

Facilitation Guide



10-15 Min
Small Group



Digital Guide

ARTS EVERY DAY
IN BALTIMORE CITY PUBLIC SCHOOLS

Quilted Arrays



ROUTINE OVERVIEW

In this teacher-led small group activity, students will use folding to create a paper quilt to explore the Associative Property of Multiplication. Students fold their paper in different sequences to create the same number of equal sections, discovering that changing how the folds are grouped changes the process but not the total number of panels. After unfolding, students decorate each panel with colors, shapes, or patterns.

Maryland Standards

MARYLAND STATE MATH STANDARDS

- **3.NOS.C.4** – Identify and apply the Commutative Property of Multiplication, Associative Property of Multiplication, and Distributive Property of Multiplication as strategies to multiply.

MARYLAND ARTS STANDARDS

- **VA.AS1.I:3–5:1** – Act on creative ideas to develop personally meaningful compositions through observation, imagination, or memory.



Not in MD? View [National Standards](#) in the Digital Guide

Getting Ready ★ REVEAL MATH: 3rd Grade: 10–3

ARTS INTEGRATED LEARNING OBJECTIVE(S):

Students will create a paper quilt-inspired design using folds, patterns, and symmetry to visually represent the Associative Property of Multiplication while explaining how different groupings of factors can create the same product.

MATH DOMAIN:

Operations
& Algebraic
Thinking

Understand properties of multiplication and use strategies to solve multiplication problems

Apply the Associative Property of Multiplication to regroup factors

MATH SKILL: Associative Property

ART SKILL: Using pattern, symmetry, and creative ideas to create a quilt design that communicates an idea

MATERIALS:

- [Slides](#)
- [Reflection Sheet](#)
- [Recording Sheet](#)
- Preferred square sized paper
- Markers, crayons, or colored pencils
- Rulers
- Pencils
- Exemplar quilt for inspiration

TEACH

Facilitation Steps

Introduction

Begin by showing students pictures of winning quilts from this year's Homage to Baltimore quilt-making competition. Ask students to notice the patterns, colors, repeated designs, and equal sections used to create one larger quilt.

Ask:

- What patterns do you notice?
- Why do you think quilt makers carefully plan their designs before they begin?
- How do the smaller pieces work together to create one large quilt?

Tell students:

"Today, you are quilt designers! Quilt makers carefully plan how many pieces their quilts will have before creating their designs. Your job is to use multiplication to plan your quilt so that it has equal sections. You'll use the associative property of multiplication to discover different ways to organize your quilt while keeping the same total number of pieces."

Explain that the multiplication expression on their recording sheet will become the blueprint for their quilt design.

Complete Your Quilt Designer Challenge

Each student will receive a recording sheet. Teachers may choose one of the following recording sheet options depending on student readiness.

Option 1: Decompose a Two-Factor Expression

Students are given a multiplication expression with two factors and must decompose one or both factors into a three-factor multiplication expression that has the same product.

Example:

$$6 \times 9 = 54$$

$$\text{-----} \times \text{-----} \times \text{-----} = 54$$

Possible student responses include:

- $2 \times 3 \times 9 = 54$
- $6 \times 3 \times 3 = 54$
- $3 \times 2 \times 9 = 54$

Additional examples:

- $2 \times 6 = 12 \rightarrow 2 \times 2 \times 3 = 12$
- $4 \times 6 = 24 \rightarrow 2 \times 2 \times 6 = 24$
- $5 \times 6 = 30 \rightarrow 5 \times 2 \times 3 = 30$
- $8 \times 6 = 48 \rightarrow 2 \times 4 \times 6 = 48$
- $7 \times 8 = 56 \rightarrow 7 \times 2 \times 4 = 56$

Students will use their three-factor expression as the blueprint for dividing and designing their quilt.



SLIDES



COMING SOON

**VIDEO
PLAYLIST**



MATERIALS
GOOGLE FOLDER

TEACH

Facilitation Steps

Option 2: Work Backwards from Three Factors

Students are given a multiplication expression with three factors and must determine an equivalent two-factor multiplication expression that has the same product.

