

**Groundwork  
Education in  
Mathematics and  
Science**

<p><b>Module:</b> Force and Motion</p> <p><b>Prepared by:</b> Jackie Beckley &amp; Jennifer Yankey (teachers) &amp; Shay Phillips (GEMS Fellow)</p> <p><b>Date(s):</b> 1/8/06</p>	<p><b>Investigation/Lesson:</b> Extension- Changing the height of a ramp and relating it to the distance traveled</p>
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<p><b>Content Vocabulary:</b></p> <p>potential energy kinetic energy gravity energy GPE-gravitational potential energy force variable</p>	<p><b>Concepts/Skills/Core Content:</b></p> <p>What should a student know/be able to do as a result of this lesson? Increasing the height of the starting line (ramp), increases the GPE of the bottle, thus increasing its kinetic energy as it leaves the ramp.</p> <p>***This lesson is appropriate for all students: it is basic , to the point, and narrowly focused on the core content at a level that all students can master.</p> <p>Which core content bullet(s) is addressed in this lesson? 1.2.2 An object's motion can be described by measuring its change in position over time, such as rolling different objects down a ramp.</p>
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<p><b>Materials:</b></p> <p>What materials are needed for this lesson?</p> <p>1 ramp (long board) 1 empty, clean 2L bottle 6-8 books of equal thickness 1 measuring tape 1 roll of masking tape 1 marker lab notebooks</p> <p>What materials preparation is necessary for this lesson?</p> <p>Clean and remove label off of a empty 2L plastic bottle. Arrange to work in an area with adequate space, such as the gymnasium or the hallway.</p>
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<p><b>Classroom/Materials Management:</b></p> <p>How will students be grouped?</p> <p>Entire class will be grouped together and tasks will be assigned to individual students.</p> <p>How will materials be distributed/returned?</p> <p>Students will be asked to help carry supplies to experiment area and then back to the classroom.</p>
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**Student Notes/Notebooks:**

Where and how will students record important classroom information? How will students know what to record?

Before moving to the hallway or gymnasium, students will be asked to copy the table below in their science notebooks.

Number of Books:	1 Book	2 Books	3 Books	4 Books	5 Books	6 Books	7 Books
Number of centimeters bottle traveled (cm):							

How will students organize their notes/notebooks?

Data will be written in their science notebooks using the data table above.

How will you provide feedback to your students about their notes/notebooks and their organization?

As the lesson progresses, the students fill in the data table with the distance traveled in centimeters. After returning to the classroom, the students are asked to write a conclusion in their notebooks based on and including their data from the table.

**Literacy Connections:** see PowerPoint for a listing of complementary readings

**Thinking Through the Lesson:**

**Introduction**-How will you introduce the lesson and connect it to prior student learning?

- Review how the cars moved on a flat surface
- Ask- What if we used a ramp?
- Explain how they will set up an experiment as a class with the given materials
- Discuss- Form a chart to record results

**Facilitation**-How will you facilitate learning and move all students to higher order thinking?

Do as a group/record results as a group- use notebooks.

**Closure**-How will you know what each student has learned/is able to do?

- Share responses from notebooks
- Have students copy overall conclusion in notebooks
- Do same experiment the next day, but change the surface (use carpet instead of tile at the end of the ramp)

**Homework:**

Use vocabulary to create a story (vocabulary should be used with context clues to understand the meaning of each word-not definition).