

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

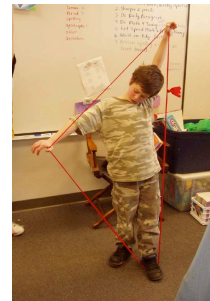
LESSON TITLE: Congruent Polygons: Copying Stretchy Shapes

Inspired by a lesson written by classroom teacher, Kathy Allen

Dance and Math Lesson

Artist-Mentor - Debbie Gilbert

Grade Level: Third Grade



Enduring Understanding

Congruent polygons are the same shape and size.

Target: Creates a congruent polygon with a partner and a prop.

Criteria: Selects a shape with a partner (a parallelogram, rectangle, square, or a triangle); uses a stretchy band to make the polygon the same size, number and length of sides, and types of angles as the partner's shape.

Target: Identifies a two-dimensional shape and draws a shape that is congruent.

Criteria: Sketches the polygon shape, labels it, describes it, and sketches a shape that has the same size, number and length of sides and types of angles.

Teaching and Learning Strategies

Introduction to Arts-Infused Concepts through Classroom Activities:

Arts-Infused Concepts: Polygons; Congruent

🎵 Do the BrainDance.

If time is available, explore concepts in everyday life:

- 🎵 Draw parallelograms, rectangles, squares, and triangles in the air with your finger or an elbow.
- 🎵 Ask a friend to make a shape and then copy his/her shape.

1. **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 (3rd grade)" #1, *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 word "shape" as we do the BrainDance.* Hint: In the parts of the BrainDance that specify right or left sides—when you are leading, you can be a mirror for the students (so you do left when they do right) or you can face away from them (so you do right when they do right). **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.

Core-Distal: Gradually increases the size of the body, growing from the center of the body into a large **square shape** and then shrinking back into a small square shape. Repeats. *Prompts: Make a big square shape. Shrink into a small square shape. Grow into a big square shape. Shrink into a small square shape.*

Head-Tail: Stretches into a large **rectangle shape**. Curls the body forward from head to tailbone. Returns to the same rectangle shape. Curls it backwards. Returns to the same rectangle shape. Repeats. *Prompts: Make a giant rectangle. Curve it forwards. Go back to the same rectangle shape — a **congruent** shape. Curl it backwards. Return to a congruent rectangle shape.* Curves from side-to-side several times.

Upper Half and Lower Half: Stabilizes the lower half of the body and only the top half dances, drawing shapes with different body parts. *Prompts: The top half of your body is in motion, while the lower half is frozen. Draw **triangles** in the air with your hands, then with your elbows. Draw **parallelograms** with your shoulders, then with your nose.* Stabilizes the upper half of the body. Only the lower half dances, staying in one spot. Draws shapes with the lower half of the body. *Prompts: The lower half of your body is in motion, while the upper half is frozen. Draw **triangles** on the ground with your feet, then in the air with your knees. Draw **parallelograms** on the ground with your feet, then in the air with your knees.*

Body-Half Right and Left: Stabilizes the left side of the body and only the right side dances, drawing **shapes** in the air. Repeats on the opposite side. *Prompts: Your left side is frozen and only the right side dances. Draw shapes in the air with only the right side of your body. Now the right side is frozen and the left half dances. Draw shapes in the air with only the left side of your body.*

Cross-Lateral: Reaches across the body with one hand and then the other. Crosses the center of the body to reach to vertices of a **rectangle**. Repeats several times. *Prompts: Use your hands to draw lines crossing in front of your body. Reach across to a high left diagonal, then a high right diagonal, then a low left diagonal, then a low right diagonal. You are reaching each vertex of a rectangle.*

Spin/Vestibular: Turns clockwise. Stops and freezes in a shape. Turns counterclockwise. Stops and freezes in a shape. Repeats. *Prompts: Glue your arms to your sides. Turn. Freeze in a **square** shape. Turn. Freeze in a **rectangle** shape. Turn. Freeze in a **parallelogram** shape. Turn. Freeze in a **triangle** shape. Inhale. Exhale. Prompts: What shapes did you do in the BrainDance?*

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

2. **Reviews polygons. Teaches the students the Polygon Chant.** Music: "Polygon Chant" #2, *Geometry Dances*. Asks them to chant along with the CD, then do a "hand dance" to illustrate the shapes in the chant during the instrumental sections. Displays the Polygon Chant Chart. Hint: Posting the chart makes it easier for the students to follow along with the chant. *Prompts: This is a chant about the attributes of some polygons. It will help you remember the unique features of each one. After you chant about each shape, you do a hand dance. Dancing is another way to help you remember. The leader will chant the words and you will chant along. During the instrumental part, use your hands to draw the shapes in the air.*

The Polygon Chant

*Parallelogram: four sides, four angles, two pairs of parallel sides
(parallelogram hand dance)*

*Rectangle: four sides, four right angles
(rectangle hand dance)*

*Square: four equal sides, four right angles
(square hand dance)*

*Triangle: three sides
(triangle hand dance)*

Student: Says the Polygon Chant, and represents the shapes with hand movements.