Example:

$$2 \times 3 \times 9 = 54$$

$$\text{-----} \times \text{-----} = 54$$

Possible student responses include:

- $6 \times 9 = 54$
- $2 \times 27 = 54$
- $18 \times 3 = 54$

Additional examples:

- $2 \times 2 \times 3 = 12 \rightarrow 4 \times 3 = 12$ or $2 \times 6 = 12$
- $2 \times 3 \times 4 = 24 \rightarrow 6 \times 4 = 24$ or $2 \times 12 = 24$
- $3 \times 2 \times 5 = 30 \rightarrow 6 \times 5 = 30$ or $3 \times 10 = 30$
- $2 \times 4 \times 6 = 48 \rightarrow 8 \times 6 = 48$ or $2 \times 24 = 48$

Students may choose which equivalent expression they prefer and explain how the associative property allows them to regroup the factors while keeping the product the same.

Step 2: Plan and Fold Your Quilt

Once students have completed their recording sheet, they will use their multiplication expression to determine how their paper should be divided into equal sections.

Tell students:

"The factors in your multiplication expression tell you how to create the equal pieces of your quilt."

Students may:

1. Fold their paper to represent the first factor.
2. Open the paper and lightly trace the fold lines.
3. Fold or divide each section to represent the second factor.
4. Open the paper and trace the new fold lines.
5. Fold or draw additional equal sections to represent the third factor.

For example:

$$2 \times 3 \times 4 = 24$$

Students might:

- Fold the paper in half.
- Divide each section into three equal parts.
- Divide each of those sections into four equal parts.

This creates 24 equal quilt pieces.

Note: If folding becomes difficult, students may use a ruler or draw equal sections instead. The goal is to accurately represent the factors in their multiplication expression.



RECORDING

TEACH

Facilitation Steps

Step 3: Design Your Quilt

Once students have divided their paper into equal sections, they will decorate their quilt using colors, patterns, shapes, or symbols.

Encourage students to:

- Create repeating patterns.
- Design symmetrical sections.
- Use colors to highlight different factor groupings.
- Create a quilt that is personally meaningful to them.

Remind students that their fold lines and section lines should remain visible so that the mathematical model is clear.

Step 4: Mathematical Discussion

As students work, ask:

- Which factors did you combine or break apart?
 - Ex: I combined 3×2 to get 6
- Did the total number of quilt pieces change?
 - Ex: No! The total is still the same.
- Which multiplication expression was easier to visualize?
 - Ex: The equation with 3 factors because it uses smaller numbers!
- How does the associative property help us regroup factors?
 - Ex: It takes big equations and makes the smaller!

Explain:

"The associative property tells us that we can group factors in different ways without changing the product. Even though our multiplication expressions may look different, our quilts still have the same total number of equal sections."

Assessment & Reflection

Student Reflection

Students will complete the following statement:

My original multiplication expression was _____.

My new multiplication expression was _____.

My quilt has _____ equal sections.

I know the associative property works because I can regroup the factors and still get the same product.

Debrief

Bring students together for a quick share-out.

Ask:

- Did anyone find more than one way to represent the same product?
 - Ex: Yes, we multiplied different factors! We could either group the first two factors or the second two factors to get the same product.
- Which multiplication expression was easiest to use when planning your quilt?
 - Ex: The equation with three factors.



REFLECTION

TEACH

Assessment & Reflection

- How did your paper folds help you understand the associative property?
 - Ex: I could see all the parts!
- What similarities did you notice between quilt making and multiplication?
 - Ex: They all use equal groups that are repeated!

Close by saying:

"Just like quilt makers carefully plan how smaller pieces fit together to create one beautiful design, mathematicians can group multiplication factors in different ways to create the same product. Today, you used both art and math to design a quilt that demonstrates the associative property of multiplication."

Teacher Look-Fors

Students can:

- Decompose or regroup multiplication expressions accurately.
- Demonstrate the associative property of multiplication.
- Represent multiplication using equal sections on paper.
- Explain how regrouping factors affect the expression but not the product.
- Create an artistic quilt design that communicates their mathematical thinking.

Teacher Reflection with students:

- "How did your quilt model the Associative Property?"
- "What did you notice about regrouping factors?"
- "How did creating a quilt help you understand multiplication?"