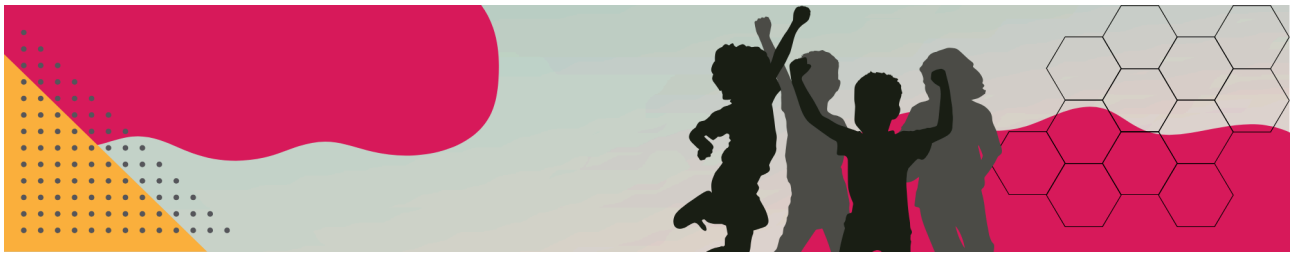
UNIT: POLYGON PERSPECTIVES–MATH MEETS CREATIVITY
SHAPE IT UP WITH POLYGONS
Grade Band: 5
Content Focus: Dance & Math



LEARNING DESCRIPTION

In this lesson, students will learn how the human body can be used to create expressive shapes and forms. After watching a video of Pilobolus' *Shadowland* and discussing the use of colors, shapes, and lines, students work in small groups to complete a Hierarchy of Shapes handout. Next, students create a body shape movement phrase in AB form that expresses different types of polygons (quadrilaterals and triangles). Students will incorporate levels and must be able to explain their shape choices and attributes. Groups will create, practice, and perform their movement phrases for each other with the audience identifying the shapes and their attributes. The lesson concludes with an exit ticket where students reflect on the main categories of polygons and describe their attributes.

LEARNING TARGETS

Essential Questions	"I Can" Statements
What are the properties and defining attributes of various polygons? How can we connect geometric understanding with creative movement to demonstrate our knowledge of polygon attributes?	I can create a movement phrase in AB form that expresses different types of polygons using body shapes and levels. I can classify polygons based on their attributes.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
5.GSR.8.1 Classify, compare, and contrast polygons based on properties. 5.GSR.8.2 Determine, through exploration and investigation, that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.	ESD5.CR.1.a Create shapes and levels through movement. ESD5.CR.1.c Demonstrate knowledge of compositional elements through movement (e.g. beginning, middle, end, transitions). ESD5.CN.3 Integrate dance into other areas of knowledge.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. 5.G.4 Classify two-dimensional figures in a hierarchy based on their attributes.	**Anchor Standard 1:** I can use movement exploration to discover and create artistic ideas and works. **Anchor Standard 2:** I can choreograph a dance. **Anchor Standard 7:** I can relate dance to other arts disciplines, content areas, and careers.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Polygon - A plane figure enclosed by line segments called sides	• Levels - how high or low you are dancing (high, middle, low)

- Regular polygon – A polygon whose sides are all equal and whose interior angles are all congruent
- Parallel lines - Lines in the same plane that never intersect, no matter how far they are extended
- Perpendicular lines - Lines that intersect at a 90-degree angle, forming right angles where they meet
- Triangle – A polygon with three sides and three angles
- Equilateral triangle – A triangle with three equal sides and three congruent triangles
- Isosceles triangle – A triangle with two equal sides and two congruent angles
- Scalene triangle – A triangle with three different sides and three incongruent angles
- Right triangle – A triangle in which one angle is a right angle
- Acute triangle – A triangle with three acute (less than ninety degree) angles
- Obtuse triangle – A triangle with one obtuse (greater than ninety degree) angle
- Quadrilateral – A polygon with four sides
- Trapezoid – A quadrilateral with only one set of parallel sides
- Isosceles trapezoid – A trapezoid whose non-parallel sides are equal in length
- Rectangle – A quadrilateral with four right angles

- Body shape - a frozen statue created by the body
- AB Form - a two-part sequence, the second part different from the first

• Square – A quadrilateral with four right angles and four equal sides • Parallelogram – A four-sided plane rectilinear figure with opposite sides parallel. • Rhombus - A parallelogram with opposite equal acute angles, opposite equal obtuse angles, and four equal sides • Pentagon – A five-sided polygon • Hexagon – A six-sided polygon • Octagon – An eight-sided polygon	

MATERIALS

- Hierarchy of Shapes handout (for each student or group)
- Pilobolus Shadowland video
- Resource: Colors, Shapes, Lines Thinking Strategy
- Polygon Type Movement Phrase in AB Form Rubric

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

- Provide students with background information on Pilobolus Dance Company.
  - Modern dance company founded in 1971
  - Collaborates with other artists to create performance works, including MIT, OK Go and Radiolab
  - Performances focus on using the human body as a medium for expression – often using contortion and gymnastics to create new shapes.
- Watch Pilobolus Shadowland video.
- After watching, engage in Colors, Shapes, Lines Thinking Strategy.
  - Instruct students to look at the artwork or object for a moment. Ask them the following:
    - What **colors** do you see?
    - What **shapes** do you see?
    - What **lines** do you see?
    - Focus particularly on the Body Shapes seen in the video.

Work Session

- Divide the class into small groups of four to five students.
- In their groups, students should complete the Hierarchy of Shapes handout.
    - After a designated period (around seven to ten minutes), review the Hierarchy of Shapes handout for accuracy as a class.
- Explain that students will now create a Body Shape Movement Phrase in 'AB Form' that expresses different types of Polygons.
- The Polygon Type Movement Phrase should Include:
    - 'AB Form'
        - Part A: Quadrilaterals
            - Group of body shapes that represent at least three different types of quadrilaterals
        - Part B: Triangles
            - Group of body shapes that represent at least three different types of triangles
    - All three levels (high, middle, and low)
- Students should be able to defend their choices for each part (Why is this a quadrilateral and not a triangle? What are the names of the different shapes in each part? What are the shape's attributes?).
- Allow students time to practice their movement phrases.
- After a designated period, have all groups perform their phrase in a dress rehearsal (all groups perform their movement phrase at the same time).
- Invite groups to perform their phrases individually in front of the class.
    - Prior to performances, discuss appropriate audience participation and etiquette.
    - After each group, have the audience identify the types of polygons and how they knew it was that shape (attributes expressed in the body shape).

Closing/Reflection

- Have students complete the following exit ticket:
    - What are the two main categories of polygons? What attributes do shapes in each category share?
    - Identify two types of shapes in each category and describe the attributes of those shapes.
    - How did you use your body to express the attributes of polygons?

ASSESSMENTS

Formative

- Pre-assessment: Responses during 'Colors, Shapes, Lines' thinking strategy to see the shapes that students already know
- Hierarchy of Shapes Handout
- Individual group check-ins during group work time
- Exit Ticket

Summative

- Polygon Type Movement Phrase in AB Form Rubric

DIFFERENTIATION

Acceleration: Students record in writing each shape of their phrase noting its name and defining attributes.

Remediation: Focus the phrase on quadrilaterals or triangles.

ADDITIONAL RESOURCES

CREDITS

U.S. Department of Education- STEM + the Art of Integrated Learning
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**This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.*