MATHEMATICS

Stick Puzzle

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Objective

The student will understand spatial reasoning and the role that it plays in their life.

The student will be able to use puzzles to initiate spatial thinking and to think geometrically; describe various types of polygons and their applications for problem solving.

Vocabulary

Polygon: A closed figure for which all sides are line segments.

Line: The straight path connecting two points and extending beyond the points in both directions.

Square: A rectangle with all sides of equal length

Quadrilateral: A polygon with four sides.

Triangle: A polygon with three sides.

Background

Spatial thinking finds meaning in the shape, size, orientation, location, direction, or trajectory of objects, processes or phenomena, or the relative positions in space of multiple objects, processes, or phenomena. Spatial thinking uses the properties of space as a vehicle for structuring problems, for finding answers, and for expressing solutions (National Research Council, 2006).

Materials

Group of 2-3 students

- A copy of the toothpick puzzles (see sources section)
- 24 toothpicks
- A coin

Procedure

In this exercise the student will use puzzles to initiate spatial thinking and a geometric perspective. Students will walk through the toothpick puzzles sheet.

As the students work, look to provide guided questions to the students in regards to the activity.

Guiding Questions

- Did you brainstorm with other students to figure out these puzzles?
- How do you think working in a group helps solve problems?

Career/Future Application

Every career uses spatial reasoning in some way, and you use it in your daily life. Say you move into a new house or apartment. You use spatial reasoning to make sure everything fits – or realize it doesn't! Engineers use spatial reasoning to plan out a project. Hairdressers use spatial reasoning to achieve the intended look of a haircut. Spatial reasoning is happening all around us on a continuous basis.

Sources

http://www.education.com/activity/article/Toothpick_Math/ **(Puzzle Worksheets)**

http://serc.carleton.edu/research_on_learning/synthesis/spatial.html