

Keeping Warm with Fractions

Summary

The study of quilts and related activities allow students to demonstrate their understanding of geometry, basic fractions, and patterning skills.

Materials

Invitation to Learn

- Colored construction paper
- Shapes for jigsaw
- Scissors

- [Quilt Patterns](#) pdf

Instructional Procedures

- Precut paper squares
- Scissors
- Glue

- [4 Patch Quilt](#) pdf

- [Quilt Patterns](#) pdf

Address labels

Large Construction paper

Additional Resources

Books

- *The Quilt-Block History of Pioneer Days*
, by Mary Cobb; ISBN 1562944851
- *The Log Cabin Quilt*
, by Ellen Howard; ISBN 0823413365
- *The Keeping Quilt*
, by Patricia Polacco; ISBN 0671649639
- *Sweet Clara and the Freedom Quilt*
, by Deborah Hopkinson; ISBN 0679874720
- *Quilting: Then and Now*
, by Karen B. Willing & Julie B. Dock; ISBN 096418207
- *Eight Hands Round*
, by Ann Paul; ISBN 0060247045
- *Patchwork Math I*
, by Debra Baycura; ISBN 0590490733
- *Patchwork Math I*
, by Debra Baycura; ISBN 0590490761

Background for Teachers

Quilts were one of the most beautiful and important things a pioneer family could have.

Pioneer women lovingly made each individual quilt block and sewed them together. They packed as many quilts as they could take on their journey west because quilts had many uses. Besides being used as warm bedding, quilts padded a wagon seat, provided shade from the sun, kept valuables from breaking, and kept a newborn baby snug. When the winds blew across the dusty plains, quilts covered the cracks and openings in the wagons and protected the pioneer family from blowing dust and sand. When a family member became sick, the quilts provided a comfortable place to rest. The

most solemn use for a quilt was to wrap one around a beloved family member before they were laid in a lonely grave along the trail.

Overall, quilts were mostly used as a warm covering for a bed. Made of three layers, a quilt consists of the top, the filling, and the back. These three layers are stitched together or tied with thread. The exact origin of quilts is in question. The name quilt originates from Latin meaning "stuffed sack," which was translated into English as quille and means "wrap around the body." The oldest known patchwork example dates back to a canopy for an Egyptian queen in 960 B.C. In the earliest quilts, grass, leaves, feathers, fleece from sheep, old rags, and sometimes straw were used for filling. The top was made from wool and linen fibers spun into thread and the thread woven into cloth. The bottom was generally muslin.

In early America fabric was very scarce and costly. It was very difficult to replace a worn-out quilt, so the women began patching the quilt with fabric left over from making clothing or from worn-out clothes. Before long, the quilts took on a new look from all the patches. As the old patched quilts wore out, the women saved scraps of cloth, cut the pieces into small squares, triangles and rectangles. From these pieces they sewed the shapes together to form designs called quilt blocks. The patchwork designs of many quilts tell the story of their lives, what they liked, or mimicked designs around them.

In pioneer times women and children often created quilt blocks as a way to tell the story of the settling of the country and quilt making evolved into a special art form. The simplest quilt blocks were the most popular patterns because pioneer women did not have much spare time and could make these easy patterns quickly. The most basic quilt blocks were used for a girl's first quilt so she could learn the skills necessary to make a quilt.

An Album quilt was very special gift made for family and friends who were moving west. Each person in the group would make a special quilt block, choosing their own fabric and design and signed each block. The album quilt was a way for a family to remember their friends and relatives who were far away.

Quilt blocks depicted other events in the pioneer family's life. They illustrated the story of their trek West. Some quilt block patterns get their names from these aspects of frontier life--Making Fences, the Red Schoolhouse, the Waterwheel, and the Log Cabin. Other quilt block names took after ordinary objects around the home--the Spool Block (named for the thread spool), the Kitchen Woodbox, Friendship Basket, Secret Drawer, and Broken Dishes. Quilt blocks were even named after food and clothing. Some quilt blocks were named after such things as ribbons, a sugar cone, a butter churn, and fruit baskets.

Special occasion quilt blocks celebrated the happy times in a pioneer family's life, such as weddings, births, and new neighbors. The weather was also a popular theme for quilt blocks and Star quilt blocks were one of the most popular. Perhaps these pioneers gazed at the wide night sky as they slept near their wagons determined to follow their dreams. The quilt block known as Star of the West was named in honor of the pioneers' trek West.

Looking at a quilt is like reading a history book but instead of learning about kings, presidents, and countries at war, you can learn a more personal history--of normal men, women, and children setting out to find a new place to live in the untamed West. You can learn about their everyday life and what they felt was important to them. When studying a quilt, see if you can find stories in the design and read between the tiny stitches to see what tales it can tell.

Intended Learning Outcomes

1. Develop a positive learning attitude toward mathematics.
4. Communicate mathematical ideas and arguments coherently to peers, teachers and others using the precise language and notation of mathematics.

Instructional Procedures

Invitation to Learn

Each student will choose a pre-cut piece of pre-cut color/shape construction paper.

Divide the class into cooperative learning groups of four according to color of the paper they chose.

