

GEOMETRY AND SPATIAL SENSE (Strand C)

Identifying Geometric Figures (Standard 1)

1. Burns, Marilyn. *The Greedy Triangle*. New York: Scholastic Inc., 1994.

A triangle is unhappy with its life and changes into other polygonal shapes. Problems arise when the shape becomes a circle. Eventually, the shape returns to a triangle.

- Have students create their own book to show where given shapes are to be found in the real-world.

2. Crosbie, Michael J. *Architecture Shapes*. New York: John Wiley & Sons, 1993.

Children are introduced to geometrical shapes through wonderful architectural pictures and features.

- Use the same ideas as those mentioned for *The Greedy Triangle*.

3. Hajdusieicz, Babs Bell. *Shape Up, Curvy Snake*. Austin, TX: Steck-Vaughn Company, 1991.

A snake reassembles itself into a variety of shapes.

- Have students use a piece of string of some length and see what different shapes they can create with this single straight line.

4. Hindley, Judy. *The Wheeling and Whirling-Around Book*. Cambridge, MA: Candlewick Press, 1994.

This book explores all kinds of things that go round, including circles, disks, spirals, and spheres.

- Have students brainstorm about objects they use that are round. Have them discuss why certain objects are probably round and not rectangular. Possibly have students spin a top and record how long it spins or how far it travels while spinning. This book also has some interesting science connections in discussing orbits, pulleys, etc.

5. Hoban, Tana. *circles, triangles, and squares*. New York: Simon & Schuster, 1974.

Photographs of real-world objects are used to introduce these shapes.

- Have students try to find as many different objects with these shapes in their classroom or around the school as possible.

6. Hoban, Tana. *Shapes, Shapes, Shapes*. New York: Mulberry Paperbacks, 1986.

Photographs of real-world objects introduce students to a wide variety of shapes.

- Have students create their own books with shapes of real-world objects. Such activities provide a wonderful opportunity to blend mathematics with art.

7. Neuschwander, Cindy. *Sir Cumference and the First Round Table*. Watertown, MA: Charlesbridge, 1997.

King Arthur searches for a table that will be useful for his knights.

- Have students create different shapes and explore their properties.

8. Pluckrose, Henry. *Math Counts: Shape*. Chicago: Children's Press, 1995.

Shapes are explored through pictures of real-world objects.

- Similar activities as those above can be done, with students finding examples of a wide range of shapes in their own world. In essence, have students engage in a Shape Scavenger Hunt. Reward bonus points for those who find unusual examples of shapes.

Spatial Relationships (symmetry, congruency, and similarity) (Standard 2)

9. Blackstone, Stella. *Grandma Went to Market: A Round-the World Counting Rhyme*. Boston: Houghton Mifflin Company, 1996.

A grandmother uses a flying carpet to travel around the world to buy fascinating objects.

- Although a counting book, the pictures have wonderful geometric properties that students can explore and describe.

10. Ernst, Lisa Campbell. *Sam Johnson and the Blue Ribbon Quilt*. New York: Mulberry Books, 1983.

A man organizes a male quilting club when he is not allowed to join the women's club. The men work to make a quilt to enter the fair.

- Have students design quilt squares with various properties, such as line symmetry or turn symmetry.

11. Flourney, Valerie. *The Patchwork Quilt*. New York: Dial Books, 1985.

A young girl learns to make a quilt from her grandmother.

- Again, have students create their own quilts or describe quilts that they see in stores or catalogs.

12. Goble, Paul. *Her Seven Brothers*. New York: Aladdin Paperbacks, 1988.

A young girl searches for seven brothers she does not know. Through a series of adventures, they become the Big Dipper. The story is based on a Cheyenne legend.

- Have students create Indian-style rugs with colored toothpicks. Rugs should meet given conditions, such as one line of symmetry, two lines of symmetry, etc.

13. Jonas, Ann. *Reflections*. New York: Greenwillow Books, 1987.

This book can be read one way and then turned over and read again. The images are reflections and can be interpreted in different ways.

- Have students create a picture and its reflection image. Pattern blocks are a great tool for such an activity. MIRAs are also good to use.

14. Maccarone, Grace. *Three Pigs, One Wolf, and Seven Magic Shapes*. New York: Scholastic, Inc., 1997.

A pig makes a lot of different shapes using a set of tangrams.

- Have students explore making shapes with a set of tangram pieces. In addition to work with geometry, incorporate number work by assigning a value to one piece. Then determine the appropriate values of other pieces.

