

Dance and Math Infused Lesson

Lesson One: *Equivalent Numbers and Movements*

Author: Debbie Gilbert Grade Level: Kindergarten



Enduring Understanding

The numbers on each side of an equation form an equal relationship that can be represented by movements.

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

In this math and dance lesson, students use movements to demonstrate the numbers in equations that equal ten. They explore movements in self-space (in one spot), general space (traveling), and freeze in shapes. Students do movements on each side of their bodies that match the numbers on each side of the equation. Next, they do traveling movements that match the numbers on each side of an equation. Finally, they reflect on how dancing equations can help them solve them in math.

Learning Targets and Assessment Criteria

Target: Creates an equation with the body using actions in self-space.

Criteria: In one spot, performs movements on one side of the body that match the number(s) on one side of an equation, and movements on the other side of the body that match the number(s) on the other side of the equation.

Target: Creates an equation with the body using actions in general space.

Criteria: Performs three different traveling movements, repeating each movement to match the three numbers in the equation.

Vocabulary	Materials	Learning Standards
<p>Arts Infused: Balance Different Same</p> <p>Math: Equations Equal</p> <p>Arts: General Space Movement Self-space Shape Space Bubble</p>	<p>Museum Artworks or Performance:</p> <p>Seattle, WA Pacific Northwest Ballet UW World Series of Dance</p> <p>Tacoma, WA Broadway Center for the Performing Arts</p> <p>Materials <i>Math Dances</i> CD by Debbie Gilbert; CD player; Computer with internet connection and projector; White board or chart paper & markers; Drum/percussion instrument; Class Assessment Worksheet</p> <p align="center"><i>continued</i></p>	<p>WA Arts State Grade Level Expectations <i>For the full description of each WA State Arts Grade Level Expectation, see: http://www.k12.wa.us/Arts/Standards</i></p> <p>1.1.1 Elements: Shape, Space 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</p> <p>Early Learning Guidelines (Pre-K – Grade 3) <i>For a full description of Washington State Early Learning and Child Development Guidelines see: http://www.del.wa.gov/development/guidelines/</i></p> <p>(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. (Age 5 and K) 3. Touching, seeing, hearing and moving around: Using the large muscles (gross motor skills): show continuous growth in movement skills; play safely in group and individual movement settings. (Age 4-5) 6. Learning about my world: Math: find the sum when joining two sets of up to five objects. Arts: show creativity and imagination. (Age 5 and K) 6. Learning about my world: Math: add and subtract numbers up to 10 using objects or drawing. Arts: develop skills for movement.</p> <p align="center"><i>continued</i></p>

Pacific Northwest Ballet images:
Noelani Pantastico in Jean Christophe
Maillot's *Romeo et Juliette*



Kiyon Gaines in Jerome Robbins' *West
Side Story Suite*



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Video

Dancin' Z Path: Light Motion and Whistlestop Dance Companies featuring dances with and without wheelchairs in a site-specific, physically integrated dance at the Olympic Sculpture Park of the Seattle Art Museum.

<http://www.youtube.com/watch?v=UpbWDE-GAm8>

The Sleeping Beauty – Aurora's Wedding Variation featuring Leslie Rausch (Video link provided to Arts Impact, courtesy Pacific Northwest Ballet)

<http://www.youtube.com/watch?v=BCo-Fjor2MI&list=PLp05ZURu0TLOg0iInt5AKPpTmRloPWWqHj&index=21>

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>

K.OA.1. Represent addition and subtraction with acting out situations, expressions, or equations.

K.OA.4. For any number from 1 to 9, find the number that makes 10 when added to the given number.

CCSS Mathematical Practices

MP.2. Reason abstractly and quantitatively.

MP.4. Model with mathematics.

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

Practice the *Math BrainDance*, see lesson step 3. Practice solving equations that equal ten, e.g. $5 + 5 = 10$ and $10 = 5 + 5$.

