

# Fraction Quilt

## 7th Grade Math and Visual Art

### CORE SUBJECT AREA

Math

### ART FORM + ELEMENTS

Visual Arts

Functional, Color, Value, Contrast, Proportion

### OBJECTIVES

Students will identify symmetry and balance as they arrange squares, rectangles, and triangles into a square quilt block. Students will cut/divide squares into equal geometric shapes and identify equivalent fractions. Students will design quilt borders using symmetry. Students will determine the ratio of the different colors within the area of their quilt. Students will convert ratios to decimals and decimals to percents.

### MSCCR STANDARDS

7.RP.1 Analyze proportional relationships and use them to solve real-world and mathematical problems: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

7.RP.3 Analyze proportional relationships and use them to solve real-world and mathematical problems: Use proportional relationships to solve multistep ratio and percent problems.

### RECOMMENDED RESOURCES

TT could bring in an actual rug to demonstrate the idea of the lesson. There are additional ratio & proportion resources located in attachments.

### LESSON SEQUENCE

<https://museum.gwu.edu/textile-museum> TTW Use this website to illustrate patterns, proportions, value and contrast in works of visual art through rugs and quilts.

TTW discuss with students how they will create their own works of art using the “Fraction Quilt” handout. TSW have to discuss the ratio of colors to the whole by using fractions, percents, and decimals for each color they use in their project. They will also have to find three points of symmetry: vertical, horizontal, and diagonal.

DAY ONE:

Today as we begin to make a quilt square design, we will find how important it is to include math in our plan and design. Equivalent fractions will be used to change a square into equal triangles, rectangles, and even smaller squares. Show the fraction board to find fraction pieces of  $\frac{1}{2}$ ,  $\frac{1}{4}$ , and  $\frac{1}{8}$ . Look at some quilt designs to see how

### MSCCR CREATIVE ARTS STANDARDS

VA: Cr1.2.7 Generate and conceptualize artistic ideas and work. Develop criteria to guide making a work of art or design to meet an identified goal.

VA: Cr2.1.7 Organize and develop artistic ideas and work. Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.

VA: Cr2.3.7 Organize and develop artistic ideas and work. Apply visual organizational strategies to design and produce a work of art, design, or media that clearly communicates information or ideas.

### DURATION

This lesson will take 1-2 class periods

### MATERIALS NEEDED

Various mediums (crayons, markers, colored pencils, pastels, chalks, varying colored strips of paper), calculators, Fraction Quilt print outs, scissors, glue sticks

### VOCABULARY

symmetry: vertical, horizontal, diagonal; equivalent fractions; pattern; color scheme; contrast; slide, rotate, ratio, percent, decimal, proportion

they have used the equivalent fractions and the many color choices in a quilt. Also look for the new design created when quilt squares are placed next to each other: Churn Dash, Jacob's Ladder, Storm at Sea, and Variable Star. Find the lines of symmetry in each of the designs. Some have 2 lines of symmetry (vertical and horizontal or two diagonals), and some have all four lines. Discuss them as you teach each new design. (These designs are located in the document "Quilt Patterns").

1. The color scheme choice of the quilt can be discussed, the light version of one color helps to develop contrast (light against dark) in a design. Primary color scheme: red, yellow, blue, light blue and black. Cool Colors: purple, blue, green, magenta and black, plus the light values of any of the colors. Trays of colored squares should be placed where four students can reach and choose as needed, as well as any mediums of their choice. Border Design: TS should use the outside 2-3 blocks on their grid to create their border design. After setting their border limits, they should locate the center point of the grid to create their symmetry from. Students can work from the center out, repeating the same shape placement on each side for mirror symmetry. This will create a border pattern.
2. Cutting/Creating Fractions: Use a fraction/shape visual to demonstrate how to create rectangles, squares, and triangles up to  $\frac{1}{8}$  size.
3. Show students how to make the border design symmetrical by repeating the same shapes on each side of the center point. Corner squares should be left empty of additional shapes for a better symmetrical design. TT should have a completed project to best illustrate for students what you are asking of them.
4. Have students create a second pattern on the inside of the border design.
5. Students should check the symmetry first by asking themselves, then a neighbor, and lastly the teacher. Collect all projects for completion on the next project day.

DAY TWO:

6. Distribute projects back to students.
7. TS should be able to state the ratio of each color used in their project to the entire area of their grid. (i.e. 8.5:100)
8. TS should then find the decimal and percent form of their ratio from #7. All data should be recorded on their "Fraction Quilt" handout. (i.e. 0.085, 8.5%)

Assessment: TTS assess students on their ability to identify ratios, and convert to decimals and percents. Part of TS grade should be based of their ability to follow directions, completion of a symmetrical border and piece (vertical, horizontal, and diagonal).

## EXTENDED LEARNING ACTIVITIES

TT could give a set of universal colors to use, to create a class quilt to put on display. Or simply make a collage quilt.

This project could be done in groups, to make group quilts symmetrical and then have groups present to the class.

Additional Ratio Foldables, and assessments are located in attachments.

## SOURCES

<http://www.projectarticulate.org/lessons/quiltingWithFractionsAndSymmetry.pdf>; edited by Jessica Jarman

## TIPS + FREQUENTLY ASKED QUESTIONS

Make a lesson sample beforehand to aid in student success.

TT should study the lesson, symmetry, and ratios before implementing this lesson.



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