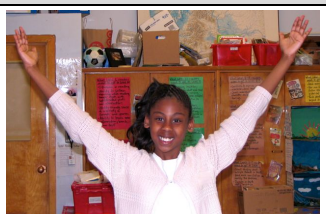
ARTS IMPACT LESSON PLAN

Dance and Math Infused Lesson



Lesson Two: *Angular Shapelines*

Author: Debbie Gilbert Grade Level: Fourth

Enduring Understanding

Two lines/rays that share an endpoint form an angle. Angles can be created by drawing them or creating them with body shapes.

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

In this math and dance lesson, students use their bodies to form right, acute, obtuse, and straight angles. With a small group, they choose an angle and make a line of shapes that all have the same type of angle. The audience identifies the angle, draws it, and describes it.

Learning Targets and Assessment Criteria

Target: Creates a shapeline that demonstrates understanding of angles.

Criteria: Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°).

Target: Understands characteristics of angles.

Criteria: Identifies, draws, and describes right angles, acute angles, obtuse angles, or straight angles in performed shapelines.

Vocabulary

Arts Infused:
Angles

Math:
Acute Angle
Line Segment
Obtuse Angle
Right Angle
Straight Angle

Arts:
Focus
Locomotor
Movement
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
Math Dances CD by Debbie Gilbert; *Music for Creative Dance, Volume II* by Eric Chappelle; CD player; White board or chart paper & markers; 8.5x11" white copy paper: copy Angular Shapelines Audience Worksheets, one per student; Writing pencils; Drum or other percussion instrument; Class Assessment Worksheet

continued

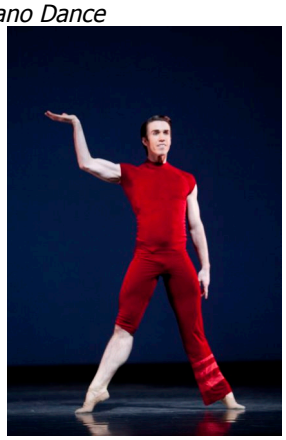
Learning Standards

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
1.1.1 Elements: Space, Shape
1.2.1 Skills and Techniques: Movements with Full Body Extension
1.4.1 Audience Skills
2.1.1 Creative Process
2.2.1 Performance Process
2.3.1 Responding Process
4.2.1 Connection between Dance and Math

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
4.G.1. Draw angles (right, acute, obtuse, straight).

CCSS Mathematical Practices
MP.3. Construct viable arguments and critique the reasoning of others.
MP.4. Model with mathematics.
MP.6. Attend to precision.

Pacific Northwest Ballet images:
Benjamin Griffiths in Paul Gibson's *The Piano Dance*



Kylee Kitchens in Mark Morris' *Pacific*

ICON KEY:

= Indicates note or reminder for teacher

☑ = Embedded assessment points in the lesson

Pre-Teach

Practice the Math BrainDance, see lesson step 3. Review and draw right, acute, obtuse, and straight angles.

Lesson Steps Outline

1. Introduce dancing angles. Review acute, right, obtuse, and straight angles. Analyze angles in photos of dancers.

2. Remind students about agreements for appropriate dance behavior.

3. Lead students in *Math BrainDance* warm-up.
Music: "Math BrainDance (Fourth Grade)" #5, *Math Dances* by Debbie Gilbert

4. Introduce making shapes with angles.
Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle

☑ Criteria-based process assessment, self-assessment. Makes right, acute, obtuse, and straight angles.

5. Demonstrate Angular Shapelines with student volunteers.
Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle

6. Guide students to build shapelines in small groups. Divide class into five groups.
Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle

☑ Criteria-based teacher checklist, self and peer assessment. Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°).

7. Facilitate performance and written response to Angular Shapelines. Distribute Shapeline Audience Worksheets and pencils. Review performer and audience expectations.

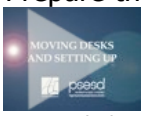
☑ Criteria-based teacher checklist, peer assessment. Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°). Identifies, draws, and describes right angles, acute angles, obtuse angles, or straight angles in performed shapelines.

8. Lead reflection.

☑ Criteria-based reflection: Makes a connection between dance and math.

LESSON STEPS

Prepare the classroom for dance.



Moving Desks/Set-up

1. Introduce dancing angles. Review acute, right, obtuse, and straight angles. Analyze angles in photos of dancers.

- *This is a lesson that is a dance lesson and a math lesson. We'll be Dancing Mathematicians making angles with our bodies and drawing them on paper. We'll identify the angles and explain how we know our answers are true.*
- *What do you know about angles?* (An angle is an opening formed when two lines share an endpoint, etc.)
- *What is a right angle? Show me a right angle with your hands. I'll draw a right angle.*
- *What is an acute angle? Show me an acute angle with your hands. I'll draw an acute angle.*
- *What is an obtuse angle? Show me an obtuse angle with your hands. I'll draw an obtuse angle.*
- *What is a straight angle? Show me a straight angle with your hands. I'll draw a straight angle.*

You may use these photos to illustrate angles: Pacific Northwest Ballet: Benjamin Griffiths in Paul Gibson's *The Piano Dance* and Kylee Kitchens in Mark Morris' *Pacific*. You could also choose to find your own photos that represent a variety of styles and cultures. Look for dancers that are making shapes that show angles in a variety of ways.

