

MATH AND CREATIVE MOVEMENT



USING DANCE TO TEACH MATH PROVIDES STUDENTS WITH A NEW WAY TO EXPLORE AND LEARN MATH CONCEPTS.

OISE/MA CSE WORKSHOP

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WHAT THE RESEARCH SAYS:

- Increased student achievement is correlated with teachers' integration of the arts into math (Mason, Steedly, & Thormann, 2005), as well as other curricular areas (Rabkin & Redmond, 2004)
- Arts integration stimulates multiple senses, helping to make ideas, concepts, and processes more easily understood (Krug & Cohen-Evron, 2011).
- Students who learn math with dance have an increased motivation towards math, are more engaged, make stronger connections, and find more ways to express their knowledge (Werner, 2011)



ONTARIO MINISTRY OF EDUCATION

The Ontario Mathematics Curriculum calls for the use of a variety of instructional and assessment tools and strategies, and teachers are expected to provide numerous opportunities for students to develop their mathematical abilities, and make connections between math and the real world (OME, 2005).

- **Math Dance:** Schaffer and Stern (2011) perform dance pieces based on mathematical ideas, focusing on the visible, interactive, and communicative properties of movement and dance to make math comprehensible
- *Math Dance* encourages deeper spatial thinking, kinesthetic learning, student engagement, and communication
- Rather than focusing on the "find the right answer" mentality that students are used to in math, *Math Dance* encourages experimentation with movement to provide students the opportunity to learn mathematical concepts in different, engaging, and meaningful ways

MAIN TAKE AWAYS:

- Allowing students to feel mathematics in their body develops spatial reasoning, and increases student engagement
- Integrating Dance and Mathematics allows for instruction in both Math concepts and Dance elements
- Repetition involved in practicing and performing reinforces concepts resulting in mastery in both Dance and Math elements





ACTIVITY 1: GEOMETRIC VISUALIZATION THROUGH DANCE

STUDENTS ARE INSTRUCTED TO MOVE THEIR BODIES, USING A VARIETY OF CREATIVE MOVEMENTS, TO FIT INSIDE AND EXPLORE THE FEATURES OF AN IMAGINARY GEOMETRIC SHAPE (ADAPTED FROM WATSON (2005))

"Imagine you are inside of a cube. Move your body so that you can fit inside of your imaginary cube that is a bit smaller than you are. Reach out and touch the face on the right side of your cube with your hand. Can you touch it with your foot? How about your left hand? Now reach up with your elbow and try to touch one of the vertices above your head. Now I want you to imagine you are inside of a sphere and adjust your body to fit into your sphere. Can you run your hand along the curvature of the sphere?"



CURRICULUM EXPECTATIONS (GR. 4)

MATH: SE: Identify and describe prisms and pyramids, and classify them by their geometric properties, using concrete materials, & SE: identify and describe the general location of an object using a grid system (OME, 2005, p. 71)

DANCE: A1.1 translate into dance a variety of movement sequences observed in nature" (OME, 2009, p. 100) & A1.4 use the elements of energy and time in a dance piece to communicate an idea" (OME, 2009, p. 101)

ACTIVITY 1 CONSIDERATIONS:

- Follow simple or complex patterns in movement to integrate Patterning and Algebra
- Have students explore other shapes such as the inside of a pyramid (Grade 4+), or the net of a prism (Grade 5+)

ACTIVITY 2 CONSIDERATIONS:

- Co-create the rubric with students!
- Adapt to your Grade level, ex. Grade 1's can use directional language or 2D shapes
- Differentiate by using fewer expectations on the rubric, or add more challenging elements!



ACTIVITY 2: GEOMETRIC DANCE ASSESSMENT

STUDENTS WORK COLLABORATIVELY TO CREATE A GEOMETRICAL DANCE, INFUSING BOTH MATHEMATICAL CONCEPTS AND DANCE ELEMENTS (MOORE, & LINDER, 2012)

"Each day, a lesson was taught regarding one geometric concept and one dance concept on the rubric, with students moving their body to demonstrate the geometric concept."

"The dance needed to include Math elements: right angles, acute angles, obtuse angles, triangles, squares, closed figure with more than 4 sides, line of symmetry, and Dance elements: dance phrases that have a beginning, middle, and end, smooth transitions, repeated phrase, low, medium, and high levels, maintained concentration and focus throughout performance"



CURRICULUM EXPECTATIONS (GR. 5)

MATH: SE: identify benchmark angles & SE: "dentify triangles, and classify them according to angle and side properties" (OME, 2005, p.82)

DANCE: SE A1.1: translate into movement sequences a variety of images and ideas from other classroom subjects, including the arts (OME, 2009, p.110) & SE A1.4: use the element of relationship in short dance pieces to communicate an idea. (OME, 2009, p.111).



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