

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

LESSON TITLE: Translations and Reflections: Dancing Slides and Flips

Dance and Math Lesson

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Grade Level: Fourth Grade

Examples:

Enduring Understanding

Flipping a figure into a mirror image creates a reflection.

Sliding a figure without turning or flipping creates a translation.

Target: Creates a dance with partners and a prop that shows a polygon with two transformations: reflection and translation.

Criteria: With a small group and stretchy bands, selects a shape, flips the shape, and slides the shape.

Target: Notates choreography, showing understanding of polygons, reflections, and translations.

Criteria: Labels, draws and describes the polygon, the flip and slide from the dance.

Teaching and Learning Strategies

Introduction to Arts-Infused Concepts through Classroom Activities:

Arts-Infused Concepts:: Lines of Symmetry; Parallel and Perpendicular Lines, Translations and Reflections, Attributes of Polygons

- Do the BrainDance
- Introduce dancing safely with stretchies.
- Introduce how to label polygons to show flips/reflections.

If time is available, explore concepts in everyday life:

- Translations: slide sideways across the gym or playground.
- Reflections: notice when you do flips with all or part of your body during the day. Think of flips in a mathematical sense (mirror image) rather than a gymnastic sense.

1. **Prepares students for dancing flips and slides** by discussing translations and reflections in dance, math, and everyday living. *Prompts: This is an arts-infused lesson about slides and flips. We'll be doing dance and math at the same time. What do you know about slides? (translations: sliding a figure from one position to another without turning or flipping the figure) Do a slide/translation with your hands. What do you know about flips? (reflections: flipping a figure to produce a mirror image) Do a flip/reflection with your hands. Where do you see slides/translations in this room? Flips/reflections? When you reflect or translate a shape, mathematicians call that a transformation.*

Student: Considers and discusses the shared concepts of slides and flips in math and dance and life. Bases the discussion on prior knowledge.

2. **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 (4th grade)" #4, *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 our dance and math words Flips/reflections and slides/translations as we do the BrainDance. We'll also use other math terms like symmetry, parallel and perpendicular lines.

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 shrinks back into a small shape. Repeats. *Prompts: Make a big **symmetrical square** shape. Shrink into a small shape. Grow into a big **symmetrical rectangle** shape. Shrink into a small shape. Grow into a big **symmetrical rhombus** shape. Shrink into a small shape.*

Head-Tail: Curls the body forward and backward with head and tailbone. Repeats. Curls from side to side. Repeats. *Prompts: Curl forward and back. That's **symmetrical** movement. Curl from side to side. 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, 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, drawing **parallel and perpendicular lines** with an arm and a leg. Repeats on the opposite side. *Prompts: Your left side is frozen and only the right side dances. Draw parallel and perpendicular lines with your right arm and leg. Now the right side is frozen and the left half dances. Draw parallel and perpendicular lines with your left arm and leg.*

Cross-Lateral: Reaches across the body with one hand and then the other. Crosses the center of the body, drawing **parallel lines** with the arms. Repeats several times. Crosses the center of the body, drawing **perpendicular lines** with the arms. Repeats several times. *Prompts: Use your hands to draw parallel lines crossing in front of your body. Now let's draw perpendicular lines.*

Vestibular: Makes a **triangle shape** with whole body. **Slides/translates** the shape twice to the right. **Flips/makes a reflection of** the shape two times (180° turn to the right/clockwise). Repeats two slides and two flips to the left. Does the same with a **rectangle** and a **pentagon**. *Prompts: Make a triangle shape. How many **vertices** does it have? We'll move to the right first. Slide. Slide. Flip. Flip. To the left. Slide. Slide. Flip. Flip. Make a rectangle shape. How many **vertices** does it have? We'll move to the right first. Slide. Slide. Flip. Flip. To the left. Slide. Slide. Flip. Flip. Make a pentagon shape. How many **vertices** does it have? We'll move to the right first. Slide. Slide. Flip. Flip. To the left. Slide. Slide. Flip. Flip.*
Inhale. Exhale. Inhale. Exhale.

Prompts: When did you use flips/reflections and slides/translations in the BrainDance?

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

3. Introduces dancing with a prop: stretchy bands. (The stretchies are strips of 4-way stretch fabric about 3 inches wide and 4-6 feet long and tied tightly together to make a loop.) Discusses how

to move safely and appropriately with them. *Prompts: How can we dance safely with the stretchy bands? When you start moving, remember to keep empty space around you. Find different ways of working with the prop. Do not wrap it around your neck. What should we do with our props when we are listening to directions (e.g. on the floor in front of you, or “sit criss-cross and make the stretchy disappear”)?* Hands a stretchy band to each student.

Student: Shares strategies for dancing safely with the stretchies.

