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ARTICLE-A-DAY™

The Sun, Moon, and Planets

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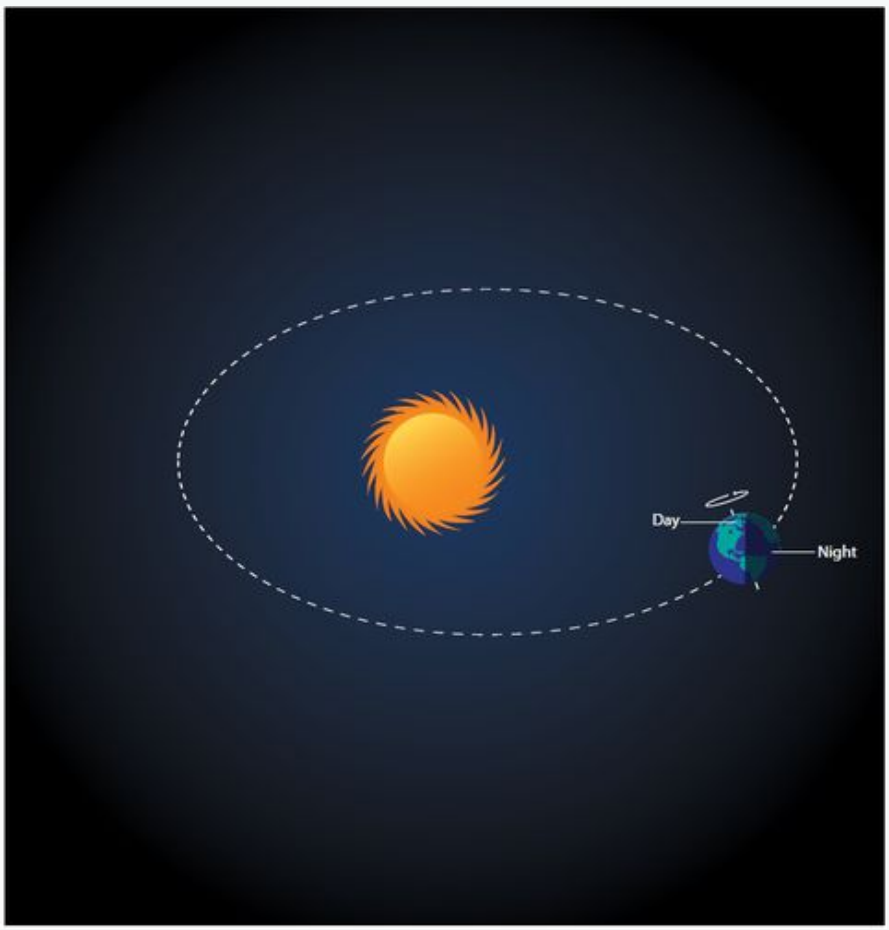
The Movement of the Earth

This text is adapted from an original work of the Core Knowledge Foundation.

