

Glossary

Words that appear in *italic* type within a definition also are defined in the Glossary.

A'a: Blocky, angular, and rough type of *lava* flow.

Agglutinates: Common particle type in *lunar sediment*; agglutinates consist of small *rock*, *mineral*, and glass fragments bonded together with glass.

Agronomist: Scientist who studies soil management and the production of field crops.

Anomaly: A deviation from the common rule, type, or form; something abnormal or inconsistent.

Anorthosite: An *igneous rock* made up almost entirely of *plagioclase feldspar*.

Antenna: A conductor by which electromagnetic waves are transmitted or received.

Apollo: U.S. Space Program which included 6 piloted *lunar* landings between 1969 and 1972. Apollo *astronauts* collected and returned 382 kilograms of *rock* and *sediment* samples from the Moon.

Astronaut: Person engaged in or trained for spaceflight.

Atmosphere: Mixture of gases that surround a planet.

Basalt: Fine-grained, dark-colored *igneous* rock composed primarily of *plagioclase feldspar* and *pyroxene*; other minerals such as *olivine* and *ilmenite* are usually present.

Beneficial: Advantageous, helpful.

Biodegradable (see *Nondegradable*): Capable of decaying and being absorbed by the environment.

Biosphere: The part of Earth's *crust*, water, and *atmosphere* where living organisms can survive.

Botanist: Scientist who studies plant life.

Breccia: Rock consisting of angular, coarse fragments embedded in a fine-grained matrix.

Celsius: A temperature scale that assigns the value 0° C to the freezing point of water and the value of 100° C to the boiling point of water at standard pressure.

Channel: A furrow or narrow passageway in the ground.

Clementine: A global mapping mission to the Moon launched in 1994 by the U. S. Department of Defense, with science support from NASA.

Communications: A means of transmitting and receiving information.

Console: A desklike structure that is the control unit of an electrical or electronic system.

Consumption: The act of eating or drinking; using energy and materials.

Core: The central region of a planet or moon frequently made of different materials than the surrounding regions (*mantle* and *crust*). Earth and the Moon are thought to have cores of iron and nickel.

Crater (see *Impact*): A hole or depression. Most are roughly circular or oval in outline. On Earth most natural craters are of volcanic origin. On the Moon most are of impact origin.

Crater chain: Several craters along a general line.

Crust: The outermost layer of a planet or moon, above the *mantle*.

Dark mantle deposits: Deposits of dark glass on the Moon, possibly products of volcanic fire fountaining.

Density: Mass per volume; how much material in a given space.

Descartes: *Lunar highlands* site of Apollo 16 landing on April 21, 1972.

Development: The act of bringing into being or advancing to a more effective state.

Differentiation: Chemical zonation caused by differences in the densities of minerals; heavy materials sink, less dense materials float.

Drought: Extended period of dry weather, especially one causing damage to crops.

Earthquake: Sudden motion or trembling of Earth caused by the abrupt release of slowly accumulated elastic energy in *rocks*.

Ejecta: Material thrown out from and deposited around an *impact crater*.

