

ARTS IMPACT LESSON PLAN

Dance and Math Infused Lesson

Symmetry

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Enduring Understanding

Dividing space or the body shape into equal, matched sections on each side of an axis line creates symmetry.

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

In this dance and math lesson, students make symmetrical and asymmetrical shapes. With a partner, they mirror each other to create symmetrical movement. They will use the 21st Century Skill of creative thinking to draw and dance a symmetrical pathway.

Learning Targets and Assessment Criteria

Target: Creates shapes which define a line of symmetry with the body.

Criteria: Creates still, physical forms that are identical, mirror images, on both sides of a vertical line through the center of the body.

Target: Performs movements that demonstrate symmetry with a partner.

Criteria: With a partner, creates identical, mirror image movements on each side of a line of symmetry between the two individuals.

Target: Creates and travels on a symmetrical pathway through general space.

Criteria: Draws a mirror image pathway map and translates mirror image into movements through the general space.

Target: Thinks creatively.

Criteria: Gathers ideas; tries multiple solutions; makes artistic choices.

Vocabulary

Arts Infused:
Asymmetrical
Axis
Line of Symmetry
Mirror image
Symmetrical
Symmetry

Math:
Bilateral Symmetry

Arts:
General Space
Locomotor
Movements
Pathways
Shape

Materials

Museum Artworks or Performance

Seattle, WA
Pacific Northwest Ballet
UW World Series of Dance

Tacoma, WA
Broadway Center for the Performing Arts

Materials
Illustrations of symmetry and asymmetry in dance and visual arts;
Word of the day sign:
symmetrical/asymmetrical; Sample pathway maps; Classroom Assessment Worksheet; Drum; Chart paper and markers; Plain paper & color pencils/markers; Music player; Blue painter's tape, or other brightly colored masking tape; List of locomotor movements; *Music for Creative Dance, Contrast & Continuum, Volume II, by Eric Chappelle*
continued

Learning Standards

WA Arts Learning Standards in Dance

For the full description of each standard, see:
<http://www.k12.wa.us/Arts/Standards>

Creating (Concepts: Symmetry, Shape, Pathway, Balance, Locomotor and Non-locomotor Movements)

1. Generate and conceptualize artistic ideas and work.
 2. Organize and develop artistic ideas and work.
 3. Refine and complete artistic work.
- Performing/Presenting/Producing**
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.

Responding

7. Perceive and analyze artistic work.
8. Interpret intent and meaning in artistic work.
9. Apply criteria to evaluate artistic work.

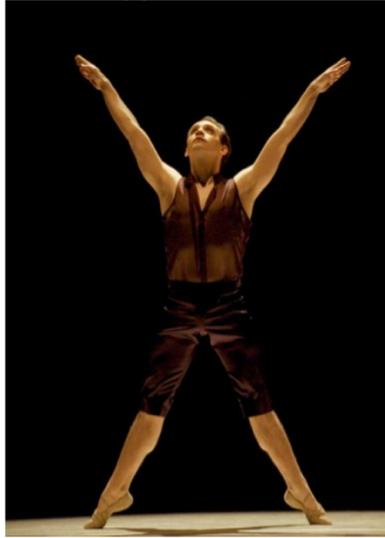
Connecting

10. Synthesize and relate knowledge and personal experiences to make art.

continued

Resources: *Dance*, book by Bill T. Jones and Susan Kuklin (optional)

Pacific Northwest Ballet images:
Paul Gibson in Kevin O'Day's
soundarou(d)dance



Olivier Wevers in Nacho Duato's
Jardi Tancat



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Early Learning Guidelines (Pre-K – Grade 3)

For a full description of Washington State Early Learning and Child Development Guidelines see:

<https://www.del.wa.gov/sites/default/files/imported/publications/development/docs/guidelines.pdf>

(Age 4-5) 3. Touching, seeing, hearing and moving around: Using the large muscles (gross motor skills): move with purpose from one place to another using the whole body; enjoy challenging self to try new and increasingly difficult activities.

(Age 4-5) 6. Learning about my world: Arts: show creativity and imagination; watch other children dance and try to mimic their movements.

Common Core State Standards (CCSS) in Math

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

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

4.G.3. Recognize a line of symmetry.

CCSS Mathematical Practices

MP.4. Model with mathematics.

MP.6. Attend to precision.