Lesson Steps Outline

1. Introduce dancing numbers, making tens, and equality.

2. Prepare students for dancing by creating agreements for appropriate dance behavior. Chart student responses.

3. Lead students in *Math BrainDance* warm-up.

Music: "Math BrainDance (Kindergarten)" #1, *Math Dances* by Debbie Gilbert

4. Introduce the space bubble for movement safety. Show pictures of professional dancers making shapes. Introduce the dance concepts of shape, self-space, and general space. Use percussion instrument(s) for accompaniment. Show video of dancers moving in self and general space.

 Criteria-based process assessment: Performs movements in one spot and traveling through the room. Freezes in a shape.

5. Guide exploration of equations in self-space, with movements on one half of the body corresponding to one side of the equation and movements on the other side corresponding to the other side of the equation.

Music: "Ten Counts" #7, *Math Dances* by Debbie Gilbert

 Criteria-based teacher checklist, self-assessment: In one spot, performs movements on one side of the body that match the numbers on one side of the equation, and movements on the other side of the body that match the numbers on the other side of the equation.

6. Guide exploration of equations in general space, with locomotor movements corresponding to each side of the equation.

Music: "Ten Counts" #7, *Math Dances* by Debbie Gilbert

Criteria-based teacher checklist: Performs three different traveling movements, repeating each movement to match the three numbers in the equation.

7. Lead a reflection connecting making tens and equality in dance and math.

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

LESSON STEPS

- ▣ Prepare the classroom for dance.



Moving Desks/Set-up

1. Introduce dancing numbers, making tens, and equality.

- *We are going to be doing math and dance at the same time. We'll be Dancing Mathematicians. Dancing Mathematicians ask questions. Dancing Mathematicians solve problems. Dancing Mathematicians figure out why an answer is true.*
- *Today, we will make movements and count them and add them together to make ten movements.*
- *Let's try shaking your right hand five times: one, two, three, four, five. Wiggle your right elbow five times: one, two, three, four, five. How many movements did we do all together? Make an equals sign with your arms and then flap your left arm ten times: one, two, three, four, five, six, seven, eight, nine, ten.*
- *I'll draw the equation for that on the board. I can do it two ways: $5 + 5 = 10$ and $10 = 5 + 5$. Dancing Mathematicians, ask yourselves, why is that true?*
- *The equals sign means "the same as."*

2. Prepare students for dancing by creating agreements for appropriate dance behavior. Chart student responses.

- *Before we begin dancing together, I have a question for you. How can you be creative and safe at the same time?*



Movement Safety

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 (Kindergarten)" #1, *Math Dances* by Debbie Gilbert

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



BrainDance by Artist Mentor



BrainDance by Students

Breath

- *Dancing Mathematicians, breathe quietly.*

Tactile

- *Tap from the top of your head all the way to your toes. We'll count by ones to twenty: 1, 2...20.*

Core-Distal

- *Grow into a big square shape and shrink into a small square shape.*

Head-Tail

- *Curl your backbone forwards and backwards and from side to side. We'll count by tens to one hundred: 10, 20, 30 ... 100.*

Upper Half

- *The top half of your body will move and the lower half will freeze. Draw circles in the air with your arms, your shoulders, and your head.*

Lower Half

- *The lower half of your body will move and the upper half will freeze. Draw rectangles with your feet, your knees, and your legs.*

Body-Half Right

- *Move the right side of your body while the left side is frozen. We'll count backwards from 10: 10, 9, 8 ... 1.*

Body-Half Left

- *Move the left side of your body while the right side is frozen. We'll count backwards from 10: 10, 9, 8 ... 1.*

Eye-Tracking

- *Focus on your right thumb. Move it from one side to the other and up and down. Watch your left thumb moving from side to side and up and down.*

Cross-Lateral

- *Reach across your body up high, up high, down low, down low. We'll count by tens to one hundred sixty: 10, 20, 30... 160.*

Vestibular

- *Turn, then freeze in a triangle shape. Turn, then freeze in a square shape. Turn, then freeze in a rectangle shape. Turn, then freeze in a trapezoid shape.*

Breath

- *Breathe quietly, Dancing Mathematicians.*

4. Introduce the **space bubble** for movement safety. Show pictures of professional dancers making shapes. Introduce the dance concepts of **shape**, **self-space**, and **general space**. Use percussion instrument(s) for accompaniment. Show video of dancers moving in self and general space.

