

Gr. 3 - Understanding Matter and Energy

Forces Causing Movement

Inertia Zoom Ball

Specific Expectations:

2.2 Investigate forces that cause an object to start moving, stop moving, or change direction.

2.3 Conduct investigations to determine the effects of increasing or decreasing the amount of force applied to an object.

2.4 Use technological problem-solving skills and knowledge acquired from previous investigations, to design and build devices that use forces to create controlled movement.

2.5 Use appropriate science and technology vocabulary, including *push*, *pull*, *load*, *distance*, and *speed*, in oral and written communication.

3.1 Identify a force as a push or a pull that causes an object to move.

3.3 Describe how different forces applied to an object at rest can cause the object to start, stop, attract, repel, or change direction.

3.4 Explain how forces are exerted through direct contact, or interaction at a distance.

Big Idea (for lesson):

Students explore a law of motion (Inertia; Newton's First Law) by building and playing with an Inertia Zoom Ball.

Accommodations:

- Increase time
- Visual Aids
- Manipulatives
- Chunking
- Step-by-Step
- Scaffolding
- Copy of Notes
- Student Grouping

Differentiated Instruction:

- Content: Use demo to show the content as you offer verbal descriptions.
- Process: Have students work in pairs and support each other if physical impediments exist.
- Product: Have students verbalize their understanding or write in a journal.
- Other: _____

Bloom's Taxonomy:

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

Multiple Intelligence:

- Verbal/Linguistic
- Logical/Mathematical
- Visual/Spatial
- Bodily/Kinesthetic
- Naturalist
- Musical/Rhythmic
- Interpersonal
- Intrapersonal

Delivering The Lesson:

Gr. 3 - Understanding Matter and Energy

Forces Causing Movement

Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 5 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	To introduce the idea of people using energy, the teacher could perform the following hook: -Take a silky piece of material (with no hem) large enough to cover a small table, and have some objects put on them (dishes are classic). -Simple tell the class that you are going to be exploring a property of motion called Inertia that day, and you're going to show them an example. -Gather the cloth in your hands and pull straight out. The objects shouldn't be rattled much, if at all. Teachers should now explain what happened in this demonstration: -It's a law of motion that something will stay put unless a force is put on it. -How did I move the cloth? (<i>Answer: I used the energy in my arms to pull the cloth out very quickly</i>) -Why didn't the objects on the table move? (<i>Answer: There is little friction due to the material, and thus no force to move the dishes.</i>)	-Silk cloth -Objects with some weight to them (dishes, books, etc.)
Action: 25 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input type="checkbox"/>	Have students follow the instructions on the handout to build an Inertia Zoom Ball in pairs. As the students build and test their Inertia Zoom Ball, ask them some questions: -How do you send the ball to the other player? (<i>Answer: by jerking the strings apart and sending energy from me to the ball</i>). -Why does the ball sometimes slow down? (<i>Answer: the string and the ball rub, which means frictions slows it down.</i>) -Feel the cord, and listen as you play. What do you notice? (<i>Answer: The cord feels warm because of the rubbing, and you can hear the movement of the ball. The movement energy is being transferred to sound and heat energy, slowing it down a bit.</i>) -How is this activity similar to the one don at the start of the class? (<i>Answer: This activity demonstrates Newton's First Law of Motion:</i>	Inertia Zoom Ball – Handout (Materials listed)

Gr. 3 - Understanding Matter and Energy

Forces Causing Movement

				<p><i>without a force like a push or a pull, an object won't move. If an object is moving, it won't stop moving in a straight line unless forced to change by another push or pull.)</i></p> <p>Have students work on the handout, which outlines visual everyday examples of inertia at work.</p>	
<p>Consolidate: 10 mins</p>	<p>W <input checked="" type="checkbox"/></p>	<p>S <input checked="" type="checkbox"/></p>	<p>I <input type="checkbox"/></p>	<p>Show the Inertia Beads video. Remind students that inertia keeps things that are at rest not moving. Ask them what is happening in this video? (<i>Answer: Inertia also keeps things moving that are already moving, like the beads in the video</i>).</p> <p>Show the demo in person, if desired.</p> <p>Another option is to mimic the tablecloth hook at the start of the lesson with something that students can try:</p> <p>-Give students a cup, card, and coin. Have them place the card over the mouth of the cup, and put the coin on the middle of the cup. If the paper is pulled quickly and straight out, the coin will fall straight down into the cup.</p>	<p>-Large beaker -Long strand of beads</p> <p>-Coin -Cup -Card</p>