ICON KEY:

 = Indicates note or reminder for teacher

 = Embedded assessment points in the lesson

Pre-Teach

Review movement safety, making shapes, and dancing in self and general space.

Lesson Steps Outline

1. Prepare students for dancing symmetry by discussing symmetry in dance, math, and everyday living. Display Word of the Day Sign – symmetrical/asymmetrical. Show images of dancers and visual art that demonstrate symmetry and asymmetry.

2. Lead BrainDance Warm-up with symmetrical and asymmetrical movements and shapes.

Music: "Potpourri II" #21, or "Bee Beat" #2, *Music for Creative Dance, Volume II*, by Eric Chappelle

3. Use a Move and Freeze exploration to highlight when students are stopped in a symmetrical or asymmetrical body shape. Use creative thinking to try multiple solutions.

Music: first, use a drum, then, #9 "Ski Reel" from *Music for Creative Dance, Volume II*, by Eric Chappelle

Criteria-based teacher checklist, self-assessment: Creates still, physical forms that are identical, mirror images, on both sides of a vertical line through the center of the body. Tries multiple solutions.

4. Demonstrate and guide Mirroring exploration that demonstrates symmetrical movement with a partner, first with one and then with two lines of symmetry. Use creative thinking to try multiple solutions.

Music: #1 "Whales" from *Music for Creative Dance, Volume II*, by Eric Chappelle

Criteria-based teacher checklist, peer reflection: With a partner, creates identical, mirror image movements on each side of a line of symmetry between the two individuals. Tries multiple solutions.

5. Model and guide drawing a pathway map, then choreography, and rehearsal of Symmetrical Pathway Dances. Use creative thinking to gather ideas, try multiple solutions, and make artistic choices.

Music: "Travel Notes": #13, #14, #15, #16, #17, #18, or #19 (see individual titles), *Music for Creative Dance, Volume II*, by Eric Chappelle

☑ Criteria-based process assessment: Draws a mirror image pathway map, and translates mirror image into movements through the general space. Gathers ideas; tries multiple solutions; makes artistic choices.

6. Facilitate performance and response.

☑ Criteria-based teacher checklist, peer assessment: Draws a mirror image pathway map, and translates mirror image into movements through the general space.

7. Lead reflective discussion on symmetrical pathway dance and creative thinking.

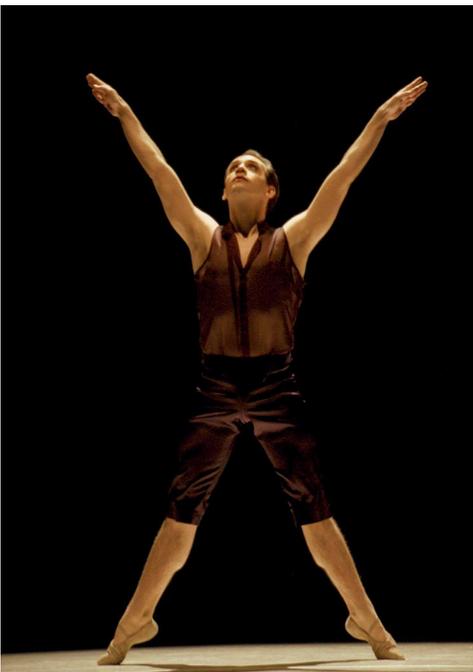
☑ Criteria-based self and peer assessment and reflection: Translates mirror image into movements through the general space. Reflects on use of creative thinking strategies.

LESSON STEPS

1. Prepare students for dancing symmetry by discussing symmetry in dance, math, and everyday living. Display Word of the Day Sign – symmetrical/asymmetrical. Show images of dancers and visual art that demonstrate symmetry and asymmetry.

- *This is an arts-infused lesson about symmetry. It is a dance lesson and a math lesson at the same time.*
- *When dancers use symmetry, they think about a line of symmetry as a vertical line, from head to toes, dividing their bodies into right and left halves. Pay attention to both halves when they are exact mirror images (bilateral symmetry) and when they are different.*

▣ Included in this lesson are two examples from Pacific Northwest Ballet. You are encouraged to search for your own images to discover examples of symmetry and asymmetry in dance and art from a variety of styles and cultures.



