

Start with a Book: Space Rangers

# Lunar Craters



## Introduction

A crater is a bowl-shaped cavity formed when an asteroid from space hits the surface of a moon or planet.

Both the Earth and the Moon have been hit by asteroids, meteors, and comets many times in their 4.5 billion year history. Some of the craters on the Moon are so big that you can see them without a telescope!

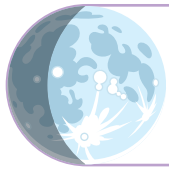
An asteroid is more likely to fall toward Earth than the Moon because of our planet's stronger gravity. But we can see many thousands of craters on the lunar surface and we only know of a few hundred on Earth. Let's learn why!

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## Supplies

- Photograph of the Moon with craters (provided)
- A large pan or shallow box
- Flour or sand (enough to make a 2-inch deep layer)
- 1 cup powdered cocoa
- Small sieve or flour sifter
- Large trash bag or piece of cloth to place under the crater box
- Different-sized objects to be used as "impactors" such as large and small marbles, golf balls, rocks, other balls of different sizes
- Ruler
- Paper and pencil
- Chair or step stool to stand on
- Cell phone with slow-motion video recording ability (optional)





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## Get kids thinking

The surface of the Moon is full of craters caused by asteroids dropping from space. Once a crater is formed on the Moon, it never disappears or changes because there is no weather or life on the planet. Once something hits the Moon, that event becomes frozen in time! Only a meteor strike could destroy the footprints, and that's not likely!

When an asteroid hits the Earth, the crater it leaves eventually disappears from the surface. That's because the Earth experiences weather - wind, rain, and snow - that over time can "erase" the crater. Plants, animals, and people change the surface of the Earth, too. No wonder there are so many craters on the Moon compared to Earth!

Show the images of the lunar craters (see pages 4-5). **ASK KIDS:** Describe what you see. What shape are the craters? Can you find some craters sitting on top of each other? Which formed first and which formed later?

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## Let's get started!

In this activity, kids will experiment with creating their own lunar craters. They'll experience what happens when an object hits another, softer surface and think about how the craters on the Moon were created.

Fill the baking pan with flour, and set it on the ground or floor, with the plastic or cloth underneath (to make clean up easier).

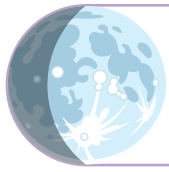
Use the sieve or sifter to put a thin layer of cocoa on top of the flour. This will make the craters easier to see.

Have each child choose an impactor and drop the object straight down into the pan.

Have the kids observe the impact crater. **ASK KIDS:**

- What color is the surface immediately around the crater?
- How does that compare to the surface of the rest of the pan?
- How far did the flour and cocoa powder spread? Have the kids use the ruler to measure these distances.





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Next, have the kids try dropping the same ball from a different height (stand on a chair).

### ASK KIDS:

- What does the resulting crater look like?
- How did the height affect the size and depth of the crater?

Then try dropping balls of different sizes (and weights) from the same height. **ASK KIDS:**

- What do the resulting craters look like?
- How did the size and weight affect the size and depth of the craters?

Finally, try throwing a ball sideways so it hits the pan at an angle, instead of coming straight down. **ASK KIDS:**

- How is the resulting impact pattern different from when you dropped the balls straight down?

If needed, smooth out the surface of the pan, and sift a fresh layer of cocoa powder on top.

**DO YOU HAVE A SMARTPHONE WITH A SLOW-MOTION CAMERA SETTING?** Try filming your meteorite impacts in slow motion! What do you see when you watch the videos?

## EXTENSIONS

Scale this project up! Do you have access to a sandbox, a shovel, and some dirt? Create a large pile of loose material: dirt covered with a layer of sand (similar to the flour covered with cocoa powder). Help kids drop a larger ball (a basketball works well) from a higher location, such as standing on a ladder.

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## More Moon crater activities

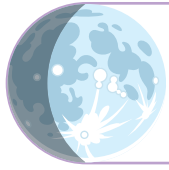
### VIDEO: THE MOON AND ITS CRATERS (PBS KIDS, READY JET GO!)

