# ARTS IMPACT LESSON PLAN

Dance and Math Infused Lesson

Lesson Two: Finding Zero on a Number Line Dance

Author: Debbie Gilbert Grade Level: Seventh

Enduring Understanding

Opposite quantities of numbers or movements combine to make zero. Movement to the right or the left

on a number line can represent addition of positive and/or negative integers.

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

In this dance and math lesson, students look at positive and negative integers on a number line and

how combining the numbers with their opposites makes zero. They create a line dance with steps to

the right and left to correspond to the numbers. In small groups, they create line dances to show

equations on a number line.

Learning Targets and Assessment Criteria

Target: Dances a line dance that illustrates combining opposite integers to reach zero on a

number line.

Criteria: Stands in a line formation. Steps to the right six times; steps to the left six times; claps.

Steps to the left five times; steps to the right five times; claps. Steps to the right four times; steps

to the left four times; claps. Steps to the left three times; steps to the right three times; claps.

Target: Creates a line dance that shows one of these two equations: 3 + (-2) = x or

(-2) + (-4) = y.

Criteria: Stands in a line formation. Performs one of the following dances:

1) Steps to the right three times; steps to the left two times; makes a shape and says “1.”

2) Steps to the left two times; steps to the left four times; makes a shape and says “-6.”

Vocabulary

Arts Infused:

Direction

Line

Opposite

Math:

Add

Negative Integer

Number Line

Positive Integer

Subtract

Zero

Arts:

Choreography

Diminution

Formation

Locomotor Movement

Variety

Materials

Museum Artworks or Performance

Seattle, WA

Pacific Northwest Ballet

UW World Series of Dance

Tacoma, WA

Broadway Center for the Performing Arts

Materials

Middle School Math Dances CD by

Debbie Gilbert; White board, document

camera, or chart paper & markers;

Music player; Class Assessment

Worksheet

Music:

“Middle School BrainDance,” Middle

School Math Dances by Debbie Gilbert

“Zero Number Line Dance,” Middle

School Math Dances by Debbie Gilbert

“Adding on the Number Line Dance,”

Middle School Math Dances by Debbie

Gilbert

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

1.1.4 Principles of Choreography: Form, Variety

1.2.1 Skills and Techniques: Moves with Others in

Spatial Formations

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/Mathemati

cs/default.aspx

7.NS. Apply and extend previous understandings

of operations with fractions to add, subtract,

multiply, and divide rational numbers.

continue

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7.NS.1. Apply and extend previous

understandings of addition and subtraction to add

and subtract rational numbers; represent addition

and subtraction on a horizontal or vertical number

line diagram.

7.NS.1.a. Describe situations in which opposite

quantities combine to make 0.

7.NS.1.b. Understand p + q as the number

located a distance q from p, in the positive or

negative direction depending on whether q is

positive or negative. Show that a number and its

opposite have a sum of 0 (are additive inverses).

Interpret sums of rational numbers by describing

real-world contexts.

CCSS Mathematical Practices

MP.1. Make sense of problems and persevere in

solving them.

MP.2. Reason abstractly and quantitatively.

MP.3. Construct viable arguments and critique the

reasoning of others.

MP.4. Model with mathematics.

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Pre-Teach

Practice adding and subtracting positive integers on a number line. Explore what

happens when combining opposite integers. Do the Middle School Math

BrainDance. Practice dancing in a line formation.

Lesson Steps Outline

1. Introduce combining opposite quantities to make zero and how to illustrate

that with a line dance.

2. Review expectations for movement.

3. Lead students in the Middle School BrainDance warm-up.

Music: “Middle School BrainDance,” Middle School Math Dances by Debbie Gilbert

4. Explore combining opposites to find zero on a number line.

þ Criteria-based process assessment: Locates a series of positive and negative

integers on a number line. Identifies the distance between each number

and zero.

5. Create a line dance with students using movements to the left and right to

show how combining opposite quantities can make zero.

Music: “Zero Number Line Dance,” Middle School Math Dances by Debbie Gilbert

þ Criteria-based teacher checklist: Stands in a line formation. Steps to the right

six times; steps to the left six times; claps. Steps to the left five times; steps to

the right five times; claps. Steps to the right four times; steps to the left four

times; claps. Steps to the left three times; steps to the right three times; claps.

6. Guide students, in small groups, to create line dances that show equations on

a number line.

Music: “Adding on the Number Line Dance,” Middle School Math Dances by

Debbie Gilbert

þ Criteria-based teacher checklist, self-assessment: Stands in a line formation.

Performs one of the following dances:

1) Steps to the right three times; steps to the left two times; makes a shape and

says “1.”

ICON KEY:

3 = Indicates note or reminder for teacher

þ = Embedded assessment points in the lesson

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2) Steps to the left two times; steps to the left four times; makes a shape and

says “-6.”