- *All dancers have space bubbles. So they have empty space in all around them and they don't touch anyone. Put on your space bubbles.*
- *Our first dance word is shape. When you make a shape, you freeze your whole body, like a statue. You can breathe and you can blink.*

▣ You may use these photos: Pacific Northwest Ballet: Noelani Pantastico in Jean Christophe Maillot's *Romeo et Juliette* and Kiyon Gaines in Jerome Robbins' *West Side Story Suite*. You could also choose to find your own photos or videos that represent a variety of styles and cultures. You could review, for example, The UW World Dance Series, <http://uwworldseries.org/world-dance>, or search for dance video that illustrates shapes and movements in self and general space.



- Here are some pictures of dancers from Pacific Northwest Ballet making shapes. What do you see?
- Make a shape. Freeze with your whole body. Make a different shape. It could be higher or lower or bigger or smaller. Make a sitting and listening shape.
- Our next dance word is self-space. When dancers dance in self-space, they stay in one spot.
- Move in self-space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze in a shape.
- Stretch in self-space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze in a shape.
- Bend in self-space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze in a shape.
- Our next dance word is general space. When dancers dance in general space, they travel through the empty space in the room.
- Make sure your space bubbles are on. Move in general space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze.
- Jump in general space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze.
- Tiptoe in general space: one, two, three, four, five, six, seven, eight, nine, ten. Freeze.

▣ Show one or more of the following video clips of professional dancers. Ask students to identify when the dancers are moving in self-space and when they are moving in general space. If time is limited, you could do this part of the strategy on another day.

Dancin' Z Path: Light Motion and Whistlestop Dance Companies featuring dances with and without wheelchairs in a site-specific, physically integrated dance at the Olympic Sculpture Park of the Seattle Art Museum <http://www.youtube.com/watch?v=UpbWDE-GAm8>

The Sleeping Beauty – Aurora’s Wedding Variation featuring Leslie Rausch (Video link provided to Arts Impact, courtesy Pacific Northwest Ballet) <http://www.youtube.com/watch?v=BCoFjor2MI&list=PLp05ZURu0TLOg0iNt5AKPpTmRloPWWqHj&index=21>

Criteria-based process assessment: Performs movements in one spot and traveling through the room. Freezes in a shape.

5. Guide exploration of equations in self-space, with movements on one half of the body corresponding to one side of the equation and movements on the other side corresponding to the other side of the equation.

Music: “Ten Counts” #7, *Math Dances* by Debbie Gilbert



Self-space Equations

▣ The music has two sections. The first section is for the first equation (e.g. $5 + 5 = 10$). It begins with 11 beats (e.g. 1, 2, 3, 4, 5, plus, 1, 2, 3, 4, 5). You’ll hear “equals”. It then ends with 10 beats. Pause the music. When you are ready for the next equation (e.g. $10 = 5 + 5$), the second section begins with ten beats. Then you’ll hear “equals,” followed by 11 beats (e.g. 1, 2, 3, 4, 5, plus, 1, 2, 3, 4, 5). You can also choose to dance the equations without music.



Prompting for Creativity

▣ When directing this exploration, face the students and mirror their movement so that you will be using your left side when they are using their right sides and vice versa.

▣ When you assess this criteria and the following criteria, use a reverse checklist, noting with a zero those who are not doing movements that match the numbers. Since everyone will be moving in unison, it will be easy to pick out anyone who is not meeting the criteria. You can go back later and give those who have met criteria a “1.” This information will let you know what and who needs more practice, so you can return to it in the future. Also, since you are dancing a few equations, you could choose to do a few as practice and assess the last one or two, or you could observe half of the class at a time.

