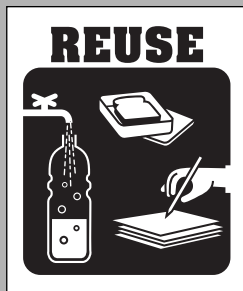


Well-Built Quilts



OBJECTIVES:

Students will:

1. make a quilt square out of fabric and describe how reusing fabric in quilting saves natural resources.
2. identify the type of triangle used to make a quilt square (equilateral, isosceles, scalene).



STANDARDS: Math



SKILLS: Analysis, classification, description, problem solving



SETTING: Classroom



TIME: 50 minutes



VOCABULARY:

Equilateral
Isosceles
Quilt
Reuse
Scalene
Triangle

Introduction

Overview:

In this lesson, students will learn about the natural resources used to make fabric and use their math skills to make a quilt square from re-used fabric scraps or old magazines.

Teacher Background:

There are many traditions of quilt making throughout the world. In the United States, factory-made blankets were not made until the industrial revolution (mid-nineteenth century). Prior to that, fabric was expensive to buy, so scraps of materials were reused and pieced together to make bedding. Historical and modern quilts are made from both new and used fabric. Used fabric from clothing items was meant to remind the viewer of the person who wore the clothes.

There is a strong African American quilting tradition of making each quilt quite different, using bright contrasting colors and repeating patterns or stripes. Alice Walker from Berkeley is well-known as the author of the book *The Color Purple* and for her many beautiful quilts.

Today, both natural and man-made fabrics are made from natural resources such as animals, plants, and fossil fuels. Fabric is cloth made of fibers. Natural fibers come from animals and plants, e.g., cotton, flax, wool, silk. Manmade fabrics can be made from petroleum. Manmade

fibers found in fabrics such as acrylic, rayon and polyester are made through a chemical process. When fabric is reused, the natural resources used to make the fabric are conserved.

Materials:

Students:

- Ruler (one per student)
- Pen or pencil (one per student)
- Protractor (one per student)
- Scissors (one per student)
- Cardboard or card stock to make 8" by 8" square triangle pattern (one per student)
- Eight inch square cardboard or card stock for backing (one per student)
- Scraps of colored paper, greeting cards, old magazines or catalogs
- "Quilt Math" worksheet (one per student)
- Glue (one per student)
- 8 1/2" by 11" piece of paper (one per student)

Teacher:

- A variety of fabric scraps for quilt squares
- "Quilt Math" worksheet overhead
- "Quilt Square Example" overhead
- Rubric overhead
- Rubrics (one per student)

Preparation:

Collect various types of fabric scraps in different colors to use as triangle pieces for quilt squares (colored paper can be substituted for fabric).



ACTIVITY

Discussion

1. Ask the students what they know about fabric. What types of fabric can they name? Explain to the students that fabric is sometimes made from natural resources such as plants. For example, jeans are made from cotton.
2. Explain how people have historically reused scraps of fabric by sewing them together to make bedding or clothing.
3. Ask students whether they know anyone who makes quilts today.
4. Discuss how even though blankets are affordable, people still enjoy making their own quilts by reusing scraps of material they have saved.
5. Explain that when people reuse items such as fabric, they are conserving natural resources and creating less waste.
6. Tell the students that they will be making their own quilt squares out of fabric or reused paper.
7. Have the students complete the “Quilt Math” worksheet.
8. Ask the students to choose the best triangle they made and cut it out of their paper pattern when finished completing the worksheet. This triangle will be used as their triangle pattern.
9. Next have them cut out eight triangles from scraps of fabric or other material using their triangle pattern. Then glue the eight triangles onto the cardboard backing to form one complete quilt square. Explain that triangles of similar colors should touch only at the corners. Show the teacher overhead “Quilt Square Example” to model how the quilt square will look when it is completed.
10. When the students have completed their quilt squares, have them place each square on the classroom floor and tape the squares together to form a complete quilt.
11. Ask the students how much fabric has been saved because the classroom quilt is made from reused materials. Help students calculate the fabric or paper savings by multiplying the size of one quilt square by the total number of students in the class.

Procedure

1. Post the overhead of the student worksheet, and introduce the activity. Model how to make a cardboard square to use as the quilt square backing.
2. Ask students whether they can name different types of triangles. Write the names of each triangle on the board (e.g., equilateral, isosceles, scalene).
3. Draw an example of each triangle next to its name and ask students to describe the properties of each type.
4. Next, model how to make one triangle of a quilt square by reviewing the directions on the “Quilt Math” worksheet.
5. Post the overhead of the rubric and review with the class the expectations for the lesson.
6. Pass out the “Quilt Math” worksheet and distribute the materials.

