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The St. Louis American is proud to partner with Normandy School District, the St. Louis Public School District and the Saint Louis Science Center to provide this classroom tool for STEM education for students in 3rd, 4th and 5th grades, with content based on Missouri Learning Standards.

Newspaper In Education
STEM
science, technology, engineering, and math

CLASSROOM SPOTLIGHT

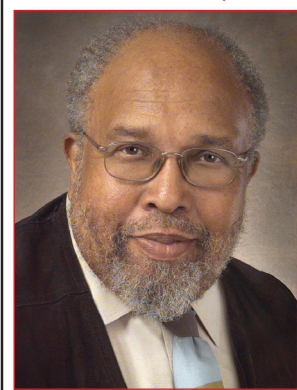### Ms. Anderson's Class Ashland Elementary

Students Sheenah Smith, Keshawn Mays, Ta'lor Beene, Kamaurion Stokes, and Ariel Partee test the effectiveness of a boat they constructed that will float and support twenty-five pennies.

SCIENCE CORNER

What Exactly Is Topology?

Topology is a type of mathematics that covers distorted shapes. In topology, objects or shapes that are distorted or changed in shape will still have the same properties, such as volume. In the eyes of topologists, two items are the same if they can be distorted without being torn or cut.

If you have soft clay (or play dough), you can observe the theory of topology. You can twist, stretch, bend, and mold the clay to create different shapes. No matter what size or shape you create, your clay will weigh the same. You will still have the same amount of clay. You can also use a rubber band to observe the theory of topology. You can create the figure eight with a rubber band, or create an oblong shape.

For An Introduction to Topology, Visit:
http://2000clicks.com/MathHelp/BasicSetTopologyKidsIntro.aspx
http://britton.disted.camosun.bc.ca/totopology1.htm

Learning Standards: I can read nonfiction text to gain background information about a mathematical topic.

SCIENCE EXPERIMENT

INVESTIGATE TOPOLOGY!

In this experiment, you will investigate topology. Topology is the theory that changing shapes of an object does not change the volume. Remember, to calculate volume, you will multiply length, width, and height.

Materials Needed:
Modeling Clay • Ruler • Graph Paper
• Permanent Markers in 3 Colors
• Rolling Pin

Procedure: Form the modeling clay into a square or rectangular shape. Mark the sides with the permanent markers, using different colors for length, width and height. Use the ruler to measure the length, width and height, and record the results. Use the rolling pin to flatten the shape. Keep the edges square while changing the shape of the clay. Measure length, width and height again and record. Continue flattening the shape while keeping the edges square and stopping to measure and record the length, width and height of the object. Try to get at least 10 examples. Calculate the volume of each recorded shape by multiplying the length, width and height. Compare the results. The volume should be the same for all shapes.

Evaluate: What did you observe as you changed the shape? Did the volume change or stay the same? What did this experiment teach you about topology?

Learning Standards: I can follow step-by-step directions to complete an experiment. I can analyze and record the results.

MATH CONNECTION

CALCULATE AREA

To calculate the area of a rectangle, you will multiply length times width. Use the formula to solve the following problems.

Length x Width = Area

1. If the length of a rectangle is 7 yards, and the area is 42 yards squared, what is the width?_____

2. If the width of a rectangle is 8 meters, and the area is 96 meters squared, what is the length? _____

3. If the length of a triangle is 7 inches, and the width is 4 inches, what is the area? _____

4. If the width of a triangle is 9 feet, and the height is 6 feet, what is the area? _____

5. If the area of a rectangle is 7000 meters squared, and the width is 70 meters, what is the height? _____

6. If the area of a triangle is 48 yards squared, and the length is 8 yards, what is the width? _____

Learning Standard: I can add, subtract, multiply, and divide to solve a problem.

DID YOU KNOW?

It is believed that Ancient Egyptians used complex mathematics such as algebra, arithmetic and geometry as far back as 3000 BC. To the right are 3 math symbols they used.

1,000   10,000   100,000

The name of the popular search engine 'Google' came from a misspelling of the word 'googol', which is a very, very large number (the number one followed by one hundred zeros to be exact).

▶ Trigonometry is the study of the relationship between the angles of triangles and their sides.

▶ It wasn't until the 16th century that most mathematical symbols were invented. Before this time math equations were written in words, making it very time consuming.

