



# High Touch High Tech<sup>®</sup>

Science Experiences That Come To You

## Crater Makers

### Supplies:

- 4 aluminum pans (1 each of the Lunar Surfaces)
  - Lunar Surface 1: flour & glitter
  - Lunar Surface 2: baking soda, salt & glitter
  - Lunar Surface 3: playground sand, corn starch & glitter
  - Lunar Surface 4: wet sand & food coloring
- Marbles
- Golf balls
- Pebbles
- Rubber eraser
- Bouncy balls
- Baseball/ softball
- Tennis ball
- Rocks

### Instructions:

When you look at the sky on a clear night, what do you see? Stars and the Moon! What does the Moon look like? It is white with gray spots. Do you know why the Moon has spots? These are *impact craters*. The Moon has millions of *impact craters*! When rocks in Space collide with the Moon, the impact creates a bowl-shaped cavity on the Moon's surface.

The solar system contains a huge number of rocks floating in Space. The space rocks range in size and composition. There are asteroids, comets, and meteoroids.

*Asteroids* are chunks of rock and metal. Asteroids can be quite large and some are hundreds of miles across! These large space rocks orbit the Sun just like Earth. They do not emit any type of light.

*Comets* are made of ice and dust. Comets move very slowly. When a comet gets close to the Sun, the ice melts creating a "tail" behind it. The dust is illuminated by the Sun's heat and bright light.

When small pieces of rock break off from either comets or asteroids, the rocks are called *meteoroids*. When *meteoroids* enter the Moon's (or Earth's) atmosphere, they become *meteors*. The bright streaks of light that we see in the night sky are *meteors*. Once the rock lands on the Moon, it is called a *meteorite*.



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Each of these types of rock can create impact craters. Asteroids are the largest; therefore, they make the largest impact. In this experiment, you can make your very own craters! You can use marbles, pebbles, golf balls or any other type of round-shaped object. These materials will be your impactors.

First you need to create the *lunar surface*. The Moon has different surfaces depending on the area. You can make different types of surfaces with various materials. You need 4 aluminum pans, flour, glitter, baking soda, salt, playground sand, cornstarch, and water.

NOTE: *It is best to do this experiment outside. But, you can put newspaper under your pans if you are inside.*

Make pans with the following lunar surfaces:

Lunar Surface #1: Flour mixed with glitter

Lunar surface #2: Baking soda mixed 1:1 with salt

Lunar surface #3: Playground sand mixed 1:1 with cornstarch

Lunar surface #4: Wet sand

You will drop the impactors, such as golf balls and pebbles, from a series of heights. First, drop an impactor from 2 feet above a pan with Lunar Surface #1. Then drop from 3 feet above and then five feet above the pans containing your lunar surfaces. Experiment with different impactors, Lunar Surfaces, and heights.

As you drop various impactors from different heights, you can see the relationship between the impactor's mass (weight) and crater size.

What object makes the biggest crater?

Does the height make the crater bigger or smaller?

Which impactor falls faster or slower?

How deep are the craters?

Which Lunar Surface is the best for making craters?

### The Science Behind It:

You have learned about the impact craters on the surface of the Moon. But, planets also have deep scars from Space rocks, including the Earth! The largest impact crater on our planet is in South Africa. It is called the **Vredefort crater**. This crater is not only the largest on Earth; it is also the oldest on record. It is estimated to be over 2 billion years old! Scientists believe the asteroid that created this impact crater was the largest ever to strike Earth. The asteroid was between 3-6 miles in diameter. It left a crater 160-190 miles across!



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The second largest impact crater on Earth is the **Sudbury Basin**. It is located in Canada. The impact occurred about 1.8 billion years ago. It is about 6-9 miles in diameter. When the asteroid hit Earth, the impact was so intense that it spread debris 500 miles away! Scientists have discovered rocks from the original asteroid as far as Minnesota. The asteroid carved a crater that is nearly 9 miles deep into the Earth's surface. The Sudbury Basin has a very high mineral content left from the asteroid. As a result, this area holds one of the largest mining industries in the world. Scientists have found a large deposit of nickel and ore.

The largest impact crater in the United States is the **Chesapeake Bay impact crater**. It was created by a large fiery meteor known as a *bolide*. This bolide hit the eastern shore of the US about 35 million years ago. Because it struck near the shore, it is called a "wet-target" impact crater. The area was a granite-rich section of a continental shelf. The intense speed of the bolide carved deep into the Earth's crust. The impact most likely caused a tsunami along with shattered rock and large amounts of sediment to erode into the crater. This all created the Chesapeake Bay.

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