Legacy of the Apollo 11 Moon Landing

Looking Back Fifty Years
When Neil Armstrong, Buzz Aldrin, and Michael Collins first embarked on their journey to the Moon on July 16, 1969, no human had ever set foot on another celestial body. Armstrong and Aldrin made the first human footprints on the Moon on July 20, landing safely in Mare Tranquillitatis (Sea of Tranquility) on the side of the Moon that we see from Earth. The two astronauts remained within about 100 meters (around 300 feet) of the lunar module Eagle and spent approximately two and a half hours outside Eagle, collecting rock and soil samples and setting up science experiments while Collins orbited above in the command module Columbia.

Revolution in Lunar Science
After the Apollo 11 astronauts splashed down in the Pacific Ocean on July 24, carrying rock and soil samples, we entered a new scientific era. At the time, little was known about the history and composition of Earth’s nearest celestial neighbor. For the first time in history, scientists could analyze samples from another world. This allowed them to determine the age, composition, and other properties of the Moon and to learn more about the solar system itself.

Returned Samples
The astronauts collected 21.7 kilograms (47.8 pounds) of samples which later revealed a wealth of information.
- The lunar maria (the dark patches one sees when looking at the Moon) are ancient volcanic lava flows.
- Early in its history, the Moon was nearly completely molten, covered in a layer of liquid rock. Since this discovery, the notion of an early “magma ocean” has been applied to all the rocky planets.
- The volcanic samples collected by Apollo 11 are old – roughly 3.6 billion years old. The Moon formed about 4.5 billion years ago, so these samples have taught us about the Moon’s early history.

Surface Experiments
The Apollo 11 astronauts deployed a small set of experiments during their short time on the lunar surface. The Solar Wind Composition Experiment collected particles of the solar wind (electrically charged particles emitted by the Sun), allowing the chemical composition of the solar wind to be measured. The Early Apollo Scientific Experiments Package (EASEP) consisted of three experiments. Along with two solar panels to provide power, an antenna and communications system to send data to Earth ground stations and receive commands, EASEP was composed of the following:
- Passive Seismic Experiment Package: detected lunar “moonquakes” and demonstrated the feasibility of lunar seismic exploration.
- Lunar Dust Detector: measured dust accumulation and radiation damage to the solar cells; the natural dust accumulation on the experiment packages proved to be lower than predicted.
- Lunar Ranging Retroreflector: cube-shaped mirrors that reflect laser pulses directly back to Earth; the light travel time measures the Moon’s distance with high accuracy and helps calibrate the scale of the solar system. This experiment is still in use today.

For More Information
- https://www.lpi.usra.edu/lunar/missions/apollo/apollo_11/