Beyond the Paper Quilt: A Math &Visual Art Teacher Workshop

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DESCRIPTION OF WORKSHOP

In this /workshop, participants will create colored paper quilt squares using standard and non standard measurement, multiplication, division, geometry, fractions, and permutations along with visual art design principles. They will work in cooperative groups to design, create, and critique their quilt squares using NCSCOS learning objectives and employing appropriate vocabulary for both mathematics and visual art design.

GOAL(S)

- **To provide participants with strategies and methods for using experiential learning, visual art design concepts and cooperative learning strategies to teach important mathematical concepts including measurement, multiplication, division, fractions, geometry and permutations.**
- **To provide participants with strategies to encourage critical and creative thinking among students in the classroom.**

OBJECTIVES

- **Participants will learn and practice ways to demonstrate complex mathematical concepts using cut paper shapes.**
- **Participants will learn to understand and correctly apply mathematical and visual art design terms by creating concrete models of these terms and describing what they have done using the appropriate mathematical and design vocabulary.**
- **Participants will gain appreciation for quilt making as an art form, and for the skill needed to create quilts.**
- **Participants will develop a sense of pride in the quilt squares they have created.**
- **Participants will experience working in cooperative groups and will practice cooperative working strategies to share ideas, tools and materials.**
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FOCUS QUESTIONS

- **How can classroom and visual art teachers provide hands-on visual art experiences that will help students understand and apply complex abstract mathematical concepts?**
- **What is the relationship between mathematics and visual art design concepts?**
- **How can cooperative learning strategies, especially conversation among learners reinforce understanding and retention of complex mathematical concepts.**

GRADE LEVEL(S)

This residency/workshop is designed for 3rd grade, but can easily be adapted to fit 4th through 8th grade curriculum.

MATERIALS AND RESOURCES REQUIRED

All materials will be provided by the artist.

White paper (80 lb weight) 9" x 12" - 10 sheets for each participant
Assorted colored construction paper, 12" x 18" – 10 sheets for each participant
Elmer's all purpose glue – 8 oz. size – 1 for each participant
Scissors – 1 for each participant
12 inch rulers – 1 for each participant

PARTICIPANT PRODUCTS

Each participant will create one or more paper quilt squares that demonstrate one or more mathematical concepts and visual art design concepts

ARTISTIC TECHNIQUES AND CONCEPTS TAUGHT

- **Participants will learn to create paper quilt squares. In creating their quilt squares, they will learn to consider the following artistic concepts:**
  Elements of art
  Color: primary/secondary/cool/warm/neutral/complimentary colors
  Shape: shape, relationship, position
  Space: positive and negative
  Principles of design
  Repetition and Pattern
  Unity and Variety
  Balance
  Symmetry
  Social Studies
  Scarcity, innovation, value
  Community and cooperation
  Specialization and division of labor

CURRICULUM OBJECTIVES TAUGHT

MATHEMATICS – GRADE 3 NCSCOS LEARNING OBJECTIVES ADDRESSED IN THIS WORKSHOP

OBJECTIVE 1.01 -Connect model, number word, and number using a variety of representations.

OBJECTIVE 1.03 - Develop fluency with multiplication from 1x1 to 12x12 and division up to two-digit by one-digit numbers using: Strategies for multiplying and dividing numbers. Estimation of products and quotients in appropriate situations. Relationships between operations.

OBJECTIVE 1.05 - Use area or region models and set models of fractions to explore part-whole relationships. Compare and order fractions (halves, fourths, thirds, sixths, eighths) using models and benchmark numbers (zero, one-half, one); describe comparisons. Model and describe common equivalents, especially relationships among

halves, fourths, and eighths, and thirds and sixths. Understand and use Represent fractions concretely and symbolically (halves, fourths, thirds, sixths, eighths).

OBJECTIVE 1.06 - Develop flexibility in solving problems by selecting strategies and using mental computation, estimation, calculators or computers, and paper and pencil.

OBJECTIVE 2.01 - Solve problems using measurement concepts and procedures involving. Equivalent measures within the same measurement system.

OBJECTIVE 2.02 - Estimate and measure using appropriate units. Length (miles, kilometers). OBJECTIVE 3.01 - Use appropriate vocabulary to compare, describe, and classify two- and three-dimensional figures.