3. Guides students in an exploration of locomotor and non-locomotor movements and congruent shapes with a prop.

a. **Leads a Move and Freeze exploration with the stretchies.** *Prompts: When you hear the drum playing, do a non-locomotor movement in one spot with your stretchy. When the drum stops, freeze in a **parallelogram** shape. Now try a locomotor movement that travels through the space when you hear the drum, and freeze in a **rectangle** shape when the drum stops. When the drum stops, freeze in a **square** shape. Now try a locomotor movement that travels through the space when you hear the drum, and freeze in a **triangle** shape when the drum stops.*

b. **Repeats Move and Freeze while spotlighting students' shapes and challenging students to make a shape that is congruent with the spotlighted shape.** *Prompts: When I play the drum, you dance, when the drum stops, freeze in a polygon shape. I'll point out one student's shape (spotlighting). Everyone will copy the shape that is made by the stretchy. Try to make the shape congruent so your stretchy's shape is exactly the same shape and size as the shape you are copying. Ask yourself, is my shape congruent? Repeats with several shapes.*

Student: Moves and freezes with the prop as cued by teacher. Makes shapes. Makes congruent shapes.

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

4. Demonstrates mirroring congruent shapes with a partner and stretchies. Faces a partner and explores making shapes that are congruent. Acts as a leader and makes a shape with the stretchy, while the partner copies the shape as if looking in a mirror. Trades roles and acts as follower, copying the new leader's shape. Asks students to find a partner and begin. *Prompts: The leaders make a polygon shape with the stretchy. The followers copy the shape, like they are looking in a mirror. Take turns leading and following. Try different shapes. Work on making your stretchy shapes congruent—the same shape and size. After they have all had a few turns at being leader and follower, ask students to do a pair-share. Prompts: What shapes did you make? What did you need to do to make sure the shapes were congruent? Music: "Little Bolero" #12 from *Music for Creative Dance, Volume II*.*

Student: Using the prop, makes polygon shapes as a leader and copies the shapes as a follower.

Discusses shapes with partner.

Embedded Assessment: Criteria-based self-assessment; peer assessment

5. Prepares students for showing Congruent Partner Polygons. Directs students to select a polygon with their partners (a parallelogram, a rectangle, a square, or a triangle). Guides them to face their partners to make the congruent shapes and then to do a 1/4 (90°) turn away from each other, like opening a book, keeping their shapes the same. *Prompts: Pick a shape with your partner (a parallelogram, a rectangle, a square, or a triangle). Practice making the shape facing your partner. Then turn a quarter turn away from your partner. That way the audience will be able to see what your shapes are and if the shapes are congruent.*

Student: Selects a polygon shape with a partner. Creates the shape with the stretchy, matching the partner's shape. Turns to face an imaginary audience.

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

6. Leads students through a performance of the Congruent Partner Polygons followed by a responding process. Reminds students of appropriate behavior for performers and audience members. Guides duos in performance. After each performance, asks students to respond to the following questions. *Prompts: What shapes did you see? How did you know which shapes the dancers were showing? Were the shapes congruent? How did you know they were or were not congruent?*

(Performance options: One to three groups could perform at a time. If you choose to do one group at a time, minimize discussion after each performance, and just say: "Name that polygon!") Hint: Collect stretchies from each duo after each dance, or collect all stretchies before performing and have just enough stretchies for each dancer set in the performing area.

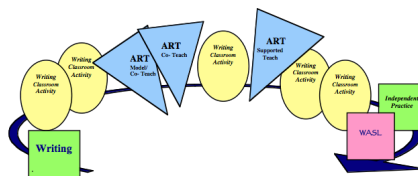
Student: Performs and responds.