- *Here are some images of dancers and visual art. Which are symmetrical and which are not?*
- *Where do you see symmetry in this room?*

▣ Prepare the classroom for dance.



Moving Desks/Set-up



Movement Safety

2. Lead BrainDance Warm-up with symmetrical and asymmetrical movements and shapes.

(BrainDance originally developed by Anne Green Gilbert, www.creativedance.org, reference: *Brain-Compatible Dance Education*, video: *BrainDance, Variations for Infants through Seniors*).

Music: "Potpourri II" #21, or "Bee Beat" #2, *Music for Creative Dance, Volume II*, by Eric Chappelle

- *Notice when our shapes or movements are symmetrical and when they are not symmetrical. Asymmetrical movements are movements that are not symmetrical.*



Symmetry and Asymmetry
BrainDance

Breath

- *Your muscles and your brain need oxygen, so inhale through your nose and exhale through your mouth. Breathe deeply and slowly.*

Tactile

- *Rub hands. Tap your body lightly from head to toe. Use both hands tapping together equally on each side of your body creating symmetrical movement.*
- *Stomp your feet. That's asymmetrical movement.*

Core-Distal

- *Breathe in through the nose and out the mouth. Repeat. Gradually increase the size of the breath, growing from the center of the body when you inhale, and shrinking when you exhale.*
- *Use symmetrical and then asymmetrical movements that expand and shrink.*

Head-Tail

- *Curl the body forward from head to tailbone. Curl it backwards. Repeat forward and back (symmetrical).*
- *Curve from side-to-side several times (asymmetrical).*

Upper Half

- *Stabilize the lower half of the body and only the top half dances. Use symmetrical or asymmetrical movements.*

Lower Half

- *Stabilize the upper half of the body. Only the bottom half dances, staying in one spot. Use symmetrical and asymmetrical movements.*

Body-Half Right

- *Stabilize the left side of the body and only the right side dances (asymmetrical).*

Body-Half Left

- *Stabilize the right side of the body and only the left side dances (asymmetrical).*

Cross-Lateral

- *Reach across the body with one hand and then the other. Repeat several times (asymmetrical).*
- *Explore other cross-lateral movements, e.g. elbow to opposite knee or hand to opposite foot (asymmetrical).*

Eye Tracking

- *Keep your eyes on your right hand. Move it from one side to the other and up and down (asymmetrical).*
- *Watch your left hand as you smoothly move it from side to side and up and down (asymmetrical).*

Spin/Vestibular

- *Spin clockwise. Stop and freeze in a symmetrical shape. Spin counterclockwise. Stop and freeze in a shape that is not symmetrical. (To turn, you can use a symmetrical shape with the upper body. The legs will most likely be moving with asymmetrical movements).*
- *Did anyone notice some changes we made in the BrainDance today? Right! We used symmetrical and asymmetrical movements.*
- *Were some portions tricky or challenging to do with symmetrical movements? Asymmetrical movements? Why?*

3. Use a Move and Freeze exploration to highlight when students are stopped in a symmetrical or asymmetrical body shape. Use creative thinking to try multiple solutions.

Music: first, use a drum, then, #9 "Ski Reel" from *Music for Creative Dance, Volume II*, by Eric Chappelle

■ When assessing the dance criteria in this lesson, any students who are not meeting criteria will be very clear to you, so you may want to use a reverse checklist, putting a "0" where students have not met criteria, rather than trying to notate every single one who has met criteria. You can go back later and give those who have met criteria a "1." This information will let you know who needs more practice, to guide your future instruction.



Prompting for Creativity

- *I'll play the drum. Make a new shape for every drumbeat. I will ask you to make a shape that is symmetrical – that is equal, or the same on both the right and left sides (bilateral symmetry), or I may ask for an asymmetrical shape.*
- *Remember, by moving just a pinky you can change a symmetrical shape into an asymmetrical one.*
- *Any time we use our bodies, there is potential to be not exactly symmetrical. We do this work within the limitations of our bodies and try to be as precise as possible.*
- *Now, I will play some music with a special signal for freezing in a shape. Listen to the music. Do you here the "Shhh"?*
- *When you hear the "Shhh," that's the signal to freeze. I'll tell you if it should be a symmetrical or asymmetrical shape. When the musical theme begins again, you'll travel through the general space with the locomotor movement. I'll call out hop, skip, or other locomotor movements.*



Symmetry

- *When you are frozen, ask yourself, is your shape the same on both sides, or not?*
- *Each time you make a shape explore how you can make it different next time so that you find multiple solutions.*

☐ Make a list of locomotor movements to have at your fingertips: hop, jump, slither, tiptoe, glide, strut, etc.