Wrap-Up

1. Discuss with the students ways that their quilt squares could be used such as making clothing, curtains, etc.
2. Ask the students to share ideas about other projects where they could reuse fabric. Making quilts is one example of reusing materials and conserving resources.
3. Hang the reuse quilt on a wall in the classroom.

Final Assessment Idea

Ask students to write different ways they could use their fabric quilt squares at home or school. Have them brainstorm a list of materials they have at home that could be used in place of fabric to make a quilt.



RESOURCES

Extensions:

Have students watch the last segment of the video *Doing the 4Rs*, where students enter a classroom quilt into a creative reuse art contest. Ask students to compare their quilt to the one in the video, discussing differences and similarities. Did the students in the video reuse materials to make their quilt? If so, what materials did they reuse?

Teacher Materials:

California State Content Standards

The standards below represent broad academic concepts. This lesson provides connections to these academic concepts through hands-on activities and exploration. This lesson is not designed for a student to master the concepts presented in the standards. Additional lessons in the classroom that build on this lesson or the standard(s) ensure that students will have the opportunity to master these concepts.

MATHEMATICS	CONTENT STANDARDS
Grade 4	Measurement and Geometry 3.7. Student will know the definitions of different triangles (e.g., equilateral, isosceles, scalenes) and know their attributes.
Grade 5	Measurement and Geometry 2.1. Student will measure, identify and draw angles, perpendicular and parallel lines, rectangles and triangles by using appropriate tools (e.g., straightedge, ruler, compass, protractor, drawing software).





Teacher

Well-Built Quilts Rubric

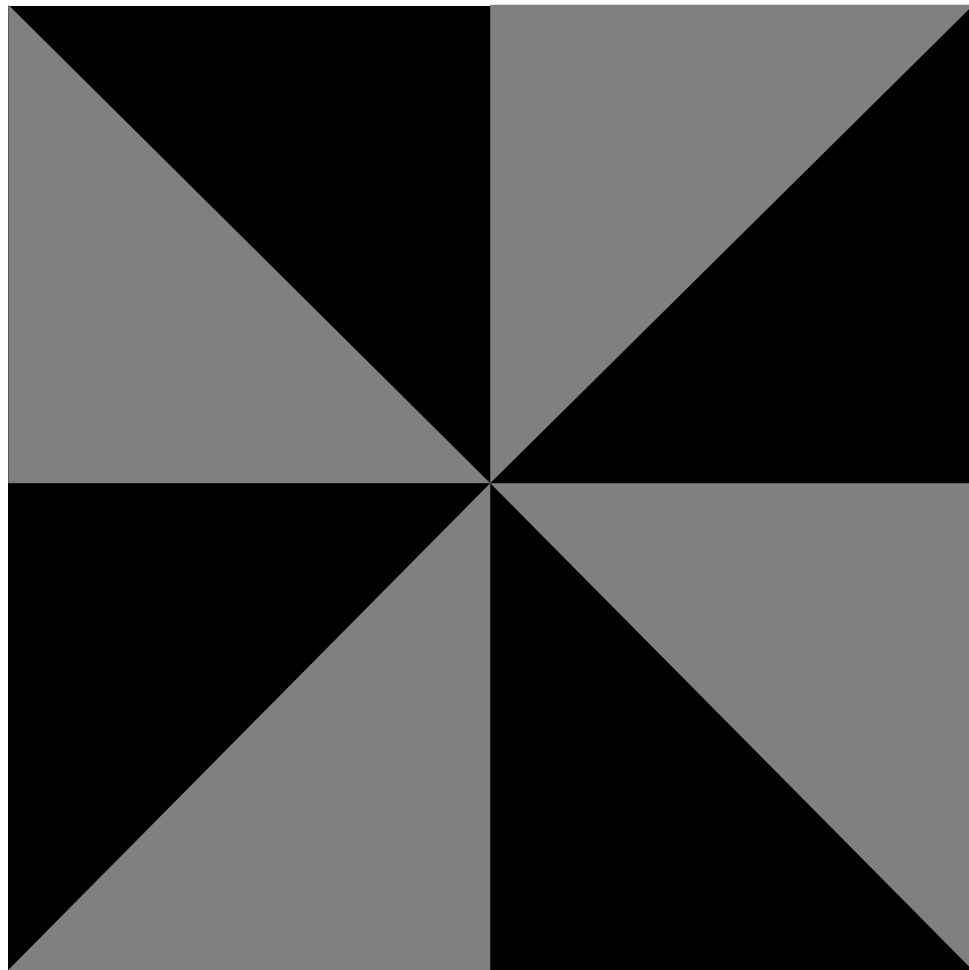
A rubric is a scoring tool that defines the criteria by which a student's work will be evaluated. This rubric is provided to assist you in setting expectations for students and assessing their performance and engagement during the lesson based on specific tasks. Ideally, a rubric is developed with the cooperation of the students. Two blank rows have been provided for you and your class to develop and add your own assessment criteria.