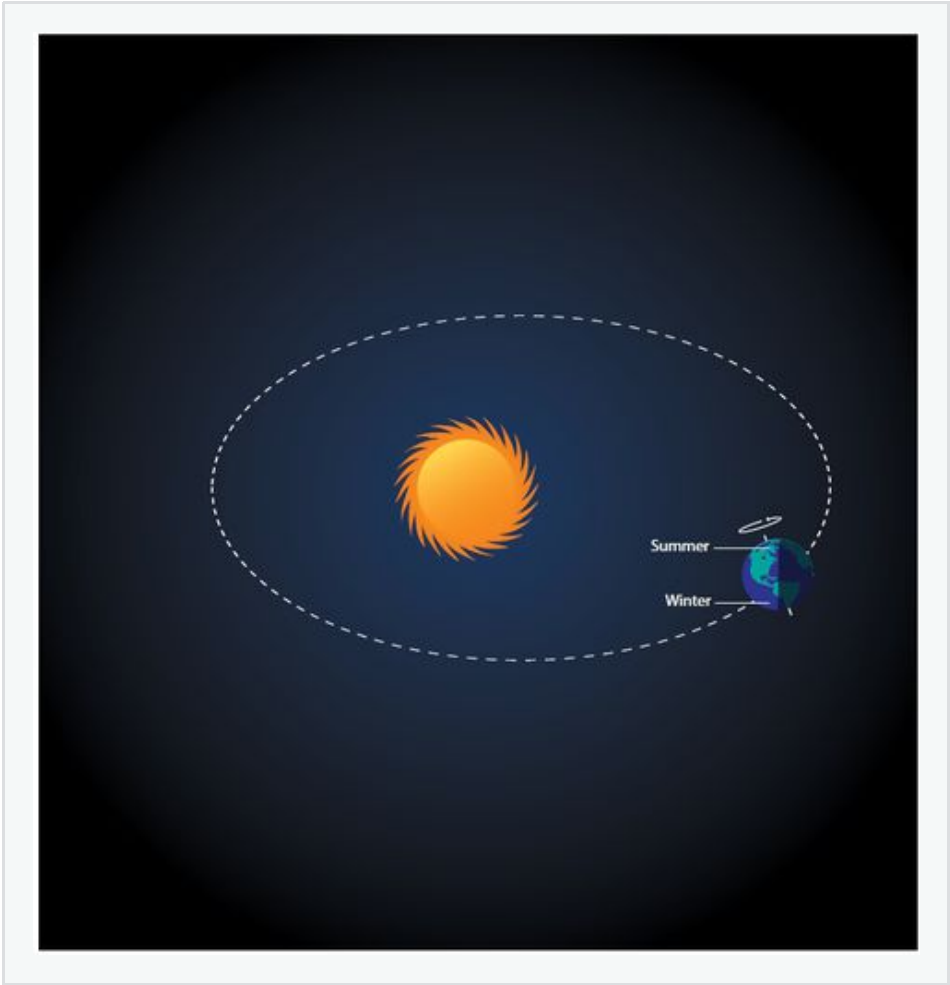
Our planet, Earth, moves in two ways. The Earth circles around the sun. It takes about 365 days, which is one year, for Earth to orbit the sun.

Earth also moves by spinning, or rotating, on its axis. It is this spinning that makes day and night on Earth and the motion of the sun across the sky from sunrise to sunset. It takes one day for Earth to make one complete rotation on its axis. As Earth rotates and spins, different parts of it face the sun. When the part facing the sun gets sunlight, it is daytime on that side of Earth. The part that faces away from the sun gets no sunlight. So, on that side of Earth, it is nighttime. Did you know that when it is daytime where we live, it is nighttime on the other side of Earth?



Earth spins on its axis. On the side of Earth facing the sun, it is daytime. On the side facing away from the sun, it is nighttime.

When Earth rotates on its axis, it is tilted. At certain times of the year, one part of Earth is tilted toward the sun. The sunlight is more direct and it feels hotter. For people living on this part of Earth, it is summer. For people living on the part of Earth tilted away from the sun, there is less sunlight and it is winter. So, when it is summertime for us, there are people living on other parts of Earth where it is winter! So, the fact that Earth is tilted on its axis is what creates the seasons of the year.



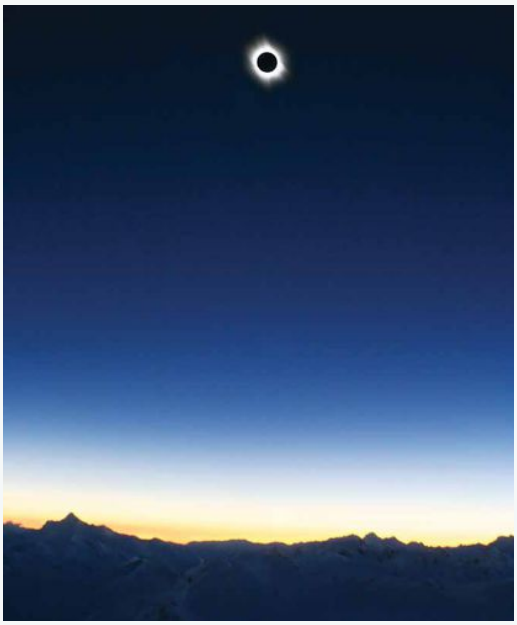
When Earth is tilted on its axis towards the sun, it is spring and summer. When Earth is tilted on its axis away from the sun, it is fall and winter.

Eclipses

This text is adapted from an original work of the Core Knowledge Foundation.