Glossary

- Electricity:** Energy caused by the motion of electrons, protons, and other charged particles.
- Entertainment:** Amusement, or diversion; something to hold attention for pleasure.
- Erosion:** Removal of weathered *rocks* by moving water, wind, ice, or gravity.
- Eruption** (see *Source*): A break out or burst of volcanic matter.
- Fahrenheit:** A temperature scale with the freezing point of water assigned the value 32° F and the boiling point of water 212° F.
- Farside:** The side of the Moon that never faces Earth.
- Feasible:** Capable of being done or accomplished; probable, likely.
- Fissure:** Crack extending far into a planet or moon through which *magma* travels to and *erupts* onto the surface.
- Food groups:** Categories into which all foods are divided; meats and protein, fruits, vegetables, dairy, carbohydrates, and sugars.
- Fra Mauro:** Landing site of *Apollo 14* on the Moon on February 5, 1971.
- Geologist:** Scientist who studies Earth, its materials, the physical and chemical changes that occur on the surface and in the interior, and the history of the planet and its life forms. Planetary geologists extend their studies to the Moon, planets, and other solid bodies in the Solar System.
- Giant impact theory:** An explanation for the origin of the Moon from Earth debris which collected in space after a *projectile* the size of planet Mars smashed into a growing Earth.
- Hadley-Appenine:** Landing site of *Apollo 15* on the Moon on July 31, 1971.
- Highland "soil":** *Sediment* on the surface of the *lunar highlands*; composed of broken *rock* and *mineral* fragments, and glass produced by *impact*.
- Highlands:** Oldest exposed areas on the surface of the Moon; extensively cratered, and chemically distinct from the *maria*.
- Igneous:** *Rocks* or processes involving the formation and solidification of hot, molten *magma*.
- Ilmenite:** Opaque mineral found in *basalt*; nearly pure iron-titanium oxide (FeTiO₃.)
- Impact** (see *Crater*): The forceful striking of one body, such as a *meteorite*, against another body such as a moon or planet.
- Impactor** (see *Projectile, Meteorite*): Object that impacts a surface.
- KREEP:** On the Moon, type of *highlands rock* rich in potassium (K), rare-earth elements (REE), and phosphorus (P).
- Latitude:** The angular distance North or South from the Earth's equator measured in degrees on the meridian of a point; Equator being 0° and the poles 90°N and 90°S.
- Lava:** fluid *magma* that flows onto the surface of a planet or moon; erupted from a *volcano* or *fissure*. Also, the *rock* formed by solidification of this material.
- Levee:** Zones in a *lava* flow where the lava between the zones is moving faster than the lava outside the zones.
- Lifestyle** (see *Sedentary*): A person's general pattern of living.
- Longitude:** The angular distance East or West, between the meridian of a particular place on Earth and that of Greenwich, England, expressed in degrees or time.
- Lunar:** Of or pertaining to the Moon.
- Lunar Prospector:** U. S. Discovery-class mission to the Moon scheduled for launch in early 1998. Its instruments are designed to provide global maps and data sets of the Moon's composition and magnetic and gravity fields from a low polar orbit.
- Magma:** Term applied to molten rock in the interior of a planet or moon. When it reaches the surface, magma is called *lava*.
- Magma Ocean:** Term used to describe the layer of *magma*, hundreds of kilometers thick; thought to have covered the Moon 4.5 billion years ago.
- Magnetic field:** The region of "altered space" that will interact with the magnetic properties of a magnet. It is located mainly between the opposite poles of a magnet or in the energetic

Glossary

space about an electric charge in motion.

Mantle: A mostly solid layer of Earth lying beneath the *crust* and above the *core*; consisting mostly of iron, magnesium, silicon, and oxygen.

Mare basalt: Rocks making up the dark, smooth, *mare* areas of the Moon

Mare "soil": *Sediment* on the surface of the *lunar maria*; fragments of *basalt rocks*, broken *mineral* grains, and glass produced by *impact*.

Maria (mare): Dark areas on the Moon covered by *basalt lava* flows.

Metamorphic: *Rocks* that have recrystallized in a solid state as a result of changes in temperature, pressure, and chemical environment.

Meteorite (see *Impactor, Projectile*): A metallic or stony (silicate) body that has fallen on Earth or the Moon from outer space.

Meteoritic bombardment: Intensive and prolonged *impacts* of a surface by *meteorites* or other *impactors*.

Mineral: Naturally occurring inorganic solid with a definite chemical composition and crystal structure.

Moonquake (see *Earthquake*): Sudden motion or trembling of the Moon caused by the abrupt release of slowly accumulated elastic energy in *rocks*.

Mountain: A natural elevation of a planetary surface.

NASA: United States federal agency; National Aeronautics and Space Administration.

Nearside: The side of the Moon that always faces Earth.

