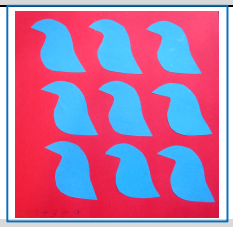
ARTS IMPACT LESSON PLAN

Visual Arts and Math Infused Lesson



Lesson One: ***Collage Arrays: Adding up Shapes***
Author: Meredith Essex Grade Level: Second

Enduring Understanding

Regular repetition of shapes in rows and columns can express number relationships in an array and unify compositions. Pairing warm and cool colors can create contrast.

Lesson Description **(Use for family communication and displaying student art)**
Students arrange objects in rectangular arrays of up to 5x5 rows. Students observe, analyze, and write equations in response to artworks with repeating shapes arranged in rows. Students then create a simple shape template out of tag board, trace it, and cut out matching multiple shapes using paper folding and cutting techniques. Shapes are arranged and glued in rectangular arrays using a warm/cool palette for contrast. Students write and share equations corresponding with arrays.

Learning Targets and Assessment Criteria

Target: Arranges and totals number in rectangular arrays.
Criteria: Makes equal number of objects in rows and columns and writes corresponding equation.

Target: Creates contrast in composition.
Criteria: Pairs array shapes in one warm/cool color with opposing warm/cool color for background.

Target: Makes and notates rectangular array collage.
Criteria: Repeats multiple identical shapes by tracing template on paper folded into quarters, cutting, arranging in rows and columns, and records the addition equation it represents.

Target: Uses craftsmanship in collage.
Criteria: Glues shapes flat and securely.

Vocabulary

Arts Infused:
Identical
Repetition
Rows
Shape

Math:
Addition
Array
Columns
Equation
Even
Odd
Quarters
Sum

Arts:
Collage
Composition
Contrast
Palette
Template
Unity
Warm and Cool

Materials

Museum Artworks or Performance:

Seattle, WA
Seattle Art Museum

Tacoma, WA
Children's Museum of Tacoma
Tacoma Art Museum

Materials
Math manipulatives: small countable objects; Individual color wheels; Writing pencils; Tag board/cardstock: 3x3" pieces; Fadeless art paper in warm & cool colors: 6x6" pieces; Scissors; Card stock: 12x12" in warm & cool colors; Glue sticks; Recycled magazines: glue mats; Arts Impact sketchbooks; Class Assessment Worksheet

Everyday Mathematics **Connections**
6.6 – Exploring Arrays

continued

Learning Standards

WA Arts State Grade Level Expectations
For the full description of each WA State Arts Grade Level Expectation, see: http://www.k12.wa.us/Arts/Standards
1.1.2 Elements: Shape
1.1.6 Elements: Color, warm/cool
1.1.7 Principles of Design: Repetition, unity
1.2.1 Skills and Techniques: Collage
2.1.1 Creative Process
2.3.1 Responding Process
4.2.1 Connection between Visual Arts and Math

Early Learning Guidelines (Pre-K – Grade 3)
For a full description of Washington State Early Learning and Child Development Guidelines see: http://www.del.wa.gov/development/guidelines/
(2nd Grade): 6. Learning about my world: Math: Accurately add and subtract with sums to 20; begin to understand how math is used in everyday life. Arts: Be interested in a variety of types of art.

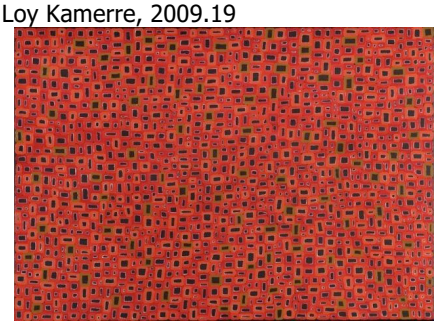
continued

Seattle Art Museum images:

Asmat Shield, early 20th century, Asmat, 2004.240

Tile with Twelve-pointed Star, 15th Century, Persian, 39.61

Awelye "Women's Ceremony", 2006, Abie Loy Kamerre, 2009.19



Common Core State Standards (CCSS) in Math

For a full description of CCSS Standards by grade level see: *http://www.k12.wa.us/CoreStandards/Mathstandards/*

2.OA.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2.OA.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

CCSS Mathematical Practices

MP 2. Reason abstractly and quantitatively

MP 6. Attend to precision.

MP 7. Look for and make use of structure.

MP 8. Look for and express regularity in repeated reasoning.

