



Tangrams: An Investigation and STEAM Activity

Introduction	
<p>Puzzles are a great example of a cultural constant. Throughout all of human history, people have been creating puzzles and riddles to entertain themselves and exercise their brains. Tangram is a type of puzzle that uses seven pieces called tans to recreate a given shape. However, it is up to the player to figure out how to use the tans to make the shape as they are only given the silhouette. Students will not only get the chance to play with tangram puzzles, but discover where the game originates from and learn a little bit about puzzles as a cultural constant (something present in many/all cultures in one form or another).</p>	
Indiana Standards Connections: K-2.PA.1: Breakdown and plan the order of the steps needed for a desired outcome to accomplish the goal.	Compelling Question(s): What steps do I need to follow to recreate the Tangram or pattern block shape? What steps do I need to follow to create the animal I chose?
Lesson Objectives: Students will be able to: <ul style="list-style-type: none">• Break the process of solving the puzzle of their choice into smaller steps to achieve their goal.	
Materials	
<ul style="list-style-type: none">• Tangram – Windows to the World• Tangram Cat Puzzles• Tangram Puzzle (can be purchased online, at Target, or printed and cut out)• Mechanical Puzzles – Lilly Library (optional)• Origami Paper Crane Tutorial (optional)	
Learning Plan	
Activities <ol style="list-style-type: none">1. Begin by asking students if they have ever heard of a Tangram. Ask them if they know when or where it was created. Who do they think creates puzzles like these?2. Show students the Tangram puzzle book artifact and read the article on the Windows to the World website. Did this match their inferences? Are students surprised to find out these puzzles are so old? How do they feel knowing that these puzzles have survived for around 800-1100 years?3. Break students into groups of two or three and have them work on tangram puzzles.4. IF STUDENTS NEED SUPPORT, model a strategy for solving the puzzles. For example, a popular strategy is to figure out which tans should be on the outside of the shape and then piecing together the middle pieces from there.5. Centers (optional):<ol style="list-style-type: none">a. Tangrams with puzzle cardsb. Pattern blocks with puzzle cards	

- c. Mechanical puzzles (Walmart regularly has eraser versions of mechanical puzzles in the seasonal stocking/basket stuffer section)
6. Allow students to create a Tangram or block pattern of their own with their group. Have them pick an animal and create a pattern to match their choice.

Assessment Suggestions

Ask students to create a diagram of their creation and how each piece fits together as though they were creating a class Tangram puzzle book. This could also just include patterns created with pattern blocks, which allows students to be a little more creative and interact more with a wider variety 2D shapes.

Alternatively, have students write down how they solved the puzzles. Did it take them a few tries? Did they have a strategy for the Tangrams? What did they do if they didn't have the write answer?

Extensions

- Have students try origami or explore mechanical puzzles (the IU Lilly Library has a collection of mechanical puzzles).