Ship Shape

Summary

Students will explore shapes and create a Silly Shape book.

Main Core Tie

Mathematics Grade 2

Strand: GEOMETRY (2.G) Standard 2.G.1

Materials

- *Circles, Triangles, and Squares*
, by Tana Hoban
Shapes of fabric or scrapbook paper
Large venn diagram
A piece of art by Piet Mondrian with two dimensional shapes

Shape Art

Rulers
- *Shape Tracers*
Construction paper
glue

Silly Shape Book

- *Silly Shape Book*
Six brads per student
Student pictures
A triangle, circle, square, rectangle, and parallelogram for each student from the *Shape Tracers* .

Slipping and Sliding Shapes

Geoboards
Rubber bands
- *Geo Dot Paper*

Copy Cat Shapes

Geoboards
Rubber bands
File folders

Additional Resources Books

- *Circles, Triangles, and Squares*
by Tana Hoban; ISBN 0-02-744-830-4
- *Arrow to the Sun*
by Gerald McDermott; ISBN 0-670-13369-8
- *Grandfather Tang's Story*
by Ann Tompert; ISBN 0-517-57487-X
- *Math Magic Shape and Pattern*
by Wendy and David Clemson; ISBN 1-58728-271-2
- *Round is a Mooncake*
by Roseanne Thong; ISBN 0-8118-2676-7
- *The Silly Story of Goldie Locks and the Three Squares*
by Grace Maccarone; ISBN 059054344X

Background for Teachers

Students need to understand that shapes have certain properties that define them. For example, a triangle is any three-sided shape. Parallelograms have opposite sides that are parallel (squares and rectangles are both parallelograms). A square has four right angles with four congruent sides. A rectangle has four right angles where only opposite sides are congruent. Shapes stay the same even when they are rotated, flipped, or slid.

Intended Learning Outcomes

5. Understand and use basic concepts and skills.

Instructional Procedures

Invitation to Learn

Show the book *Circles, Triangles, and Squares* by Tana Hoban to the class. Ask the students what shapes they see on each of the pages.

Instructional Procedures

Show the students different pieces of fabric with different shapes, lines and other geometric patterns. Ask the students what they see in the fabric. Using a Venn diagram, compare and contrast the pieces of fabric based on the shapes found in the fabric.

Show different compositions by Piet Mondrian and ask the students to identify the different shapes that they see.

Shape Art

Divide the class into groups of two.

Assign each group a shape (triangles, circles, squares, rectangles, parallelograms).

Their job is to make a picture on construction paper using only their given shape. Encourage the students to use many different sizes of their shape in different positions.

Discuss and display the art work.

Silly Shape Book

Invite a student to come to the front of the class. Ask the class, "If I pick up Jennifer and flip her over, is she still Jennifer? If Jennifer bends to the side, is she still Jennifer. If I pick up a book and turn it upside down, is it still a book? If I turn a book to the side, is it still a book? Of course it is. Shapes are the same way. If I flip a triangle upside down, it is still a triangle. If I flip a triangle to the side, it is still a triangle." Continue to rotate each shape until the students begin to understand that a shape remains the same even when it is turned or flipped.

Introduce the *Silly Shape Book* to the students that they will be making.

Using a brad, have the students attach the picture of themselves to the first page of the book. Have the students fill in their name on the appropriate line. Next, have the students attach a different shape to each additional page with a brad, and write in the shape name. Allow the students to manipulate their books to become more familiar with the concept that shapes remain the same when rotated.

Have the students fill out the remaining pages of their book during a shape hunt either indoors or outdoors. Have the students draw the shapes that they see.

Slipping and Sliding Shapes

Give the students time to explore using the geoboard. Encourage them to make many different shapes with the rubber bands. Remind them of the general definitions of shapes.

Make a triangle on the geoboard and ask the students what shape it is. Turn the geoboard around and ask what shape it is then. Continue to make shapes, flip them, and ask the students if the shape changes, or if it stays the same.

Have the students make their own shapes, and record them on the geopaper.

Copy Cat Shapes

Review the terms rows and columns with the students.
Have the students sit so that they are facing each other. Tell them to place a file folder between them.
Player one makes a shape on their Geoboard. Using the terms rows and columns, they guide player two to make an identical shape to theirs. The two players compare shapes and then switch roles.

Extensions

Curriculum Extensions/Adaptations/ Integration
Go on a shape walk around the neighborhood. Have the students take their journals and draw what they see. When you get back organize the different shapes that they found on a chart. Discuss which shapes were found the most, and which shapes were found the least.
Have the students work together to make shapes on the floor. Discuss the properties of shapes and how to make them. For example, ask the following: "if we use the tallest child and the shortest child in the class to make a square, will it work? Remember that a square must have four sides that are all the same."
Family Connections
Ask the students to continue the shape walk at home and in areas around the community.

Assessment Plan

Observe the students while they are participating in any of the activities.
Collect the geopaper and record the results.
Give a quiz asking students to color all of the triangles one color, all of the squares a different color, etc.

Bibliography

Research Basis
Van Hiele, P. M. (1999). Developing geometric thinking through activities that begin with play. *Teaching Children Mathematics*, February 1999, p. 310-316.
Van Hiele developed three stages of geometric thinking. The first level of thinking is called the visual level where figures are judged only by their appearance. Next, is the descriptive level where children are able to identify figures because of certain properties. Finally, there is the informal deduction level where students use knowledge about one figure to deduce information about another. In order for children to progress through these three stages, instruction should begin with inquiry or play.
Jacobsen, C. Lehrer, R. (2000). Teacher appropriation and student learning of geometry through design. *Journal of Research in Mathematics Education*, Volume 31.1, pp 71-88.
Lehrer and Jacobsen report that sustained classroom conversation about transformational geometry increases student achievement and understanding. In addition, teacher knowledge of geometry contributes significantly to the types of questions asked and the ability to engage students in deeper thinking.

Authors

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