- *I am going to write this equation on the board: $5 + 5 = 10$. One side of your body will be the $5 + 5$, and the other side will be the 10. Let’s make a movement for each number. Stretch your right arm five times: one, two, three, four, five. Make a plus sign with your arms. Kick your right leg five times: one, two, three, four, five. Make an equals sign with your arms. Wiggle your whole left side ten times: one, two, three, four, five, six, seven, eight, nine, ten.*
- *I’ll write another equation: $10 = 5 + 5$. One side of your body will dance ten movements and the other side will dance $5 + 5$ movements. When I say “equals” make an equals sign with your arms. When I say “plus” make a plus sign with your arms. Wiggle your whole right side ten times: one, two, three, four, five, six, seven, eight, nine, ten. Equals. Stretch your left arm five times: one, two, three, four, five. Plus. Kick your left leg five times: one, two, three, four, five.*
- *What’s different about those equations? What is the same? Did you notice how there are a total of ten movements on each side of the equations?*
- *Look at the equals sign. It means “the same as.” Did you do the same number of movements on each side of the equals sign?*

▣ Repeat process with other equations that equal ten.

Criteria-based teacher checklist, self-assessment: In one spot, performs movements on one side of the body that match the numbers on one side of the equation, and performs movements on the other side of the body that match the numbers on the other side of the equation.

6. Guide exploration of equations in general space, with locomotor movements corresponding to each side of the equation.

Music: "Ten Counts" #7, *Math Dances* by Debbie Gilbert



General Space Equations

- *Now we will dance equations in a different way. We will travel in general space. When I say "plus" and "equals" you can make those signs with your arms. Here's an equation: $3 + 7 = 10$. Let's do three jumps, add seven tiptoes, and then do ten stomps. Jump: one, two, three. Plus. Tiptoe: one, two, three, four, five, six, seven. Equals. Stomp: one, two, three, four, five, six, seven, eight, nine, ten.*
- *Here's another equation: $10 = 7 + 3$. Let's dance it with ten stomps, then seven tiptoes plus three jumps. Stomp: one, two, three, four, five, six, seven, eight, nine, ten. Equals. Tiptoe: one, two, three, four, five, six, seven. Plus. Jump: one, two, three.*
- *Did you notice how we were balanced, with a total of ten movements on each side of the equal sign? The number of movements on one side of the equals sign is the same as the number of movements on the other side of the equals sign.*

▣ Repeat process with other equations that equal ten.

Criteria-based teacher checklist: Performs three different traveling movements, repeating each movement to match the three numbers in the equation.

7. Lead a reflection connecting making tens and equality in dance and math.

- *Dancing Mathematicians, how did we do equations today? How was it different from the way we have done equations in math? How was it the same?*
- *You danced the same number of movements on each side of the equals sign because the equals sign means "the same as."*
- *The next time that you do equations in math, remember how you did them with your whole body in movement and it will help you solve them in math.*

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

ARTS IMPACT LESSON PLAN Dance and Math Infusion

Kindergarten Lesson One: *Equivalent Numbers and Movements*

CLASS ASSESSMENT WORKSHEET

Disciplines	DANCE/MATH		DANCE/MATH			Total 5
	Self-space Equality		General Space Equality			
Concept						
Criteria	In one spot, performs movements on one side of the body that match the number(s) on one side of an equation.	In one spot, performs movements on the other side of the body that match the number(s) on the other side of the equation.	Performs three different traveling movements, repeating each movement to match the three numbers in the equation.			
Students			First movement	Second movement	Third movement	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
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: _____

DANCE AND MATH LESSON: *Equivalent Numbers and Movements*

Dear Family:

Today your child participated in an **Arts and Math** lesson. We talked about how both mathematicians and dancers can demonstrate equations that equal ten.

- We did the Math BrainDance to warm up our brains and bodies.
- We explored movements in self-space (in one spot), general space (traveling), and froze in shapes.
- We did movements on each side of our bodies that matched the numbers on each side of the equation. We danced $5 + 5 = 10$ by stretching our right arms five times and added kicking our right legs five times, to equal wiggling the whole left side of our bodies ten times.
- We did traveling movements that matched the numbers on each side of an equation. We danced $10 = 7 + 3$ by stomping ten times to equal seven tiptoes plus three jumps.
- We danced the same number of movements on each side of the equals sign because the equals sign means "the same as."
- We reflected by thinking about how dancing equations can help us solve them when we do them in math.

At home, you could make tens by grouping spoons and forks, or other objects. Then you could write an equation to match. Ask you child to show you how to dance the equation.

Enduring Understanding

The numbers on each side of an equation form an equal relationship that can be represented by movements.