MAKING MOON ROCKS

OVERVIEW

Campers will learn about space and planets while creating their own moon rocks.

TOPIC AREA(S)	GRADE LEVEL
Space	Grades 3 and 4 (Circuits GW)

QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED

- So, who wants to be an astronaut?
- Who can tell me some facts about space?
- Who was the first astronaut on the moon?
- What do you guys know about the moon?
- What are moon rocks made of?

BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)

Facts About Space

- Space is completely silent
- Venus is the hottest planet in the solar system (450 degrees C). Mercury is the closest to the sun but has no atmosphere to regulate temperature
- There are 8 planets - Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
- There may be life on Mars (water has been detected too!)
- There are about 200-400 billion stars in the Milky Way (our galaxy!)
- A full NASA space suit costs $12 000 000
- One day on Venus is longer than a year
- There is water floating in space
- There is a volcano on Mars three times the size of Mount Everest

First Astronaut on the Moon

- It was 1961. John F. Kennedy was the president of the United States. He wanted to land humans on the moon. The United States had just started trying to put people in space. Apollo 11's mission was to land two men on the moon. They also had to come back to Earth safely.
- Apollo 11 blasted off on July 16, 1969. Neil Armstrong, Edwin "Buzz" Aldrin and Michael Collins were the astronauts on Apollo 11.
- Four days later, Armstrong and Aldrin landed on the moon. They landed on the moon in the Lunar Module. It was called the Eagle. Collins stayed in orbit around the moon. He did experiments and took pictures.
- The sign the astronauts left on the moon says, "Here men from the planet Earth first set foot upon the moon July 1969, A.D. We came in peace for all mankind."
- On July 20, 1969, Neil Armstrong became the first human to step on the moon. He and Aldrin walked around for three hours. They did experiments. They picked up bits of moon dirt and rocks.

- The two astronauts returned to orbit, joining Collins. On July 24, 1969, all three astronauts came back to Earth safely.

Moon Facts

- The moon was once a piece of earth
- The moon orbits the earth every 27.3 days
- It is the fifth largest moon in the Solar System. Learn more about the other moons in the Solar System.
- The average distance from the Moon to the Earth is 384403 kilometres (238857 miles).
- Mons Huygens is the tallest mountain on the Moon, it is 4700 metres tall, just over half the height of Mt Everest (8848m).
- The effect of gravity is only about one fifth (17%) as strong on the surface of the Moon compared to the strength of gravity on the surface of the Earth.
- Although research is continuing, most scientists agree that the Moon features small amounts of water.
- The Moon is very hot during the day but very cold at night. The average surface temperature of the Moon is 107 degrees Celsius during the day and -153 degrees Celsius at night.
- The Earth's tides are largely caused by the gravitational pull of the Moon.
- A lunar eclipse occurs when the Earth is between the Sun and the Moon.

What Are Moon Rocks Made of?

- There are many different types of moon rocks
    - Basalt, anorthosite, breccia
- Basalt - originate from the the lunar maria of the moon, it has a fine-grain crystalline structure and large holes that indicate the rocks connection to molten lava. It also has a grey colour that indicates the presence of various minerals.
- Anorthosite - this is the highland rock of the moon. This type of rock is believed to have originated from the moon's crust after it was smashed and distributed by meteoric impacts, indicating that the moon was once molten.
- Breccia - this is the "shocked rock" of the moon. It is produced by the smashing, melting, and mixing of the lunar surface materials. The texture is a mixture of many different crystalline structures, causing them to be granulated.
- Pieces of these rocks have made it to earth, whether through being brought home as samples or through crashing to earth after orbiting it for many years. Through these samples, we are able to study the moon and learn new things about space.

RELEVANCE TO THE CURRICULUM

Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
• Needs & Characteristics of Living Things • Growth and Changes in Animals • Materials, Objects and Everyday Structures • Movement • Energy in Our Lives • Properties of Liquids and Solids • Daily and Seasonal Changes • Air and Water in the Environment	• Growth and Changes in Plants • Habitats and Communities • Strong and Stable Structures • Pulleys and Gears • Forces Causing Movement • Light and Sound • Soils in the Environment • Rocks and Minerals	• Human Organ Systems • Biodiversity • Forces Acting on Structures and Mechanisms • Flight • Properties of and Changes in Matter • Electricity and Electrical Devices • Conservation of Energy and Resources • Space	• Interactions in the Environment • Cells • Form and Function • Systems in Action • Pure Substances and Mixtures • Fluids • Heat in the Environment • Water Systems

MATERIALS (SPECIFY WHETHER PER CAMPER, GROUP OR CLASS)

Materials Per Group:

- 4 cups of baking soda
- ¼ cup water
- Glitter
- Black food colouring

SAFETY CONSIDERATIONS

None. Don't eat please

PROCEDURE

1. Split the class into small groups of about 2 or 3.
2. Give the campers the required ingredients.
3. First, mix the baking soda and glitter together. Then, add in the water and food coloring.
4. Once you have all the ingredients combined, form the mixture into rock shapes. You are supposed to let these rocks sit overnight.

Let's go for a walk to look at rocks!

REFERENCES

http://www.glitteronadime.com/moon-rock-science-experiment/
https://theplanets.org/space-facts/
https://www.nasa.gov/audience/forstudents/k-4/stories/first-person-on-moon.html
http://www.sciencekids.co.nz/sciencefacts/space/moon.html
https://airandspace.si.edu/exhibitions/apollo-to-the-moon/online/science/lunar-rocks.cfm
http://meteorites.wustl.edu/lunar/moon_meteorites.htm

SHOW VIDEO:

https://www.youtube.com/watch?v=6AviDjR9mmo&list=PLivjPDlt6ApTHMisqbFv2SmJ7x0333mFz&index=8&t=0s