CATEGORY	4	3	2	1
Construct a quilt square and identify the triangle used to complete the square	Student makes a complete quilt square and identifies the correct triangle.	Student makes a quilt square missing one triangle, and identifies the correct triangle.	Student makes a quilt square, missing more than two triangles and cannot identify the correct triangle.	Student makes an incomplete quilt square missing more than four squares and cannot identify the correct triangle.
Explain how reusing materials in quilting saves natural resources	Student can describe how reusing fabric saves natural resources.	Student has problems describing how reusing fabric saves natural resources.	Student is not able to describe how reusing fabric saves natural resources.	Student does not attempt to describe how reusing fabric saves natural resources.





Quilt Square Example

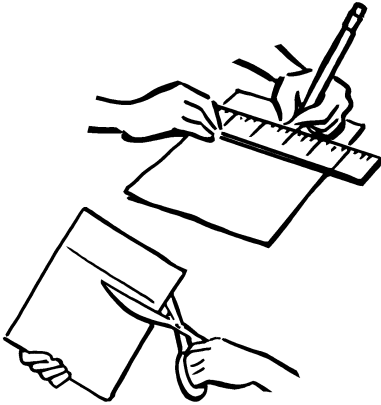




Student

Quilt Math

Directions: Using cardboard and fabric or reused paper, follow the directions and answer the questions to complete a reuse quilt square by using a ruler, protractor, pencil and scissors.

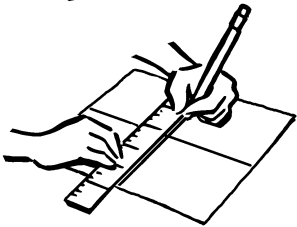


1. In this lesson, you will make a quilt square.
First, make an eight-by-eight-inch square out of cardboard for the backing.
Using your ruler, measure eight inches for the length and width and cut out the square. How wide and long is the square pattern?
_____ inches (It should be the same width and length).

2. Repeat this process to make a square out of a piece of paper. This will be used to make your quilt pattern.

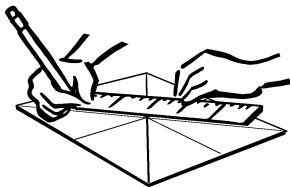


3. Divide the length or width of the paper square by two and show your result. _____ inches



4. Now measure this distance on the length of the square and draw a straight line through the square. Measure this distance on the width and draw a line through the square. Your original square should now be divided into four identical squares.

5. Make the four squares into eight triangles. These triangles will have two equal sides and one longer side.



6. To make the triangles, choose a square to start with. Measure forty-five degrees on your protractor and make a mark. Now go to opposite corner of the square, and measure forty-five degrees with your protractor. Make a mark. Now connect your two marks by drawing a line. Repeat on each square.

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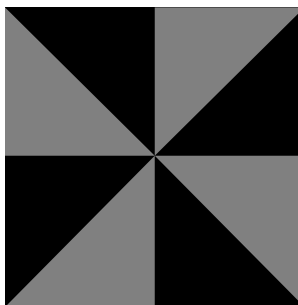
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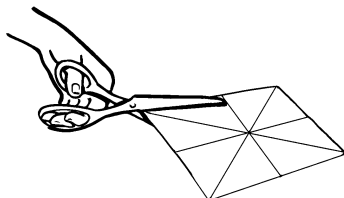


Your pattern should now have eight triangles and look like this:



7. Review the definitions for the three different kinds of triangles below and identify which type you have just made.

- **Scalene:** a triangle having three sides of unequal length.
- **Equilateral:** a triangle having all sides or faces that are equal.
- **Isosceles:** a triangle having two equal sides.



8. Now cut out one triangle and use this to measure eight fabric triangles that will become a quilt square.

9. Glue the fabric triangles on the cardboard backing.

Is this type of triangle an equilateral, scalene or isosceles triangle?

10. Describe how reusing fabric to make a quilt can help save natural resources.

Name: _____ Date: _____



DEFINITIONS

Vocabulary:

Equilateral: a triangle having all sides or faces that are equal.

Isosceles: a triangle having two equal sides.

Quilt: a bed coverlet of three layers: a top, middle, and bottom. The middle layer is a filling of wool, cotton, down, etc.

Reuse: extending the life of an item by reusing it again as it is or creating a new use for it.

Scalene: a triangle having all sides of unequal length.

Triangle: a plain figure that has three sides and three angles.

