

Gr. 3 - Understanding Matter & Energy

Forces Causing Movement

Static Friction/Moving Friction

Specific Expectations:

- 2.1 Follow established safety procedures during science and technology investigations.
- 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.
- 2.5 Use appropriate science and technology vocabulary, including *push*, *pull*, *load*, *distance*, and *speed*, in oral and written communication.
- 3.2 Identify different kinds of forces.
- 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 through interaction at a distance.
- 3.5 Identify ways in which forces are used in their daily lives.

Big Idea (for lesson):

Students explore the difference between static and kinetic friction by building a hands-on widget that easily demonstrates the difference in effort necessary, and discuss the implications and benefits of these forces on motion.

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: Students may show their final product in pairs, and communicate their findings either verbally, visually, or through written means.
- Other: _____

Bloom's Taxonomy:

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

Multiple Intelligence:

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

Gr. 3 - Understanding Matter & Energy

Forces Causing Movement

- Interpersonal
 Intrapersonal

Delivering The Lesson:

Portion & Timing	Grouping:			Introduction:	Materials
Minds On: 10 mins	W <input checked="" type="checkbox"/>	S <input type="checkbox"/>	I <input type="checkbox"/>	<p>Teacher can do the “magic” demonstration as described at the following link: http://www.stevespanglerscience.com/lab/experiments/root-beer-genie, or show the video listed on the side.</p> <p>After students find out how the trick works, ask them to explain how it works in their own words.</p> <p>Ask students how friction prevents the one bottle from falling? (<i>Answer: The surface of the ball (the "genie") provides adequate force or resistance to bind the rope against the glass and keeps the rope from slipping out of the bottle.</i>)</p>	2 Glass Soda Bottles 2 Pieces of Rope 1 Small Ball Static & Moving Friction – Root Beer Genie – Sick Science!.mp4
Action: 15 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input checked="" type="checkbox"/>	<p>Have students build their own friction box according to the instructions on the handout.</p> <p>Teacher can circulate and ask questions of the different groups:</p> <ul style="list-style-type: none"> -Which is harder to overcome, static or kinetic (moving) friction? (<i>Answer: static</i>) -Can you think of any everyday situations where this would be good to know? (<i>Answer: pushing a car out of a ditch versus keeping it going.</i>) 	Static Friction & Moving Friction Handout (Materials listed)
Consolidate: 10 mins	W <input checked="" type="checkbox"/>	S <input checked="" type="checkbox"/>	I <input type="checkbox"/>	<p>Spend a few minutes comparing different sized boxes, different weights of objects, etc. and pointing out the changes in effort when the students try to pull.</p> <p>Make a T-chart on the board and have students suggest situations where it would be ideal for friction to be greater (ie. running shoes) and situations where it would be better for friction to be lessened (ie. the bottom of skis).</p>	Objects of various weights.