ICON KEY:

= Indicates note or reminder for teacher

☑ = Embedded assessment points in the lesson

Pre-Teach

Sketchbook Activity: Notice and draw examples of rectangular arrays that are part of our daily life: key boards, calculators, phones, mesh or screen, speakers, windows, ceiling tiles. Note odd and even totals.

Lesson Steps

1. Warm-Up: Demonstrate and guide arranging math small objects in rectangular arrays with equal number of rows and columns up to 4 and writing corresponding equation on paper or white board.

☑ Criteria-based teacher checklist: Makes equal number of objects in rows and columns and writes corresponding equation.

2. Introduce concept of repetition for unity in art and guide student math analysis of *Asmat Shield,* early 20th century Asmat, and *Tile with Twelve-pointed Star,* Persian, from the Seattle Art Museum collection.

3. Introduce concept of "collage". Demonstrate and guide making small shape template for creating multiple congruent collage array shapes.

4. Introduce concept of combining warm and cool colors to create contrast in composition through analyzing *Awelye Women's Ceremony* by Abie Loy Kamerre from the Seattle Art Museum collection.

5. Demonstrate and guide selecting warm or cool colors for array shapes and an opposing – warm or cool for the background.

☑ Criteria-based room scan: Pairs array shapes in a warm/cool color with an opposing warm/cool color for background.

6. Demonstrate and guide folding paper for multiples and cutting and arranging array shapes.

☑ Criteria-based teacher checklist: Repeats multiple identical shapes by tracing the template on paper folded into quarters, cutting, arranging in rows and columns, and records the addition equation it represents.

7. Demonstrate and guide gluing using glue mat or book and glue sticks.

☑ Criteria-based teacher checklist: Glues shapes flat and securely.

8. Lead criteria-based self-assessment and group gallery walk reflection.

☑ Criteria-based student self assessment and group reflection: Checks for compositions matching equations, craftsmanship, and warm/cool color pairing.

LESSON STEPS

1. Warm-Up: Demonstrate and guide arranging math small objects in rectangular arrays with equal number of rows and columns up to 4 and writing corresponding equation on paper or white board.

- *If I have 2 rows and 2 columns, what is my total number of objects? Is it an odd or even number? What is the equation that matches this array? (2+2=4)*
- *Make 3 rows and 3 columns. Predict whether this array's total will be an odd or even number. Now write the equation that matches it. (3+3+3=9)*
- *Make 4 rows and 4 columns. Predict whether the total will be odd or even and share your thinking. Now write the equation that matches it. How many groups of 4? (4+4+4+4=16).*

☑ Criteria-based teacher checklist: Makes equal number of objects in rows and columns and writes corresponding equation.

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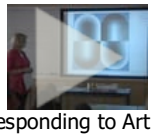
2. Introduce concept of repetition for unity in art and guide student math analysis of *Asmat Shield,* early 20th century Asmat, and *Tile with Twelve-pointed Star,* Persian, from the Seattle Art Museum collection.


Responding to Art in the Classroom

The Seattle Art Museum's collection is available on-line at: http://www.seattleartmuseum.org/emuseum/code/collection.asp. To find the images in this lesson, enter the accession number for the work of art in the search box on the collections page of SAM's website. Accession numbers for these works of art are listed in the materials box at the beginning of the lesson.

- *What do you notice about these artworks? Where do you see repeated shapes? Often in art, shapes are repeated to create a sense of unity and calm: a feeling that all parts belong to together in a composition.*

- *How do you think artists used math in these artworks?*

- *If we made an array to show the largest repeating shapes (notice the white flower shapes in the Persian Tile) in these artworks: how many rows and how many columns would we need for each of them (Amsat Shield: 2 columns, 6 rows), (Persian Tile: 2 columns, 2 rows).*

- *What would the equations be that go with these artworks? (2+2+2+2+2+2=12); (2+2=4)*

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3. Introduce concept of "collage". Demonstrate and guide making small shape template for creating multiple congruent collage array shapes.

