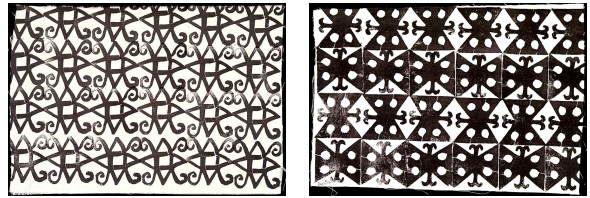


ARTS IMPACT LESSON PLAN

Visual Arts and Math Infused Lesson

Symmetry with Shapes

Authors: Maria Grade and Carol Gould



Enduring Understanding

Repeating identical shapes an equal distance from each other and flipped on a central axis creates a reflection/mirror image.

Lesson Description (Use for family communication and displaying student art)

This lesson begins with a focus on symbols from different cultures. Students then create a print stamp featuring a unique symbol of self that balances positive and negative space and is organized in mirror symmetry. Symbols are then stamped in rows on fabric inspired by the tradition of Adinkra cloth from Ghana.

Learning Targets and Assessment Criteria

Target: Thinks creatively.

Criteria: Gathers ideas, considers and tries multiple solutions, and makes artistic choices.

Target: Designs a personal symbol.

Criteria: Draws a unique shape that relates to self.

Target: Applies the principle of mirror symmetry.

Criteria: Creates design with a reflection of shapes on either side of a central axis.

Target: Creates balance.

Criteria: Creates equal amounts of positive and negative space in stamp composition.

Target: Creates a stamp for printmaking.

Criteria: Transfers design, cuts foam with precise edges, and applies foam symbol to block.

Target: Prints a pattern.

Criteria: Applies opaque layer of paint to stamp each time it is printed and repeats printed image in rows across entire fabric surface.

Vocabulary

Arts Infused:

Axis
Pattern
Symmetry

Math:

Area
Equal
Weight

Arts:

Balance
Composition

continued

Materials

Museum Artworks or Performance

Seattle, WA

Seattle Art Museum

Tacoma, WA

Children's Museum of Tacoma
Tacoma Art Museum

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
- 1.1.5 Elements: Space – negative, positive
- 1.1.7 Principles of Organization: Balance, Symmetry, Repetition
- 1.2.1 Skills and Techniques: Printmaking
- 1.3.1 Styles of Cultures and Times: Symbols
- 2.1.1 Creative Process
- 2.3.1 Responding Process
- 4.2.1 Connection between Visual Arts and Math

continued

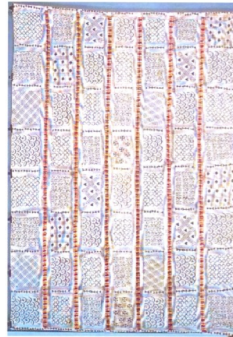
Contrast
Opaque
Positive space
Negative space
Printmaking
Reflection
Repetition

Cultural:
Adinkra
Ghana
Sign
Symbol

Materials:

Drawing paper: 9x12"; Fun Foam, 2 x 2 inches with adhesive back; Foam board: cut into 2.5x2.5" squares or 2" foam cubes; Scissors; Daubers (stencil sponges); Sharpie brand pens: ultra fine point; Acrylic paint: black; Paper plates (small) for paint; Thin cotton cloth: 9x12"; Newsprint: 12x18"; Blue painter's tape; Graphite transfer paper (optional); Drawing pencil: 4B or 6B (optional); Classroom Assessment Worksheet; Arts Impact sketchbook

Seattle Art Museum images:
Sunday Cloth (Kwasiada Adinkra), 20th Century, African, 81.17.472



Samaurai Leather Firefighting Coat (Kawabaori), 18th Century, Japanese, 89.93



Tacoma Art Museum image:
Women's Domestic Vest, Late 19th – early 20th Century, Han Chinese



National Core Arts Standards

1. Generate and conceptualize artistic ideas and work.
2. Organize and develop artistic ideas and work.
3. Refine and complete artistic work. and sort simple shapes; create own patterns with a variety of materials. Arts: Show an increasing ability to use art materials safely and with purpose.