7. Lead performance and response to Adding on the Number Line Dances.

Discuss performer and audience behavior.

þ Criteria-based teacher checklist, peer assessment: Stands in a line formation.

Performs one of the following dances:

1) Steps to the right three times; steps to the left two times; makes a shape and

says “1.”

2) Steps to the left two times; steps to the left four times; makes a shape and

says “-6.”

8. Guide reflection.

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

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LESSON STEPS\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Introduce combining opposite quantities to make zero and how to illustrate that with a

line dance.

• Dancing Mathematicians, we are going to create a line dance, not just any line dance, but a

number line dance.

• Where on the number line would I end, if I started on zero, added six, and then added

negative six?

• That’s it — zero! Show me that with a hand dance. Start at zero. Move your hand to the right 1,

2, 3, 4, 5, 6. To show adding the negative six, move your hand to the left 5, 4, 3, 2, 2, 1, 0.

• We are going to do that same process with our whole bodies to create a number line dance in

which we combine opposite numbers to end at zero.

• We’ll extend our learning by creating small group dances that show equations on a number line.

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2. Review expectations for movement.

• Before we move, think about our expectations for dancing.

• I am looking for focus and respect.

• Keep empty space around yourself at all times and keep your eyes open and your body

under control.

• Have fun and learn simultaneously.

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3. Lead students in the Middle School 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: “Middle School BrainDance,” Middle School Math Dances by Debbie Gilbert

3 In the BrainDance music, you will hear the title of each pattern spoken. The prompts below are

suggestions if you would like to give the students more detail. You can also adapt the prompts to meet

the needs of your students and the lesson. If you prefer to have the prompts spoken for you, you can

use the “Middle School BrainDance with narration.”

• Before we start moving, we are going to do a BrainDance to warm-up our brains and bodies in

preparation for learning the dance.

• The BrainDance will take us through a series of patterns that help to wire the central nervous

system. The movement will increase oxygen and blood flow to your brain and body, and help

with balance, alignment, and coordination.

• Notice the variety of movements we do with our upper bodies. You may be able to use some of

them later to add variety to the number line dance.

Breath

• Dancing Mathematicians, breathe quietly.

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Tactile

• Energize the surface of your body, tapping from your head to your toes.

Core-Distal

• Expand from your core into a large shape, reaching to the limits of your distal edges.

• Shrink into a small shape pulling everything back towards your core.

Head-Tail

• Curl your spine forwards and backwards and forwards and backwards.

• Curve from side to side.

Upper Half

• Freeze the lower half of your body. Move the upper half.

Lower Half

• Freeze the upper half of your body. Move the lower half.

Body-Half Right

• Dance with your whole right side while the left side is frozen.

Body-Half Left

• Dance with your whole left side while the right side is frozen.

Cross-Lateral

• Reach across your body with your arms on different levels.

Vestibular

• Turn. Freeze in a shape. Turn. Freeze in a shape. Turn. Freeze in a shape. Turn. Freeze in

a shape.

Breath

• Breathe quietly, Dancing Mathematicians.

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4. Explore combining opposites to find zero on a number line.

3 Use a white board or document camera for drawing the number line.

• I am going to draw a number line. We’ll find a series of positive and negative integers and

calculate the distance between those numbers and zero.

• Find six on the number line. What negative integer would we add to get to zero? How do

you know?

• Find negative five on the number line. What positive integer would we add to get to zero? How

do you know?

• Find four on the number line. What negative integer would we add to get to zero? How do

you know?

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• Find negative three on the number line. What positive integer would we add to get to zero?

How do you know?

• What do all of these calculations have in common?

þ Criteria-based process assessment: Locates a series of positive and negative integers on a number

line. Identifies the distance between each number and zero.

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5. Create a line dance with students using movements to the left and right to show how

combining opposite quantities can make zero.

Music: “Zero Number Line Dance,” Middle School Math Dances by Debbie Gilbert

3 When assessing the 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 note 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 repeat the exploration in the future.

3 When you are moving in front of the class while doing this dance, you will either need to face away

from your students or move to your left when they are moving to their right (mirroring them).

• Combining opposite integers brings you to zero. We are going to use that big idea to make a

line dance. We’ll move to the right for positive integers and to the left for negative integers.

• We will use the numbers we have generated to make a line dance. The numbers will

correspond to side steps in the dance. The steps are called locomotor movements because

they travel.

• We’ll start in a line formation.

• For six and adding negative six, dance six steps to the right and six steps to the left. Clap to

show you have reached zero.

• For negative five and adding five, dance five steps to the left and five steps to the right. Clap

to show you have reached zero.

• For four and adding negative four, dance four steps to the right and four steps to the left. Clap

to show you have reached zero.