- *Here are photographs of dancers from Pacific Northwest Ballet. Can you identify the angles they are making with their bodies?*

2. Remind students about agreements for appropriate dance behavior.

Movement Safety

- *Remind me, how can you be creative and safe at the same time?*

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3. Lead students in *Math BrainDance* warm-up. (BrainDance originally developed by Anne Green Gilbert, www.creativedance.org, reference: *Brain-Compatible Dance Education,* video: *BrainDance, Variations for Infants through Seniors.*)
Music: "Math BrainDance (Fourth Grade)" #5, *Math Dances* by Debbie Gilbert


BrainDance by Artist Mentor

- *The BrainDance is designed to warm up your body and make your brain work better at the same time. Notice when we make angles in the BrainDance.*


BrainDance by Students

Breath
- *Dancing Mathematicians, breathe peacefully.*

Tactile
- *Tap the top of your head three times. Tap your shoulders five times. Tap your stomachs seven times. Tap your knees nine times. Tap your feet eleven times. What's my rule?*

Core-Distal
- *Grow into a huge shape imagining that your arms are rays that reach into space and never end. Shrink into a small shape, imagining that your arms are small line segments.*

Head-Tail
- *Curl your backbone forwards and backwards with your arms in parallel lines. Bend from side to side with your arms in perpendicular lines.*

Upper Half
- *Freeze the lower half of your body. Do symmetrical movements with the top half of your body.*

Lower Half
- *Freeze the upper half of your body. Do movements that are not symmetrical with the lower half of your body.*

Body-Half Right
- *Make angles with the right half of your body while the left half is frozen. Make an acute angle, a right angle, an obtuse angle, a straight angle.*

Body-Half Left
- *Make angles with the left half of your body while the right half is frozen. Make an acute angle, a right angle, an obtuse angle, a straight angle.*

Eye-Tracking
- *Focus on your right thumb. Watch it as you draw a shape in the air with parallel and perpendicular lines. Watch your left thumb as you draw a shape in the air with parallel and perpendicular lines.*

Cross-Lateral
- *Reach across your body up high, up high, down low, down low. We'll count to twelve: 1, 2, 3 … 12. Let's cut that in half: 1, 2, 3 … 6. Let's cut that in half again: 1, 2, 3.*

Vestibular

- *Turn, then freeze in a shape with an acute angle. Turn, then freeze in a shape with a right angle. Turn, then freeze in a shape with an obtuse angle. Turn, then freeze in a shape with a straight angle.*

Breath

- *Breathe peacefully, Dancing Mathematicians.*

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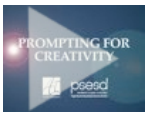
4. Introduce making shapes with angles.

Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle



Prompting for Creativity

Play music to cue students to travel, and pause the music when it is time for them to freeze in a shape with an angle.

- *We are going to alternate dancing while traveling through the empty space with freezing in a shape that shows an angle. We call movement that travels locomotor movement, like walking, tiptoeing, stomping or leaping.*

- *Dance through the empty space without touching anyone and then freeze in a shape that shows a right angle using your arms and side as the line segments.*

- *Move through the space with a different locomotor movement and then freeze in a shape that shows a 90° angle in a different way. How do you know you are showing a right angle?*

Describe some of the student shapes that you observe, focusing on the different choices for showing right angles.

- *Because you are a dancer and working with your body, you will actually be making many different angles at once. In order to show the angle you are trying to demonstrate, focus on it with your eyes. It's like your eyes are shining a spotlight on the angle you want me to notice.*

Repeat with acute, obtuse, and straight angles.

- *Move and then freeze in a shape that shows either a right, acute, obtuse, or straight angle. Ask yourself, what angle are you showing? How do you know that's true?*

☑ Criteria-based process assessment, self-assessment: Makes right, acute, obtuse, and straight angles.

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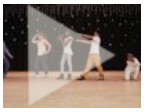
5. Demonstrate Angular Shapelines with student volunteers.
Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle


Angular Shapeline

- *I need five volunteers. We are going to make a shapeline with angles. First, we'll choose which angle we want to show in our shapeline: right, acute, obtuse, or straight. We won't tell the audience our choice. The audience will have to identify it after we have made our shapeline.*

- *Each dancer will travel through the space (so that's a locomotor movement) to a place in a line. Then, she'll freeze in a shape showing the angle we've chosen. In order for the audience to see the angle, she'll focus on it with her eyes.*

- *We'll add one dancer at a time until we have a line of shapes made by all the dancers. Each dancer will make a shape showing the angle we've chosen. Each shape has the same angle, but the shapes are not the same because each dancer chooses a different way to make the angle.*

- *Now look at the shapeline. Where do you see the angles in the dancers' shapes? Can you identify the angle they have chosen? Can you describe it?*

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6. Guide students to build shapelines in small groups. Divide class into five groups.
Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle

You can choose the groups of five or six in advance to keep the momentum of the class going.

