Moser/Muniz

Name: _____ Name: _____ Name: _____ Name: _____
Date: _____ Period: _____

How Do Impact Craters Form? LAB

Pre-Lab Directions: You will work in groups of 4 and produce **ONE** completed lab, but ALL need to understand what the independent and dependent variables represent. Before asking questions…**READ #1**…

1. **READ** the lab materials, procedures, and results/analysis sections. This will enable you to determine your variables! Oh, and don't forget—**WRITE IN PENCIL!!!**

2. **Research Question:** Start with the word, "How" AND **BE SPECIFIC**!!!

3. What are the **2 independent variables** in this lab? [this is what you **change**]

4. What is the **1 dependent variable** in this lab? [this is what you **measure**]

5. **Write** your **hypothesis** ("If…..Then…." format; using 1 independent and 1 dependent variable)

6. **Use this data table for this lab.**

Object (Which object did you use?)	Mass (g)	Height Dropped From (m)	Diameter of Crater (cm)
1:_____		.5 m	
2:_____		.75 m	
3:_____		1.0 m	

Materials

Box of sand
Ruler
Meter stick
3 different-sized objects
Digital Scale

Procedure

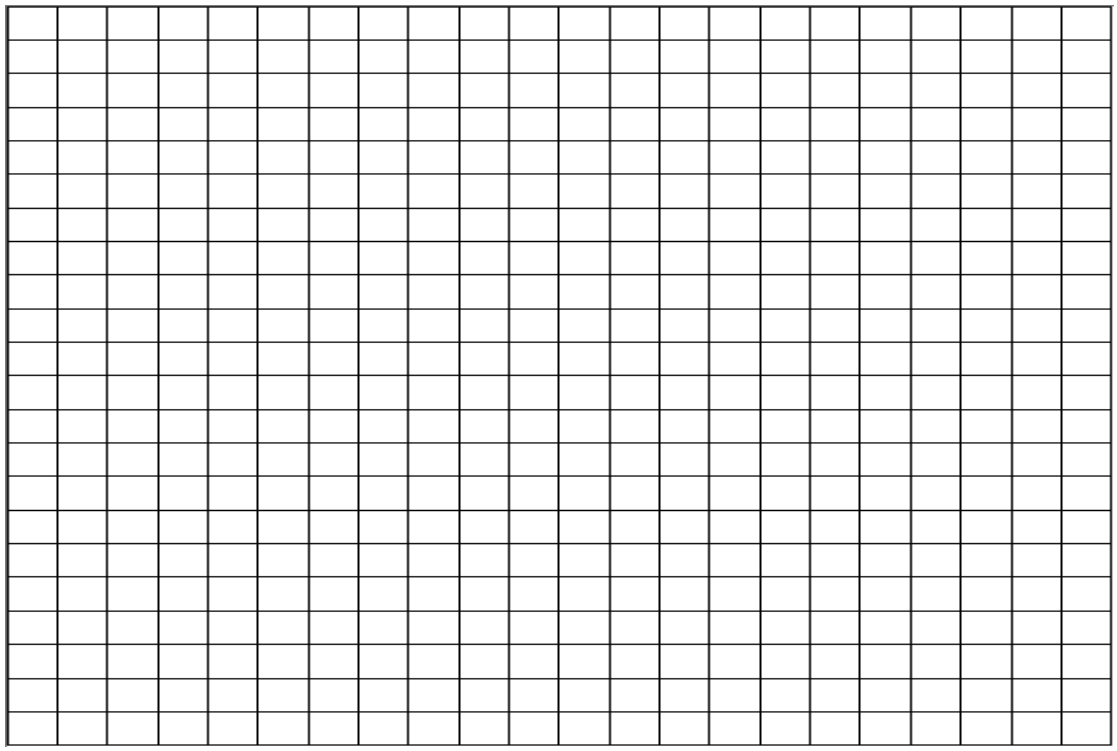
1. Determine the mass in grams of each of your objects by using the scale. Record this in your data table**.**
2. Use the large, plastic container with sand and flatten the surface of the sand with a ruler or your "planner."
3. One at a time, drop each of the different-sized objects from heights of 0.5m, 0.75m and 1m, into the container. Make sure to smooth the surface of the sand between each drop.
4. **Measure the diameter** of the crater produced each time. Record your measurements in a data table.
5. HINT! You will need to make TWO lines for the two variables! What are they?

