Name:_____ Period:_____ #:_____

Marble Drop

So, we've busted the myth that a penny dropped from the Empire State building would create enough force to kill a person. What about other objects, though?

Problem : What is the effect of the height a marble is dropped from on the size of the crater it makes?

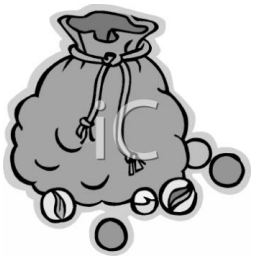
Research:

- Newton's second law states _____.
  So, as acceleration increases (if mass stays the same), force _____.
- Would a marble have the same drag (air friction) if dropped from the Empire State Building as a penny? Explain why or why not.

Hypothesis: If_____ then_____
_____ because _____
_____

Materials:

- bowls or pans
- marbles
- rulers/meter sticks
- paper/pencil
- sand
- scale



Procedures:

1. Measure the mass of your marble on a scale. Mass = _____g.
2. Calculate the force of the ball using gravity as the acceleration ($9.8 m/s^2$). F=_____ N.
3. Fill a bowl or pan with sand.
4. Drop the marble from a height of 10 cm. Record the diameter of the crater to the nearest millimeter (mm).
5. Repeat for a total of 3 trials and record all data in data table.
6. Change drop height to 20 cm and then 30 cm, recording data for 3 trials at each height.
7. Then try dropping the marble from a standing position to the floor (aim carefully!). Repeat for a total of 3 trials and record data.

Table 1: The Effect of _____ on _____

Drop Height (cm)	Diameter of Crater (in mm)			
	Trial 1	Trial 2	Trial 3	Average Diameter
10				
20				
30				
Standing (____cm from sand)				

Graph:
***Construct and design a bar graph on a piece of graph paper. Staple the graph to this paper. The graph should include;

- Title (with IV and DV)
- Axis labels with units (if applicable)
- Clustered bars for Trial 1, 2, 3, and the average for each height.

Analysis: (3 sentences about your graph)

1._____

_____

2._____

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3._____

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Conclusion: (must include all parts of a quality conclusion)

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