

ARTS IMPACT—ARTS-INFUSED INSTITUTE LESSON PLAN (YR2-AEMDD)

LESSON TITLE: Parallel and Perpendicular Lines and Lines of Symmetry:
Rhombus Shadowing

Dance and Math Lesson

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Grade Level: Fifth Grade

Examples:

Enduring Understanding

Dividing space or shape into equal, matched sections on each side of a line creates symmetry. Communicating shapes and actions that stay the same distance apart and do not cross creates parallel lines. Making lines that intersect at right angles creates perpendicular lines.

Target: Demonstrates symmetry in movement and stillness.

Criteria: Leads and follows using frozen shapes and body motion that are the same on both sides of a center line.

Target: Demonstrates parallel lines in movement and stillness.

Criteria: Leads and follows using frozen shapes and body motion with lines that stay the same distance apart and do not cross.

Target: Demonstrates perpendicular lines in movement and stillness.

Criteria: Leads and follows using frozen shapes and body motion with lines that intersect at right angles.

Teaching and Learning Strategies

Introduction to Arts-Infused Concepts through Classroom Activities:

Arts-Infused Concepts: Parallel and Perpendicular Lines; Lines of Symmetry

📌 Introduce the BrainDance.

If time is available, explore concepts in everyday life:

📌 Walk in parallel and perpendicular lines on the playground.

📌 Look for lines of symmetry in your body when you are sitting, standing or moving.

1. **Prepares students for dancing parallel and perpendicular lines and lines of symmetry** by discussing lines in dance, math, and everyday living. *Prompts: This is an arts-infused lesson about parallel and perpendicular lines and lines of symmetry. We'll be doing dance and math at the same time. When dancers use symmetry, they think about a line of symmetry as a vertical line from head to toes dividing our bodies into right and left halves. Do you see anything in the room that is symmetrical? What do you know about parallel lines? (lines that stay the same distance apart and don't cross) What do you know about perpendicular lines? (lines that cross at right angles) Where do you see parallel lines in this room? Perpendicular?*

Fifth Grade—Dance and Math—Parallel and Perpendicular Lines and Lines of Symmetry—Rhombus Shadowing

Student: Considers and discusses the shared concepts of parallel and perpendicular lines and symmetry in math and dance and life. Bases the discussion on prior knowledge.

2. Prepares students for dancing by creating agreements/rules for dance behavior. Charts student response.

Prompts: How can you be creative and safe at the same time?

Student: Contributes to group agreements.

3. Leads students in *BrainDance* warm-up. (Originally developed by Anne Green Gilbert, reference: *Brain-Compatible Dance Education*, video: *BrainDance, Variations for Infants through Seniors*). Music: "Geometry BrainDance (5th grade)" #5, *Geometry Dances*. *Prompts: The BrainDance is designed to warm up your body and make your brain work better at the same time. We'll use a few examples of math concepts as we do the BrainDance. Look for symmetry, parallel and perpendicular lines, angles, slides (translations), and flips (reflections).* **Demonstrates the dance using the following sequence of movement patterns:**

Breath: Inhales and exhales. Repeats. *Prompts: Your muscles and your brain need oxygen, so inhale through your nose and exhale through your mouth.*

Tactile: Rubs hands. Taps body lightly from head to toe. Stomps feet. *Prompts: Use both hands tapping together equally on each side of your body creating **symmetrical** movement. When you stomp your feet are you doing symmetrical movement?*

Core-Distal: Gradually increases the size of the body, growing from the center of the body into a **large symmetrical shape** and then shrinking back into a small shape. Repeats. *Prompts: Make a big **symmetrical triangle** shape. How many **vertices** are you showing? Shrink into a small shape. Grow into a big **symmetrical quadrilateral** shape. How many **vertices** are you showing? Shrink into a small shape. Grow into a big **symmetrical pentagon** shape. How many **vertices** are you showing? Shrink into a small shape.*

