

*Tangram Puzzle Book*

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| **Introduction**  |
|  This lesson utilizes the “Tangram Puzzle Book” from China as a point of connection between learning geometric figures and the practice of constructing and deconstructing to create a new product. This lesson combines physical science and geometry math standards for second grade.  |
| **Indiana Standards Connections:**  **2-PS1-3** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. **2.G.1** Identify, describe, and classify two- and three-dimensional shapes (i.e., triangle, square, rectangle, cube, right rectangular prism) according to the number and shape of faces and the number of sides and/or vertices. Draw two-dimensional shapes.**2.G.2** Investigate and predict the result of composing and decomposing two- and three-dimensional shapes. | **Compelling Question(s):**  How can I group the different shapes included in my tangram set?What are the different shapes in my tangram set called?How many different patterns/images can I create with my tangram set?What shapes from my tangram set are used to create a certain picture? |
| **Lesson Objectives:**  Students will:  * Classify the different shapes included in the tangram set (ie. name of shape, number of sides, color, length of sides…)
* Follow a tangram pattern to create an image/picture
* Deconstruct an image based on what shapes they can see
* Create their own images/pictures using the tangram shapes
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| **Materials**  |
|  * Picture of Chinese tangram book to display or physical copy to pass out
* Tangram sets for each student or for small groups
	+ 2 large right triangles, one medium-sized right triangle, two small right triangles, one square, one parallelogram
* Tangram example pictures
	+ Pictures with shapes and colors defined
	+ Pictures with shapes defined
	+ Pictures without colors or shapes defined

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| **Learning Plan**  |
| **Activities** **Introduction:**Students will be shown pictures of different images created by tangrams. Ask students to identify the images created. Ask students to identify what shapes they see within the image. Use this time to go over the different shapes used for the puzzles. Show students a picture of the Chinese tangram book and introduce the idea of creating one shape from many. Show different examples of shapes and images created from the tangram set. **Activity:**Pass out tangram sets and give students a few minutes to sort out the shapes based on different attributes. Students may sort the tangrams based on size, color, shape, corners… Then pass out different tangram puzzles for students to create. This is a great chance to differentiate the puzzles or tasks depending on student need. Some students may rely on color to help build the puzzles. A student who has mastered combining shapes using color as a guide may be ready to create puzzles that give the outlines of shapes only, not in color. More advanced activities may have students solve puzzles without any guiding lines, or with just a product in mind (i.e. tell students to build a rabbit with no model as a guide.)**Wrap-Up:**Have students share different puzzles they solved or different images they created. Ask students to identify what shapes they used in each puzzle and talk about how they knew which shape to use or how they got their ideas.  |
| **Assessment Suggestions**  * Use a student lead conference to check in with students to be sure they can name each shape in the set and tell you the attributes of the shape.
* Give students a tangram picture and ask them what shapes are being used to create the image.
* Ask students to reconstruct a given image with or without guidelines or maps.
* Give students a certain set of shapes and ask them to imagine what can be built with the shapes. Allow students the opportunity to manipulate and experiment with the shapes.
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| **Extensions** * Students moving quickly through the activity could benefit from more complex puzzles or the addition of other shapes. Many tangram sets also include hexagons, rhombuses, trapezoids… Students can learn the names of the additional shapes, categorize them, and learn to identify their attributes. Students may then use these shapes to create more images and patterns.
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