

ARTS IMPACT INSTITUTE LESSON PLAN - Core Program Year 2 Art-Infused

VISUAL ARTS LESSON – **Radial Symmetry**

Arts-Infused Disciplines: Visual Art/Math

Artist-Mentor: Maria Grade

Arts-Infused Concept: Radial Symmetry

Grade Levels: Kindergarten – Sixth Grade

Example:



Enduring Understandings

Repeating lines and elements radiating from a central point based on a circle can create radial symmetry in art.

Target: Recognizes and creates designs with radial symmetry.

Criteria: Draws approximate repeating shapes, lines or dots using identical techniques that originate and repeat from a center point (circumcenter).

Target: Includes a wide variety of embossed design techniques.

Criteria: Uses both the front and back of the metal circle and applies raised and indented shapes, lines and dots.

Target: Maintains craftsmanship towards the design as a whole.

Criteria: Handles materials gently and uses tools without damaging the copper by folding, creasing, puncturing or flattening the surface.

Teaching and Learning Strategies

1. Introduces and defines radial symmetry. Discusses the radial symmetry evident in the world around us. *Prompt: Where do we see something in nature which radiates evenly from the center?* Shows images of objects such as snowflakes, spider webs, flowers. *Prompt: Where do we see something in everyday life which radiates evenly from the center?* Shows images of bicycle wheels or kaleidoscopes, pinwheels. Lists the properties and qualities of radial symmetry to create a definition on the board. Lists all examples generated by the students on the board. Student: Observes and discusses radial symmetry. Suggests examples. Embedded Assessment: Criteria-based teacher checklist

2. Introduces the selected resources (contemporary painting; Native American hat) **which show evidence of radial/rotational symmetry.** Asks for aesthetic responses to the effect radial symmetry has within the artwork. *Prompts: In what way does the artist arrange the elements of this piece to elicit our attention and reflection? Where does the artist repeat an element? How does the radial symmetry change our experience of the artist's expression?* Student: Discusses evidence of radial symmetry in art examples. Provides aesthetic responses to art. Embedded Assessment: Criteria-based teacher checklist

3. Discusses the tradition of radial symmetry in the art of many cultures throughout history and the beliefs which are connected to those art forms. Displays Rangoli, Mandala, Hex, Millefiori, Tapa, Quilt, Arabic and Gothic design examples.

Student: Observes the traditional uses of radial symmetry in art and discusses the range of purposes and beliefs.

4. Introduces the copper material and the tradition of repoussé. *Prompts: Repoussé means to 'push back' in French. This method often includes both **embossing** and **indenting** a metal surface from both sides to create a slightly projecting relief surface. What do you see in the center of this gold repoussé example? Show the Hellenistic Phiale. Prompts: We do not know the specific artist, only that it was created around 300 BC. Art historians have found that it is meant to represent the navel of the universe. All around the navel are symmetrically arranged bees and acorns. What do you think that might mean? (plenty of food) How does this radially symmetrical arrangement express to, or tell, the viewer more about the way Hellenistic artists saw the world?*

Student: Discusses the radial design and qualities of the repoussé technique.

5. Demonstrates the division of a copper circle with a template and the application of the center design. The even number of sections will vary with the artistic developmental growth of each group of students. Demonstrates the varied uses of stylus tool, addition of layers and the reversal of the copper to include both embossing and indenting in the finished design. *Prompts: I am making sure to include a variety of design elements that I invent like dots and tiny shapes and stars. I complete a whole layer of the same one element before I go onto my next idea. Each time, I'm checking to see if the repetition falls on a rotation that can be found in each section. I am not sure that I can draw the exact same bee each time so I am not going to try to do anything too complicated for this design. I have some raised details and some pushed in details for greater interest.* Shows before and after design examples. Models self-assessment and subsequent refinement of design to meet criteria. Models journal entry to reflect on their design and document potential personal meaning.

Student: Observes demonstration; suggests ideas for elements to add and what to avoid.

