

# Lab - MYSTERY MOSS

## Extension 8.2.2 – Potential and Kinetic Energy

**Challenge** – To identify the Smart Water Bottle X's mass!

**Directions** – Your group needs to collect data and analyze the results to help your group identify an unknown mass. Your group needs to take into consideration what you have learned about kinetic and potential energy, as they play an important factor in helping your group solve the mystery!

**Supplies** –

a sewer pipe, a large nail, 6 empty soda cans, empty water bottle, scale and a ruler.

**Procedures** – Patterns created in this activity are used to identify the unknown mass of Smart Water Bottle X.

1 – Fill the empty smart water bottle at your station to the top black line, labeled **A**. Please make sure to put the lid back on as this is going to be a falling mass.

2 – Measure the mass of the smart water bottle using the scale (g) and record the measurement in the data table.

3 - Place a wood block on the floor to protect the floor.

4 – Use the ruler to measure height (how tall the soda can is) and record in the data table, then place the empty soda can in the center of the wood block.

5 – Lean the sewer pipe over a little then place the large nail through the 1.5 meter mark. Drop the smart water bottle inside the pipe letting it gently slide down until it is stopped by the nail.

6 –Stand the sewer pipe up straight and place it over the soda can, make sure the sewer pipe is on the wooden block and that the soda can is still standing straight up and not tipped over. When you are ready, pull the nail out and let the smart water bottle fall onto the empty soda can.

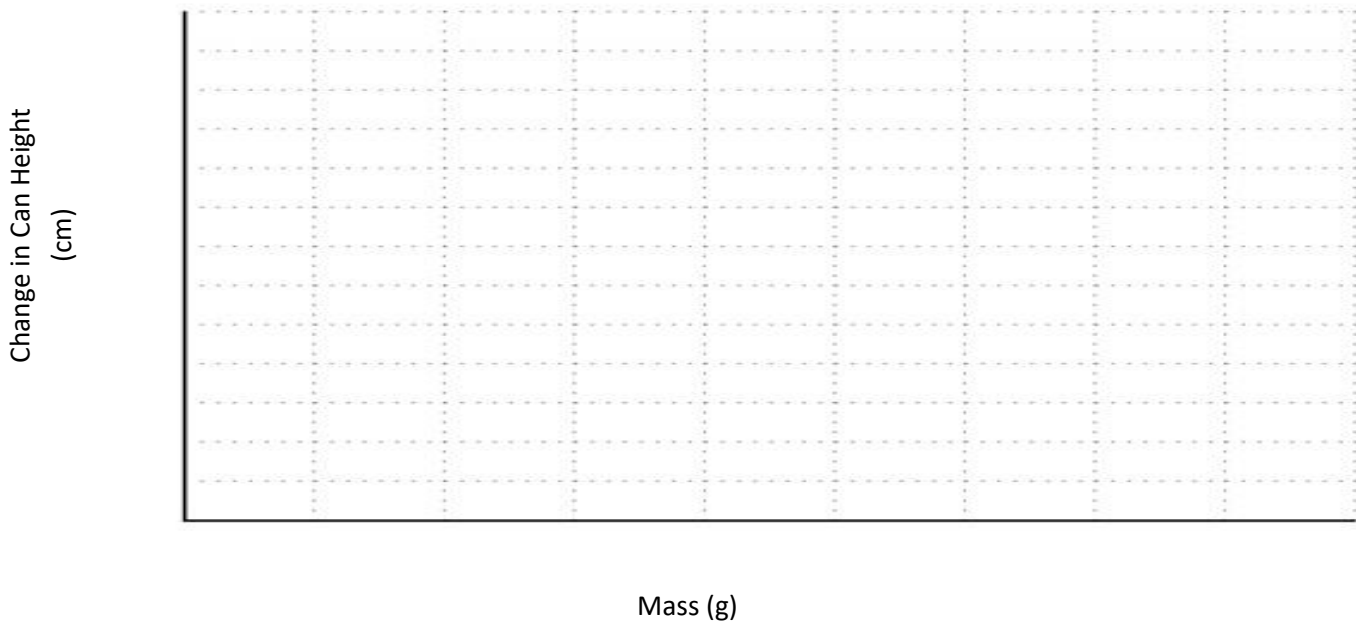
7 – Lift everything off the soda can and use a ruler to measure the height of the crushed can and record in the data table.

8 – Keep all of the soda cans at your station to use later in the lab.

9 – Repeat all of the steps, emptying the water each time to the lines labeled **B, C, D, and E**

Water filled to labeled water line	Mass of Smart Water Bottle (g)	Original Height of Can (cm)	Crushed Height of Can (cm)	Change in Height Original Height – Crushed Height (cm)
<b>A</b>				
<b>B</b>				
<b>C</b>				
<b>D</b>				
<b>E</b>				

**Graph Data** – Create a graph using the data you just collected. You will use the pattern created by the graph to help you identify the mystery mass of Smart Water Bottle X.



**Smart Water X – Mystery Mass**

10. You now have 1 can left and will use this can to identify the mystery mass of Smart Water X.
11. Measure the height of the can and record in the data table. Then place the can on the wooden block, and set up the test just as you did before, only this time, your group is **NOT ALLOWED TO WEIGH Smart Water X**
12. After the test, measure the height of the soda can with the ruler to find out how much Smart Water X crushed it. Then use the graph your group created to find the mystery mass.

	Original Height of Can (cm)	Crushed Height of Can (cm)	Change in Height Original – Crushed (cm)	Mass of Smart Water X (g)
<b>Smart Water X</b>				

**Analysis Questions -**

1. How did you use the graph and the data to solve the mystery mass?
2. How does this experiment use **kinetic energy** to help solve the mystery mass?
3. How does this experiment use **potential energy** to help solve the mystery mass?
4. What is the **independent** variable in this experiment?
5. What is the **dependent** variable in this experiment?
6. What is the **controlled** variable in this experiment?