Name:_____

Counterweights and Energy

Instructions:

1. Have one group member hold the box still while another group member puts a few weights in the cup (~30 g) at the other end of the paper strip.

2. When ready, have a group member press and hold the button on the spark timer to start recording dots. When the button is pressed, say "go" to have the other group member release the box. Hold the button down until the box crashes into the spark timer, then release the button.

3. Remove the paper from the spark timer by tearing the paper off right before it attaches to the box. Be careful not to remove any of the dots! Mark which end of the paper was where the dots started, and which end was where the dots ended.

4. Use the ruler to measure the distance from the last dot to the third-from-last dot (record your measurement in meters)

   Distance of last 3 dots_____

5. Get a new paper strip and reset the equipment to repeat the experiment (make sure to use the same amount of weight in the cup).

6. Add weights to the box for the second trial (try starting with the same weight as in the cup). Be sure to add enough weight to slow down the fall of the cup, but not so much that it won't fall (the amount you need to add will depend on how slippery your table is! A very slippery surface will need more weight to hold the box down, and a rough surface will not need as much– you can repeat the drop test as many times as you need to figure out a good amount of mass to use, the spark timer does not need to be running for this).

7. Repeat the drop procedure above, making sure to mark the ends of the paper afterwards and measure the dot spacing over 3 dots at the end.

   Distance of last 3 dots_____

Questions:

What do you notice about the spacing of the dots on the paper at the beginning of the fall and at the end?

What happens to the kinetic energy of the box while the cup is falling? (circle one)

INCREASES DECREASES STAYS THE SAME

What happens to the potential energy of the cup while it is falling? (circle one)

INCREASES DECREASES STAYS THE SAME

Did the box speed up more during the first fall or the second fall?

The timer places a dot on the paper 60 times per second. This means that 3 consecutive dots correspond to a time interval of 0.05 seconds. Given the distances measured for the initial and final dots for the two falls, what were the final speeds of the box for each experiment? (speed = distance/time)

First trial: Second trial:

Which trial would have a more gentle landing?