artsNOW
Integrated learning solutions

UNIT: GEOMETRY
COMPOSING MUSIC WITH DYNAMICS, PITCH, AND GEOMETRY
(Lesson 3 of 5)
Grade Band: 4
Content Focus: Music & Math

LEARNING DESCRIPTION

In this lesson, students will create musical phrases that focus on dynamics and pitch to represent the number of sides and types of angles present in polygons.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How can music represent geometric concepts? What are the different types of angles and what are their defining characteristics?	I can use dynamics and/or pitch to represent the three different types of angles. I can use body percussion to represent the number and length of sides in a polygon.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
4.GSR.7.1 Recognize angles as geometric shapes formed when two rays share a common endpoint. Draw right, acute, and obtuse angles based on the relationship of the angle measure to 90 degrees. 4.GSR.8.1 Explore, investigate, and draw points, lines, line segments, rays, angles (right, acute, obtuse), perpendicular lines, parallel lines, and lines of symmetry. Identify these in two-dimensional figures. 4.GSR.8.2 Classify, compare, and contrast polygons based on lines of symmetry, the presence or absence of parallel or perpendicular line segments, or the presence or absence of angles of a specified size and based on side lengths.	ESGM4.CR.2 Compose and arrange music within specified guidelines. ESGM4.PR.2 Perform a varied repertoire of music on instruments, alone and with others. ESGM4.RE.1 Listen to, analyze, and describe music. ESGM4.CN.1 Connect music to the other fine arts and disciplines outside the arts.

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
4.G.1 Draw points, lines, line segments, rays, angles (i.e., right, acute, obtuse), and parallel and perpendicular lines. Identify these in two-dimensional figures. 4.G.2 Classify quadrilaterals based on the presence or absence of parallel or perpendicular lines. 4.G.3 Recognize right triangles as a category, and identify right triangles. 4.G.4 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line symmetric figures and draw lines of symmetry.	**Anchor Standard 1:** I can arrange and compose music. **Anchor Standard 4:** I can play instruments alone and with others. **Anchor Standard 6:** I can analyze music. **Anchor Standard 9:** I can relate music to other arts disciplines, other subjects, and career paths.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Right angle - An angle whose measure is exactly 90° • Acute angle - An angle whose measure is between 0° and 90° • Obtuse angle - An angle whose measure is between 91° and 180° • Equilateral triangle - A three-sided figure with sides of equal length • Isosceles triangle - A three-sided figure with two sides of equal length • Scalene triangle - A three-sided figure with no sides equal in length • Parallelogram - A quadrilateral with both pairs of opposite sides parallel • Pentagon - A five-sided polygon • Rectangle - A parallelogram with four right angles • Rhombus - A parallelogram with four sides of equal length • Square - A plane figure with four equal straight sides and four equal angles • Trapezoid - A quadrilateral with at least one pair of parallel sides	• Steady beat - A constant, regular pulse that remains the same throughout a piece of music • Rhythm - The pattern of sounds and silences, organized over time • Tempo - How fast or slow the beat of music is • Dynamics - How loud or soft a sound is • Pitch - How high or low a sound is • Body percussion - Using your body to produce various sounds through movements such as clapping, snapping, stomping, and tapping • Rest - A symbol that represents a period of silence; during a rest, no note is played or sung, but the rhythm or timing continues

