

Working with Tangrams

I. Spatial Sense -- Initial Geometric Development

A. Literature Connection

Read *Grandfather Tang's Story*. This is a Chinese folk tale, with a moral, that tells of two foxes who play a game in which they change into different animals. Some interesting results occur.

Have students build the figures in the story. Students often have some difficulty paying close attention to the orientation of certain pieces. After students have made all the figures in the story, have them create other figures of their choice. You could have them write a story or a few paragraphs about the figures they created.

Extension: What do you know about the areas of each of the figures you made? Justify your answer.

B. Problem-solving

Consider the table below. Try to build a square using just 2 pieces or 3 pieces. What shapes can you build using 5 pieces? Sketch out your solutions.

II. Number and Area Relationships

A. Relationships among the pieces

Find all the relationships you can among the pieces. Which pieces can be used to make other pieces? What does this tell you about area?

B. Number values

Now that you know the relationships among the pieces, give a value to one piece. Ask the students what would be the appropriate value of another piece. For instance,

- a) if the square has a value of 6, then what is the value of the medium triangle? of the little triangle? of the parallelogram?
- b) if the parallelogram has a value of $\frac{2}{3}$, what is the value of the medium triangle? of the large triangle?
- c) if the medium triangle has a value of T, what is the value of the large triangle?

Suppose you build a cake out of several tangram pieces. Assign a value or cost to the entire cake. Determine what would be fair costs for each of the pieces.

C. Angle Measures

Find the measures of the angles in each of the pieces. Now use that knowledge to measure the angles of other objects in your room using the tangram pieces.

D. Pythagorean Theorem

Use appropriate tangram pieces to illustrate the Pythagorean theorem -- the sum of the squares on the two legs equals the square on the hypotenuse.

References

Marilyn Burns Manipulative Videos (Six Models)

Charles, Linda Holden and Micaelia Randolph Brummett. *Connections: Linking Mathematics with Manipulatives*. Sunnyvale, CA: Creative Publications, 1989.