Embedded Assessment: Criteria-based self-assessment; journal reflection

6. Teacher: Demonstrates and encourages use of all tools and experimentation beforehand on scrap pieces to establish the pressure needed. **Leads class in experimentation** on scrap copper pieces with a stylus tool.

Student: Observes and discusses process, experiments on scrap copper.

7. Teacher: Distributes materials and guides class through the process of tracing the edges of the template to create clear pie-shaped sections which meet at the center point. Directs students to create a center/navel/seed design.

Student: Organizes materials and traces even sections onto the copper circle. Creates a center design to begin the artwork.

Embedded Assessment: Criteria-based self assessment; teacher checklist; journal reflection

8. Teacher: Initiates a quiet, contemplative design process for the class with music to encourage focus. Advises students during the process of doing their repoussé designs, brainstorming ways to edit or enhance faint marks or stray non-symmetrical elements so that they will meet criteria.

Student: Creates design and refines it, following self assessment. Documents through use of a journal entry the personal meaning of various design elements.

Embedded Assessment: Criteria-based self assessment; teacher checklist; journal reflection

9. **Teacher: Leads a group critique of the radial designs**, remarking on successful evidence of the meeting of criteria. *Prompt: Where do we see successful use of a variety of inventive designs, of raised designs, of indented designs, of especially careful attention to symmetry and craftsmanship?*

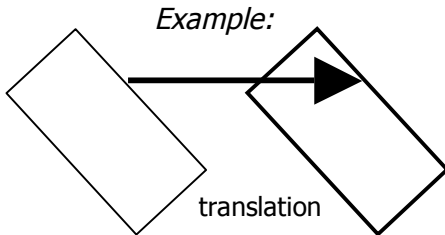
Student: Criteria-based peer critique

Vocabulary	Materials and Community Resource	WA Essential Learnings & Frameworks
<p><u>Arts Infused: Visual Art and Math:</u> balance, central point, radial symmetry, repetition, rotation</p> <p><u>Visual Art:</u> craftsmanship emboss indent relief repousse repoussage stylus</p>	<p>Museum Artworks: <u>Tacoma Art Museum</u> Egg and Cross, 1995 <i>Michael Gregory</i></p> <p><u>Seattle Art Museum</u> Painted Wooden Hat, 1895; <i>Charles Edansaw</i></p> <p>Tile with twelve-pointed star, 15th century <i>Persian</i> 39.61</p> <p>Internet and books: Metropolitan Museum of Art, Hellenistic Phiale, 300 BC; other photos of cultural examples of radial symmetry: Rangoli, Mandala, Hex, Millefiori, Tapa, Quilt, Arabic and Gothic designs.</p> <p>Art Materials: copper 36 gauge cut into 6" circles, steel stylus tools, Fun Foam sheets, rulers, templates, copper tape for edges (optional)</p>	<p>Essential Learnings <i>AEL 1.1 concepts:</i> radial symmetry, repetition <i>AEL 1.1.2 principles of organization:</i> balance, rotation <i>AEL 1.2 skills and techniques:</i> repoussé <i>AEL 3.2 for a purpose:</i> personal meaning</p> <p><i>MEL 1.3: geometric sense:</i> relationships and transformations: slides</p> <p>Arts State Frameworks <i>Kindergarten:</i> uses repetition of one element to create pattern <i>Grade 1:</i> uses repetition of several elements to create pattern <i>Grade 4:</i> identifies and demonstrates symmetrical (formal) radial balance in two dimensions <i>Grade 5:</i> identifies and applies principles of balance and repetition in an artwork <i>Grade 6:</i> identifies rotation</p> <p>Math State Frameworks <i>Grade 3:</i> draws a shape that is congruent to a given two-dimensional shape; uses attributes and properties to identify, name, draw, compare, and/or sort two-dimensional shapes and figures <i>Grade 4:</i> identify and draw a line of symmetry; identify symmetrical two-dimensional figures and shapes; complete a design from a variety of cultures that incorporate a line of symmetry (e.g. basket design); compare attributes of congruent figures in multiple orientations; simulate translations and reflections; create design using translations and reflections <i>Grade 5:</i> identify a specific transformation as a translation (slide) or reflection (flip); draw congruent figures and shapes in multiple orientations using a transformation; create designs using translations and/or reflections</p>

