

Framing Dance Residency Teacher Handout:
Weight-Sharing Exercises using the Laws of Science

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.

Laws of Science

Several Laws of Science can be demonstrated using weight-sharing exercises. In this handout we will focus on the Sir Isaac Newton's *Universal Law of Gravitation* and *Three Laws of Motion*.

The *Universal Law of Gravitation* states that any two objects exert gravitational force towards one another. View the two weight sharing exercises: *Pull and Push*. In the first exercise, the students pull against each other by balancing their body weight between them. Regardless of weight, two partners can balance their weight by lowering their mass towards the floor, using gravity. They then rise, and can switch hands and lower again. The balancing and pulling action exhibits how gravitational force pulls on two objects. *Push* uses the same concept, but through pushing against one another, back to back.

Three Laws of Motion:

The First Law states every object in a state of rest or motion stays in that state/motion unless acted upon by an outside force.

The Second Law establishes a connection between an object's mass and its acceleration. The greater the mass, the greater the amount of force needed to accelerate the object.

The Third Law- For every action there is an equal and opposite reaction. That is, for every force applied to an object or surface, that object pushes back with equal force.

View the exercises: *Weight Sharing and Traveling Across the Floor*. In the first pull exercise, students use their weight and the force of gravity to pull one another across the floor. In the second push exercise, students push against one another's backs with equal force so that they remain upright enough while their center of gravity is shared down the middle. This weight sharing allows them to walk across the floor while neither student is holding his/her own weight. Both exercises incorporate all three Laws of Motion stated above by showing an object at rest (stationary stance with knees) until acted upon (pull), acceleration when acted upon (some pulls result in large jumps), and for every action there is an equal and opposite reaction (back to back force allows for a center of gravity between students).

Improvisation

View *Improvisation: Creating Different Ways to Push/Pull and Lift*. Students were told to create 5 different ways to push/pull/balance with one another, using 5 different body parts. This exercise encourages creative thinking and exploration of different movement choices.

Feedback

View: *Feedback: Reinforcement of Lesson*. Students are encouraged to reiterate back to the teacher what concepts were explored that day and what they learned from it.