MATERIALS

- Cards with various polygons on them
- Paper
- Pencils

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

- Begin by leading the class in a body-percussion warm-up.
    - Start with clapping.
        - Clap your hands together in a slow, steady beat (e.g., 1-2-3-4).
        - Speed it up gradually after 30 seconds, then slow it down again, focusing on keeping the rhythm steady.
    - Add upper arm taps.
    - Alternate between clapping and tapping your upper arms with an open hand. Example pattern:
        - Clap (both hands) - Tap upper arms (both hands) - Clap - Tap upper arms
        - Repeat this for one minute, focusing on rhythm and coordination.
    - Move to stomps.
        - Stomp alternating feet in a slow, steady beat (e.g., 1-2-3-4).
        - Speed it up gradually after 30 seconds, then slow it down again, focusing on keeping the rhythm steady.
    - Now alternate between stomping your feet and clapping your hands. Example pattern:
        - Stomp right foot - Clap hands - Stomp left foot - Clap hands
        - Keep the rhythm steady and try to make each stomp and clap equally strong.
    - Snap-Clap-Tap Combo
        - Pattern: Combine snapping your fingers, clapping, and tapping your legs. Example pattern:
            - Snap (right hand) - Snap (left hand) - Clap - Tap thighs (both hands)
            - Repeat and gradually speed up the tempo.
    - Practice a full body rhythm pattern.
        - Example pattern:
            - Stomp right foot
            - Tap upper arms (both hands)
            - Clap
            - Snap (right hand)
            - Stomp left foot
            - Tap thighs
            - Clap
            - Snap (left hand)
- Debrief the warm-up discussing tempo, rhythm, and pitch of the different sounds students made with their bodies.

Work Session

- Review the different types of angles–obtuse, acute, and right.
- Next, clap three times, once quietly, once at a medium volume, and once loudly. Ask students which clap would represent which type of angle.
    - Students should arrive at the conclusion that the quiet clap would represent the smallest angle, acute, and the loudest clap would represent the largest angle, obtuse.
    - Project a pattern of angles on the board. Lead students in various body percussion movements that change dynamics based on the size of the angle.

- Ask students to turn and talk with a partner about how pitch through body percussion (reminding students to think back to the activator) could be used to represent the three different types of angles.
    - Ask several partners to share their responses. Students might say a snap is higher in pitch than a stomp, so the snap would represent an acute angle.
- Divide students into small groups. Assign each group a polygon.
    - Each group must determine the types of angles present in their polygon.
    - Ask students to determine how they will distinguish between the three different types of angles using dynamics or pitch.
    - Next, ask students to use a different type of body percussion to represent each side of their polygon.
        - A composition might look like this:
          Trapezoid: Four claps (top side), stomp (obtuse angle), two claps (side), snap (acute angle), six claps (bottom side), snap (acute angle), two claps (side).
            - In this musical phrase, the number of claps represents the length of the sides. The snap is quieter than the stomp, so the snap represents the acute angles and the stomps represent the obtuse angles.
    - Encourage students to keep a steady beat throughout their performance. The teacher can play a steady beat in the background to support students if desired.
    - Now, each group must create a musical phrase using body percussion that demonstrates three polygons of their choice.
        - Discuss how composers use “rests” between beats to create a separation between musical phrases. Students can choose to use a rest between each polygon’s musical phrase.

Closing/Reflection

- Students will perform their musical phrases for the class. Discuss appropriate audience etiquette and participation prior to performances.
    - Optional: Students can share their key with the audience before the performances or the audience can try to decipher the key.
- As each group performs, challenge the audience to draw the polygon and the angles being represented.
- After each performance, the performing group will share their polygons with the class and discuss how their composition demonstrated the various polygons that inspired their choreography.

ASSESSMENTS

Formative

- Teachers will assess understanding throughout the lesson by observing:
    - Students’ ability to follow along with the activator
    - Discussion of tempo, pitch and dynamics
    - Ability to connect types of angles to pitch and dynamics
    - Collaboration with group members to create a musical phrase to represent their polygon

Summative
• Students can use dynamics and/or pitch to represent the three different types of angles. • Students can use body percussion to represent the number and length of sides in a polygon. • Students can explain how their musical choices reflect mathematical concepts.

DIFFERENTIATION

Accelerated: Challenge students to demonstrate symmetry in their composition and then draw what that would look like in geometric form with the line of symmetry drawn.

Remedial:

- Focus on either using dynamics only to represent angles.
- Create a musical phrase to represent a polygon together as a class before having students work in groups to create their own.

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.*