

Try This!

Work in groups or as a family to determine the order of events that in the history of the Earth and Moon. More information and graphics are available at <http://www.lpi.usra.edu/education/timeline/introduction.shtml>

Materials Needed:

- Event Cards
- Answer sheet for events
- Open area or hallway for participants to stand in order OR floor or table space to lay out the cards

Procedure:

There are many ways to present this activity. Here are two suggestions:

Option 1: Human Timeline of the Earth-Moon History

- Share with all participants that they will be creating a timeline of the Earth's and Moon's shared history with their bodies.
- Provide each person with an event card.
- Invite everyone to work together to determine which events happened first, second, third, and so on.
- Have them arrange themselves as a human timeline across the room.
- Compare their arrangement with the answers in the answer sheet.
- Discuss the information about the rocks.
 - Which rocks are older, rocks from the Earth or rocks from the Moon? (*The Moon rocks are older.*)
 - How common might old Moon rocks be? (*Very common; most rocks from the Moon are billions of years old*)
 - Why might these old Moon rocks be important? (*They hold information about things that happened to the Earth and Moon.*)

Option 2: Card Timeline of the Earth-Moon History

- Divide the participants into groups of 3-5 people
- Provide each small group of people with a complete set of event cards.
- Ask the groups to work together to arrange the events in order (floor or table space is needed to lay out the cards).
- Share the answer sheet so that the groups can compare their results.
- Discuss the information about the rocks.
 - Which rocks are older, rocks from the Earth or rocks from the Moon? (*The Moon rocks are older.*)
 - How common might old Moon rocks be? (*Very common; most rocks from the Moon are billions of years old*)
 - Why might these old Moon rocks be important? (*They hold information about things that happened to the Earth and Moon.*)

Resources for Treasure Hunt In Earth's Attic
Event Cards



Tycho Crater Forms on the Moon



**Asteroid Smashes Into Earth;
Extinction of Dinosaurs**



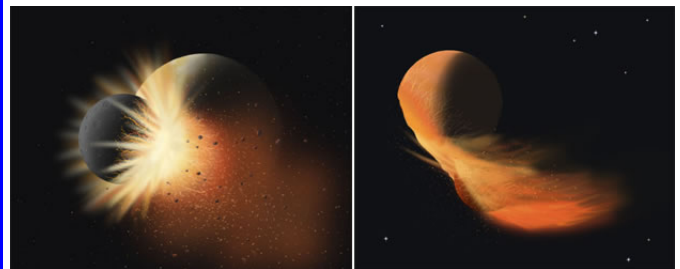
**Moon Becomes Geologically
Inactive**



***Homo sapiens* (Modern Humans)
First Appear**



**Formation of Earth's Early
Atmosphere and Oceans**

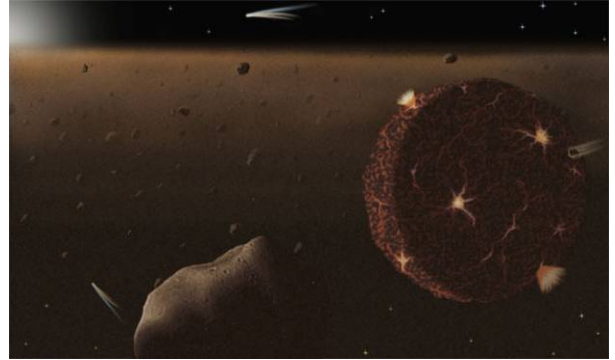


Formation of Earth's Moon

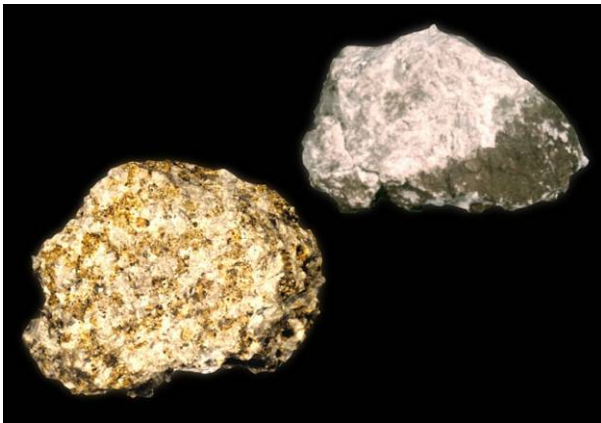
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Volcanic Activity on the Moon