15. McDermott, Gerald. *Anansi the Spider: a tale from the Ashanti*. New York: Henry Holt and Company, 1972.

Three sons set off to help their father.

- Have students study the pictures in the story and describe the geometric features. Students can also create and illustrate their story with a wide variety of geometric shapes and properties.

16. Paul, Ann Whitford. *Eight Hands Round: A Patchwork Alphabet*. New York: HarperCollins Publishers, 1991.

Each letter of the alphabet is related to a quilt pattern. A brief story of that quilt pattern is included. Many of the stories relate to issues from earlier times in the history of the country, so the book is a great source for blending mathematics and social studies.

- Have students create quilt squares with various properties – such as one line of symmetry, or turn symmetry, etc.

17. Tompert, Ann. *Grandfather Tang's Story: A Tale told with Tangrams*. New York: Crown Publishers, Inc., 1990.

In this Chinese tale, two foxes chase each other as they continually change shapes. Each of the shapes can be made with all seven pieces of the tangram puzzle. Tragedy almost strikes at the end as one of the animals is shot by a hunter.

- Again, have students create shapes with a set of tangrams. They can explore the value of a shape if a given tangram piece has a specified value.

Transformations (size changes, scale changes, and tessellations) (Standard 2)

18. a. Beneduce, Ann Keay. *Gulliver's Adventures in Lilliput*. New York: Putnam & Grosset, 1996.
b. Hodges, Margaret. *Gulliver in Lilliput*. New York: Holiday House, 1995.

Gulliver lands in Lilliput, where all the people are only six inches tall.

- Students can explore proportional reasoning. Twice around the thumb should be the length around the wrist; twice around the wrist is the neck; twice around the neck is the waist – do these relationships hold true for the students in the class?

19. Briggs, Raymond. *Jim and the Beanstalk*. New York: Putnam & Grosset, 1970.

Jim climbs a beanstalk and meets a giant, helping him find glasses, dentures, and a wig.

- Have students compare common objects such as combs and toothbrushes to their height. Use those values to determine the length of a giant's comb or toothbrush.

20. Friedman, Aileen. *A Cloak for the Dreamer*. New York: Scholastic, Inc., 1994.

The young son of a tailor wants to travel the world rather than work in his father's shop. When he makes a cloak, there is a major problem with it. But, his father modifies the cloak and makes his son's dream come true.

- Have students create their own tessellation. Which regular polygons tessellate? Why?

21. Suyeoka, George, Robert B. Goodman, and Robert A. Spicer. *Issunboshi*. Aiea, HI: Island Heritage Publishing, 1974.

A one-inch boy protects a princess and wins her heart and hand.

- Again, have students determine the size of objects for the 1 inch boy.

Properties and Formulas (including area, perimeter, volume) (Standard 3)

22. Clement, Rod. *Counting on Frank*. Milwaukee: Gareth Stevens Publishing, 1991.

The boy studies sizes and all types of facts. For instance, he determines how many of his dog would fit in a room, how long it would take to fill a bathtub, or how tall he would be if he grew at a given rate.

- Have students determine the measurements of their classroom. How many students, books, televisions, etc. would fit in the room?

23. Grifalconi, Ann. *The Village of Round and Square Houses*. Boston: Little, Brown and Company, 1986.

In the African village of Tos, the men live in square houses and the women live in round houses. The story explains how this practice came to be.

- Have students investigate the areas of figures with a given perimeter or the perimeters of figures with a given area.

24. Lasky, Kathryn. *The Librarian Who Measured the Earth*. Boston: Little, Brown and Company, 1994.

This is the story of Eratosthenes and how he measured the circumference of the Earth.

- Have students explore ways that the circumference of the earth is measured today.

25. Neuschwander, Cindy. *Sir Cumference and the Dragon of Pi*. Watertown, MA: Charlesbridge, 1997.

A riddle dealing with the ratio of circumference to diameter must be solved to save the life of Sir Cumference.

- Have students find the circumference and diameter of a large number of circles and compute the ratio. Look for patterns.

Miscellaneous

26. Brown, Jeff. *Flat Stanley*. New York: HarperTrophy, 1964.

When a young boy is flattened, he uses his new properties to investigate many problems, including the solution to a crime.

- Have students discuss the similarities and differences between common 2-D and 3-D objects, such as squares and cubes, circles and spheres, and so forth.