National Core Arts Standards (continued)

4. Select, analyze, and interpret artistic work for presentation.
5. Develop and refine artistic techniques and work for presentation.
6. Convey meaning through the presentation of artistic work.
7. Perceive and analyze artistic work.
8. Interpret intent and meaning in artistic work.
9. Apply criteria to evaluate artistic work.
10. Synthesize and relate knowledge and personal experiences to make art.
11. Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

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/> (Age 4-5) 6. Learning about my world: Math: Match and sort simple shapes; create own patterns with a variety of materials. Arts: Show an increasing ability to use art materials safely and with purpose.

Common Core State Standards (CCSS) in Math

For a full description of CCSS Standards by grade level see:


<http://www.k12.wa.us/CoreStandards/Mathematics/default.aspx>


- 1.G.2. Compose two-dimensional shapes to create a composite shape.
- 4.OA.5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.
- 4.G.3. Recognize a line of symmetry for a 2-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts.

CCSS Mathematical Practices

- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7. Look for and make use of structure.

ICON KEY:

 = Indicates note or reminder for teacher

 = Embedded assessment points in the lesson


Pre-Teach

Identify and discuss examples of symbols, symmetry, and pattern seen in the world around us.

Lesson Steps Outline


1. Review concepts of symbols, referencing examples that are widely known as well as those specific to modern U.S. culture and traditionally specific to other cultures.

Introduce and guide art analysis of *Sunday Cloth (Kwasiada Adinkra)*, African, and *Samaurai Leather Firefighting Coat (Kawabaori)*, Japanese, from Seattle Art Museum collection and *Women's Domestic Vest*, Han Chinese, from Tacoma Art Museum collection. Elicit possible verbal translations from the students.

 Criteria-based process assessment: Participates in dialogue about signs and symbols, sharing translations for the visual symbols.


2. Introduce or review the shared concept of symmetry (or formal balance) and equal area of positive and negative space.

3. Demonstrate and guide creative thinking process in creating a unique symbol of self. Guide criteria-based self-assessment of the results before transferring the design to foam.

 Criteria-based teacher checklist and self-assessment: Gathers ideas, considers and tries multiple solutions, and makes artistic choices. Draws a unique shape that relates to self. Creates equal amounts of positive and negative space in mirror image on either side of an axis. Transfers design.

4. Demonstrate cutting out symbol to the line, opening scissors fully, turning both scissors and foam carefully in hand. Demonstrate applying the design to the block so that it is balanced.

Guide students as they cut the design and attach it to their block.

 Criteria-based teacher checklist: Cuts foam with precise edges and applies foam symbol to block.

5. Demonstrate applying paint and then printing onto the newsprint to make a test print. Emphasize the amount of paint, pressure, and steadiness needed to fully transfer paint to fabric in order to see the complete design.

Criteria-based process assessment: Observes demonstration, assembles materials, and prepares workspace to stamp fabric.

6. Direct the students to print their cloths, sign them, and remove them from newsprint to dry.

Criteria-based teacher checklist: Applies opaque layer of paint to block each time it is printed and repeats printed image in rows across entire fabric surface.

7. Direct students to complete the criteria-based self-assessment, adding a description of their symbols' meaning in the space left beneath the assessment worksheet.

Criteria-based teacher checklist: Draws a unique shape that relates to self. Creates design with a mirror image of shapes on either side of an axis. Creates equal amounts of positive and negative space in stamp composition. Transfers design, cuts foam with precise edges, and applies foam symbol to block. Applies opaque layer of paint to stamp each time it is printed and repeats printed image in rows across entire fabric surface.

8. Display all stamps and cloths. Guide group critique on creative thinking and process.

Criteria-based student self-assessment and group reflection: Gathers ideas, considers and tries multiple solutions and makes artistic choices. Draws a unique shape that relates to self.

LESSON STEPS

1. Review concepts of symbols, referencing examples that are widely known as well as those specific to modern U.S. culture and traditionally specific to other cultures.

- *There is a tradition in U.S. culture of using pictorial symbols to tell others what we believe and who we are.*

▣ Find students who have visual symbols on their clothing somewhere. (yellow ribbon, Nike, etc.)