OBJECTIVE 4.02 - Determine the number of permutations and combinations of up to three items.

OBJECTIVE 4.03 - Solve probability problems using permutations and combinations.

VISUAL ART – GRADE 3 – NORTH CAROLINA STANDARD COURSE OF STUDY LEARNING OBJECTIVES ADDRESSED IN THIS WORKSHOP

GOAL 1 - The learner will develop critical and creative thinking skills and perceptual awareness necessary for understanding and producing art.

OBJECTIVE 1.01 - Expand the use of appropriate vocabulary.

OBJECTIVE 1.02 - Apply knowledge and concepts gained across the curriculum as a source of ideas for art.

OBJECTIVE 1.03 - Select color both for emotional appeal and realism.

OBJECTIVE 1.04 - Respond to positive attention and suggestions from others.

OBJECTIVE 1.05 - Discuss why one solution is better than another through comparison.

OBJECTIVE 1.08 - Develop the ability to work in small groups to reach a group goal which will be greater than any one individual might achieve alone.

OBJECTIVE 2.01 - Expands control and manipulation of the media and tools which may include the following: Cut paper - papers, found objects, fibers, glue, sharp-edged scissors, curling, scoring and stapling, cutting a variety of single and multiple shapes.

OBJECTIVE 2.03 - Demonstrate increased fine motor skills.

OBJECTIVE 3.03 - Identify geometric shapes: circle, square, rectangle, triangle, diamond, oval, octagon, and pentagon.

OBJECTIVE 3.04 - Use a variety of geometric and organic shapes in creating own work.

OBJECTIVE 3.06 - Develop ability to discuss his or her own work and that of others in terms of art elements.

OBJECTIVE 3.07 - Recognize composition is using the elements of art to create an artwork.

OBJECTIVE 3.08 -Achieve balance in compositions through use of like or different objects.

OBJECTIVE 3.09 - Develop repetition to create pattern in one's own artwork.

OBJECTIVE 3.10 - Respect the work of others when critiquing art.

OBJECTIVE 3.11 - Consider numerous solutions during the problem-solving process.

OBJECTIVE 3.12 -Recognize symmetrical and asymmetrical balance.

The learner will reflect upon and assess the characteristics and merits of their work and the work of others.

OBJECTIVE 6.01 -Understand that the purpose for a work of art affects how it is made.

OBJECTIVE 6.02 -Recognize diversity in art as a natural and positive expression of individuality.

OBJECTIVE 6.06- -Critique art work using proper art vocabulary.

OBJECTIVE 6.08 - Critique artwork in relation to design principles: emphasis, movement, repetition, space, and balance.

SOCIAL STUDIES CURRICULUM OBJECTIVES ADDRESSED IN THIS WORKSHOP

OBJECTIVE 5.01 - Define and identify examples of scarcity.

OBJECTIVE 5.02 - Explain the impact of scarcity on the production, distribution, and consumption of goods and services.

OBJECTIVE 5.03 - Apply concepts of specialization and division of labor to the local community.

OBJECTIVE 5.04 - Compare and contrast the division of labor in local and global communities.

Lesson Questions

1. **What are the Elements of Art and the Principles of Design?**
2. **What are some of the Mathematics concepts that can be addressed in the context of creating a quilt design.**
3. **How can a quilt design be a model for a mathematics concept?**
4. **Why is an art activity a good way for students to learn a math concept?**
5. **What mathematics concepts will my quilt square model.?**
6. **What art elements and design principles will I use in my square?**

Activities

1. Participants will receive an introduction to the Elements of Art and Principles of Design.
2. Participants will learn some of the mathematics concepts that can be addressed in the context of creating a quilt design.
3. Participants will work together to create color wheels.
4. Participants will brainstorm to create a list of the mathematics concepts they want to address in their first quilt square.
5. Participants will brainstorm to create a list of the art elements and design principles they can use to create the quilt square.
6. Participants will create their own quilt squares and in the white space at the top of the square will write the mathematics and art concepts they employed in each square.
7. Participants will display and discuss their squares with their peers.

ADDITIONAL ACTIVITIES

1. Quilt squares may be joined together with paper strips to make whole quilts.
2. Quilt squares may be compared to show how many different ways a concept may be modeled.