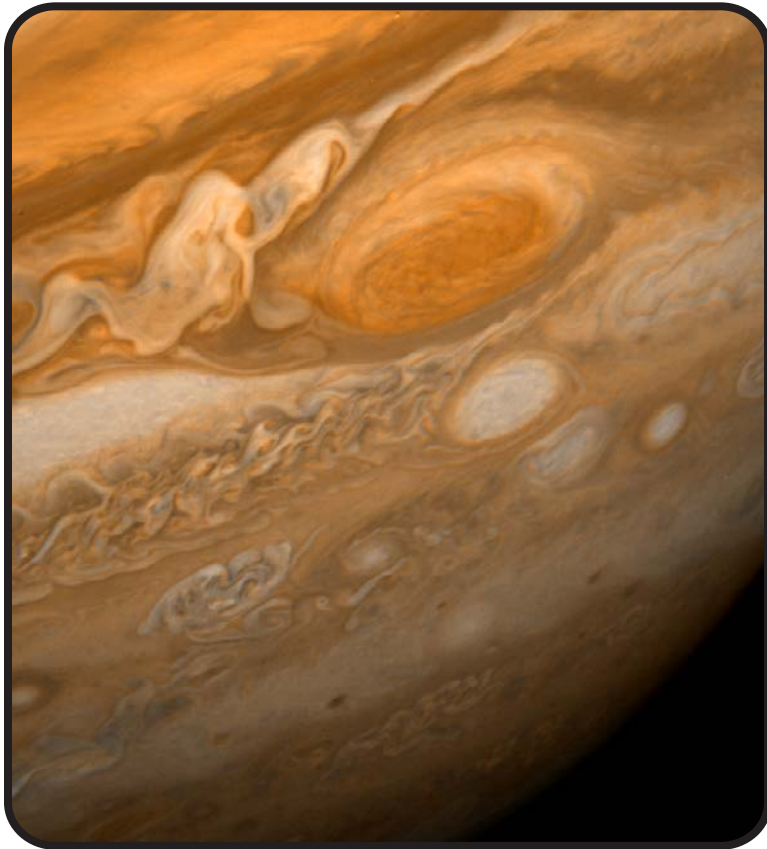


# THE SOLAR SYSTEM

A Science A-Z Earth Series

Word Count: 1,239



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Written by David Dreier

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## KEY ELEMENTS USED IN THIS BOOK

**The Big Idea:** Learning about our solar system can give students a sense of wonder and perspective. They can ponder and appreciate Earth's crucial position in our solar system, which makes this planet such an ideal place for us to live. Students may also consider how small our entire world is compared to some of our fellow planets, the Sun, and the vastness of space. For some students, this perspective might provide a sense of scale for their own panoramas and concerns. It may also help students understand why many people are excited about the prospects of discovering and exploring new solar systems, both within our galaxy and beyond.

**Key words:** asteroid, asteroid belt, atom, comet, crater, diameter, dwarf planet, Earth, gas, gas giant, gravity, heat, helium, hydrogen, Jupiter, Kuiper Belt, light, liquid, Mars, Mercury, methane, moon, Neptune, orbit, oxygen, planet, Pluto, plutoid, revolution, rotation, Saturn, solar system, star, surface, tail, temperature, Uranus, Venus

**Key comprehension skill:** Interpret graphs, charts, and diagrams  
*Other suitable comprehension skills:* Cause and effect; compare and contrast; classify information; main idea and details; identify facts; elements of a genre

**Key reading strategy:** Visualize  
*Other suitable reading strategies:* Ask and answer questions; summarize; connect to prior knowledge; using a table of contents and headings; using a glossary and boldfaced terms

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## Introduction

The **solar system** is our home in space. It's special to us because it's where we live.

Let's take an imaginary flight through the solar system. We'll start at the center, with the Sun. As we move away from the Sun, we will pass many **planets**. One of those planets is our own Earth. Earth and the other planets all circle the Sun. Climb aboard! Let's begin our journey.