Embedded Assessment: Criteria-based room scan

4. **Directs students in making polygon shapes, slides, and flips with the stretchies.**

a. **Leads shape-making.** *Prompts: What is a parallelogram? (four sides, four angles, four vertices, two pairs of parallel sides) How would you make a parallelogram with the stretchy? Think about the four angles in the parallelogram. How can you use your body with the stretchy to show those angles?* Describes a few of the different parallelograms created by the students. Repeats the same process (define the shape, make the shape with the prop, describe student shapes) with triangles, rectangles, squares, pentagons, and hexagons.

b. **Guides exploration of slides/translations and flips/reflections of the polygons.** *Prompts: Make a shape with your stretchy. Slide the shape two times. Make sure you are moving in empty space. Now flip your shape into a reflection. Flip again. Make sure your shape stays congruent during and after your transformation movement.* Optional: Uses a drum for accompaniment.

Student: Explores making parallelograms, triangles, rectangles, squares, pentagons, and hexagons with the prop. Slides and flips the polygon shapes.

Embedded Assessment: Criteria-based room scan; criteria-based self-assessment

5. **Assists students in Slide/Translation and Flip/Reflection Choreography.** *Prompts: In a small group, you are going to choreograph an instant dance with your stretchies. Your job is to choose a polygon and slide/translate it and flip/reflect it. You can decide if the slides come first or the flips come first. You’ll do two of each (slide/translate, slide/translate, flip/reflect, flip/reflect or flip/reflect, flip/reflect, slide/translate, slide/translate). When you choose your polygon, think about how many vertices it has and how you can keep it congruent as you flip and slide it.* Divides students into groups of 3-5. Directs them to make their choices and practice. Music: “Skippy Ska” #8, *Music for Creative Dance, Volume II*, or *Shape Choreography no vocal, Geometry Dances #10*.

Student: Chooses a shape. Decides the order of flipping and sliding. Rehearses.

Embedded Assessment: Criteria-based room scan; criteria-based self-assessment

6. **Guides students in an informal showing of Slide/Translation and Flip/Reflection Choreography followed by a responding process.**

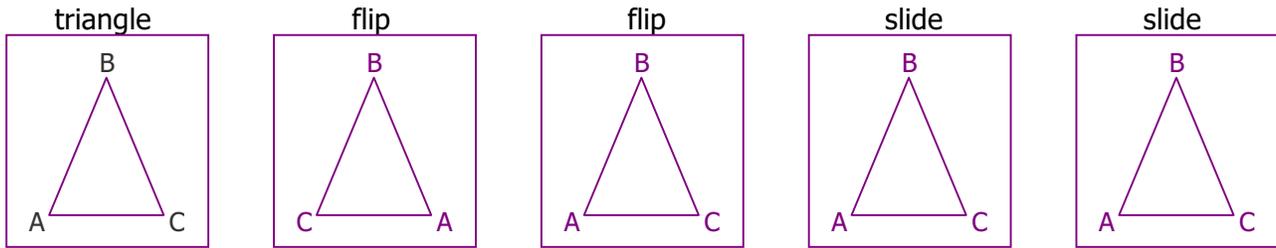
Reviews performer and audience behavior. After each group performs, asks the audience to analyze the dance. *Prompts: Audience—What polygon did you see? How do you know? Did the performers do slides/translations first or flips/reflections first? How do you know?* After all groups have performed, asks the audience a question about their performance. *Prompt: How can dancing slides/translations and flips/reflections help you understand and use them in math?* Hint: As students perform, you could make a master sheet, noting who is in each group and what their polygons and translations are. That will help you fill out the assessment worksheet later.

Student: Performs and responds.

Embedded Assessment: Criteria-based teacher checklist; criteria-based class critique; criteria-based group reflection (thoughts about performance)

7. **Directs the students to draw and describe the polygon and transformations from the dance** to help students transfer their dance learning into math learning. Distributes Slide/Translation and Flip/Reflection Choreography Worksheet. **Demonstrates how to fill out the worksheet.**

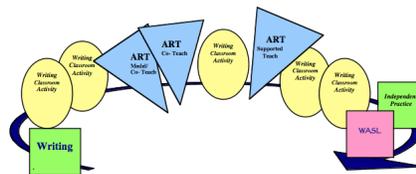
Hint: An effective strategy to clearly show a flip is to label each vertex of the polygon with a capital letter. Then when the polygon has been reflected, the labels can show that the figure has been flipped.



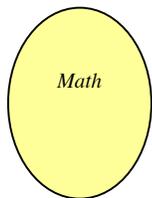
Prompts: Now you'll have a chance to show what you know in writing. Draw and describe your polygon from the dance and draw your slides/translations and flips/reflections or flips/reflections and slides/translations.

Student: Draws and describes the shape and transformation from the dance.

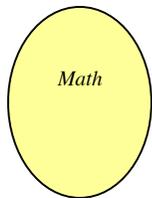
Embedded Assessment: Criteria-based teacher checklist; criteria-based self-assessment



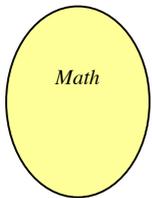
After DANCE lesson and before INDEPENDENT PRACTICE:



1. Repeat the BrainDance to reinforce the learning.



2. Explore the math concepts using your math curriculum.



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

3. Use "hand dances" to help remember slides/translations, flips/reflections, parallel, perpendicular, symmetry.
4. Repeat Slide/Translation and Flip/Reflection Choreography with other polygons.
5. Create Slide/Translation and Flip/Reflection Choreography with more repetitions or more complicated patterns.