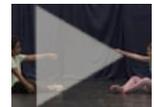
Asymmetry

☑ Criteria-based teacher checklist, self-assessment: Creates still, physical forms that are identical, mirror images, on both sides of a vertical line through the center of the body. Tries multiple solutions.

4. Demonstrate and guide a Mirroring exploration that demonstrates symmetrical movement with a partner, first with one and then with two lines of symmetry. Use creative thinking to try multiple solutions.

Music: #1 "Whales" from *Music for Creative Dance, Volume II*, by Eric Chappelle

- *I need an assistant. We'll sit facing each other. Our line of symmetry is an imaginary line running along the floor between us (perpendicular to the partners).*
- *In mirroring activities, the idea is to move slowly so you are doing the same movement at the same time. This is not about tricking your partner.*
- *Sit facing each other. Each individual has the bottoms of feet together and knees out. One person is the leader, then trades.*
- *The two of you are working together leading and following, using slow, smooth, flowing movements to make symmetrical movement on both sides of one line of symmetry. Be creative and try different ways of moving together.*
- *Now let's use two lines of symmetry. One is the line on the floor between you and the other is a line drawn down the center of your body, so movement of both the left and right sides of your body will be the same. Again, be creative and try different ways of moving together to be symmetrical.*
- *When you finish, turn and talk with your partner about what choices were successful in creating the symmetry and why.*
- *Are there other ways we could set up a line of symmetry between two people (e.g. toe to toe with one person lying down and the other person standing)?*



Mirroring with One Line of Symmetry



Mirroring with Two Lines of Symmetry

☑ Criteria-based teacher checklist, peer reflection: With a partner, creates identical, mirror image movements on each side of a line of symmetry between the two individuals. Tries multiple solutions.

5. Model and guide drawing a pathway map, then choreography, and rehearsal of Symmetrical Pathway Dances. Use creative thinking to gather ideas, try multiple solutions, and make artistic choices.

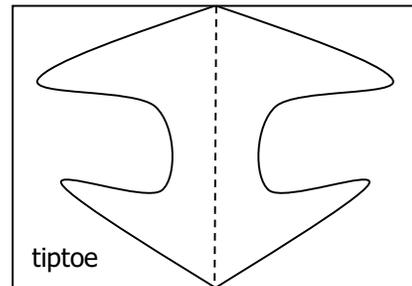
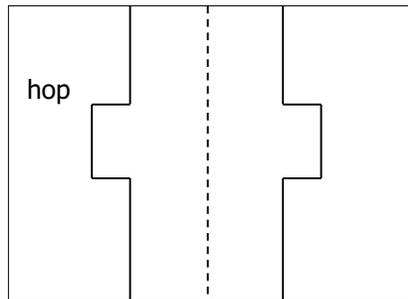
Music: "Travel Notes": #13, #14, #15, #16, #17, #18, or #19 (see individual titles), *Music for Creative Dance, Vol. II*, by Eric Chappelle

▣ Make a few sample pathway maps ahead of time to show as examples.



Symmetrical Pathway Dance

- *We are going to be drawing a symmetrical pathway map and using the map to create our dance.*
- *With an assistant, I'll demonstrate making the map. First, I'll fold the paper and then draw a simple pathway, or roadmap, on one side of the fold. I'll draw my pathway and my partner will draw a mirror image of the pathway.*
- *We'll trace, with a finger, the pathway on the paper. Then draw the pathway in the air. Next, we'll walk the pathway.*
- *My assistant who copies my pathway, will get to choose which locomotor movement(s) to perform as we travel on the pathway.*



▣ You may identify partners ahead of time to ensure effective partnerships and to keep the momentum of the class going.