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INVENTORS & INVENTIONS

AFRICAN AMERICAN EVERYMAN—TOPOLOGIST, MATHEMATICIAN, BLACKSMITH, AND POET:

Scott Warner Williams

Scott Warner Williams was born on April 22, 1943 in Staten Island, New York. His mother took him to visit Massachusetts Institute of Technology when his family 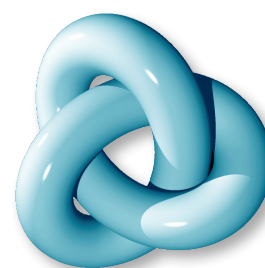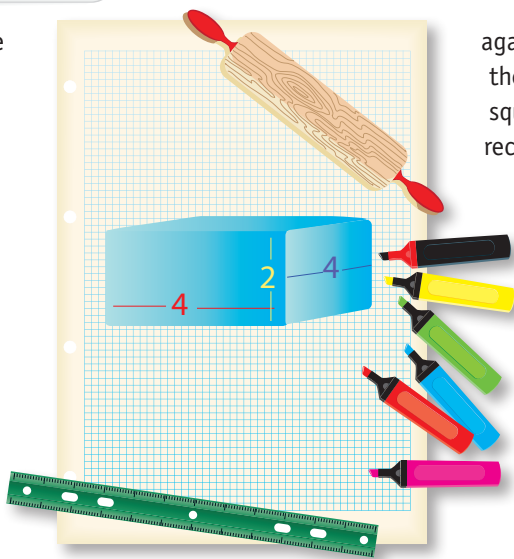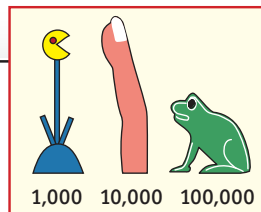was on vacation in Boston when he was 12. During that visit, he told his family he would earn a Ph. D. in mathematics. He received a Bachelor of Science in Mathematics form Morgan State College in 1964. He earned a Master of Science in Mathematics from Lehigh University, Bethlehem, Pennsylvania in 1967. While at Lehigh University, he co-founded the Black Uhuru Society with the other three minority students enrolled at the university. In 1969, Williams fulfilled his promise and earned his Ph.D in Mathematics from Lehigh University. His focus of study was topology, which is the theory that although shapes can be distorted and changed, their properties remain the same.

Williams served as a Research Associate in the Department of Mathematics at Pennsylvania State University from 1968 to 1971 and was appointed an Assistant Professor of Mathematics at State University of New York (SUNY) at Buffalo, 1971 to 1985, and made a full professor in 1985.

Dr. Williams was one of two founders of Black and Third World Mathematicians, the first African American Mathematics Society, which became The National Association of Mathematicians (NAM). He has also served on the Editorial Board of the Notices of the American Mathematical Society, the Advisory Board for the Summer Conferences on Topology and Applications. Currently, he is a regular columnist and a graphics images editor with the online journal Topology Atlas and presently editor of the National Association of Mathematics.

From 1972-1983, Williams worked as an Artist Blacksmith. His work has appeared in numerous art galleries and craft shows around the United States, including The Smithsonian. Williams has published poetry and short stories. In 1997, he was awarded the Fatherhood and Family Award of the Year in Buffalo, NY, for his work in the community.

Learning Standards: I can read a biography to learn about an African American who made contributions in the field of mathematics.

The trefoil knot is the simplest form of a nontrivial knot. It can be made by joining two loose ends of an overhand knot, resulting in a knotted loop. This knot is fundamental to the study of mathematical knot theory used in topology, geometry, physics, and chemistry.

MAP CORNER

ComputerBasedMath.org is designed to help students to better understand mathematics

Use the newspaper to complete the following activities:
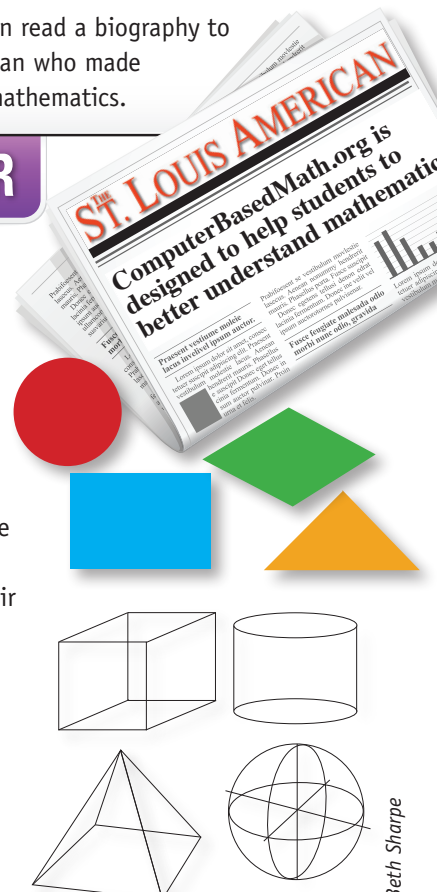
Shape Attributes
Identify 2 dimensional shapes (circle, rectangle, rhombus, trapezoid, and triangle). Cut them out of the newspaper, then paste them into a chart according to their attributes. Do the same with 3 dimensional shapes (rectangular prism, cylinder, pyramid, and sphere).

Polygon Perimeters
Locate and circle 4 verbs in a news story. Use a ruler to connect the verbs like a dot-to-dot puzzle to form a polygon. Measure and label each side of your polygon with an inch ruler. Add the lengths of the sides to find the perimeter. Write the perimeter in the center of your polygon. Try it again with nouns or adjectives.

Learning Standards:
I can use the newspaper to locate, describe, and create geometric shapes and properties.

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