Head-Tail: Curls the body forward and backward with head and tailbone holding arms in parallel lines overhead. Repeats. Curls from side to side with arms making perpendicular lines. Repeats. *Prompts: Curl forward and back while reaching your arms up in **parallel lines**. That's **symmetrical** movement. Curl from side to side with your arms in **perpendicular lines**. Is that symmetrical?*

Upper Half and Lower Half: Stabilizes the lower half of the body and only the upper half dances, drawing **parallel and perpendicular lines** with different body parts. *Prompts: The top half of your body is in motion, while the lower half is frozen. Draw parallel lines in the air with your hands, then with your elbows. Draw perpendicular lines with your arms.* Stabilizes the upper half of the body, and only the lower half dances, staying in one spot, drawing **parallel and perpendicular lines** with different body parts. *Prompts: The lower half of your body is in motion, while the upper half is frozen. Draw parallel lines on the ground with your feet, then in the air with your knees. Draw perpendicular lines on the ground with your feet, then in the air with your legs.*

Body-Half Right and Left: Stabilizes the left side of the body and only the right side dances, making **angles** with an arm and/or a leg. Repeats on the opposite side. *Prompts: Your left side is frozen and only the right side dances. Use your arm or leg and the side of your body to make angles. Can you make a 90° angle? 60°? 45°? 30°? Obtuse? Now the right side is frozen and the left half dances. Make angles with the left side.*

Cross-Lateral: Reaches across the body with one hand and then the other. Crosses the center of the body, defining a 45° **angle** between the arm and body. Repeats several times with arms.

Flips (makes a reflection) shape from side to side. Like opening and closing a book. *Prompts: This is the cross-lateral dance. Reach your arm across your body. Notice you are making a 45°*

angle between your arm and your body. Alternate arms. Now flip, make a reflection, like opening and closing a book. Flip. Flip. Flip.

Vestibular: Makes a **shape** with whole body. **Slides** (translates) the shape to the right, left, right, left. Does four 90° turns. **Slides** the shape to the right, left, right, left. Does two 180° turns. **Slides** the shape to the right, left, right, left. Does one 360° turn. *Prompts: Make a shape. Slide (translate) it right, left, right, left. Four 90° turns: 1,2,3,4. Make a shape. Slide (translate) it right, left, right, left. Two 180° turns: 1,2. Make a shape. Slide it right, left, right, left. One 360° turn: 1.*

Inhale. Exhale. Inhale. Exhale.

Prompts: When did you use parallel and perpendicular lines and symmetry in the BrainDance?

Student: Participates in warm-up according to teacher prompts.

4. Introduces making symmetrical shapes. Cues exploration of symmetrical shapes with a drum beat. Adds symmetrical shapes with **parallel or perpendicular lines**. *Prompts: When you are frozen, like a statue, you are in a **shape**. When both sides of your shape are the same, you are making a symmetrical shape. Every time I hit the drum, make a different symmetrical shape. Check your shape. If you drew a line right down the center of your body, would both sides be the same? Here's a challenge. Can you make a symmetrical shape with parallel lines? How about perpendicular lines?*

Student: Explores symmetrical shapes as cued by teacher.

Embedded Assessment: Criteria-based room scan and self-assessment

5. Introduces the dance concepts of locomotor and non-locomotor movement.

a. **Demonstrates the concepts.** *Prompts: **Locomotor movements** move the body through space. Locomotor movements travel. Actions of the body that do not cover space and stay in one spot are **non-locomotor movements**.*