Earth orbits around the sun. The moon orbits around the Earth. The way that Earth, the moon, and the sun move can make other interesting things to look at in the sky. When Earth, the moon, and the sun all move together in a direct line, something called an eclipse can take place.

We can see two kinds of eclipses from Earth. One kind happens when the moon gets in between the sun and Earth. When that happens, we can't see the sun for a while. At least, we can't see part of it. We call this a solar eclipse or an eclipse of the sun.



During an eclipse of the sun, the moon moves between Earth and sun and blocks out the sun.

The other kind of eclipse, called a lunar eclipse, also involves the sun, the moon, and Earth. It takes place when the moon passes behind Earth and into its shadow. In the image on the next page, you can see that a shadow covers part of the moon. It is Earth's shadow that you see. Earth has blocked out the sun and left part of the moon in darkness.

Eclipses do not happen often because the sun, Earth, and the moon all have to line up just right. Solar eclipses can only be seen from a narrow strip of Earth at a time. While they happen once or twice a year, it is very, very rare to see one. Eclipses of the moon happen more often, several times

each year. They can be seen from half of Earth at a time, so are more often visible.

Whether or not you can see an eclipse depends on where you are on Earth. You must never look directly at a solar eclipse. The sun is very bright and could burn your eyes. But, it is safe to look at an eclipse of the moon. If an eclipse is predicted, it is usually big news, so you will likely hear about it.

The moon during a lunar eclipse

The Planets Closest to the Sun

This text is excerpted from an original work of the Core Knowledge Foundation.

Our planet Earth is one of eight planets in our solar system that orbit around the sun. The other planets are Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. People have been looking at the planets for thousands of years. People from Mesopotamia, the Greeks, Mayans, Incas, and Aztecs were all interested in the planets. They used just their naked eye to study the planets. Now, we have telescopes and other tools that help us get a better look at the planets.

A telescope

The four planets closest to the sun—Mercury, Venus, Earth, and Mars—are small planets. These planets have a rocky, or solid, surface.

Mercury and Venus are closer to the sun than Earth. The other planets are farther away.

Earth needs 365 days to make one orbit around the sun. That is the length of one year on Earth.

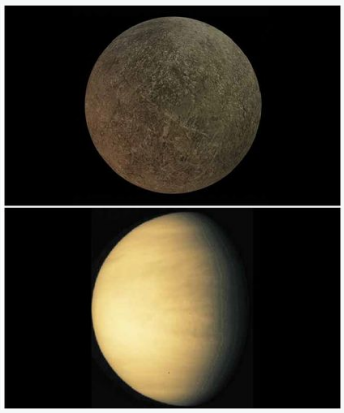
The closer a planet is to the sun, the less time it needs to make an orbit around the sun. Mercury is the closest planet to the sun. It needs just 88 days to make one orbit. Venus is the next closest to the sun. It needs just 225 days to make an orbit. The planets that are farther away take much longer. It takes Neptune 165 years to orbit the sun!

The sun and planets

Besides being closest to the sun, Mercury is the smallest of all the planets. The English name for the planet comes from the Romans. They named the planet after the Roman god Mercury. The Greek name for this same god is Hermes.

Venus is the second planet from the sun and is closest to Earth. This planet was named after the Roman goddess of love. For a long time, scientists thought that Venus might be a lot like Earth. After all, it is close to Earth. It is about the same size as Earth and it is covered with clouds, like Earth. But this idea turned out to be wrong, too. We know now that Venus and Earth are different in lots of ways.

Scientists had to change their ideas to fit the new facts. They have now concluded that Venus is much hotter than Earth. It would not be a good place for us to live or even visit.



Mercury (top) and Venus

Mars is the fourth planet from the sun. It is named after the Roman god of war. When you look at Mars in the night sky, it looks quite red. This is because the rocks on Mars contain rust.

Many space probes and robots have landed on Mars. They have taken photographs and also dug up rocks.

One probe that went to Mars not long ago found some ice. That was big news. Ice is frozen water. If there is water on Mars, there might be life. Some experts argue that nothing could live on Mars. They say it is too cold and too dry. Others think there might be life on Mars. They think there might be something alive down under the rocks. Still others think there might have been life on Mars at one time but there isn't any now.

