# Impact Craters

## Purpose

To determine the factors affecting the appearance of impact craters and ejecta.

## Key Words

impact

impactor

ejecta

## Materials

1 pan

"lunar" surface material

tempera paint, dry

sieve or sifter

balance

3 impactors (marbles or other spheres)

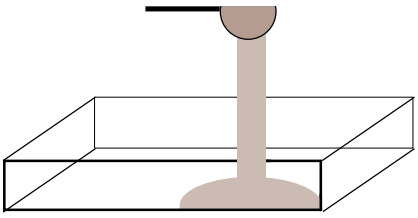
meter stick

ruler, plastic with middle depression

protractor

"Data Chart" for each impactor

graph paper



## Procedure

### Making an hypothesis

1. After looking at photographs of the Moon, how do you think the craters were formed?

2. What do you think are factors that affect the appearance and size of craters and ejecta?

### Preparing a "lunar" test surface

1. Fill a **pan** with **surface material** to a depth of about 2.5 cm. Smooth the surface, then tap the pan to make the materials settle evenly.

2. Sprinkle a fine layer of **dry tempera paint** evenly and completely over the surface. Use a **sieve** or **sifter** for more uniform layering.

3. What does this "lunar" surface look like before testing?

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## Cratering Process

1. Use the **balance** to measure the mass of each **impactor**. Record the mass on the "**Data Chart**" for this impactor.

2. Drop impactor #1 from a height of 30 cm onto the prepared surface.

3. **Measure** the diameter and depth of the resulting crater.

4. Note the presence of ejecta (rays). Count the rays, measure, and determine the average length of all the rays.

5. Record measurements and any other observations you have about the appearance of the crater on the Data Chart.
   Make three trials and compute the average values.

6. Repeat steps 2 through 5 for impactor #1, increasing the drop heights to 60 cm, 90 cm, and 2 meters. Complete the Data Chart for this impactor. Note that the higher the drop height, the faster the impactor hits the surface.

7. Now repeat steps 1 through 6 for two more impactors. Use a separate Data Chart for each impactor.

8. Graph your results.
   Graph #1: Average crater diameter vs. impactor height or velocity.
   Graph #2: Average ejecta (ray) length vs. impactor height or velocity.
   Note: on the graphs, use different symbols (e.g., dot, triangle, plus, etc.) for different impactors.