

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Making Impact Craters

The surface of the moon is covered with impact craters- circular features caused by projectiles striking the moon with enough force to mark the surface. When a projectile, or impactor, hits, material flies in all directions, causing a circular dent, or crater. The impact may leave streaks of material, called rays, running outwards from the circle. Impact craters vary greatly in size, and can be found on all the terrestrial planets and on many moons. In this experiment, you will model the formation of impact craters. By alternating variables, you will better understand some of the factors that affect the size and shape of impact craters.

### Procedure

1. Fill a pan with sand to a depth of about 5 cm. Smooth the surface, and then tap the pan to make the material settle evenly.
2. Sprinkle a fine layer of colored sand evenly over the entire surface.
3. Record the mass of the first impactor in grams on the attached data tables.
4. Drop the first impactor into the pan from a height of 30 cm, using the meter stick to determine height. Repeat this two more times with the same impactor.
5. Using the ruler, measure and record the diameter and depth of the resulting craters. Count and measure the length of any rays. Determine the average ray length and record it on the data table for that impactor. Smooth the surface of the material in the pan and evenly sprinkle a new layer of colored sand over it.
6. Repeat the procedure, dropping the impactor from a height of 90 cm. Record your findings in the data tables.
7. Repeat these steps with the second impactor. Be sure and record the mass of this impactor in the data tables.
8. Record all results on the attached data tables.
9. Draw a graph with “impactor velocity (cm/s)” on the x-axis and “Average crater diameter” on the y-axis. Use the chart below to determine the velocity based on height. Use different colors for each impactor and connect the points.

Drop Height	Velocity
30 cm	242 cm/s
90 cm	420 cm/s

10. Draw a second graph with “impactor velocity (cm/s)” on the x-axis and “Average ray length” on the y-axis. Use different colors for each impactor and connect the points.

Impactor Mass (g): _____			
Drop Height (cm): 30			
	Trial #1	Trial #2	Trial #3
Crater diameter (cm)			
Crater depth (cm)			
Average ray length (cm)			

Impactor Mass (g): _____			
Drop Height (cm): 90			
	Trial #1	Trial #2	Trial #3
Crater diameter (cm)			
Crater depth (cm)			
Average ray length (cm)			

Impactor Mass (g): _____			
Drop Height (cm): 30			
	Trial #1	Trial #2	Trial #3
Crater diameter (cm)			
Crater depth (cm)			
Average ray length (cm)			

Impactor Mass (g): _____			
Drop Height (cm): 90			
	Trial #1	Trial #2	Trial #3
Crater diameter (cm)			
Crater depth (cm)			
Average ray length (cm)			