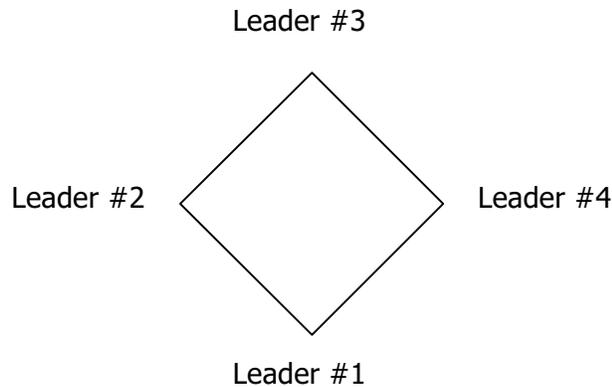
b. **Leads a Move and Freeze exploration of locomotor and non-locomotor movements and symmetrical shapes.** Plays the drum and cues the students. *Prompt: When you hear the music you move and when it stops, you freeze in a symmetrical shape. Does your shape have any parallel or perpendicular lines? How do you know? Use a locomotor move, like hopping, to travel through the empty space in the room. (Plays drum for a few seconds then stops playing.) Freeze in a symmetrical shape. Does your shape have any parallel or perpendicular lines? Use a non-locomotor move, like stretching, to move in one spot. (Plays drum for a few seconds then stops playing.) Freeze in a symmetrical shape.* Repeats with other locomotor movements (e.g. walk, skip, crawl) and non-locomotor movements (e.g. shake, bend, twist). Refers to locomotor and non-locomotor movement chart for additional suggestions.

Student: Explores concepts as cued by teacher.

Embedded Assessment: Criteria-based room scan and self-assessment.

6. Demonstrates and directs Rhombus Shadowing. Music: "Little Bolero" #12 or "Skippy Ska" #8, *Music for Creative Dance, Volume II*

a. **Demonstrates** with self and three students. Stands in a rhombus formation. Faces in one direction with leader #1 in front. Leader #1 does non-locomotor movements that are symmetrical. All shadow the leader, then make a 90° turn to the right. Leader #2 is now the leader. Continues until all have had a chance to lead.



- b. **Directs Symmetrical Rhombus Shadowing.** Cues changes of leadership vocally or by pausing music. *Prompts: In a group of four, make a rhombus formation, with everyone facing the same direction. By the way, what are the attributes of a rhombus? (parallelogram with 4 equal sides) The first leader is at one point of the rhombus. You will follow that leader, then make a 90° turn to the right. Then you will have a new leader. When you repeat two more times each person will have a chance to be the leader. Leaders do non-locomotor movements that are symmetrical. The idea is for everyone in your group to be doing the same movement at the same time. Slow movement makes it easy for your shadows to follow you.*
- c. **Guides Parallel Rhombus Shadowing.** *Prompts: This time when you lead, only use movements that make parallel lines.*
- d. **Leads Perpendicular Rhombus Shadowing.** *Prompts: This time when you lead, movements that make perpendicular lines.*
- e. **Asks groups to choose one type of shadowing and rehearse.** *Prompts: As a group, choose symmetrical, parallel, or perpendicular shadowing. You'll need to come to an agreement; each leader in your group will use the same type of shadowing. When you make your choice, then it's time to practice. Be very clear about your movements so that an observer will be able to tell which math concept you have selected. For example, if you pick parallel lines, how can you make sure an observer will know you are doing parallel and not symmetrical?*

Student: Leads and follows.

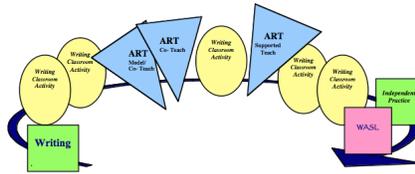
Embedded Assessment: Criteria-based teacher checklist; criteria-based peer assessment

7. Leads students through a performance of Rhombus Shadowing followed by a responding process.

- a. **Performing:** Asks a few groups at a time to perform the Rhombus Shadowing and the rest to be the audience, then they will switch roles. Discusses performer and audience behavior. *Prompts: You have been doing some fascinating examples of symmetrical, parallel, and perpendicular movements and I'd like you to have a chance to see what they look like. Your group has chosen which you would like to do: symmetrical, parallel, or perpendicular. Before you begin, performers, what do you want from your audience? Audience, what do you want from your performers?*
- b. **Responding:** After each group performs, asks the audience. *Prompts: Which group showed symmetry? How did you know? Where was the line of symmetry? Which group showed parallel lines? How did you know? Which group showed perpendicular lines? How did you know? Did the dance use locomotor or non-locomotor movement? (non-locomotor) Why?*

Student: Performs the dance and responds.

