Math 4 - Act. 17: Lines of Symmetry

Summary

Students will demonstrate lines of symmetry by using polygons, pentominoes, and block letters of the alphabet.

Group Size

Individual

Materials

- Display items with definite lines of symmetry (e.g., a slice of bread, an apple)
- Pattern block pieces
- Pentominoes
- Paper die cut letters of the alphabet

Additional Resources
Make symmetry name cards

Background for Teachers

A pattern is symmetric if there is at least one symmetry (rotation, translation, reflection, glide reflection) that leaves the pattern unchanged.
Slide/Translation
To translate an object means to move it without rotating or reflecting it. Every translation has a direction and a distance. (See Attachment 1 below)
Reflection
To reflect an object means to produce its mirror image. Every reflection has a mirror line. A reflection of an "R" is a backwards "R." (See Attachment 2 below.)
Symmetries create patterns that help us organize our world conceptually. Symmetric patterns occur in nature, and are invented by artists, craftspeople, musicians, choreographers, and mathematicians.
In mathematics, the idea of symmetry gives us a precise way to think about this subject. We will talk about plane symmetries (those that take place on a flat plane), but the ideas generalize to spatial symmetries, too.
Plane symmetry involves moving all points around the plane so that their positions relative to each other remain the same, although their absolute positions may change. Symmetries preserve distances, angles, sizes, and shapes.

> A basic type of symmetry is a reflection. The reflection of a figure in the plane about a line moves its reflected image to where it would appear if you viewed it using a mirror placed on the line. Another way to make a reflection is to fold a piece of paper and trace the figure onto the other side of the fold.
> A second type of symmetry is slide (translation). Sliding/ translating an object means moving it without rotating or reflecting it. You can describe a translation by stating how far it moves an object, and in what direction.

Intended Learning Outcomes

3. Reason mathematically.

Instructional Procedures

Instructional Procedures

Using display items, demonstrate the meaning of symmetry. Make sure students understand definition of symmetry.
Using polygons, allow students to decide which polygons have lines of symmetry by folding each polygon. Students will explain their reasoning.
Do the same with pentominoes.
Pass out paper block letters of the alphabet. Predict which letters will have a line of symmetry. Have students fold and verify their predictions. This is reflectional symmetry.

Curriculum Integration

Math/Science--Where in nature do we find lines of symmetry? Brain storm and look for symmetry in butterflies, animal shapes, etc.

Extensions

Possible Extensions/Adaptations/Integration

Pair students with a partner and give them a geoboards. Have one student draw part of a figure and then pass the geoboard to his or her partner to finish the figure so that it has a line of symmetry.

Homework & Family Connections

Work together to complete the scrapbook assignment.

Assessment Plan

Scrapbook assessment included at the end of this lesson series.
Use pattern block stickers (can use die cut pieces) to make a design, and then draw lines of symmetry.

Authors

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