Planets Form



Oldest Moon Rocks



Oldest Rocks in the Grand Canyon



Oldest Rocks on Earth



One Giant Leap for Mankind

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Answer Sheet of Events

4.56 Billion Years Ago	Planets Form: All of the planets in the solar system form.
4.5 Billion Years Ago	Formation of the Moon: Earth was hit by a planetary body half Earth's width! Debris blown into space around Earth formed our Moon.
4.5 Billion Years Ago	Oldest Moon Rocks: The Moon's magma ocean cooled, allowing a crust to form. Apollo Astronauts collected Moon rocks from some of this ancient crust.
4.2 Billion Years Ago	Formation of Earth's Early Atmosphere and Oceans: Volcanos spewed gases — including water vapor and carbon dioxide— into the atmosphere. When the Earth's surface cooled down enough the water vapor condensed as liquid water to form our oceans.
4.0 Billion Years Ago	Oldest Rocks on Earth: Continental crust (land!) had formed by this time. The oldest rocks are found in Canada (but older grains are in Australia.)
3.5 Billion Years Ago	Volcanic Activity on the Moon: While the Moon has been geologically inactive for many millions of years, the youngest volcanic flows are about 1 billion years old.
3.0 Billion Years Ago	Earth's Moon Becomes Geologically Inactive: Okay, except for occasional volcanism . . .
1.5 Billion Years Ago	Oldest Rocks in the Grand Canyon: In the last 10 million years or so, the Colorado River has cut a 1.5-kilometer-deep channel into Earth's crust, slicing through almost 1.5 billion years of geologic history. These oldest rocks, exposed at the bottom of the Grand Canyon, provide geologists with evidence of ancient environments and events.
100 Million Years Ago	Tycho Crater Forms on the Moon: The edges of this small crater are sharp indicating that it is a recent – or young crater on the Moon.
65 Million Years Ago	Asteroid Smashes Into Earth; Extinction of Dinosaurs: When the dinosaurs went extinct, mammals increased in number and type.
About 200,000 Years Ago	<i>Homo sapiens</i> (Modern Humans) First Appear: Hominids (upright human ancestors) appear in the fossil record a couple of million years earlier.
30–40 Years Ago	One Giant Leap for Mankind: On July 20, 1969, Neil Armstrong was the first human to set foot on the lunar soil of our Moon.

Websites for Further Exploration

Ways to Get Involved

Connect to the Moon

<http://www.lpi.usra.edu/education/lprp/>

This site includes paths for inquisitive adults, students, and formal and informal educators to find online resources, information, and opportunities for involvement in lunar science and exploration.

Moon Zoo

<http://www.moonzoo.org/>

Moon Zoo uses about 70,000 high resolution images gathered by the Lunar Reconnaissance Orbiter. Citizen scientists are invited to categorize craters, boulders and more, including lava channels and even all sorts of different spacecraft sitting on the Moon's surface.

Windows to the Universe: The Moon's Geological History

<http://www.windows2universe.org/earth/moon2.html>

This site shares our Moon's geological history and other pages link to other details about the Moon. The information is presented at three levels, for ages 8 and older.

Views of the Solar System: The Moon

<http://www.solarviews.com/eng/moon.htm>

This site includes a broad background on the Moon and an explanation of the Moon's role as a fossil, helping scientists to better understand our solar system's history. Written to be easily understood by teens and adults.

Solar System Exploration: The Moon

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Moon>

This website, suitable for ages 12 and up, offers information including headline news about the Moon, lunar missions, a gallery of images, facts and figures, and activities.

Moon Poster: Evolution of Our Moon

<http://www.lpi.usra.edu/education/moonPosters/Poster1/backb.pdf>

This is a detailed description of the evolution of the Moon, written for teens to adults.

The Center for Lunar Science and Exploration

<http://www.lpi.usra.edu/nlsi/index.shtml>

This NLSI team site includes background science information, images, the traveling exhibits, high school research projects, and more.

Planetary Science Research Discoveries: The Oldest Moon Rocks

<http://www.psrp.hawaii.edu/April04/lunarAnorthosites.html>

PSRD is an educational site geared toward adults, which shares the latest research being made by NASA-sponsored scientists. This article describes how rocks from the lunar crust provide new clues to the age and origin of the Moon and the terrestrial planets.

Books for Further Exploration

Check out Your Library

There are several sections to look for information about the Moon in your local library; you may want to start with these sections:

- 523.3 Moon / Astronomy
- 525 Earth and Moon
- 559.91 Lunar Geology

What the Moon is Like (Let's-Read-and-Find-Out Science, Stage 2)

Franklyn M. Branley, HarperTrophy, 2000, ISBN 0064451852 : The lunar environment — including the possibility of water on the Moon — is explored for children ages 4-8. Hands-on activities allow the children to learn more about cratering and other lunar features.

On the Moon

Anna Milbourne and Laura Fearn, Usborne Books, 2004, ISBN 0794506178 : A book for children ages 4 to 8 that examines the Moon, its environment, and the astronauts who explored it.

The Best Book of the Moon: *Ian Graham, Kingfisher, 2005, ISBN 0753459027* : Lunar cycles and eclipses, features, landings, and myths are presented for children ages 4 to 8

The Moon

Elaine Landau, Children's Press, 2008, ISBN 0531125629

The author provides children age 9-12 basic information about the Moon. Images support the text.

Jump Into Science: Moon

Steve Tomecek, National Geographic Children's Books, 2005, ISBN 0792251237

Children go on a journey with a bug and a cat to discover the Moon's scientific history and concepts; written for children ages 9-12.

Earth And The Moon: *Ron Miller, 2003, 21st Century, ISBN: 0761323589* : Written for young teens, this book examines the theories of the Moon's formation, and the complex relationship between the Earth and Moon.

The Earth and the Moon

Linda Elkins-Tanton, Chelsea House, 2006, ISBN 0816051941

Written for young adults and adults, this book discusses Earth's size, orbit, mass, seasons and more as well as the evolution of the Moon.

The Moon and How to Observe It

Peter Grego, 2010, Springer, ISBN: 1852337486

A book for practical amateur astronomers who not only want to observe, but want to know the details of exactly what they are looking at. Includes observation guides, photos, and clear explanations of the Moon's geological evolution.

The Modern Moon: A Personal View

Charles Wood, 2003, Sky Publishing Corporation, ISBN: 0933346999

The perfect companion to lunar telescope viewing. Wood works his way across the lunar surface, identifying features of scientific importance and the people involved in unraveling their story.

The Once and Future Moon

Paul Spudis, 1998, Smithsonian Inst. Press. ISBN: 1560988479

A geologist discusses what our exploration of the Moon has taught us, and what we might do in the future to know and use the Moon better.