- *What makes a symbol recognizable to a group of people?*
- *Is always necessary to be able to decode a symbol to appreciate its form?*
- *Let's think of ways a pictorial symbol, logo, emblem, or sign on your clothing could tell a person a lot about who you are.*
- *Are there other symbols that you might add to your clothing that would give it more meaning?*
- *Why you do think artists use symbols on clothing or on other places?*

Introduce and guide art analysis of *Sunday Cloth (Kwasiada Adinkra)*, African, and *Samuraï Leather Firefighting Coat (Kawabaori)*, Japanese, from Seattle Art Museum collection and *Women's Domestic Vest*, Han Chinese, from Tacoma Art Museum collection. Elicit possible verbal translations from the students.



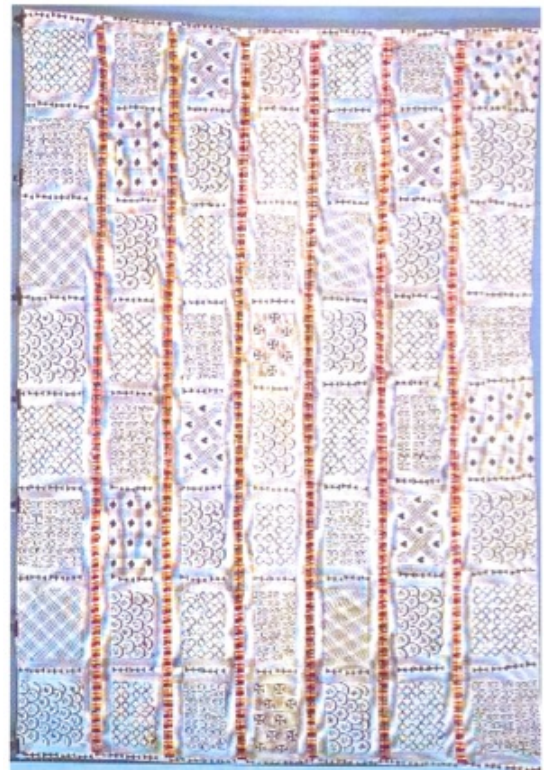
Responding to Art in the Classroom

▣ Reveal known meanings from the Adinkra tradition of Ghana.

Adinkra cloth features visual symbols, originally created by the Akan that represent proverbs or aphorisms. Adinkra symbols are used extensively in fabrics, pottery, logos, and advertising. The symbols have a decorative function but also represent objects that encapsulate evocative messages that convey traditional wisdom, aspects of life, or the environment.

From: http://en.wikipedia.org/wiki/adinkra_symbols

- *Can you identify any symbols you see?*
- *What other information might you need to "read" the symbols on these textiles?*



▣ The Seattle Art Museum's collection is available on-line at: <http://www1.seattleartmuseum.org/eMuseum/code/emuseum.asp>. To find the image 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 the work of art is listed in the materials box at the beginning of the lesson.



▣ The Tacoma Art Museum's collection is available on-line at: <http://www.tacomaartmuseum.org/explore/collections>.

Criteria-based process assessment: Participates in dialogue about signs and symbols, sharing translations for the visual symbols.

2. Introduce or review the shared concept of symmetry (or formal balance) and equal area of positive and negative space.

- *Symmetrical balance can be described as having equal "weight" or mirror balance on equal sides of a centrally placed axis. Symmetry means the same thing in math and art.*
- *Symmetry means a mirror image—one side is the mirror image of the other. Symmetry can occur in any orientation as long as the image is the same on either side of the central axis.*
- *Positive space is composed of the primary shapes, subjects, or areas of interest. Negative space is area around it or the background.*
- *Balance means the surface (shapes/foam) that you will print and the open surface around it will be approximately equal in area on your printing stamp.*



3. Demonstrate and guide creative thinking process in creating a unique symbol of self. Guide criteria-based self-assessment of the results before transferring the design to foam.

▣ Students can draw or transfer design using transfer paper onto paper backing of adhesive foam.