The eight planets in our solar system, in order from the Sun

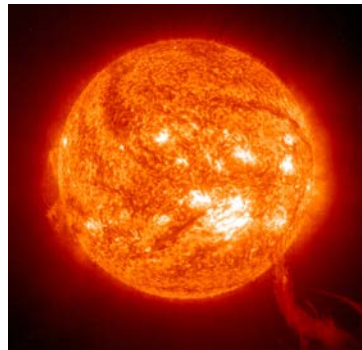


## The Sun

The Sun is one of many **stars** in space. Stars are huge, fiery balls of gas. The Sun is made mostly of a gas called *hydrogen*.

The Sun looks big and bright because it is fairly close to us. Other stars are much, much farther away. That's why they're just little specks of light.

Atoms of hydrogen in the center of the Sun are forced together. They turn into a gas called *helium*. This process gives off huge amounts of energy. It causes the Sun to be hot and bright.



The Sun's huge size gives it very strong **gravity**. Gravity is a force that pulls objects together. Gravity keeps the planets **orbiting** the Sun.

### WOWSER!

Over time, the Sun's hydrogen will almost run out. The Sun will begin to cool down. But it will take 5 billion years for that to happen!



### FAST FACTS About the Sun

- |                              |   |
|------------------------------|---|
| • Diameter:                  | 1.39 million kilometers (864,000 mi.)   |
| • Temperature:               | Core: about 15 million °C<br>(27 million °F)<br>Surface: about 5,500°C (10,000°F)<br>Corona: more than 1 million °C<br>(1.8 million °F) |
| • Mass, compared with Earth: | 332,000 times as massive  |

## The Planets

Our trip through the solar system will take us by eight planets.

Scientists place the planets into two groups. One group has Mercury, Venus, Earth, and Mars. They all have a solid surface.

The outer four planets are Saturn, Jupiter, Uranus, and Neptune. These planets are called **gas giants**. They do not have a solid surface. You wouldn't be able to breathe the air on these planets.

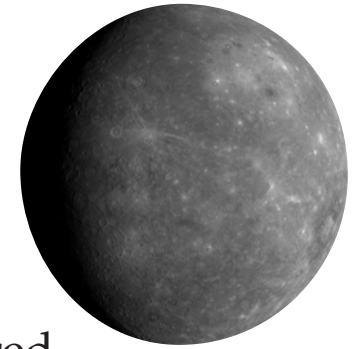


Here's a memory aid to remember the order of the planets from the Sun (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune):  
**M**y **V**ery **E**ducated **M**other **J**ust **S**howed **U**s **N**eptune.



## The Inner Planets

The first planet we see after leaving the Sun is Mercury. It is a small planet covered with **craters**, like our **Moon**. And like the Moon, it has no air.

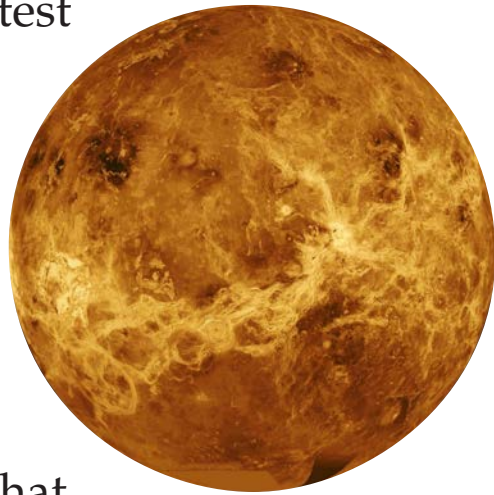


On Mercury, the Sun looks three times larger than it does on Earth. When the Sun is overhead on Mercury, the temperature rises to about 430°C (800°F). After sunset, it drops down to about -170°C (-280°F).

### FAST FACTS About Mercury

- Diameter: 4,879 kilometers (3,032 mi.)
- Average distance from the Sun: 58 million kilometers (36 million mi.)
- Period of rotation (one turn on axis): 59 Earth days
- Period of revolution (one orbit around Sun): 88 Earth days
- Number of moons: 0

The next planet we will see is Venus. It is the brightest object in our sky, except for the Sun and Moon.



Venus has thick clouds that trap heat from the Sun. The temperature on Venus is about 470°C (880°F). The planet has many volcanoes. Almost all of Venus's surface is lava.