TRANSFORMATION DEFINITIONS

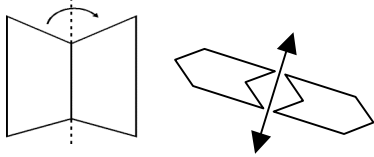
transformation (geometric): A change in position/location of a figure. Types of transformations include translation (slide), reflection (flip), rotation (turn), (or combinations of these).

translation/slide: A transformation of a figure by sliding without turning or flipping in any direction.



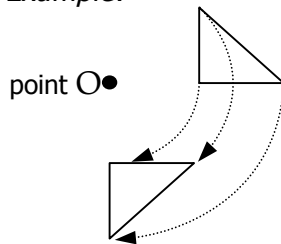
reflection or reflection on a line: A transformation of a figure by flipping the figure over a line, creating a mirror image.

Examples:



rotation/turn: A transformation of a figure (or points) in a plane resulting from turning a figure around a center point O —either clockwise or counterclockwise.

Example:



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ASSESSMENT WORKSHEET

Students	Symmetry VISUAL ART	Symmetry MATH	Repoussé Techniques VISUAL ART	Craftsmanship VISUAL ART	Total Points 4
	Describes repeating shapes or lines that originate and repeat from a center point	Draws approximate repeating shapes, lines or dots using identical techniques that originate and repeat from a center point	Uses both the front and back of the metal circle and applies raised and indented shapes, lines and dots.	Handles materials gently and uses tools without damaging the copper by folding, creasing, puncturing or flattening the surface	
1.					
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22.					
23.					
Total					
Percentage					

Criteria-based Reflection Questions: (Note examples of student reflections.)

Self-Reflection: *What radial symmetry elements did you repeat? What personal meaning do they hold for you?*

Peer to Peer: *Where did you see careful attention to symmetry in the work of your peers?*

Thoughts about Learning:

Which prompts best communicated concepts? Which lesson dynamics helped or hindered learning?

Lesson Logistics:

Which classroom management techniques supported learning?

