

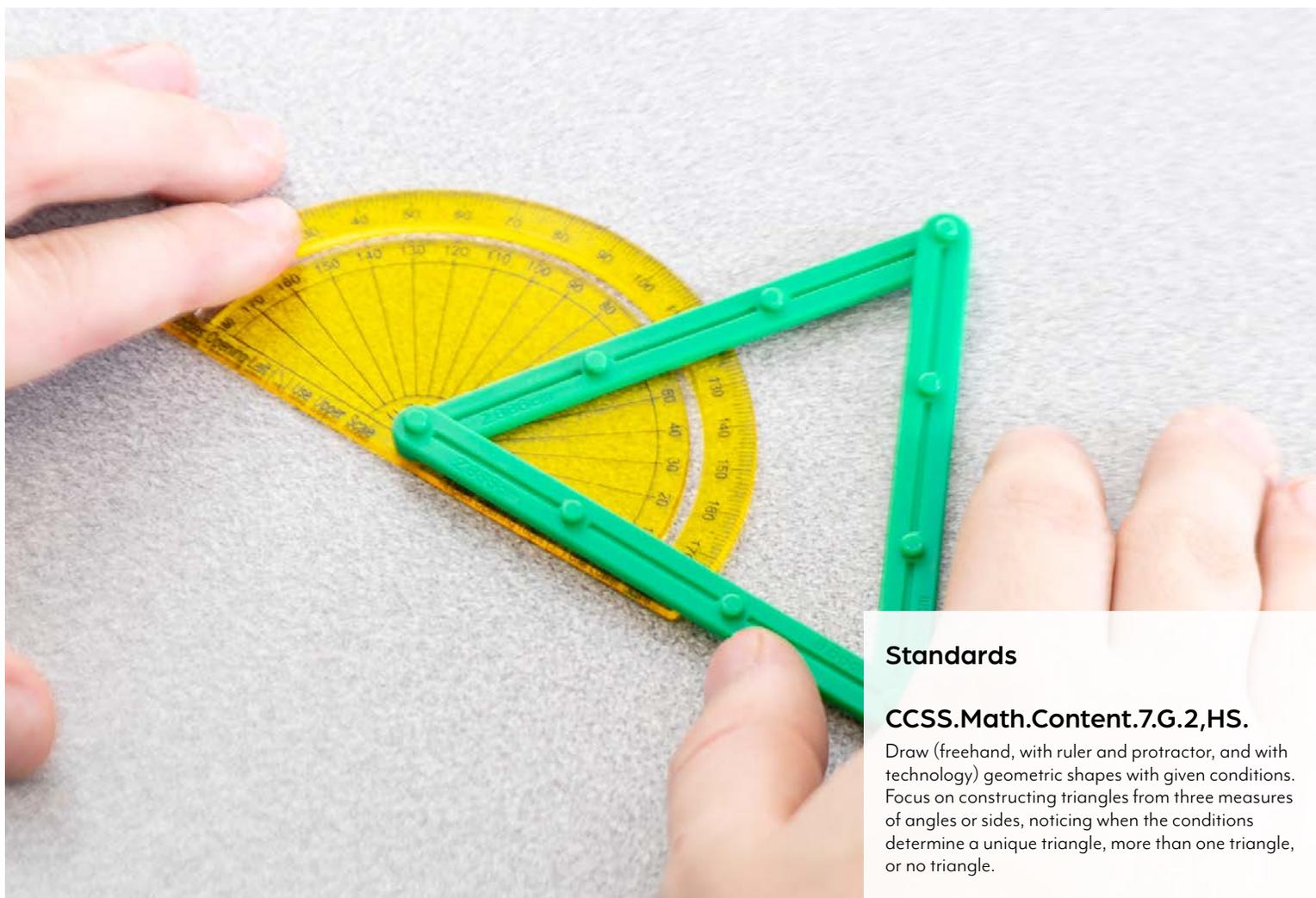


Adapted from MaTh Labs

Volume 34 | Gr. 7-10

Time: Approx. 45 minutes

# Triangle inequality theorem



## 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.



## Materials list

- Nasco Geostix (1 pkg. per small group/pairs) w/protractor (**TB27053**)

## Objectives

*Students will...*

- Understand how the sides of a triangle are related (Triangle Inequality Theorem)
- Determine if three sides create a triangle

## Background

Students may have explored relationships with angles of triangles. In this lesson, they will explore a relationship of the sides.

## Question

How are the three side lengths of a triangle related?

## Launch (8–10 minutes)

Have students explore the Geostix by creating various triangles that snap together.

Ask: “What do you notice?” Discuss that triangles have three vertices, 3 sides and 3 angles. You can record what they noticed on the board.