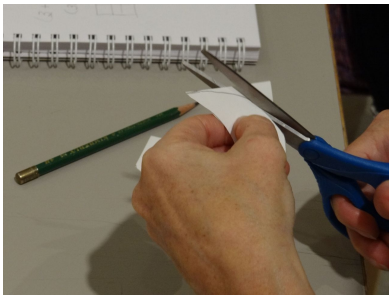

Creating Templates

- *Collage means "to paste" in French. We will be cutting out identical shapes to make a collage array.*

- *We are making a shape that is small, simple, and easy to cut out of 3x3" tag board.*

- *This will be our "template" that is used to trace around to make shapes exactly the same size and color for our collage arrays.*

- *"Customize" your 3x3 square: Use your pencil to draw where you might trim off a corner, add a curved edge or change the square into another shape. Don't cut too much off! It can be a completely imaginary shape, a simple star, a diamond, a shape of an animal…but it needs to be easy to cut out, trace around, and cut out again and again.*



Prompting for Creativity

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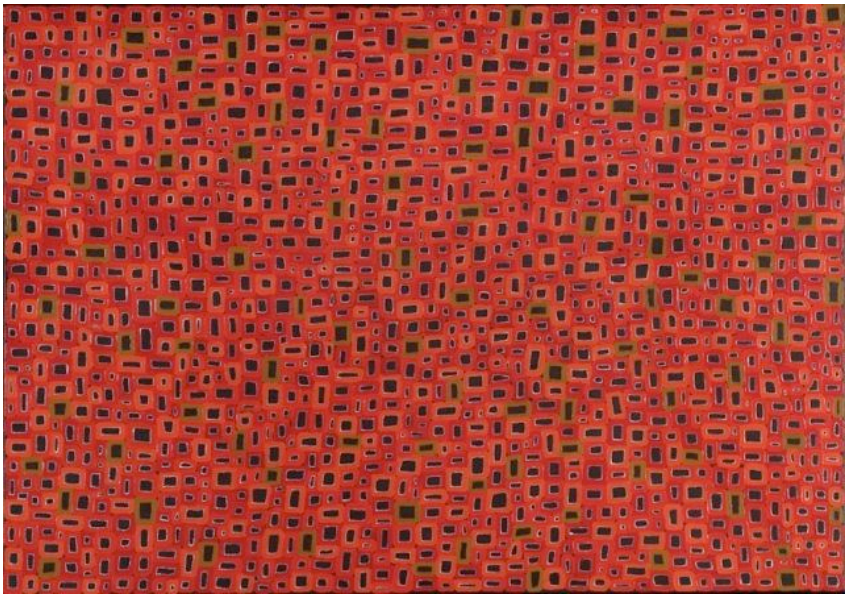
4. Introduce concept of combining warm and cool colors to create contrast in composition through analyzing *Awelye Women's Ceremony* by Abie Loy Kamerre from the Seattle Art Museum collection.



- *Look closely; how do you think the idea for this art is similar to arrays? How is it different?*
- *We are actually focusing more on an art concept than math when we look at this art: contrast. Contrast means to stand out.*
- *Look at the color wheel. One half of the colors on the color wheel are cool colors: Green, blue, and violet. Think of cool places like forests, lakes and mountains. The other halves of the colors on the color wheel are red, orange, and yellow. Think of hot things and places: fire, sun, deserts.*
- *Artists put warm and cool colors next to each other to create contrast—to make areas stand out—in their compositions.*
- *When you look closely at this art, notice which rectangles jump out the most. What makes them stand out? What warm and cool colors did the artist put next to each other to create contrast?*

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5. Demonstrate and guide selecting warm or cool colors for array shapes and an opposing – warm or cool – for the background.

- *Choose a 6x6" colored paper in a warm or cool color. We are going to make our array shapes all the same color to emphasize color contrast, repetition, and math all at the same time.*
- *Now pick an opposing color for your big collage background paper (if you chose a warm color for shapes, choose a cool color for background, or the opposite).*

☑ Criteria-based room scan: Pairs array shapes in a warm/cool color with an opposing warm/cool color for background.

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6. Demonstrate and guide folding paper for multiples and cutting and arranging array shapes.

Folding and Cutting Congruent Shapes/Fractions, Cutting through Multiple Layers

Students can be assigned the number of shapes in arrays – for differentiated learning – or can create their own number of shapes for arrays.

- *Using good craftsmanship-care, thought, and time invested in your art: Fold your color 6x6" small paper carefully in half, lining up edges vertically and creasing. Trace around your template twice on the folded paper.*
  (This will make 4 shapes for a 2x2 array).

- *Next, with thumb pointing up and wide-open scissors turn the paper (not the scissors) to slowly cut out the two traced shapes through both thicknesses.*
- *Arrange an array of 4 with your shapes. If you have time and space on you paper, more of the same shapes can be cut out of the <u>same color</u> paper to create a 3x3 array if desired.*

- *Arrange your array, write out the equation in the lower left corner of your paper, and raise your hand to have a teacher check your work before gluing.*

☑ Criteria-based teacher checklist: Repeats multiple identical shapes by tracing the template on paper folded into quarters, cutting, arranging in rows and columns, and records the addition equation it represents.