Teacher: _____ Date: _____

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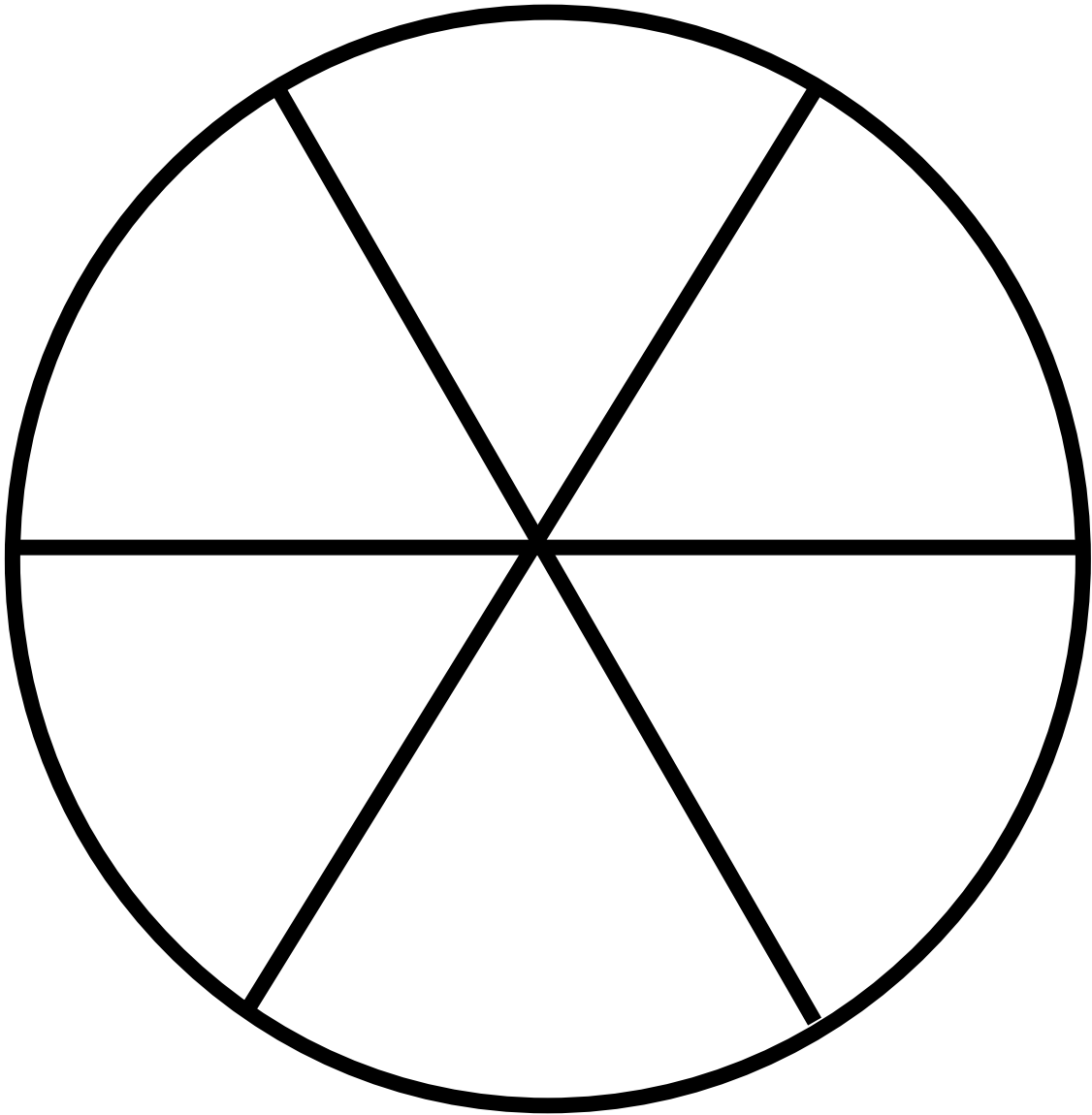
Student Name:	Symmetry VISUAL ART	Symmetry MATH	Repoussé Techniques VISUAL ART	Craftsmanship VISUAL ART	Total Points 4
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Criteria-based Reflection Questions:

Self-Reflection: *What radial symmetry elements did you repeat?*

What personal meaning do they hold for you?

Peer to Peer: *Where did you see careful attention to symmetry in the work of your peers?*



ARTS IMPACT FAMILY LETTER

VISUAL ARTS LESSON – Radial Symmetry

Dear Family:

Today your child participated in a visual arts lesson integrated with math. We studied **radial symmetry** in visual art and math.

- We looked at a Native American hat and a contemporary painting and found the ways the artists used radial symmetry and how it adds visual interest. We also looked at radial symmetry in visual art examples from around the world and the different meanings associated with those designs.
- We each made a **copper Repoussage**. This is a piece of art produced by a metal working process known as Repousse. Repoussé means to 'push back' in French. This method often includes both **embossing** and **indenting** a metal surface from both sides to create a slightly projecting relief surface.
- We incorporated a radial symmetry design repeating shapes, lines and dots in different sections of the design around a **central point**.
- We practiced artistic craftsmanship. We used the copper material carefully so that we would not damage it as we worked with it.

At home, you could look for examples of radial symmetry in nature and in the objects around you.

Enduring Understanding

Repeating lines and elements radiating from a central point based on a circle can create radial symmetry in art.