



Newton's Laws

Forces in Motion

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3rd Grade Science/Dance

Science Strand 3.3:

FORCE AFFECTS MOTION

Standard 3.3.1 Plan and carry out investigations that provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Emphasize investigations where only one variable is tested at a time.

Objective:

In a 60-minute class, 3rd grade students will explore forces in motion by creating locomotor movement sequences based on Newton's 1st, 2nd, and 3rd laws.

Dance Standard 3.D.P.1:

Cooperate with a partner or other dancers to safely change levels, directions, and pathway designs in near-, mid-, and far-range movement.

Experiment One: Newton's First Law of Motion

Any object at rest will stay at rest unless a force is applied.

Any object in motion will stay in motion unless resistance is applied.

Materials: Hammer and Blocks of wood, 2" x 4" x 3" (no more than four)

Music: Fly Around by Cirque du Soleil



Science Activity: Stack 3 or 4, 2x4 wooden blocks (three inches long), on top of each other. With a hammer, hit the bottom block out from under the other blocks. (The bottom block will go flying. The other blocks on top will drop, staying on top of each other.)

Dance Activity: Have students get in groups of four. Three students will line up and make symmetrical shapes in low, medium, and high levels respectively. The other student will move across in a locomotor step and when he/she gets close to the shapes the low shape will follow doing the same locomotor step. Repeat for the medium and high level. Switch locomotor steps to make it more interesting. (Leap, gallop, skip, roll)



Experiment Two: Newton's Second Law of Motion

Any object that has a certain weight (mass) will go farther each time it is hit with a greater force. A lighter object will go farther than a heavier object if they are both hit with the same force.

Materials: Hammer kit (see attached paper) and small 1 ½ - inch ball to hit. Noodles.

Music: E chengando junto by Andre Rio.



Science Activity: Put together the hammer apparatus that swings. Hit a small ball with the hammer with different forces. Hit a small ball of lighter weight with the same force. Hit a small ball of heavier weight with the same force.

Dance Activity: Have the students find a partner. Partner #1 makes a shape. Partner #2 makes a shape with the noodle (away from partner.) Teacher calls out an angle (which will determine the amount of force.) Partner with the noodle (#2) approaches partner #1 with a locomotor step, swings the noodle. Partner #1 travels with the speed and distance according to the amount of force applied. Explore calling out different ball weights.



Experiment Three: Newton's Third Law of Motion

For every action there is an equal and opposite reaction.

Materials: Two 3-foot ½-inch PVC pipe. 5 balls: cork, glass, wood, bouncy, and steel. Signs of balls and locomotor steps.

Music: Pirates of the Caribbean by Dominique Hauser



Science Activity: Using the collision balls on the PVC pipe, push the balls toward each other with the same force. Describe what happened and why it happened.

Dance Activity: Assign a locomotor step to each kind of ball. For example, cork – skip, bouncy – hop, wood – gallop, glass – roll, and steel – jump. Have the students find a partner. Have each partner start on opposite ends. Teachers calls out right side wood ball, left side glass ball. When they meet they will be a reaction depending on the type of ball.