Nondegradable (see *Biodegradable*): Something that can not be chemically decomposed.

Norite: *Igneous* rock found in the *lunar highlands* composed of *plagioclase* and *pyroxene*.

Nuclear energy: Process by which the fission of ^{235}U releases heat to make steam, which then drives turbines to create electricity.

Nutrition: Process by which animals and plants take in and utilize food material.

Ocean of Storms: Landing site of *Apollo 12* on the Moon on Nov. 19, 1969; Oceanus

Procellarum.

Olivine: *Mineral* found in *basalt*; ranges from Mg_2SiO_4 to Fe_2SiO_4 .

Orange "soil": On the Moon, a mixture of very small dark orange and black glass balls which formed from quickly cooled *lava* droplets during a *pyroclastic eruption*.

Organism: Any form of animal or plant life.

Pahoehoe: *Basaltic lava* with a smooth, billowy, orropy surface.

Photosynthesis: The process by which plants convert water and carbon dioxide into carbohydrates, using sunlight as the source of energy and the aid of chlorophyll.

Plagioclase feldspar: Common *mineral*; ranges from $\text{NaAlSi}_3\text{O}_8$ to $\text{CaAl}_2\text{Si}_2\text{O}_8$.

Plate tectonics: Theory formulated in the late 1960s that states the Earth's *crust* and upper *mantle* (a layer called the lithosphere) is broken into moving pieces called plates. The formation of *mountains* and *volcanoes*, and the occurrence of *earthquakes* have been explained using this theory.

Pressure ridges: Long, narrow wavelike folds in the surface of *lava* flows; formed where lava may have buckled up against slower moving or stationary lava downstream.

Projectile (see *Impactor, Meteorite*): Object that *impacts* a surface.

Pyroclastic eruption: Explosive eruption of *lava* producing and ejecting hot fragments of rock and lava.

Ray: Streak of material blasted out and away from an *impact crater*.

Recycling: To treat or process waste materials making them suitable for reuse.

Regolith (see *Sediment, Soil*): Loose, unconsolidated *rock, mineral*, and glass fragments. On the Moon, this debris is produced by *impacts* and blankets the surface.

Rille: Long *channel* on the Moon crossing the surface of *maria*; probably formed either as an open channel in a *lava* flow, or as an underground tube carrying hot lava which collapsed as the lava flowed out.

Glossary

Robot: A machine that does mechanical tasks on command and operates automatically.

Rock: A naturally formed solid that is an aggregate of one or more *minerals*.

Scale: The relationship of a distance on a map or model to the true distance in space; written as a ratio, such as 1:24,000.

Sea of Serenity: One of the *maria* on the Moon's *nearside*; Mare Serenitatis.

Sea of Tranquility: Landing site of *Apollo 11* on the Moon on July 20, 1969; Mare Tranquillitatis.

Sedentary (see *Lifestyle*): characterized by much sitting and little physical activity.

Sediment (see *Regolith*): Soild *rock* or *mineral* fragments transported and deposited by wind, water, gravity, or ice; precipitated by chemical reactions; or secreted by organisms; accumulated as layers in loose, unconsolidated form.

Sedimentary: *Rock* formed when *sediment* is compacted and lithified.

Self-sustaining: Able to exist and function without outside help.

SNC meteorites (see *Meteorite*): Group of meteorites with relatively young ages (slightly over 1 billion years old) that probably came from Mars.

Soil (see *Regolith*, *Sediment*): The upper layers of sediment on Earth that support plant growth.

Solar power: Energy derived from the Sun or sunlight for use as a source of *electricity*.

Solar system: The Sun and all the objects (planets, moons, asteroids, and comets) that orbit the Sun.

Solar wind: The stream of charged particles (mainly ionized hydrogen) moving outward from the Sun with velocities in the range 300-500 kilometers per second.

Source (see *Eruption*): Location where *igneous* matter (*lava* and gases) erupts onto the surface; vent, *fissure*, *volcano*, etc.

