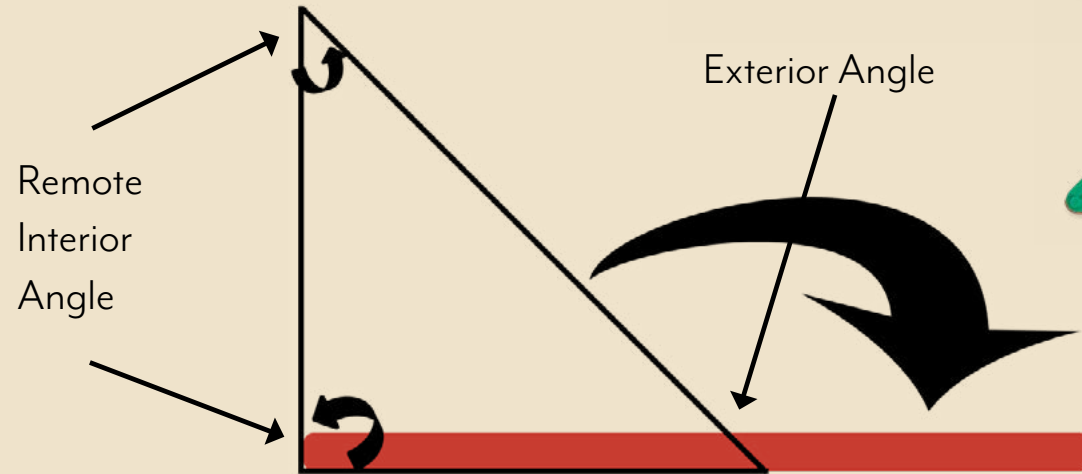
Explore Activity (20-25 minutes)

Students will begin by building various triangles with the Geostix. They will add a red Geostix to one of the sides creating an exterior angle. They will be guided to measure this angle and the other two angles furthest away (remote interior angles).

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.

During closure ask: Is there a way to verify the exterior angle is the sum of the two remote interior angles. Students could verify by noticing the exterior angle and the adjacent interior are supplementary and total 180 which is the same as the two remote interior with the exterior.

Check for understanding

1. Have pairs or small groups explain their thinking as the teacher circulates and facilitates the exploration.

2. Have students explain how the exterior angle relates to the two remote interior angles.

3. Have students share any other ideas they want to investigate.

Extension

The teacher may ask students to decide if there are any other angle relationships in a triangle.

Nasco
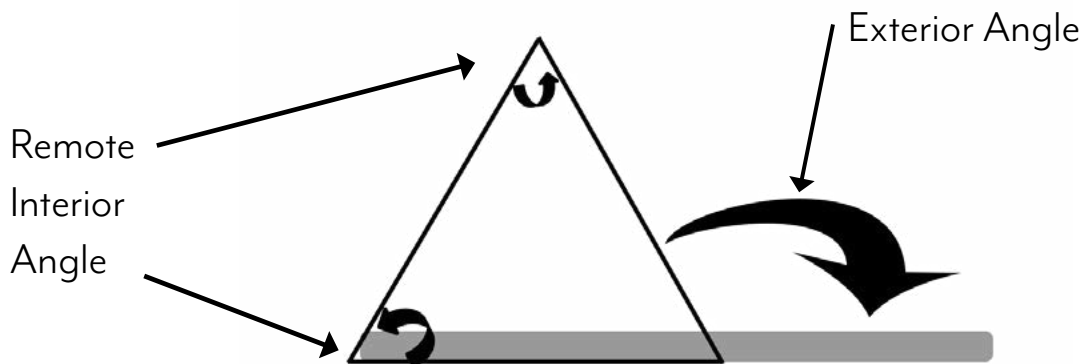education

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NascoEducation.com

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

1. Use three blue Geostix to make a triangle. What type of triangle is this?

_____

Attach a red Geostix along one of the sides to create an exterior angle. See below.

Exterior Angle

Remote
Interior
Angle

Use the protractor to find the measure of the exterior angle. _____

Next, use the protractor to measure the two angles in the triangle that area across from the exterior angle.
These are called "remote interior angles."

_____   _____

2. Do this again, this time creating a right triangle. Which Geostix made a right triangle? _____

   Attach a red Geostix along one of the sides to create an exterior angle.

Use the protractor to find the measure of the exterior angle. _____

Next, use the protractor to measure the two angles in the triangle that area across from the exterior angle.
These are called "remote interior angles."

_____   _____

3. What do you notice about the exterior angle and the two remote interior angles?

_____

_____

Check for Understanding: Fill in the missing values for the triangle's angles.

Exterior Angle	Remote Interior Angle	Remote Interior Angle	Explain how you found your answer
24°	38°		
48°		123°	
	20°	104°	
94°		72°	