

# Potential & Kinetic Energy

## 5<sup>th</sup> Grade

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### **Benchmark:**

SLC 9: A. Students will explore how energy changes (transforms) from one form to another within their surroundings. B. Students will communicate their knowledge of energy changes.

### **Objectives:**

Students will learn about kinetic and potential energy and how they relate to each other and the ability to do work.

### **Materials:**

- 3 marbles of different mass
- Inclined plane
- Metric ruler
- Milk carton
- Energy worksheet

### **Initial Demonstration/Initial Observation:**

Set up a demonstration of rolling three different marbles down an inclined plane. Place the bottom section of a milk carton at the bottom of the ramp to catch the marble and then measure the distance that the carton moves each time.

Ask for hypotheses explaining why the carton moved different distances with different marbles or different angles of the incline plane.

### **Target Observations:**

- The larger the mass the further the milk carton moves
- The higher the object is raised the further the milk carton moves

### **Target Model:**

-The larger the mass and the higher an object is raised, the more energy is stored in that object.

### **Procedure:**

Have the class split up into small groups of 4. Each group should receive a set of materials to work with. The groups will test the three different masses at the same height and one mass at three different heights. If there is time, make a bar graph of mass vs. distance milk carton traveled and of height vs. distance milk carton traveled.

### **Discussion/Summary:**

- Who can tell me the meaning of work?  $W=Fx D$
- What is mechanical energy?

- Which marble has more mechanical energy when sitting on a flat plane? Do your test results show this? *The marble with the most mass*
- If I put the marbles up on the inclined plane, would they have energy? Why? *Yes, because above sea level*
- When do the marbles have the most potential energy? The least? *Most at a very high point and the least at sea level ( $PE=mgy$ )*
- When do the marbles have the least kinetic energy? The most? *Least at the most potential energy and the most when going the fastest ( $KE=1/2 MV^2$ )*
- What happens when the smallest marble is let go at twice the height of the larger one? Why? Do your test results show this? *It will push the cup further.*
- What are some examples of storing and using energy in our environment? *Teeter-toter, Wrecking ball, Elevators*
- What are some factors that affect the amount of work an object can do? *Mass and Height*

**Target Revised Model:**

-The larger the mass and the higher an object is raised, the more energy is stored in that object.

-Potential energy is stored energy (object is at rest)

-Kinetic energy is the energy used while moving

-When an object is put into motion, potential energy turns into kinetic energy

-When an object comes to rest, kinetic energy turns into potential energy

Name:

Date:

## Potential & Kinetic Energy

Record below how far the cup travels for each of the three different balls:

	Mass of the Ball	Distance Cup Traveled
Ball 1		
Ball 2		
Ball 3		

Record below how far the cup travels for three different heights:

	Height of the Inclined Plane	Distance Cup Traveled
Height 1		
Height 2		
Height 3		

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