Embedded Assessment: Criteria-based teacher checklist, class critique



Before next DANCE lesson:

Math

1. Repeat the BrainDance frequently to reinforce the learning.

Math

2. Explore the math concepts using your math curriculum.

Math

If time is available, explore the concepts in other ways:

- Use "hand dances" to help remember parallel, perpendicular, and symmetry. Dancing with only your hands takes very little space and time. Just use your hands to make symmetrical shapes or movements and draw parallel and perpendicular lines on your desk or in the air.
- Repeat Rhombus Shadowing.

Independent Practice: Hand dance it! Draw it on paper! Symmetry—Both sides the same—a mirror image! Parallel lines—same distance apart—never cross! Perpendicular lines cross at right angles.

Vocabulary	Materials and Community Resource	WA Essential Learnings & Frameworks
<u>Arts:</u> locomotor movement non-locomotor movement shape <u>Arts Infused:</u> quadrilateral angle flip line segment lines of symmetry parallel pentagon perpendicular slide symmetrical triangle	Museum Artworks or Performance: Broadway Center for the Performing Arts, Tacoma, WA: <i>Do Jump, Peking Acrobats</i> Art Materials or Performance Materials: CD player <i>Music for Creative Dance, Volume II</i> <i>Geometry Dances</i> drum BrainDance chart blank paper for group agreements chart markers locomotor and non-locomotor movement chart assessment checklist	<i>AEL 1.1 concepts:</i> space, shape, locomotor and non-locomotor movement; parallel and perpendicular lines <i>AEL 1.1.2 principles of organization:</i> improves movement <i>AEL 1.2 skills and techniques:</i> uses dance concepts <i>AEL 2.1 applies creative process:</i> conceptualizes purpose – to show math concepts <i>AEL 4.2: dance and math connection</i> <i>MEL 1.3.2 geometric sense:</i> applies understanding of the properties of parallel and perpendicular and line symmetry to two-dimensional shapes and figures Math State Frameworks <i>Grade 5:</i> identifies parallel and perpendicular lines and/or lines of symmetry

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Rhombus Shadowing

ASSESSMENT WORKSHEET

Disciplines Concept	DANCE AND MATH SYMMETRY		DANCE AND MATH PARALLEL LINES		DANCE AND MATH PERPENDICULAR LINES		Total 6
Students	Leads and follows using frozen shapes and body motion that are the same on both sides of a center line		Leads and follows using frozen shapes and body motion with lines that stay the same distance apart and do not cross		Leads and follows using frozen shapes and body motion with lines that cross at right angles		
	Leads	Follows	Leads	Follows	Leads	Follows	
1.							
2.							
3.							
4.							
5.							
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24.							
25.							
26.							
27.							
28.							
Total							
Percentage							

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

Self-Reflection: *Does your shape have any parallel or perpendicular lines? How do you know?*

Peer to Peer: *Which group showed symmetry? How did you know?*

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: _____

ARTS IMPACT—ARTS-INFUSED LEARNING FAMILY LETTER

DANCE AND MATH LESSON Parallel and Perpendicular Lines and Lines of Symmetry - Rhombus Shadowing

Dear Family:

Today your child participated in a **dance and math** lesson. We talked about how we can find **symmetry**, **parallel lines**, and **perpendicular lines** in math, in dance, and in the world around us.

- We made **shapes** that were symmetrical around a vertical axis through the body so that the right and left halves were the same.
- We worked with a small group to lead and follow (**shadow**), creating identical, mirror image movements.
- We worked with a small group to lead and follow, creating parallel and perpendicular movements.
- We learned that by both studying lines of symmetry, and parallel and perpendicular lines in math and by dancing them, it is easier to remember what they mean and how to use them.

You could look for symmetry, parallel lines, and perpendicular lines in the objects around your house or at the grocery store. Talk about why the designers of the objects decided to use symmetry or parallel and perpendicular lines.

Enduring Understanding

Dividing space or shape into equal, matched sections on each side of an axis line creates symmetry. Communicating shapes and actions that stay the same distance apart and do not cross creates parallel lines. Making lines that intersect at right angles creates perpendicular lines.