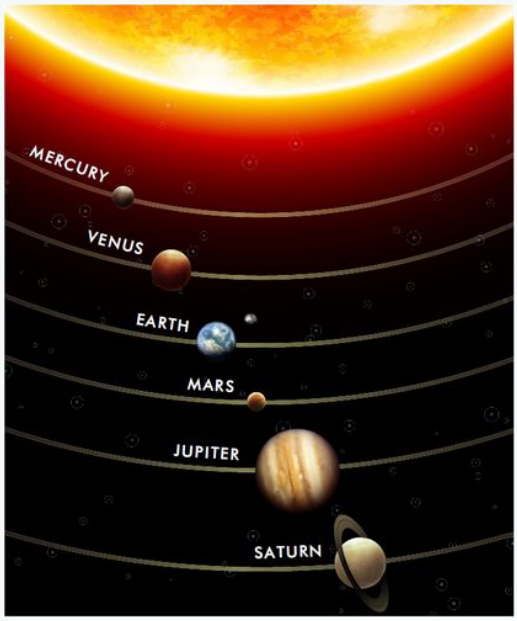
Mars

The Outer Planets

This text is adapted from an original work of the Core Knowledge Foundation.

The four planets closest to the sun are Mercury, Venus, Earth, and Mars. There are four more planets in our solar system called the outer planets. So there are eight planets in all.

Jupiter is the very next planet after Mars. After Jupiter come Saturn, Uranus, and Neptune in that order. Neptune is the planet that is farthest from the sun. Uranus is difficult to see with the naked eye and Neptune is impossible to see without help. Neptune is only visible using a telescope.

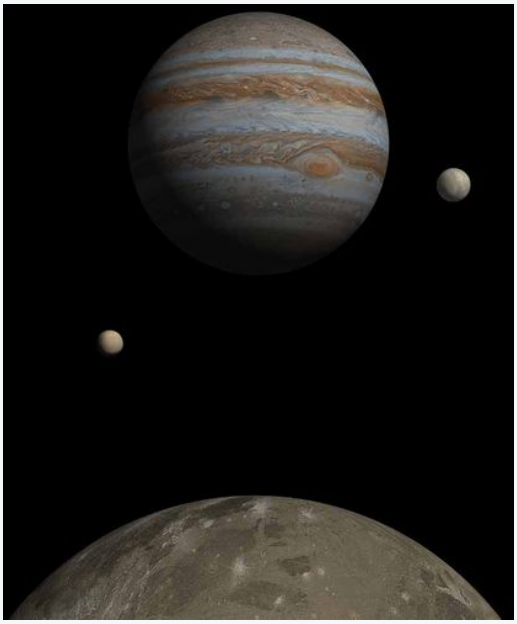


Part of our solar system: the sun and six of the eight planets

The outer planets are very large and are mostly made of gas. Scientists often call these planets gas giants. Of all the planets, Jupiter is the largest: 1,300 Earths could fit inside Jupiter! It is made mostly of hydrogen gas, the most common gas in the universe.

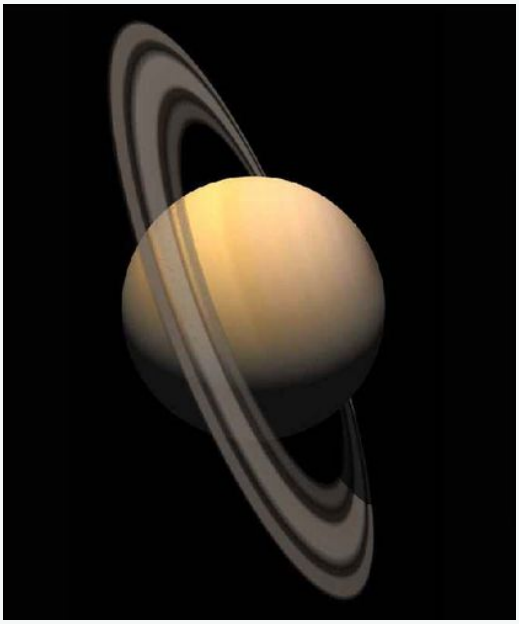
The gases on Jupiter seem to be blowing around. In the image of Jupiter below, you can see the giant, red spot. It looks like an eye! Experts think it is a big wind storm, like a huge hurricane.