• For negative three and adding three, dance three steps to the left and three steps to the right.

Clap to show you have reached zero.

• Add variety by adding movements with your upper body as you move from side to side in the

line dance.

• Let’s put it all together and practice it with music.

• You have just used combining opposites to create your dance, but you have also used the

dance choreographic device called diminution. That means you have decreased the number of

movements.

þ Criteria-based teacher checklist: Stands in a line formation. Steps to the right six times; steps to the

left six times; claps. Steps to the left five times; steps to the right five times; claps. Steps to the right

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four times; steps to the left four times; claps. Steps to the left three times; steps to the right three

times; claps.

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6. Guide students, in small groups, to create line dances that show equations on a

number line.

Music: “Adding on the Number Line Dance,” Middle School Math Dances by Debbie Gilbert

(This music is the same beat as the previous music, but does not include the verbal counting cues.)

3 You can choose the groups in advance to keep the momentum of the class going. You can also list

their names in the order of their groups on the assessment checklist to make assessing during the

performance easier. Groups of four to five work well for this.

• Now that you have danced finding zero on the number line, let’s increase the mathematical

rigor. In your group, you will select one of these two equations: 3 + (-2) = x or (-2) + (-4) = y.

• Your task is to show that equation in a Number Line Dance.

• Move to the right or left based on your given numbers. End your dance in a shape and say the

number that is the solution to your equation.

• You can count out loud as you are moving. It will help you stay together as dancers and it will

help the audience keep track of you mathematically.

• To make your line dance more interesting, you can add movements with your upper bodies.

• Make choices with your group and then practice.

• Ask yourself, are you being accurate with the numbers of steps and movements? Are you

moving in the correct direction? Can you move in unison with your group?

þ Criteria-based teacher checklist, self-assessment: Stands in a line formation. Performs one of the

following dances:

1) Steps to the right three times; steps to the left two times; makes a shape and says “1.”

2) Steps to the left two times; steps to the left four times; makes a shape and says “-6.”

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7. Lead performance and response to Adding on the Number Line Dances. Discuss

performer and audience behavior.

• Now is your opportunity to show your Adding on the Number Line Dance and we can check

our work.

• Before we begin, performers, what do you want from your audience?

• Audience, what do you want from your performers?

• Audience, when the dance is done, I am going to ask you which of the equations they danced

and what they did that helped you make that observation.

• Did they make any movement choices that showed variety?

þ Criteria-based teacher checklist, peer assessment: Stands in a line formation. Performs one of the

following dances:

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1) Steps to the right three times; steps to the left two times; makes a shape and says “1.”

2) Steps to the left two times; steps to the left four times; makes a shape and says “-6.”

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8. Guide reflection.

• Dancing Mathematicians, what did you discover about adding opposite quantities in the Zero

Number Line Dance?

• How was that dance different from the small group Adding on the Number Line Dances?

The same?

• The next time you work with positive and negative integers, combining opposites, and the

number line in math, remember how you used them with movement and it will help

you understand.

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

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ARTS IMPACT LESSON PLAN Dance and Math Infusion

Seventh Grade Lesson Two: Finding Zero on a Number Line Dance

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

STUDENT SELF-ASSESSMENT WORKSHEET

Disciplines MATH/DANCE MATH/DANCE Total

Concept Combining Opposite Integers 5

Direction

Addition on the Number

Line

Criteria

Student Name

Stands in a line formation. Stands in a line formation.

Performs one of the following

dances:

Steps to the

right six

times; steps

to the left

six times;

claps.

Steps to the

left five

times; steps

to the right

five times;

claps.

Steps to the

right four

times; steps

to the left

four times;

claps.

Steps to the

left three

times; steps

to the right

three times;

claps.

1) Steps to the right three

times; steps to the left two

times; makes a shape and

says “1.”

2) Steps to the left two times;

steps to the left four times;

makes a shape and says “-6.”

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ARTS IMPACT LESSON PLAN Dance and Math Infusion

Seventh Grade Lesson Two: Finding Zero on a Number Line Dance

CLASS ASSESSMENT WORKSHEET

Disciplines MATH/DANCE MATH/DANCE Total

Concept Combining Opposite Integers 5

Direction

Addition on the Number

Line

Criteria

Student Name

Stands in a line formation. Stands in a line formation.

Performs one of the following

dances:

Steps to the

right six

times; steps

to the left

six times;

claps.

Steps to the

left five

times; steps

to the right

five times;

claps.

Steps to the

right four

times; steps

to the left

four times;

claps.

Steps to the

left three

times; steps

to the right

three times;

claps.

1) Steps to the right three

times; steps to the left two

times; makes a shape and

says “1.”

2) Steps to the left two times;

steps to the left four times;

makes a shape and says “-6.”

1.

2.

3.

4.

5.

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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:

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