

The Moon: Cosmic Decoder Ring

Text-Only Version

The surface of the Moon holds the key to decoding our solar system's past.

View the planetary images with 3D glasses.

What do you see when you look at the Moon? Most people see circles, large and small, bright and dark. What caused them?

Scientists decoded a major mystery when they deciphered the Moon's circular features.

Were the circular features—called craters – formed by volcanic activity, or by asteroid and comet impacts?

Scientists cracked the cosmic mystery when they analyzed Moon rocks collected by the Apollo astronauts. The rocks had been broken, fragmented, and changed by tremendous heat and pressure. These changes could only have been caused by asteroid and comet impacts.

Recognizing that impacts created the circular features revolutionized our understanding of the Moon and the processes that shaped its surface.

The Moon's well-preserved craters have decoded the other ancient surfaces of the solar system.

Scientists now understand that the Moon's surface holds a key to a fundamental process—cratering! Circular features are found on surfaces across the solar system and are recognized as impact craters—thanks to the Moon.

Weathering has eroded away many of the craters on Earth and Mars. Craters on many planets and moons, including Mercury, Venus, Earth, and Mars, have been changed or erased by volcanic and tectonic activity.

Our Moon has no wind, flowing water, or ice to erode its surface; its surface is geologically quiet. The Moon is unique because its cratered landscape is well-preserved, allowing scientists to examine details of the ancient impacts and to create a timeline of impact events.

The Moon's cosmic code will unlock the timeline of a major process that shaped our solar system: impact cratering.

Our Moon is the best and closest place in the solar system to study the process of asteroid and comet impacts.

NASA Lunar Science Institute postdoctoral researcher Axel Wittmann is investigating meteorites and Moon rocks created by impacts. By studying the ages and compositions of these rocks, he is able to determine when the impacts occurred. Scientists are curious to know if the Moon's largest craters formed at about the same time, together with other craters throughout the solar system.

This timeline of crater formation on the Moon is helping planetary scientists piece together the history of catastrophic collisions in our solar system—and on Earth!

This exhibit was developed by the Center for Lunar Science and Exploration (<http://www.lpi.usra.edu/nlsi/>) of the NASA Lunar Science Institute.