When assessing this criteria, 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, so you can plan future instruction.

- *With your group, select an angle. You can choose a right (a 90° angle), acute (an angle that is less than 90°, like a 30°, 45 °, or 60° angle), an obtuse angle (an angle that is greater than 90°), or a straight angle.*

- *Practice making a shapeline. Choose your own locomotor movement for traveling into your place in the shapeline. Use your whole body in your movement, not just your feet.*

- *Each dancer will make a shape with the angle you have chosen as a group. Each dancer should choose to make the angle in a different way, for example, with arm and leg, with back and leg, with side and arm, sitting on the floor, standing. In order for the audience to see your angle, focus on your angle with your eyes, like you are shining a spotlight on the angle you selected. Add one dancer at a time until you have a line of shapes.*

- *When your whole group is frozen in your shapeline, ask yourself, am I and is everyone in our group showing the same type of angle? How do you know that's true?*

☑ Criteria-based teacher checklist, self and peer assessment: Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°).

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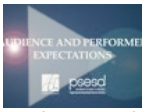
7. Facilitate performance and written response to Angular Shapelines. Distribute Shapeline Audience Worksheets and pencils. Discuss performer and audience expectations.

Music: "Pizz.Ah!" #5, *Music for Creative Dance, Volume II* by Eric Chappelle



Audience and Performer Expectations

- *What do the performers want from their audience? What does the audience want from the performers?*

- *Each group will perform its shapeline and hold the shapes. The audience members will try to identify the angle chosen by the group. Draw the angle. Describe the angle. Is it <90°, 90°, >90°, 180°?*

- *After your own group performs, don't forget to identify, draw, and describe your own angle.*

☑ Criteria-based teacher checklist, peer assessment: Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°). Identifies, draws, and describes right angles, acute angles, obtuse angles, or straight angles in performed shapelines.

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8. Lead reflection.

- *Dancing Mathematicians, what did the performers do to help you identify which angle they had chosen?*

- *What you have done as Dancing Mathematicians can help you identify angles in math. You can do a "hand dance" to remember what you have learned about angles. Just use your hands to make different angles on your desk or in the air. Show me a right angle, an acute angle, an obtuse angle, and a straight angle.*

- *What other ideas do you have to remember what you learned by dancing angles when it is time for doing math with pencils and paper?*

☑ Criteria-based reflection: Makes a connection between dance and math.

Angular Shapelines Audience Worksheet

Name: _____ Date: _____

	What angle did the group demonstrate?	Draw the angle.	Is the angle <90°, 90°, >90°, 180°?
Group 1			
Group 2			
Group 3			
Group 4			
Group 5			

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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines	**DANCE/MATH**	**MATH**					Total 6
Concept	**Angles** **Shapeline**	**Angles**					
Criteria	Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°).	Identifies, draws, and describes right angles, acute angles, obtuse angles, or straight angles in performed shapelines.					
Student Name		Group 1	Group 2	Group 3	Group 4	Group 5	

ARTS IMPACT LESSON PLAN Dance and Math Infusion

Fourth Grade Lesson Two: *Angular Shapelines*

CLASS ASSESSMENT WORKSHEET

Disciplines	**DANCE/MATH**	**MATH**					Total 6
Concept	**Angles Shapeline**	**Angles**					
Criteria	Uses body to represent line segments that meet at an endpoint and makes a shape in a line that shows a right angle (90°), acute angle (<90°), obtuse angle (>90°), or straight angle (180°).	Identifies, draws, and describes right angles, acute angles, obtuse angles, or straight angles in performed shapelines.					
Student Name		Group 1	Group 2	Group 3	Group 4	Group 5	
1.							
2.							
3.							
4.							
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25.							
26.							
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: _____

ARTS IMPACT FAMILY LETTER

DANCE AND MATH LESSON: ***Angular Shapelines***

Dear Family:

Today your child participated in an **Arts and Math** lesson. We talked about how both mathematicians and dancers can identify and create angles.

- We reviewed angles. Right angles are 90°. Acute angles are less than 90°. Obtuse angles are greater than 90°. Straight angles are 180°.
- We did the Math BrainDance to warm up our brains and bodies.
- We used our bodies to make right, acute, obtuse, and straight angles.
- We worked in a small group to show one of the types of angles in a shapeline.
- We performed the shapelines for each other and responded by identifying, drawing, and describing the angles we observed.
- We reflected by considering how making angles in dance will help us identify them in math.

At home, you could look for angles around the house. Ask your child to show you how to use your body to make right, acute, obtuse, and straight angles.

Enduring Understanding

Two lines/rays that share an endpoint form an angle.
Angles can be created by drawing them or creating them with body shapes.