Topic: Math

Title: Tangrams **Primary Audience:** All ages

Description: Participants will observe the shapes that make up a tangram pattern and how these shapes can be used to construct other figures, use the shapes to reconstruct the original square, and communicate predictions, observations, and conclusions with others in a group.

Keywords: Topology, geometry, shapes

Concepts:

- A square contains several shapes within itself.
- The area within a square can be transformed into many other forms.
- Two isosceles, right triangles can form a square.
- The area of the square is preserved as long as all pieces are used.

Materials:

COSI Fun in Science Topology Kit, in addition to….

Materials per participant:
1 tangram pattern
1 tangram set in a resealable bag precut wood, plastic or cardboard
1 small resealable bag

Materials per group of 5 or 6:
1 bin or tote

Props for demonstration:
1 tangram pattern
1 large tangram set
Variety of tangram pictures around the room

Instructions:
(Hold up the large square) What shape is this? Right, it is a square. If I turn it so that one corner points toward the floor, it looks like a diamond. Have we really changed the square itself? (No.) What would happen if we cut this square diagonally from one corner to the opposite corner? What shapes would we have? (Hold up two triangles) Two triangles. (For older participants, what type of triangles are these? Isosceles, right triangles. This means that two sides are the same length and one angle is a right angle

- 90 degrees.)

Let's try cutting this square in a different way. What if I cut it in half from side to side? What shapes would I have? (Two rectangles.) (Hold up two rectangles)

Have I changed the square in any significant way? I have cut it in half, but can I form it into its original shape? (yes) Is it still the same size; does it occupy the same amount of space or area? (yes)

(Have tangram pictures around the room) In the bins are small resealable bags with pieces of paper in them. (Hold an example up) The pieces were created from a square. Do you know what a set of these shapes is called? A tangram. What are tangrams used for? What kinds of pictures can you make with tangrams? Can you recreate the original square using all of the pieces?

(For younger children, suggest that they try to make a square using as many pieces as they need)

Place the pieces back in the bag and put them in your bin. Take out a card with the tangram pattern on it. At home, you can cut the tangram into pieces. Try to cut on the lines. Cutting on either side of the lines will change the shape of the pieces slightly. In your *Topology* activity guide, there are several pictures to create using your tangrams.

Possible Interactive Questions:
(Included within the instructions)

What's Going On?
Participants are learning more about the properties of shapes and are using tangrams to aid this process.

Further Exploration:

1.

Relevant Ohio Science Content Standards:

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