#### **FAST FACTS** About Venus

- Diameter: 12,104 kilometers (7,521 mi.)
- Average distance from the Sun: 108 million kilometers (67 million mi.)
- Period of rotation: 243 Earth days
- Period of revolution: 225 Earth days
- Number of moons: 0

The third planet we will see is very familiar. It is Earth. We think it is the only planet in our solar system with life and liquid water.



Earth lies in a part of the solar system where liquid water can exist. This made it possible for life to develop.

The air of our planet is about one-fifth oxygen. Oxygen is produced by the plants on Earth.

#### **FAST FACTS** About Earth

- Diameter: 12,756 kilometers (7,926 mi.)
- Average distance from the Sun: 150 million kilometers (93 million mi.)
- Period of rotation: 23.93 hours
- Period of revolution: 365.24 days
- Number of moons: 1

The next planet is Mars. This planet has a reddish color and hardly any air. The red color is caused by rust in rocks.



It is cold on Mars. Scientists have learned that Mars has ice at its poles. Mars probably had running water on its surface long ago. That water may now lie underground.

Mars often has big dust storms. The planet has the biggest volcano in the solar system.

#### **FAST FACTS** About Mars

- Diameter: 6,794 kilometers (4,222 mi.)
- Average distance from the Sun: 228 million kilometers (142 million mi.)
- Period of rotation: 24.6 Earth hours
- Period of revolution: 687 Earth days
- Number of moons: 2

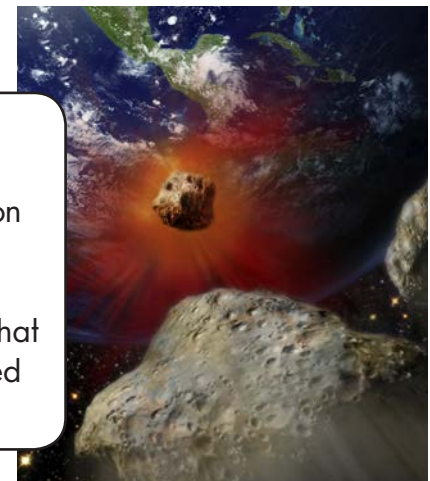
Between Mars and Jupiter is a large area full of **asteroids**. This area is called the *asteroid belt*.

Asteroids are rocks left over from when the solar system was born. Some asteroids are small boulders. Others are huge. There are millions of asteroids.

The largest object in the asteroid belt is named Ceres. It is about 940 kilometers (584 mi.) wide.



Earth has been hit by many asteroids in its history. About 65 million years ago, a huge asteroid smashed into what is now Mexico. That asteroid may have killed the dinosaurs.





## The Outer Planets

Next, we will visit the four gas giants. The air of the gas giants is poisonous. The first gas giant you'll see is Jupiter.

Jupiter is the biggest planet in the solar system. It may have a large, icy center under all the gases.



Jupiter's air has large bands. They are caused by strong winds. The air contains a huge spinning storm. It is called the Great Red Spot.

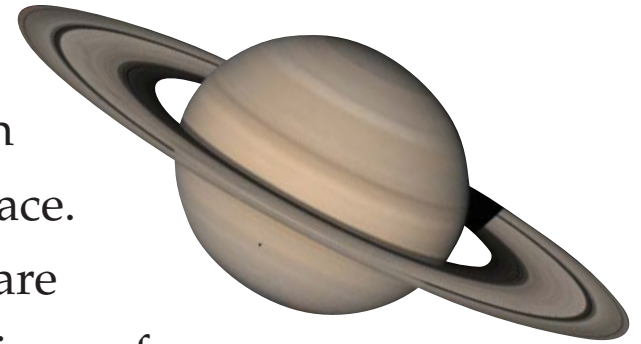
### FAST FACTS About Jupiter

- Diameter: 142,984 kilometers (88,486 mi.)
- Average distance from the Sun: 778 million kilometers (484 million mi.)
- Period of rotation: 9.9 Earth hours
- Period of revolution: 11.9 Earth years
- Number of moons: 63

The next gas giant we'll see is Saturn. It is famous for its beautiful rings.

Like Jupiter, Saturn has air that is divided into bands. They are caused by very fast winds.

Saturn's rings reach far into space. The rings are made of pieces of rock and ice. Scientists think the rings are the remains of **comets** and other objects.