## Explore activity (20–25 minutes)

Students will begin by building various triangles with the Geostix. They will be guided to use specific colors of the Geostix that make triangles and two examples that don't. Upon their sort, they are asked to take the triangles apart and lay two from end to end next to the red Geostix. The goal is that they notice the two smaller sides have to be longer than the third in order to create a triangle. (Triangle inequality theorem)

## Summarize (8–10 minutes)

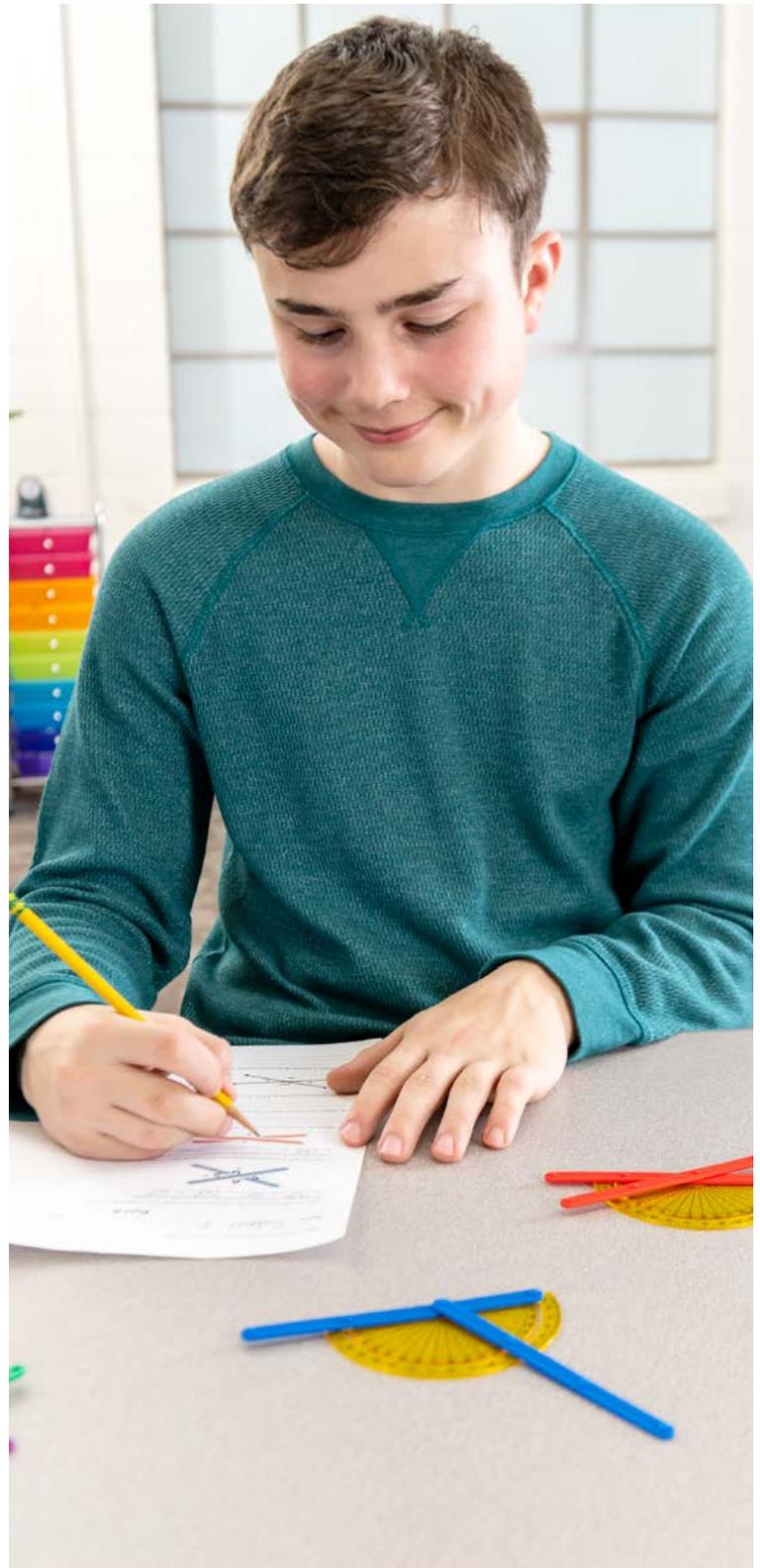
As a class, discuss what students noticed and the questions they asked. Spend about 10 minutes discussing their ideas and observations/conclusions. During closure, debate if certain side lengths will create a triangle such as 5, 5, 10 or fractional sides such as .5, .5, and 1.

## 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 sides in a triangle compare to that of a quadrilateral.
3. Have students share any more ideas they want to investigate.

## Extension

The teacher may ask students to consider if there is a relationship of the side lengths of specific triangles such as right triangles. This may lead to an exploration of the Pythagorean Theorem.



# Triangle inequality theorem

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Part A

1. Use the light green, orange and red Geostix to try to create a triangle. Remember each end must touch and snap to create a vertex.

Were you able to get a triangle? \_\_\_\_\_

2. Use the orange, purple and red Geostix to try to create a triangle. Remember each end must touch and snap to create a vertex.

Were you able to get a triangle? \_\_\_\_\_

## Part B

1. Use the orange, blue and red Geostix to try to create a triangle. Remember each end must touch and snap to create a vertex.

Were you able to get a triangle? \_\_\_\_\_

2. Use the purple, dark green and red Geostix to try to create a triangle. Remember each end must touch and snap to create a vertex.

Were you able to get a triangle? \_\_\_\_\_

## Part C

Next take apart the first triangle of green, orange and red. Place the two shorter sides end to end next to the red side. Do this for all 4 triangles.

1. What do you notice about the two shorter sides of the triangle? Which sides made a triangle, part A or B?

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**Check for understanding:** Will the following sides create a triangle? Explain.

Side 1	Side 2	Side 3	Yes or No?	Explain why or why not
2	3	4		
2	2	4		
.5	1	2		
12	20	30		