

Framing Dance Residency Teacher Handout:  
Space Exercises using Geometry:  
Pathways

**Karen Stokes Dance (KSD)** is committed to bringing dance and movement into the classroom to enhance comprehension of material. Students gain a concrete learning experience by merging audio, spatial, kinetic, and visual modes of learning. In the following handout and accompanying videos, KSD uses exercises in dance, creative movement, and partnering techniques to demonstrate rules of Science, Math, and Language Arts.

### Geometry

*Geometry* is one of the most noticeable academic subjects represented in dance. Dance incorporates shapes, patterns, angles, and symmetry, which can all be seen in the video: *Space 2: Pathways*.

Video: *Space 2: Pathways*.

*Pathways* refer to symmetrical and asymmetrical designs created on the floor using traveling steps, like rolling, hopping, walking, or leaping. Pathways reinforce Geometry concepts by creating designs on the floor rather than through the body. These exercises incorporate locomotor skills with concepts of Geometry: two dimensional shapes, angles, curves, lines, and rays.

#### Exercise 1: Individual Pathways

Students individually explore how to get from point A to point B in direct (straight line) or indirect (zigzag, curvilinear, spiral) pathways. Students are asked to also explore various modes of traveling – hopping, skipping, running, walking.

#### Exercise 2: Group Pathways

Students explore moving as a group in a spiral and reverse spiral pathway.

#### Exercise 3: Designing Pathways (not shown in video)

Students draw a design on paper and then are asked to create the designed pathway on the floor.

In all three exercises, the teacher encourages diversity of movement by posing problems for them to solve as they are moving across the floor:

What different traveling steps can you use?

How many different ways can you interpret moving in one shape? Video Example: two children spiral differently across the floor – one in a very large spiral that gets smaller and smaller; one that spirals around herself as she goes across the floor.

#### Choreography:

Students are given two rules of space (static and dynamic shapes, levels, or pathways) and asked to create 8 counts of movement within those two rules. Video Example: boys are given seaweed (curved dynamic shapes) and square pathway. This lesson combines Geometry concepts with the body (improvisation, locomotor skills) and mind (problem-solving skills) to reinforce the lesson and give the students an opportunity to use these skills in cognitive applications.

<http://archive.bridgesmathart.org/2012/bridges2012-453.pdf>

### **Why we should care**

Dance can be used to teach the fundamentals of mathematics and provide the students with basic intuition about the abstract concepts involved. Actually getting to experience math at work might be more exciting to students than “Two trains leave cities A and B going at 60mph...” Applying mathematics to more familiar ‘real life’ situations would certainly remove the stigma of the field being dry and inaccessible.

Math concepts can be used consciously to create dance. Many choreographers create pieces based on their intuition; being explicitly aware of the principles they are applying could help speed up the creative process.

Finally, the awareness of how mathematics and dance interact and draw from each other can help us understand both areas on a whole new level and keep the inquiry exciting.

### **Geometry in Dance**

Geometry is perhaps the most apparent subfield of mathematics present in dance. We can consider the shapes, patterns, angles and symmetry of many different aspects of dance within a variety of scopes. The analysis could concern anything from one dancer frozen in a position to a whole ensemble actively moving in space. In the first case, we would look at the lines of the body and their relation to each other and to the space in which the dancer exists. In the latter, we would consider not only the lines and shapes created by the collective and the way in which they change with the music, but also the patterns of beats bringing on those changes.

<http://educationcloset.com/2012/11/15/the-geometry-of-dance/>

### **Symmetrical/Asymmetrical Dance**

When watching a beautifully choreographed dance, one of the things you’ll notice is the use of symmetry of motion, both of an individual dancer, and in that of a group. You’ll also notice the use of asymmetry as a method to break the eye from the scene, or to demonstrate dissent within the piece. Of course, symmetry is a geometric concept and this can be deeply and intentionally taught through the use of motion.

<http://artsintegration.com/portal/geometry-in-dance-2/>

Understanding these geometric concepts will be supported by exploring the relevance of geometry in relation to movement, specifically through the use of their own bodies. They will create a small piece of dance/movement that will model their understanding of these geometric concepts and be able to explain their process with the class.