Embedded Assessment: Criteria-based teacher checklist; criteria-based class critique

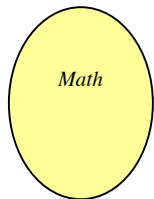
7. Directs the students to draw and describe the shape they chose to help students transfer their dance learning into math learning. Distributes Congruent Partner Polygons Worksheet. *Prompts: Now you'll have a chance to show what you know in writing. Draw your shape from the dance you did with your partners, label it, describe it, and draw a congruent shape.* (Note: Students can complete their worksheets in the dance space, or after students have returned to their desks.)

Student: Draws, labels, describes, and copies the shape from the dance.

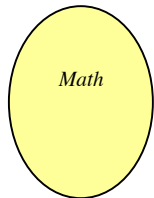
Embedded Assessment: Criteria-based teacher checklist; criteria-based self-assessment worksheet



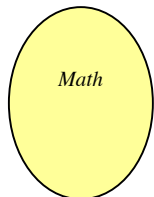
Before next DANCE lesson:



1. Repeat the BrainDance and/or the Polygon Chant frequently to reinforce the learning.



2. Explore the math concepts using your math curriculum.



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

3. Repeat Mirroring and/or Congruent Partner Polygons with other shapes.
4. Make congruent shapes on Geoboards.
5. Draw the polygons with paper and pencil as you say the Polygon Chant.

**Independent Practice: Hand dance it! Draw it on paper!
Congruent – same size – same shape!**

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 parallelogram polygon rectangle shape square triangle</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: CD player <i>Music for Creative Dance, Volume II</i> <i>Geometry Dances</i> drum stretchies BrainDance chart Polygon Chant chart locomotor and non-locomotor movement chart assessment checklist Congruent Partner Polygons Worksheet pencils</p>	<p><i>AEL 1.1 concepts:</i> shapes <i>AEL 1.1.2 principles of organization:</i> creates basic movement sequences <i>AEL 1.2 skills and techniques:</i> concentration and muscle control <i>AEL 1.4: audience skills</i> <i>AEL 2.1 applies creative process:</i> organizes shapes into a creative work <i>AEL 4.2: dance and math connection</i></p> <p><i>MEL 1.3.1 geometric sense:</i> draws congruent figures; indicates whether two figures are congruent and explains why or why not <i>MEL 1.3.2 geometric sense:</i> understands and applies attributes and properties to two-dimensional shapes and figures</p> <p>Math State Frameworks <i>Grade 3:</i> describes and compares congruent 2D figures; draws a shape that is congruent to a given 2D shape; uses attributes and properties to identify, name, draw two-dimensional shapes and figures; draws and labels two-dimensional figures given particular attributes; identifies, names, and describes the attributes and properties of polygons.</p>

Congruent Partner Polygons Worksheet

Name: _____ Date: _____

Draw your polygon.	Draw a congruent polygon.
Identify your polygon.	Describe your polygon. These questions might help you: How many angles does the shape have? How many sides does the shape have? Are any sides equal in length? Are any sides parallel? Are any angles right angles?

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ASSESSMENT WORKSHEET

Disciplines	DANCE AND MATH	MATH	Total
Concept	CONGRUENT SHAPES: Polygons Congruent Partner Polygon Dance	CONGRUENT SHAPES: Polygons Congruent Partner Polygon Worksheet	2
Students	Selects a shape with a partner (a parallelogram, rectangle, square, or a triangle); uses a stretchy band to make the polygon the same size, number and length of sides, and types of angles as the partner's shape	Sketches the polygon shape, labels it, describes it, and sketches a shape that has the same size, number and length of sides and types of angles	
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28.			
Total			
Percentage			

Criteria-based Reflection Questions: (Note examples of student reflections.)

Self-Reflection: *What shapes did you make? What did you need to do to make sure the shapes were congruent?*

Peer to Peer: *What shapes did you see? How did you know which shapes the dancers were showing? Were the shapes congruent? How did you know they were or were not congruent?*

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 – Congruent Polygons—Copying Stretchy Shapes

Dear Family:

Today your child participated in a **dance and math** lesson. We talked about using our bodies and a prop to make **congruent shapes** (the same in both shape and size).

- We reviewed the attributes of these **polygons: parallelogram, rectangle, square, triangle**.
- We made polygon shapes with stretchy fabric and copied a partner's shape to make congruent shapes.
- We analyzed other students' shapes.
- We drew our shape from the dance, labeled it, described it and drew a congruent shape.
- We learned strategies for drawing, describing, and dancing congruent shapes.

You could look for congruent parallelograms, rectangles, squares, or triangles in your house or in your yard. How do you know they are congruent?

Enduring Understanding

Congruent polygons are the same shape and size.