- *As you work with your partner, be aware of how you use creative thinking to gather your ideas, try multiple solutions, and make your choices.*
- *With your partner, choose the leader. The leader must draw slowly so the partner can follow easily. Your partner draws the symmetrical, mirror image pathway on the other half of the paper. Keep the pathways simple so we see the symmetry.*
- *Trace the pathway with your fingers on the paper. Trace the pathway with your fingers in the air.*
- *If you were the follower (second artist) for the drawing, you get to decide what movement(s) to perform on your pathway.*
- *Imagine your line of symmetry (the fold of your paper) as a line on the floor that extends from the front of the room to the back of the room as you rehearse your study.*

▣ Tape a long line on the floor for students to use as a reference. A line of symmetry running from the front of the room to the back gives the best perspective on the dance studies.

- *I will tape a line of symmetry on the floor for you to use as a reference for your practice and performances.*

- *Practice your dance.*

Criteria-based process assessment: Draws a mirror image pathway map, and translates mirror image into movements through the general space. Gathers ideas; tries multiple solutions; makes artistic choices.

6. Facilitate performance and response.

- *Audience, draw the pathway map you saw dancers perform.*

Audience response could be done on paper, or by drawing the pathway map with the hands in the air.



Audience and Performer Expectations

Criteria-based teacher checklist, peer assessment: Draws a mirror image pathway map, and translates mirror image into movements through the general space.

7. Lead reflective discussion on symmetrical pathway dance and creative thinking.

- *How did you translate the pathway picture into movement? Did you have certain strategies that helped you create the symmetrical pathway through the space?*
- *Audience, what did the performers do to ensure you saw the symmetrical pathway in their dance study?*
- *How did you use creative thinking to help you make your pathway and dance?*

Criteria-based self and peer assessment and reflection: Translates mirror image into movements through the general space. Reflects on use of creative thinking to gather ideas, try multiple solutions, and make artistic choices.

Lesson Extensions:

1. Discuss connections between symmetry, dance, art, and the world around us.

2. Read the book by Bill T. Jones, *Dance*. Show photos of a professional dancer making shapes.

- *Try doing some of the symmetrical and asymmetrical shapes that you see Bill T. Jones making in this book.*

3. Reference the natural and human made world.

- *Let's make a list of symmetrical objects we see in the room. How is symmetry used in the world around us? In architecture? In utilitarian objects? In nature?*

ARTS IMPACT LESSON PLAN Arts Infusion

Symmetry

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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	DANCE		MATH	DANCE/ MATH	DANCE/ MATH	Total 5
Concept	Symmetry				Creative Thinking	
Criteria	Creates still, physical forms that are identical, mirror images, on both sides of a vertical line through the center of the body.	With a partner, creates identical, mirror image movements on each side of a line of symmetry between the two individuals.	Draws a mirror image pathway map.	Translates mirror image into movements through the general space.	Gathers ideas, tries multiple solutions, and makes artistic choices.	
Student Name						

SYMMETRICAL PATHWAY MAP - PEER ASSESSMENT

Performers' Names	Symmetry	
	Draw the Symmetrical Pathway Map the dancers created.	Describe the movement(s) the dancers used to travel on their map.

ARTS IMPACT LESSON PLAN Arts Infusion

Symmetry

CLASS ASSESSMENT WORKSHEET

Disciplines	DANCE		MATH	DANCE/ MATH	DANCE/ MATH	Total 5
Concept	Symmetry					Creative Thinking
Criteria	Creates still, physical forms that are identical, mirror images, on both sides of a vertical line through the center of the body.	With a partner, creates identical, mirror image movements on each side of a line of symmetry between the two individuals.	Draws a mirror image pathway map.	Translates mirror image into movements through the general space.	Gathers ideas, tries multiple solutions, and makes artistic choices.	
Student Name						
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27.						
28.						
29.						
30.						
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 dance and math?

Teacher: _____

Date: _____

DANCE AND MATH LESSON: *Symmetry*

Dear Family:

Today your child participated in an **Arts and Math** lesson using symmetrical and asymmetrical body shapes, mirroring activities, and a movement study. We explored various ways that the concept of line of symmetry (axis) can be applied in dance.

- 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 partner to discover how we could create identical, mirror image movements.
- Collaborating with a partner, we made a movement study to show a symmetrical pathway through the space.
- In this lesson we used the 21st Century Skill of creative thinking to gather ideas, try multiple solutions, and make artistic choices.

At home, you could look for examples of symmetrical objects or designs. Look for items that are the exactly the same on each side of a line that divides them in half.

Enduring Understanding

Dividing space or the body shape into equal, matched sections on each side of an axis line creates symmetry.