Symbol Stamps



Prompting for Creativity

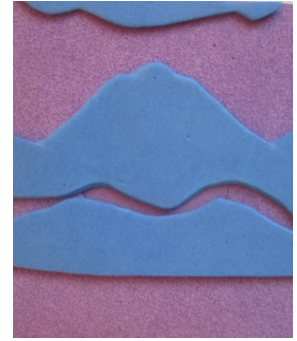
- *We want to create a symbol that has never been seen before. Something original that has meaning just for us. My symbol can be a combination of images that are meaningful to me.*
- *Our criteria for final designs are that they are symmetrical and have equal amounts of positive and negative space.*
- *We'll be using our creative thinking skills to develop our symbols.*
- *Gather ideas: Think about the Adinkra symbols. Think about what is meaningful to you and how you can symbolize it in a completely original way. Think bold simple shapes.*
- *Consider and draw multiple design solutions. Let's draw three or four possible symmetrical symbols of ourselves on scrap paper.*
- *Notice examples of stamp designs that do and do not meet criteria. Make an artistic choice. Choose your best design idea that meets criteria.*
- *Do I have equal areas of positive and negative space? I can see this easily if I squint my eyes as I look at my design. Ask yourself, what could I do to make my design look more balanced?*
- *Now draw (or trace over transfer paper) to transfer your symbol design onto adhesive foam. When drawing on the foam, it is okay to draw over mistakes; we do not need to erase.*



☑ Criteria-based teacher checklist and self-assessment: Gathers ideas, considers and tries multiple solutions, and makes artistic choices. Draws a unique shape that relates to self. Creates equal amounts of positive and negative space in mirror image on either side of an axis. Transfers design.

4. Demonstrate cutting out symbol to the line, opening scissors fully, turning both scissors and foam carefully in hand. Demonstrate applying the design to the block so that it is balanced. Guide students as they cut the design and attach it to their block.

- *I can cut through my shape's edges to make a hole in the middle, because when I rejoin the edges together, I will not see the cut when I use it to print.*
- *I apply my design to block so that there will be equal balance between the printed surface and the open surface (positive and negative space).*
- *I might not be finished with my design if it is very small or very large on the block.*
- *I want about half my design to be dark and half to be light—so half of the surface of my stamp should be foam.*
- *Can I add scraps to make a border of accents? I can, provided that I keep it symmetrical as part of the symbol.*



Criteria-based teacher checklist: Cuts foam with precise edges, and applies foam symbol to block.

5. Demonstrate applying paint and then printing onto the newsprint to make a test print. Emphasize the amount of paint, pressure, and steadiness needed to fully transfer paint to fabric in order to see the complete design.



Printmaking

- *Notice how I apply the paint and do a test print on the newsprint.*
- *How can changing the orientation of the stamp also change the pattern? How can changing the direction of the rows themselves change the pattern?*
- *I'll put an arrow on the stamp to remind me how I want to orient my stamp when I print.*
- *I'll print a row or two.*
- *Notice how I reapply the paint after each print.*
- *The cloth does not need to be printed symmetrically or organized following the rules of symmetry—you can see on your assessment worksheet that it is not one of the criteria for this lesson.*
- *You will fill the entire cloth with our symbol in rows—straight and close together, not touching.*
- *The repetition of a symbol is what we saw that created a pattern on the Asante Adinkra cloth and what is inspiring our own cloth and use of symbols today.*
- *Make sure you have all your materials and get your workspace ready to begin printing.*



Criteria-based process assessment: Observes demonstration, assembles materials, and prepares workspace to stamp fabric.

6. Direct the students to print their cloths, sign them, and remove them from newsprint to dry.

- *Print your pattern on your cloth.*
- *Don't forget to sign it.*



Criteria-based teacher checklist: Applies opaque layer of paint to block each time it is printed and repeats printed image in rows across entire fabric surface.

7. Direct students to complete the criteria-based self-assessment, adding a description of their symbols' meaning in the space left beneath the assessment worksheet.

- *Look at our criteria and assess your work.*
- *Describe how you gathered ideas, thought about different stamp design ideas, and created your final stamp.*
- *Describe the meaning of your symbol.*

Criteria-based teacher checklist: Draws a unique shape that relates to self. Creates design with a mirror image of shapes on either side of an axis. Creates equal amounts of positive and negative space in stamp composition. Transfers design, cuts foam with precise edges, and applies foam symbol to block. Applies opaque layer of paint to stamp each time it is printed and repeats printed image in rows across entire fabric surface.

