Big Impacts, Big Basins

Imagine standing on the Moon at this time. Hot basalt lava flowed from long fissures, filling regions of low elevation. Fountains of lava provided scientists with the timing of basin formation, ranging from 3.8 to 4.0 billion years ago. By 3.8 billion years ago, the period of intense asteroid bombardment came to an end. This left the Moon covered with large, deep impact basins, such as the Tranquillitatis Basin, which lie far apart on the Moon's surface. The crater sizes and depths of these basins were determined by the mass of the asteroid that impacted the Moon and the density of the rock anorthosite, which is primarily made of a single mineral: low-density, aluminum-rich, plagioclase feldspar. This rock forms the “lunar highlands” of the Moon. The oldest rocks exposed at the lunar surface when a huge impactor struck the Moon 3.9 billion years ago, forming Serenitatis Basin.

The giant impact theory explains the Moon's relative lack of iron. Earth's iron core was untouched and much of the titanium, aluminum, and other elements had been sent into space. After the Apollo missions, a new model was proposed: the “giant impact theory.” In this model, an impactor, half the size of Earth, collided with Earth and was ejected at high velocity, making an asteroid fly into the Moon. This theory explains the Moon’s relative lack of iron and the relative abundance of titanium compared to other elements.

The Moon is a scientific treasure. It records the early history of Earth and our solar system that has been unraveled through lunar samples from the Apollo missions, and where we may go next. Upper elementary students can use the images, data, studies, and information made available through the Lunar and Planetary Institute (LPI) at http://www.lpi.usra.edu/lunar to learn about the Moon and conditions on the Moon. Upper elementary students can also use the NASA Activity Guide Exploring Planets in the Classroom: The Moon to learn about the Moon and conditions on the Moon. For more about the Moon, visit www.nasa.gov and www.lpi.usra.edu.

An Earth-based Tour of the Moon

A quick look at the Moon’s side is not enough to appreciate its size, variety, and the uniqueness of the Moon’s surface. The Moon is fascinating to observe and learn about.

An Earth-based tour of the Moon involves selecting a clear night, making sure the Moon is above the horizon, and using a telescope or binoculars to view the surface of the Moon. The Moon is divided into highlands and lowlands. The highlands are made of anorthosite, a light-colored rock, while the lowlands are made of basalt, a dark rock.

FURTHER EXPLORATION

To view the Moon, use a telescope or binoculars. Be sure to select a clear night, find a location away from city lights, and use a telescope or binoculars. Keep in mind that the Moon is not always visible, and the Moon’s phase changes throughout the month. To learn more about the Moon, visit www.nasa.gov and www.lpi.usra.edu.

BIBLIOGRAPHY


Exploring Planets in the Classroom: The Moon —Exploring Planets in the Classroom: The Moon —

This is one of a three-poster set that examines how our geologic understanding of the Moon will be used as we plan to explore the Moon. This poster sets the stage for the next two in the series, explaining how our Moon formed and has evolved through time. This is designed for sixth- to ninth-grade students.

The perfect companion to this poster is a free activity guide published by the Lunar and Planetary Institute called Exploring Planets in the Classroom: The Moon. This activity guide is available from: www.lpi.usra.edu/education/educator. The perfect companion to this poster is a free activity guide published by the Lunar and Planetary Institute called Exploring Planets in the Classroom: The Moon. This activity guide is available from: www.lpi.usra.edu/education/educator.