Independent Practice: Hand dance it! Draw it! Slide to make a Translation! Flip to make a Reflection!

| Vocabulary | Materials and Community Resource | WA Essential Learnings & Frameworks |
|--|--|--|
| <p><u>Arts:</u> locomotor movement non-locomotor movement shape</p> <p><u>Arts Infused:</u> congruent flip hexagon lines of symmetry parallel parallelogram pentagon perpendicular polygon rectangle reflection slide square symmetrical translation triangle transformation</p> | <p>Museum Artworks or Performance: Broadway Center for the Performing Arts, Tacoma, WA: <i>Do Jump, Peking Acrobats</i></p> <p>Art Materials or Performance Materials: stretchies CD player <i>Music for Creative Dance, Volume II</i> <i>Geometry Dances</i> drum BrainDance chart locomotor and non-locomotor movement chart Slide and Flip Choreography worksheets pencils assessment checklist</p> | <p><i>AEL 1.1 concepts:</i> shape, space, slide, flip <i>AEL 1.1.2 principles of organization:</i> improvises, creates movement sequences <i>AEL 1.2 skills and techniques:</i> performs sequences AEL 1.4: audience skills <i>AEL 2.1 applies creative process:</i> organizes elements into a creative work <i>AEL 2.3: describes, analyzes</i> <i>AEL 4.2: dance and math connection</i></p> <p><i>MEL 1.3.2 geometric sense:</i> applies understanding of congruence to two-dimensional shapes and figures <i>MEL 1.3.4 geometric sense:</i> understands and applies single transformations using a translation (slide) or reflection (flip)</p> <p>Math State Frameworks <i>Grade 4:</i> solves problems involving congruence; records results of a translation (slide) or reflection (flip), identifies and draws a single translation (slides) or a single reflection (flips)</p> |

Slide/Translation and Flip/Reflection Choreography Worksheet

Name: _____ Date: _____

| polygon | first type of movement | last type of movement |
|---|--|--|
| <p>What type of polygon did you use in your dance?</p> | <p>Are your first two movements slides/translations or flips/reflections?</p> <p style="text-align: right;">1 point</p> | <p>Are your last two movements slides/translations or flips/reflections?</p> <p style="text-align: right;">1 point</p> |
| <p>Draw your polygon.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">(your starting shape)</p> | <p>Draw your shape after the first and the second transformation.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">(after first move) (after second move)</p> <p style="text-align: right;">1 point</p> | <p>Draw your shape after the third and fourth transformation.</p> <p style="text-align: center;">_____</p> <p style="text-align: center;">(after third move) (after fourth move)</p> <p style="text-align: right;">1 point</p> |
| <p>Describe your polygon.</p> | <p>Explain why the first two moves are slides/translations or flips/reflections.</p> <p style="text-align: right;">1 point</p> | <p>Explain why the last two moves are slides/translations or flips/reflections.</p> <p style="text-align: right;">1 point</p> |
| <p>Explain how your two transformations are different.</p> | | |

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LESSON TITLE: Translations and Reflections: Dancing Slides and Flips

ASSESSMENT WORKSHEET

| Disciplines | DANCE AND MATH | MATH | | | | | | | Total |
|-------------|--|--|-------|-----------|---------------------|-------|-----------|--|-------|
| Concept | TRANSLATIONS AND REFLECTIONS | TRANSLATIONS AND REFLECTIONS | | | | | | | 8 |
| Students | With a small group and stretchy bands, selects a shape, flips the shape, and slides the shape. Slide and flip choreography | Labels, draws and describes the polygon, the flip and slide from the dance. Choreography worksheet | | | | | | | |
| | | Translations (Slides) | | | Reflections (Flips) | | | | |
| | | Labels | Draws | Describes | Labels | Draws | Describes | | |
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Criteria-based Reflection Questions: (Note examples of student reflections.)

Self-Reflection: *How can dancing slides and flips help you in math?*

Peer to Peer: *What polygon did you see? How do you know? Did the performers slide first or flip first? How do 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 – Translations and Reflections—Dancing Slides and Flips

Dear Family:

Today your child participated in a **dance and math** lesson. We talked about how you can flip or slide shapes in dance and in math.

- We made **polygons** with giant stretchy bands and explored flipping them (making **reflections**) and sliding them (making **translations**).
- We worked with a small group to create a dance with a polygon and flips (reflections) and a slides (translations).
- We labeled the polygon, drew the shape, the flips (reflections), and the slides (translations), and explained our dance in writing.
- We learned how dancers and mathematicians reflect a figure by flipping it into a mirror image and translate a figure by sliding it without turning or flipping.

You could look for slides and flips in patterns in your kitchen or on your clothing.

Enduring Understanding

Flipping a figure into a mirror image creates a reflection.
Sliding a figure without turning or flipping creates a translation.