Spacecraft: Vehicle capable of traveling in outer space.

Stratigraphy: Study of layered rock to under-

stand the sequence of geological events.

Taurus-Littrow: Landing site of *Apollo 17* on the Moon on Dec. 11, 1972.

Terrain: Area of the surface with a distinctive geological character.

Tool carrier: Storage container for tools on the *Apollo Lunar Roving Vehicle*.

Transportation: The means of carrying something from one place to another.

Troctolite: *Igneous* rock found in the *lunar highlands* composed of *plagioclase* and *olivine*.

Vesicle: Bubble-shaped cavity in a volcanic rock formed by expanding gases.

Volatiles: Chemical elements that enter a vapor phase at relatively low temperatures.

Volcano: *Mountain* formed from the eruption of *igneous* matter through a *source* vent.

Water conservation: The wise use of water as a natural resource; the prevention of loss or waste of water.

Weathering: The mechanical breakdown and chemical alteration of *rocks* and *minerals* at Earth's surface during exposure to air, moisture, and organic matter.

Zoologist: Scientist who studies animals.

World Wide Web Resources for Educators for the Moon

Lunar Exploration

<http://cass.jsc.nasa.gov/moon.html>

Lunar & Planetary Institute (Exploring the Moon)

<http://www-sn.jsc.nasa.gov/explore/explore.htm>

Johnson Space Center (future human exploration)

<http://ilewg.jsc.nasa.gov/>

International Lunar Exploration Working Group

<http://nssdc.gsfc.nasa.gov/planetary/planets/moonpage.html>

National Space Science Data Center (Moon homepage)

<http://spacelink.nasa.gov/Instructional.Materials/Curriculum.Materials/Sciences/Astronomy/Our.Solar.System/Earth's.Moon/Exploring.The.Moon.Teacher.Guide.4-12/index.html>

Exploring the Moon on-line version of this publication at NASA Spacelink

Apollo Mission

<http://www-sn.jsc.nasa.gov/explore/Data/Apollo/Apollo.htm>

Apollo Experiment Operations

<http://www.hq.nasa.gov/office/pao/History/alsj/>

Apollo Lunar Surface Journal

Clementine Mission

<http://nssdc.gsfc.nasa.gov/planetary/clementine.html>

Lunar data from the Clementine Mission

<http://cass.jsc.nasa.gov/publications/slidesets/clementine.html>

Clementine Explores the Moon, annotated slide set

<http://cass.jsc.nasa.gov/research/clemen/clemen.html>

Clementine Mission - Images of the Moon

Lunar Prospector Mission

<http://lunar.arc.nasa.gov/>

Homepage from NASA Ames Research Center

<http://juggler.lmsc.lockheed.com/lunar/>

Lunar Prospector homepage from Lockheed-Martin

<http://nssdc.gsfc.nasa.gov/planetary/lunarprosp.html>

National Space Science Data Center

Planetary Exploration

<http://www.soest.hawaii.edu/PSRdiscoveries/>

Planetary Science Research Discoveries web magazine

http://www.soest.hawaii.edu/spacegrant/class_acts/

Hands-on classroom activities for planetary science

<http://spacelink.nasa.gov/>

NASA Spacelink

<http://bang.lanl.gov/solarsys/>

Views Of The Solar System (Calvin Hamilton/LANL)

<http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets/luna.html>

The Nine Planets - Moon pages (Bill Arnett/SEDS)

<http://pds.jpl.nasa.gov/planets/>

Welcome to the Planets (PDS/JPL)

http://stardate.utexas.edu/resources/ssguide/SSG_Contents.html

Guide to the Solar System (McDonald Observatory)

<http://nssdc.gsfc.nasa.gov/imgcat/>

NSSDC Planetary Image Catalog

<http://photojournal.jpl.nasa.gov/>

NASA Planetary Photojournal

<http://nix.nasa.gov/>

NASA Image eXchange (NIX)