Jupiter also has 63 known moons that orbit it. Some of these moons are very large, even larger than Earth's moon.



Jupiter and some of its moons

Saturn is known for its many large rings that orbit the planet. These rings are made of ice and dust. The ice reflects light and makes the rings glow. Saturn also has many moons that orbit it.

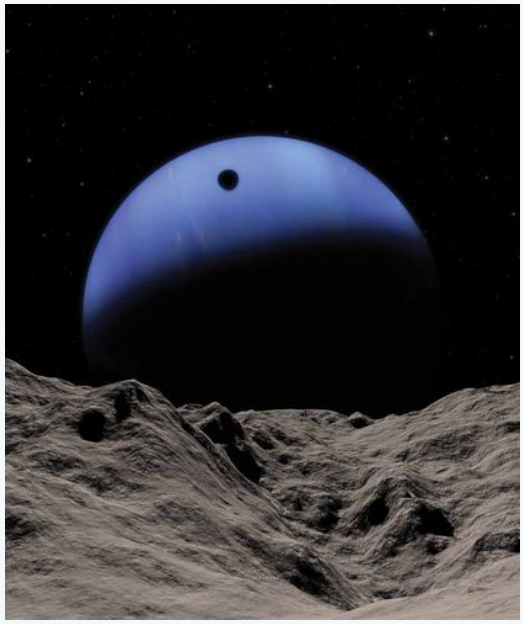


Saturn and its rings

The last two planets are Uranus and Neptune. These planets are the farthest from the sun so they

are very cold. Uranus and Neptune also have rings, but they aren't easily seen like Saturn's. Both planets also have moons.

So now you know the names of all eight planets. Try asking the adults in your family how many planets there are. They may tell you that there are nine planets. When the adults in your family were in school, people said that there was a ninth planet called Pluto. But in 2006, scientists decided that Pluto did not have all of the characteristics needed to be classified as a planet. They removed Pluto's name from the list of planets, so now there are only eight planets.



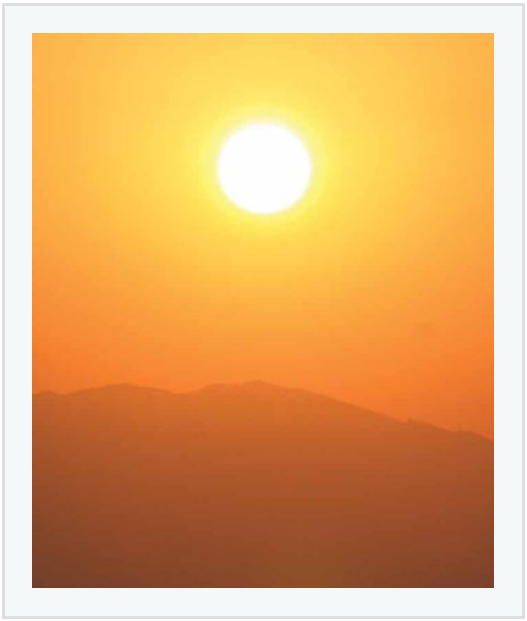
This is Neptune as it might look if seen from one of its moons. The shadow of another moon makes a dark spot on the planet's surface.

In the Center of a Group of Planets

This text is excerpted from an original work of the Core Knowledge Foundation.

Look up in the sky at noon. What do you see? If it is not cloudy, you will see the sun shining brightly in the sky.

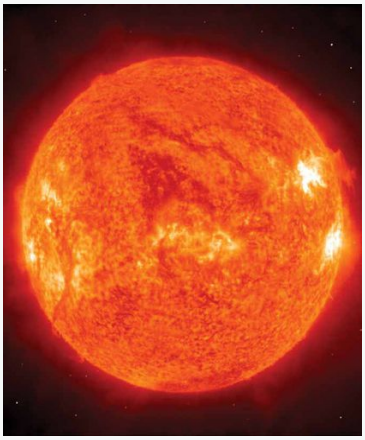
The sun provides energy—both light and heat energy. The sun's light and heat give life to plants and animals. Without the sun, Earth would be freezing cold. Have you ever wondered what the sun is made of or why it gives off so much light and heat?



The sun gives us light and heat energy.

