

Lunar Facts

An analysis of the lunar surface shows that it has the same abundance of many elements as the Earth. This leads us to the conclusion that the moon was created when a rock the size of Mars slammed into Earth, shortly after the solar system began forming about 4.5 billion years ago.

The moon is illuminated by the Sun, just like Earth. When we see a full moon the daytime side of the moon is facing toward us. When we only see a crescent moon, then the daytime side of the moon is partially turned away from us.

The Moon is gravitationally locked to the Earth. We always see the same side. We never see the back of the moon from the Earth!

You analyze the Moon's surface and find the most common elements are silica (45%), alumina (15%) iron (14%) and lime (12%). These are useful materials to build a lunar base out of.

The Moon's heavily cratered surface is the result of intense pummeling by space rocks between 4.1 billion and 3.8 billion years ago. Due to a lack of erosion and moon quakes these craters remain on the surface (as opposed to the Earth where most evidence of old craters has been lost).

With a seismometer you can measure occasional small moon quakes. The Moon's interior is only partially molten in the inner core though and therefore we do not have to worry about big quakes on the moon.

The atmosphere is so thin on the moon it is comparable to a very good vacuum on Earth and the density of particles we find at the International Space Station's orbit. However, there are some particles in the air: a few gases such as helium and argon, sodium, and potassium.

In the deep shadows of craters near the poles of the Moon we find some water ice. Water ice is crucial to establish a habitat as it would be very expensive to bring water to the Moon from the Earth. We do not yet know the exact abundances or locations of possible water ice on the Moon. The VIPER rover will look for water ice on the Moon starting in 2022 or 2023.

The Moon's gravity at the surface is only 16% of what it is on Earth. Careful when you take a bounce – you will hop very far easily!

The cost of one US lunar base program is estimated to be US\$35 billion in total! This includes the rockets to get us there and back. The cost of just the lunar base itself would be US\$17 billion. Additionally, it would cost over US\$7 billion per year to maintain the base.

A private venture called the Open Lunar Foundation estimates it could establish a lunar base for only US\$2 or 3 billion. Canadian astronaut Chris Hadfield is a part of this effort.