



SHELL  
EDUCATION

# Strategies to Integrate the *Arts* in Mathematics



$$a^2 + b^2 = c^2$$



$$2 + 5 = 7$$



Linda Dacey  
Lisa Donovan

LESLEY  
UNIVERSITY

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Dona Herweck Rice, *Editor-in-Chief*; Robin Erickson, *Production Director*;  
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Tracy Edmunds, *Editor*; Leah Quillian, *Assistant Editor*; Grace Alba, *Designer*;  
Corinne Burton, M.A.Ed., *Publisher*

## **Contributing Authors**

Louise Pascale, Ph.D., associate professor, Lesley University Creative Arts in Learning Division  
Celeste Miller, M.F.A., adjunct faculty, Lesley University Creative Arts in Learning Division

## **Consultants**

Jennifer Bogard, Doctoral Candidate, Lesley University and Literacy Coach  
Devin Feirra, music director, Charlestown Boys and Girls Club, Community Arts Master's Degree Candidate,  
Lesley University Creative Arts in Learning Division  
Susan Griss, M.A., adjunct, Lesley University Creative Arts in Learning Division  
Francine Jennings, Ed.D., national faculty, Lesley University Creative Arts in Learning Division  
Jennifer Roosa, Grade 8 mathematics teacher, Lee Public Schools, MA  
Carrie St. John, Grade 2 teacher, Lee Public Schools, MA

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## **Shell Education**

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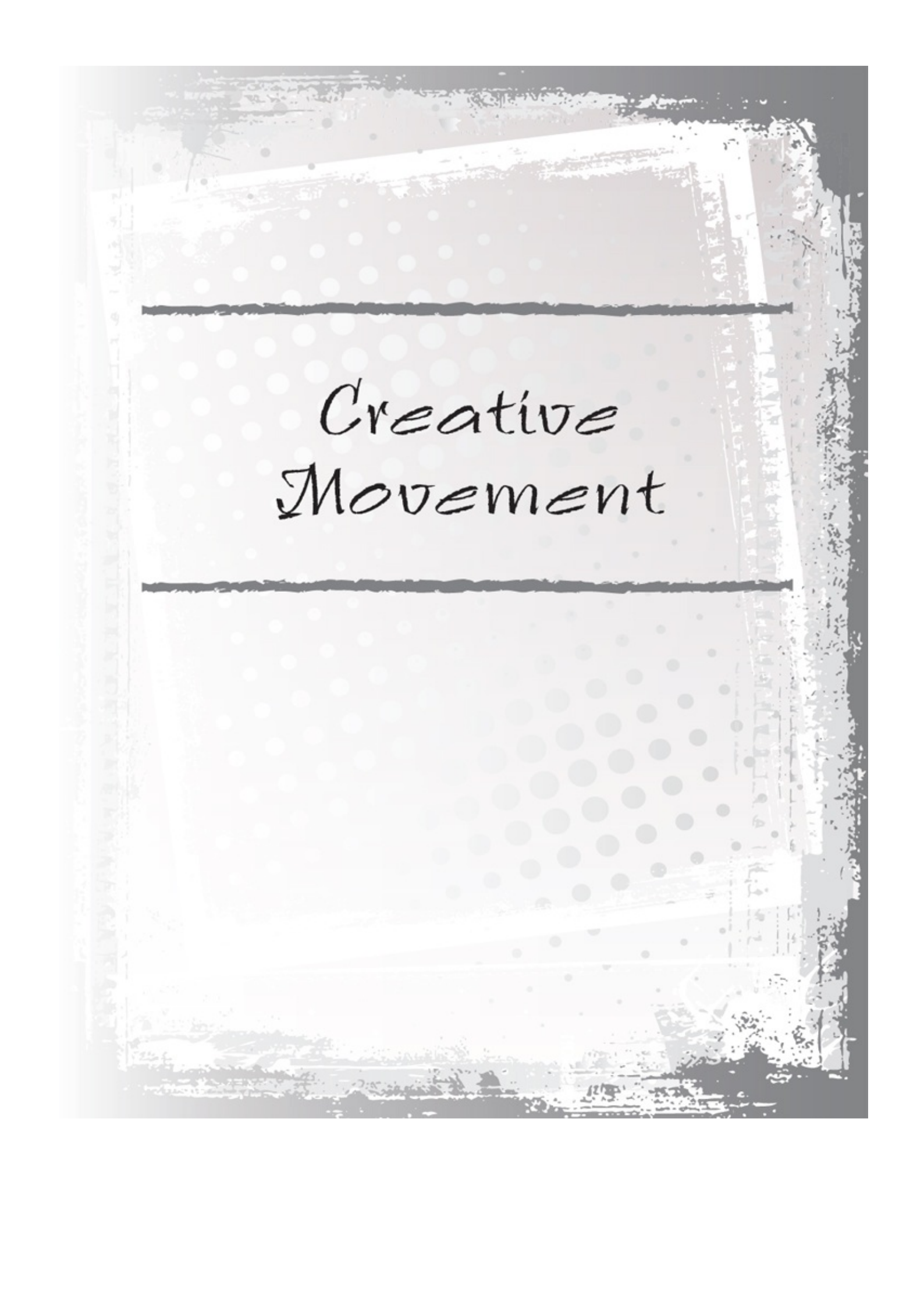
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*Creative  
Movement*