7. Demonstrate and guide gluing using glue mat or book and glue sticks.


Craft of Gluing with Glue Stick/O'Glue

- *Once your array composition and equation has been checked, remove each shape one by one, turn over on glue mat or book (recycled magazine), and run glue over the edge of shape, and then glue exactly where it was.*
- *Using craftsmanship, rub shapes down well so they are flat and stay put.*
- *Sign your name in the lower right corner.*

☑ Criteria-based teacher checklist: Glues shapes flat and securely.

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8. Lead criteria-based self-assessment and group gallery walk reflection.


Guiding Reflecting on Student Art

- *Count your rows and make sure that they match your equation. How many rows of how many shapes are equal to your total number of shapes? Is your total an odd or an even number?*
- *Check your craftsmanship: are all of your shapes cut out well so they match? Did you glue them down so they are flat and not coming off the paper?*
- *Check to make sure that you have used warm or cool for shapes, and the opposite (warm or cool) for the background.*
- *Take a gallery walk around and stand next to another artist's collage. Without reading the equation written in the corner, see if you can look at the array and share the equation you see.*

☑ Criteria-based student self assessment and group reflection: Checks for compositions matching equations, craftsmanship, and warm/cool color pairing.

***Everyday Mathematics* Extensions:**
6.8 – Multiplication Number Stories
6.9 – Multiplication with Arrays

Teachers may choose to use or adapt the following self-assessment tool.

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	**MATH**	**VISUAL ARTS AND MATH**	**MATH**	**VISUAL ARTS**		Total 5
Concept	**Arrays/Addition**	**Arrays/Repetition**	**Addition**	**Contrast**	**Craftsmanship**	
Criteria Student Name	Makes equal number of objects in rows and columns and writes corresponding equation.	Repeats multiple identical shapes by tracing template on paper folded into quarters, cutting, arranging in rows and columns.	Records addition equation that collage array represents.	Pairs array shapes in one warm/cool color with an opposing warm/cool color for background.	Glues shapes flat and securely.	

ARTS IMPACT LESSON PLAN Visual Arts and Math Infusion

Second Grade Lesson One: *Collage Arrays: Adding up Shapes*

CLASS ASSESSMENT WORKSHEET

Disciplines	**MATH**	**VISUAL ARTS AND MATH**	**MATH**	**VISUAL ARTS**		Total 5
Concept	**Arrays/Addition**	**Arrays/Repetition**	**Addition**	**Contrast**	**Craftsmanship**	
Criteria Student Name	Makes equal number of objects in rows and columns and writes corresponding equation.	Repeats multiple identical shapes by tracing template on paper folded into quarters, cutting, arranging in rows and columns.	Records addition equation that collage array represents.	Pairs array shapes in one warm/cool color with an opposing warm/cool color for background.	Glues shapes flat and securely.	
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What was effective in the lesson? Why?

What do I want to consider for the next time I teach this lesson?

What were the strongest connections between visual arts and math?

Teacher: _____ Date: _____

ARTS IMPACT FAMILY LETTER

VISUAL ARTS AND MATH LESSON: ***Collage Arrays: Adding up Shapes***

Dear Family:

Today your child participated in an **Arts and Math** lesson. We looked at an Asmat shield and a Persian ceramic tile and talked about how the artists used repetition of shapes in rows or columns. We also talked about all of the ways that math might have been used in making this art: especially measurement, counting, and addition.

- We arranged objects in rectangular arrays (rectangular composition with rows and columns) of up to 5x5 rows.
- We observed and wrote equations in response to artworks with repeating shapes arranged in rows and columns.
- We created a simple shape template out of tag board. Then we traced our template on folded paper to help us cut out matching multiple shapes.
- We studied color wheels and looked at another work of art that placed warm and cool colors next to each other to create contrast.
- We arranged and glued our shapes in rectangular array collages using a warm and cool palette.
- We wrote the addition equation that matched our collage array and shared our art and math with the class.

At home, you could search for repetition of shapes or grids inside and outside and encourage your child to notice the number of rows and columns seen. Together, you could make arrays out of found objects like caps, buttons, or rocks and practice writing equations to go along with them (and discover multiplication along the way)!

Enduring Understanding

Regular repetition of shapes in rows and columns can express number relationships in an array and unify compositions. Pairing warm and cool colors can create contrast.