8. Display all stamps and cloths. Guide group critique on creative thinking and process.



Guiding Reflecting on Student Art

- *How is the symbol that you repeated different than the t-shirt with a Nike symbol on it? (commercial design vs. unique, artistic symbol with personal meaning)*
- *How important is it that your symbol's meaning be recognized by others? Why do you think so?*
- *What can we appreciate about the design even if we don't immediately recognize what the symbol is?*
- *Describe how you used your creative thinking skills and gathered ideas, thought about different stamp design ideas, and created your final stamp.*
- *How does making a work of art containing a symbol that has never been seen before change the way you see symbols in general?*
- *In what ways did you/did you not meet the criteria and how did the awareness of the criteria affect your artistic process?*



Criteria-based student self-assessment and group reflection: Gathers ideas, considers and tries multiple solutions and makes artistic choices. Draws a unique shape that relates to self.

ARTS IMPACT LESSON PLAN Arts Infusion

Symmetry with Shapes

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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	VISUAL ARTS/CULTURE		VISUAL ARTS/MATH		VISUAL ARTS			Total 7
	Creative Thinking Skills	Symbol	Space/Balance	Symmetry	Printmaking Techniques			
Criteria	Gathers ideas, considers and tries multiple solutions, and makes artistic choices.	Draws a unique shape that relates to self.	Creates equal amounts of positive and negative space in composition.	Creates design with a mirror image of shapes on either side of an axis.	Transfers design, cuts foam with precise edges, and applies foam to block.	Applies opaque layer of paint to stamp each time it is printed.	Repeats printed image in rows across entire fabric surface.	
Student Name								

Criteria-based Reflection Questions:

Self-Reflection:

Describe how you gathered ideas, thought about different stamp design ideas, and created your final stamp.

Write the meaning(s) of the symbol you designed.

How does making a work of art containing a symbol that has never been seen before change the way you see symbols in general?

In what ways did you/did you not meet the criteria and how did the awareness of those criteria affect your artistic process?

ARTS IMPACT LESSON PLAN Arts Infusion

Symmetry with Shapes

CLASS ASSESSMENT WORKSHEET

Disciplines	VISUAL ARTS/CULTURE		VISUAL ARTS/MATH		VISUAL ARTS			Total 7
Concept	Creative Thinking Skills	Symbol	Space/Balance	Symmetry	Printmaking Techniques			
Criteria	Gathers ideas, considers and tries multiple solutions, and makes artistic choices.	Draws a unique shape that relates to self.	Creates equal amounts of positive and negative space in composition.	Creates design with a mirror image of shapes on either side of an axis.	Transfers design, cuts foam with precise edges, and applies to block.	Applies opaque layer of paint to stamp each time it is printed.	Repeats printed image in rows across entire fabric surface.	
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Total								
Percentage								

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: _____

VISUAL ARTS AND MATH LESSON: *Symmetry with Shapes*

Dear Family:

Today your child participated in an **Arts and Math** lesson. We talked about symmetrical organization with shapes using a textile from Ghana as an inspiration. We also looked at images of Asian clothing and the symbols seen in that clothing.

- We talked about symbols and the reasons we wear symbols on clothing. We imagined the meaning of unfamiliar symbols, and wondered if it was always necessary to be able to decode a symbol to appreciate its form.
- We gathered ideas, considered and tried multiple solutions, and made artistic choices throughout a creative thinking process.
- We created an original symmetrical symbol design with personal meaning. Our design compositions balanced positive and negative space. We cut adhesive foam to create a printmaking stamp of our design.
- We attached our symbol cut from foam onto a block, and then planned a printing pattern. We carefully considered the direction we were holding our stamp each time we printed, knowing that the direction of the stamp could also create a pattern. We were careful to fully apply paint to the stamp and then print, reloading paint on the block so that the design would be complete each time we printed it.

At home, you could look for places where you see repeated symmetrical patterns. Look together to see if you can find symbols that communicate meaning without words.

Enduring Understanding

Repeating identical shapes an equal distance from each other and flipped on a central axis creates a reflection/mirror image.