Results/Analysis

1. Using Mass, your 1st independent variables (x-axis), and the 1 dependent variable (y-axis), plot your data on a line graph below. Don't forget to color in your key!!

Title: _____

Y-Axis: Diameter of Crater (cm)



0

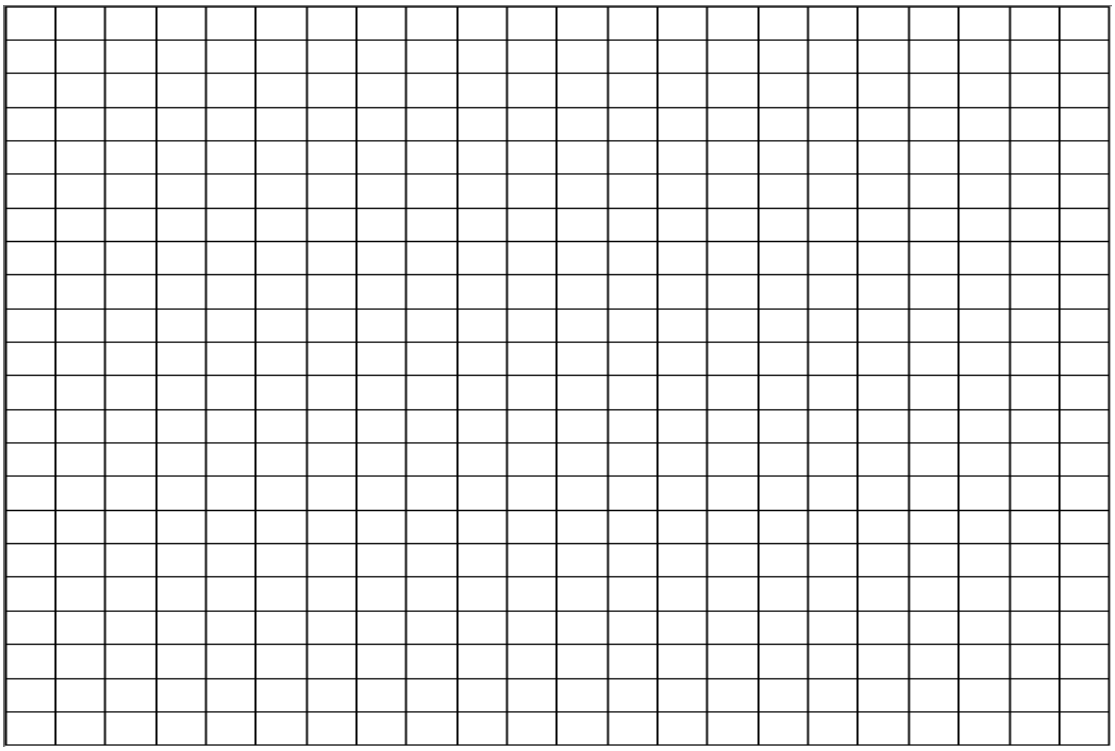
X-Axis: Mass of Object

Key:
= Marble
= Metal Ball
= Rock

2. Using Height Dropped From, your 2nd independent variables (x-axis), and the 1 dependent variable (y-axis), plot your data on a line graph below. Don't forget to color in your key!!

Title: _____

Y-Axis: Diameter of Crater (cm)



0

X-Axis: Height Dropped From

Key:
- ☐ = Marble
- ☐ = Metal Ball
- ☐ = Rock

3. Which of the variables (independent or dependent) is directly related to the velocity of the falling objects? Why?

4. Examine your data (the two graphs) closely and **answer the 2 conclusion paragraphs below** using the following guidelines.

First Paragraph: Your first sentence will state the research question you had going into the experiment in the past tense. The second sentence will restate your hypothesis in past tense. Your third sentence will state whether your hypothesis was supported or rejected by your data (graphs). You will then write a sentence or two summarizing your findings (what trends to do you see from your graphs and why).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Second Paragraph: In this paragraph you will analyze your data in detail. Then you will conclude about the general relationships between crater width and the size, mass, and velocity of the object that produced the crater. Use terms like velocity, acceleration, height, and mass here (underline these terms each time you use them in **RED**). You will then connect the findings of this lab to the relevancy of impact events on the Moon and Earth. Finally, end your conclusion with a description of one additional experiment you would run to investigate velocity or craters. If you need more room, continue on the back of this sheet.