You may be surprised to know that the sun is a star. It is in fact the closest star to Earth. It is made up of different, hot gases. How hot? A hot summer day on Earth is 100 degrees. On the sun, it is 10,000 degrees! The sun stays that hot all the time! The sun's gases create the light and heat energy it gives off.

Long ago, people believed that the sun moved around Earth. This seemed to make sense. Each morning at the start of the day, the sun rose in the east. At the end of the day, the sun set in the west—exactly opposite from where it had came up. To explain this change, people said the sun moved around Earth. But now we know that this is not what really happens. The sun does not move around Earth. It is Earth that moves around the sun!



A close-up of the sun

The sun is in the center of a group of eight planets. All of these planets, including Earth, circle, or orbit, around the sun. The sun, planets, and other objects in space that orbit the sun are called the solar system. The word *solar* has the Latin root word *sol*, which means "the sun." Everything in the solar system relates to the sun.

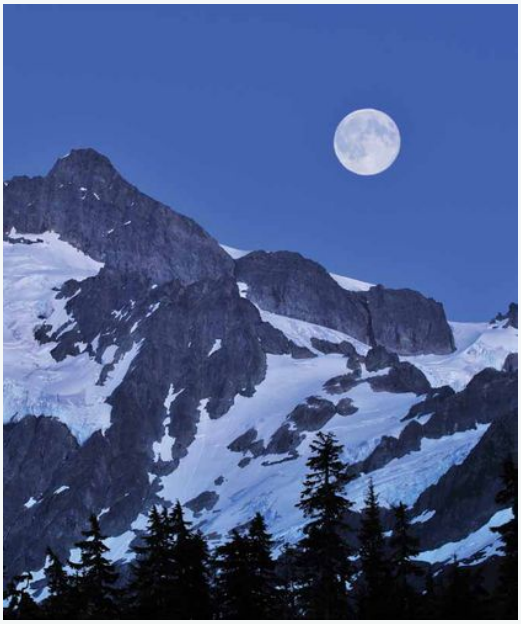
Planets orbiting the sun

The Earth's Moon

This text is adapted from an original work of the Core Knowledge Foundation.

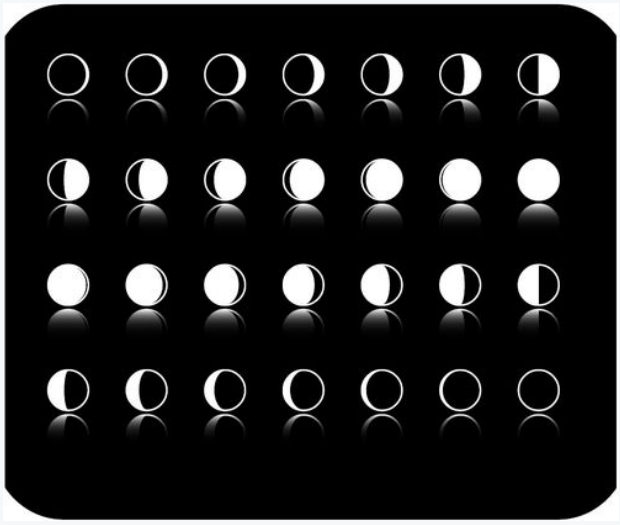
Look up in the sky at night. What do you see? If it is not cloudy, you may be able to see the moon.

When you see the moon at night, it might look white. It might look gray or silver. Sometimes, it seems to shine and glow. But the moon does not give off light the way the sun does. The moon is a ball of rock that gives off no light of its own. It simply reflects light from the sun. That means light from the sun hits the moon and bounces off.



Our moon is easily visible on most clear nights.

You may know that Earth orbits around the sun. But did you know that the moon orbits around Earth? It takes just about one month for the moon to completely circle Earth. If you look up at the night sky each night of the month, you may think that the size and shape of the moon is changing. However, the size and shape are not really changing. The moon is still a round ball. It looks different at different times of the month because of the way the light from the sun is reflected and how much of the moon we can see from Earth.



This chart shows the phases of the moon. It shows what you might see if you looked at the moon each night for a month. You can read the chart just like you would read a book. Start at the top and go from left to right. When you finish reading the first row, go on to the next one. You can see how the moon seems to change during the month.