Name: _____ Class: _____ Date: _____

Gravity Drop Day #1

Goal: The goal of the lab is explore the acceleration due to Earth's gravity and to prove that it is the same for all objects, regardless of how heavy they are.

Materials:

- CPO stand
- Marble Dropper
- Ruler
- Metal marble (diameter = 0.019m)
- Timer
- One photogate
- Calculator
- Plastic marble (diameter = 0.019m)

Procedure:

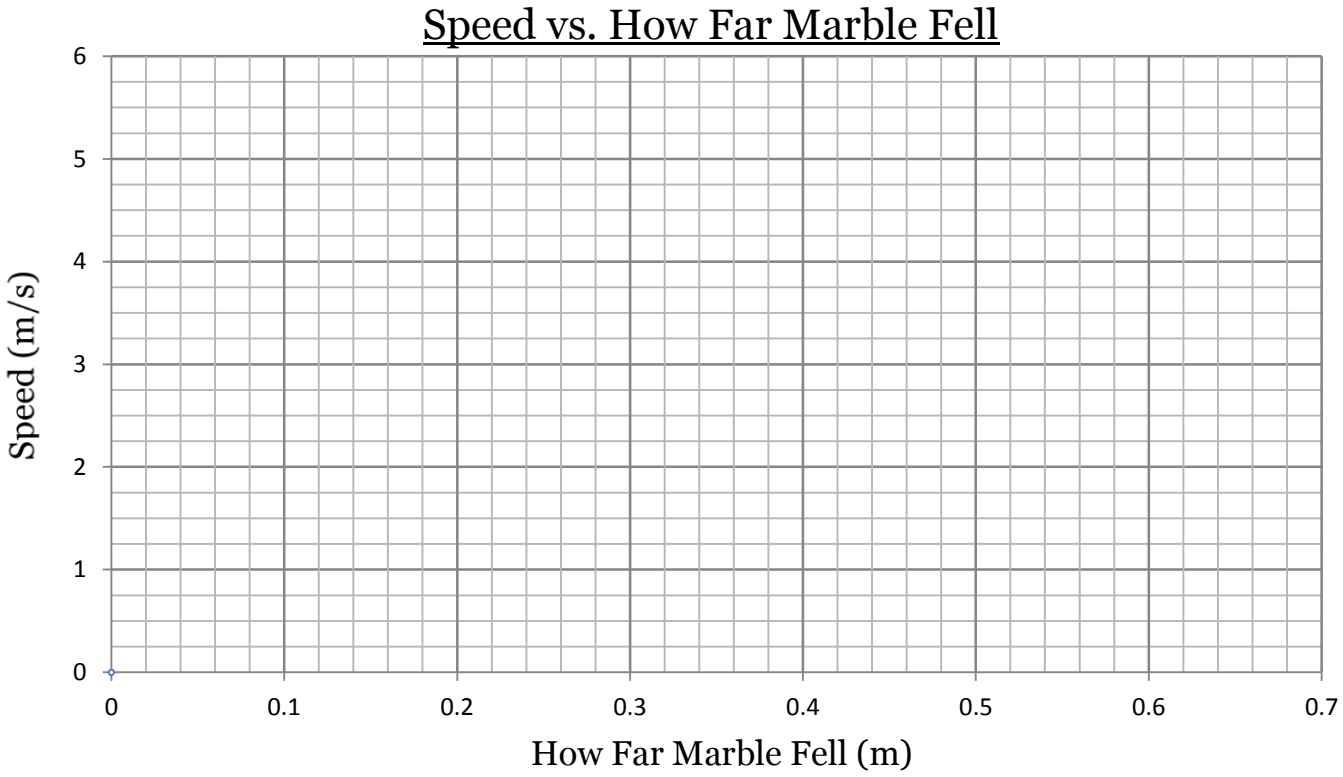
1. Move photogate to required distance below dropper.
2. Set timer to Interval Mode. Turn on Gate A (or whichever gate you decided to use).
3. Insert metal marble into dropper. Drop marble through photogate.
4. If it was a "good drop" (marble was caught by marble catcher), then record the time.
5. Calculate marble's speed (0.019 ÷ time).
6. Insert plastic marble into dropper. Drop marble.
7. Record time. Calculate marble's speed.
8. Move photogate to next distance. Repeat steps 3-7 for all seven distances.

Data Table:

Drop Height *How far below the dropper is the photogate?*	**Metal Marble** Time (s)	**Metal Marble** Speed (m/s)	**Plastic Marble** Time (s)	**Plastic Marble** Speed (m/s)
0.0 m	0	0	0	0
0.1 m				
0.2 m				
0.3 m				
0.4 m				
0.5 m				
0.6 m				
0.7 m				

Graphing:

Take out two different-colored pens. Make a scatterplot of your data, below.
Make a dot for each data point (each speed you calculated). You should have 16 dots total.



Post-Lab Questions:

1. Draw a different-colored line of best fit through both data sets.

2. In general, what happens to an object's speed as is falls?

3. Are your two lines similar (metal acceleration vs. plastic acceleration)?

4. So, does the weight of an object effect how fast it accelerates toward the ground?

5. **CRITICAL THINKING:** When a skydiver jumps out of an airplane, they accelerate toward the ground very quickly. According to our graph, their speed should increase to infinity. But, in reality, they eventually stop accelerating and just fall at a constant speed. What slows down their acceleration?