# Creative Movement

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## Understanding Creative Movement

Integrating creative movement across the curriculum is an engaging approach to learning that allows students to experience, translate, and communicate mathematical ideas kinesthetically. In 1983, Howard Gardner identified bodily-kinesthetic intelligence within his theory of multiple intelligences (2011) as one way that students learn. Neuroscientists are finding that memory and recall is improved when the body is engaged in the learning process (Zull 2002) and that the mind uses the body to make sense of ideas (Carpenter 2010).

While important for all learners, opportunities to express themselves nonverbally can be particularly powerful to strengthen students' linguistic skills. Such opportunities can provide students with access to mathematical content that would not be possible otherwise. Stacey Skoning (2008) states that creative movement, or dance, "is important to incorporate into our inclusive classrooms if we want to meet the needs of more diverse groups of students."

Creative movement allows students to be physically active, which often increases students' attention span, but it's much more than just the incorporation of movement into classroom activities. When students are involved in creative movement, they become more mindful of their bodies' ability to communicate, explore what happens when they move with intention, engage in problem solving through movement, and develop awareness of their creative choices. It's important to keep the possibilities for this work in mind as your students explore these lessons.

As students deconstruct and reconstruct concepts, they take ownership of the ideas through kinesthetic means and creative choices. When students translate mathematical ideas into movement, they create meaning for abstract ideas and, through the process, they gain a more positive attitude toward mathematics (Werner 2001).

# Strategies for Creative Movement

## ☞ Embodiment

In this strategy, students use shapes (body shapes, lines, angles, curves), level (low, middle, high), and movement or gesture to *embody*, or show with their bodies, their understanding of concepts and terms. The strategy can be used to model complex ideas, helping students to grasp, investigate, and internalize concepts. Students can also create spontaneous creative movement to help them summarize or review their learning.

Working with others to embody ideas in movement can prompt students to discuss characteristics of a particular concept, both as they translate ideas into movement and while they view the presentation of other groups' ideas. Dance artist Celeste Miller suggests that the language of movement can provide a “palette for expression of both abstract and tangible ideas” (Miller, pers. comm. 2012). Having groups of students embody the same concept allows these students to see how different movement interpretations can convey the same ideas. Coming up with more than one approach for depicting an idea encourages creative and critical thinking. This strategy can help students solidify ideas and help you assess students' depth of understanding.

## ☞ Moving Statues

This strategy combines held poses with movement as students incorporate the use of shape (body shapes, lines, angles, curves), level (low, medium, high), and quality of movement (characteristics such as sustained, swing, percussive, collapsed), allowing them to make nuanced changes in movement. Students can form moving statues alone, in pairs, or in groups.

A group statue results in a large, fluid representation of a concept as students create an evolving model of the idea being explored. Moving statues also can require students to position themselves in relationship to others. Through such experiences, creative movement can improve self-esteem and social functioning (Theodorakou and Zervas 2003).

## ☞ Experimentation

In this strategy, students use physical problem solving to discover new knowledge. As they explore curricular topics, students embody ideas and investigate them through movement, triggering new ways of thinking and allowing for generalizations to be discovered. For the process to truly be experimental, concepts should be considered before they are fully developed. Coaching students through cues and open-ended questions will improve their critical thinking and creative choices (Chen 2001). Experimentation can also be used to introduce a new topic and need not take a long time.



## **Choreography**

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Audiences can be mesmerized by dancers moving across the stage, alone, in pairs, or in groups. Dancers can seem to move seamlessly from individual locations as they join together as a group and then part to return to individual spots. Choreographers orchestrate this motion through the planning and notation of movement.

Choreography requires students to decide how to incorporate moves, pathways, tempo, and location into a creative movement piece and then to notate or communicate those decisions. Without such notation, dance instructions could not be transmitted over time (Waters and Gibbons 2004).

## **Movement Phrases**

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In this strategy, students create a series of movements to represent the parts of a process or concept. They perform this series of movements, linking each to the next to illustrate a series of steps or components within a curricular concept. When students link ideas, they can better understand relationships among concepts and form generalizations. As students create and build upon their movement ideas, they also develop the vocabulary of movement, such as directional words (pathways) and levels (high, medium, low). According to Stacey Skoning (2008), “having a common movement vocabulary in the classroom benefits everyone because the common vocabulary makes it easier to discuss the movement phrases that are being created.”