Show the class a variety of quilts and/or Quilt Patterns. Ask students to describe to you the patterns they see, using mathematical/geometric language i.e. symmetry, 1/2, 1/4, squares, triangles, turns, and flips.

Divide the class into "color and shape" groups of four and give each group a quilt pattern to examine. Students are to examine the quilt block, discussing the pattern, color, shapes, sizes, fractions, other math/geometry terms.

Place discussion patterns on board so all can see them.

Jigsaw: Next, regroup students according to the shape of their color card. Each group should have a member who has a different shape and color. (One red square, one blue square, etc.)

Direct each member to share with their new "shape" group what their color group discussed about their pattern. Encourage them to use mathematical and geometric terms.

Assessment: This activity is an informal assessment meant to assess student's prior knowledge.

The presentations should give the teacher an idea of where students are at in terms of their understanding of geometry, basic fractions, and patterning skills. Assessment can be done when students are answering questions and during their informal presentation.

Instruction Procedures

How Amazing is That?

Exploration

- Show students a square piece of construction paper. Brainstorm different ways to cut the square in half (i.e. diagonal, up-and-down). Brainstorm the resulting shapes that you would get.
- Cut square in half and ask for shape, line of symmetry, fractions represented by the piece. etc. Cut in half again.
- Ask what fraction of the whole is represented by the smallest piece.
- Give students two squares of different colored construction paper (3x3).
- Students will experiment with folding and cutting squares into triangles, rectangles

That's Not Math...That's Art

Teacher will direct student's attention to the 4 Patch Quilt and discuss the 2x2 array that this square forms. Ask students how many individual squares can be found in this quilt block. (4 squares)

Focus on the two colors used in the examples to make the square. Ask a student to show you a square that is one half of one color and one half of another.

Ask, "How would we write that fraction?" "Is this entire quilt square exactly one half of one color and one half of another?" "How is that possible?" "Why?"

Instruct students that they will be constructing a 4-patch quilt block. The quilt block must be created using two colors and each color will be exactly one half of the quilt block.

Each cooperative learning group of four will create a combined quilt block for the class.

Pass out squares to be used for the base of quilt square (4 Patch Quilt.)

Direct students to experiment with the shapes, moving them around to find as many ways as they can to create their half and half quilt block. NO GLUING YET!

Direct students to discover the many ways they can make a half and half design

At this point, tell students that they will be combining their quilt blocks to make a larger quilt block and each design must be different. "Different" can be color, pattern, and size.

Students will share their chosen design with their group. Students will compare and contrast their individual blocks with other members in their group and determine if all patterns are

different.

When students have decided on their personal block and they have collaborated on what the group square will be, they may glue the pieces to the individual quilt blocks.

At this point, some students "lose" their design by removing the pieces. Suggest they trace the piece and lightly shade it in. The colored pieces will cover the sketching.

Gluing: Start at one corner of the square and be sure that adjacent sides fit tightly together as they glue.

Refer students back to how the pioneers chose names for the quilt blocks they created. Each student will name his or her own quilt block. Write the name neatly on the address label and place it on the bottom right corner.

Students will then combine and glue the four individual squares on a 14x14 piece of paper, forming a border around the combined quilt block.

The quilt squares will be displayed around the room.

Extensions

Encourage students to create as many different quilt square designs as they can using the same fraction.

Create a quilt block using other fractions such as one fourth, thirds, etc.

Create a quilt block using a 9-patch template or 16-patch template.

Set up a repeating pattern center with pattern blocks.

Provide materials to "copy" additional quilt block patterns.

Have students make up a creative story about a pioneer child and a special quilt.

Create a class quilt using fabric or paper about themselves, families, and science or social studies themes, such as habitats, animals, weather, or fossils.

Family Connection

Have family members share any information or stories about family quilts.

Does the student have a favorite blanket? Ask parents to tell child history of the blanket.

Read quilt storybooks together.

Assessment Plan

Write a description of their quilt block using mathematical language that includes details about the pattern they created. Encourage students to look at an individual square and identify the fraction represented by a color within that square. They should be able to identify shapes, fractions, and describe their pattern in geometric terms.

Assess quilt project with the half & half quilt block rubric.

Bibliography

Research Basis

Aronson, E., Patnoe, S. (1997). *The jigsaw classroom: Building cooperation in the classroom.*

Retrieved January 2007, from <http://www.jigsaw.org/overview.htm>

Jigsaw is a very efficient way to learn new material. The jigsaw process encourages listening, engagement, and interest by giving each member of the group an essential part to play in the activity. Group members must work as a team to accomplish a common goal. No student can succeed unless everyone works well together as a team. This strategy is ideal for ELL and special needs students.

Bagley, M. Hess, K. (1987). *200 ways of using imagery in the classroom.* Munroe, NY: Trillium Press. Interactive instruction relies heavily on discussion and sharing among participants. Seaman and Fellenz (1989) suggest that discussion and sharing provide learners with opportunities to "react to the ideas, experience, insights, and knowledge of the teacher or of peer learners and to generate alternative ways of thinking and feeling" (p. 119). Students can learn from peers and teachers to

develop social skills and abilities, to organize their thoughts, and to develop rational arguments.

Authors

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