[pbslearningmedia.org/resource/ready-get-go-the-moon-and-craters/the-moon-and-its-craters-ready-jet-go/#.XMdBqKR7mUk](https://pbslearningmedia.org/resource/ready-get-go-the-moon-and-craters/the-moon-and-its-craters-ready-jet-go/#.XMdBqKR7mUk)

### HOW DID THE MOON GET ITS CRATERS? (GIFT OF CURIOSITY)

[giftofcuriosity.com/how-did-the-moon-get-its-craters-an-art-and-science-activity-for-kids/](https://giftofcuriosity.com/how-did-the-moon-get-its-craters-an-art-and-science-activity-for-kids/)





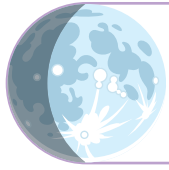
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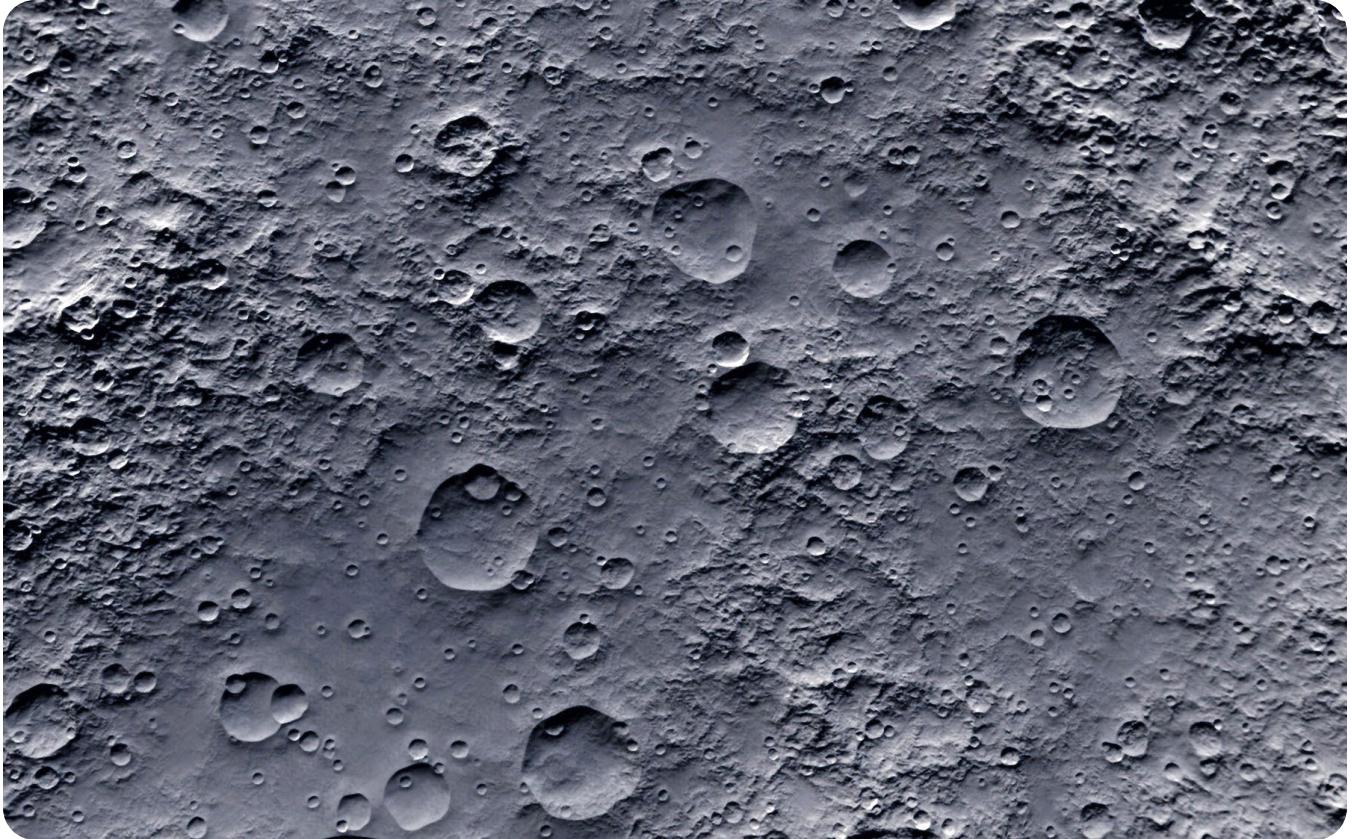
The lunar surface (Photo © NASA)





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Close up view of the lunar surface (Photo © NASA)

