

FYI

Earth and Its Moon

Unlike most other planets, Earth has only one moon. The moon travels around Earth in an elliptical orbit at an average distance of 384,000 km.

The moon is only 1/400th the diameter of the sun, whereas Earth is about 1/100th of the diameter of the sun. In terms of volume, that means that a million Earths would fit inside the sun and over 64 million of our moons would fit inside it (volume is proportional to R^3).

The large, dark areas we see on the moon are called **maria** (singular **mare**), meaning oceans or seas, because that is what they resembled to early observers. The maria are evidence of large meteor impacts that have been common during the moon's history because of its lack of atmosphere. The resulting craters were filled in by dark molten material that later formed basalt. The impacts occurred early in the moon's history, and the moon's surface has remained relatively unchanged since then because the moon has no remaining geological activity such as volcanoes and quakes.

As the sun formed and left a disk of material swirling around it, the material in the disk cooled and formed small clumps of matter that would later become the planets in our solar system. Although this is when Earth was formed, scientists claim that the moon did not come into being at this time. The moon is made up of rock and metal like Earth, but it has a very different density from Earth and therefore a different composition. This is only explainable if the two were formed at different times.

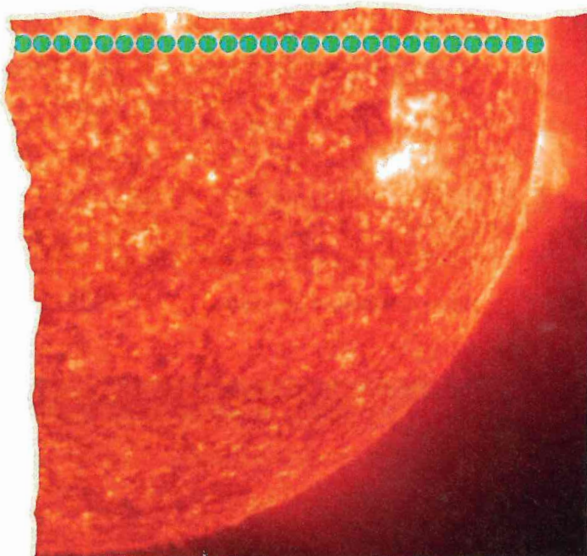


Figure 1-7: Diagram of Earth's size relative to the size of the sun. One hundred and nine Earths would be required to fit across the sun's disk, and over 1 million Earths could be contained within its volume.

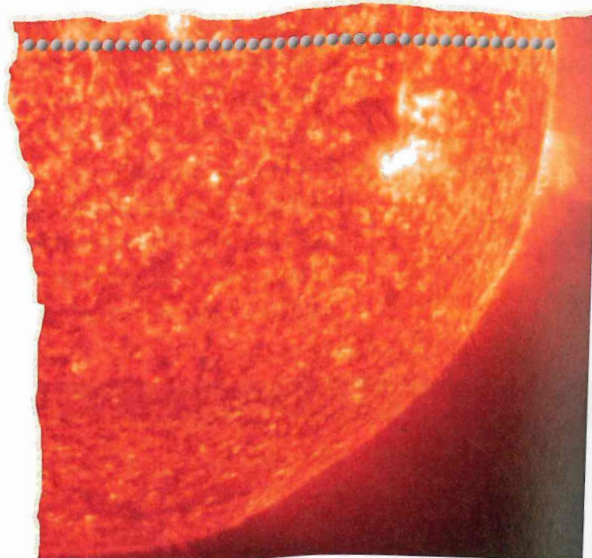


Figure 1-8: Diagram of the size of the moon relative to the size of the sun. Four hundred moons would be required to fit across the sun's disk. The moon is 400 times closer to Earth than it is to the sun.

There is strong evidence to support the claim that the moon formed from a collision in which a small planet-like boulder crashed into Earth at some point early in its formation. The moon would have been formed from material that had been shattered from Earth's crust during the collision. It is thought that, because of its relatively large size in comparison to Earth, the moon may be protecting Earth from ongoing smaller collisions. By taking the hit from some of the large incoming meteors headed for our planet, the moon acts as a shield, and has undoubtedly prevented several additional mass extinctions from occurring in our past.



Checking In

1. Why does the explanation that the moon formed from a collision with Earth fit the evidence better than other theories, such as that the moon's formation coincided with that of Earth?
2. What is a scientific explanation for the dark spots that we sometimes call “the man in the moon”?