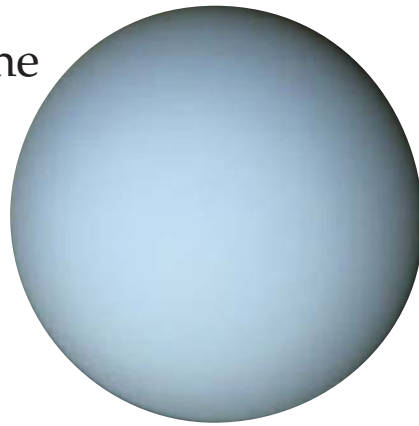
### FAST FACTS About Saturn

- Diameter: 120,536 kilometers (74,898 mi.)
- Average distance from the Sun: 1.4 billion kilometers (886 million mi.)
- Period of rotation: 10.7 Earth hours
- Period of revolution: 29.4 Earth years
- Number of moons: 60



Uranus is the next planet we come to. Its name is pronounced either YOOR-uh-nus or yuh-RAY-nus.

Uranus is a blue-green planet. It gets its color from a gas called *methane*. Sunlight reflects through the gas. The light that the methane lets through is blue-green.

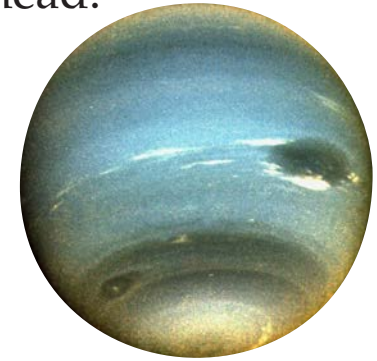


Under all the gas, Uranus has an icy center.

#### **FAST FACTS** About Uranus

- Diameter: 51,118 kilometers (31,763 mi.)
- Average distance from the Sun: 2.87 billion kilometers (1.78 billion mi.)
- Period of rotation: 17.24 Earth hours
- Period of revolution: 84 Earth years
- Number of moons: 27

Look what's up ahead. That's Neptune. It's the last planet on our trip.



Neptune has a bluish color. But it's brighter than Uranus. Scientists think that Neptune's color is also caused by methane. But they don't know why it's so bright.

Neptune has an icy center. The planet is so far from the Sun that it gets almost no heat.

#### **FAST FACTS** About Neptune

- Diameter: 49,528 kilometers (30,775 mi.)
- Average distance from the Sun: 4.5 billion kilometers (2.8 billion mi.)
- Period of rotation: 16.1 Earth hours
- Period of revolution: 164.8 Earth years
- Number of moons: 13

## Dwarf Planets

We're not at the end of our trip yet. Now we'll see some smaller objects.

In 2006, astronomers decided that Pluto was too small to be a planet. They said Pluto and other small planets would now be called **dwarf planets**.



An artist's idea of a space probe visiting plutoids.

These other dwarf planets are a lot like Pluto. So astronomers decided to call them *plutoids*.

Plutoids orbit the Sun in a distant part of the solar system. This area is full of icy objects. Astronomers think they will find more plutoids there.

In 2009, there were four known plutoids. Two of them were Pluto and a dwarf planet named Eris. The other two were named Makemake (MAA-kee MAA-kee) and Haumea (how-MAY-uh).

Not all dwarf planets are plutoids. To be a plutoid, a dwarf planet must orbit beyond Neptune.

Ceres is a dwarf planet but it is not a plutoid. That is because it orbits in the asteroid belt.



An artist's idea of the asteroid belt

## Moons

Many of the planets we passed had moons. A moon is an object that orbits a planet.

The moon that people know best is our own Moon. It is one of the largest moons in the solar system.



Scientists think our Moon was created billions of years ago. They think a huge object smashed into Earth. Material was thrown into orbit around Earth. The material came together to form the Moon.



The largest moon in the solar system is Ganimede (GAN-uh-mede).

It is one of Jupiter's moons. Ganimede has an icy crust that may cover an ocean.

Saturn has a big moon named Titan. It is the second-largest moon in the solar system. Titan is covered by thick orange clouds. Astronomers are using a special spacecraft to probe Titan's surface.



Images of Titan's surface from the European Space Agency's Huygens probe

## Comets

Comets are beautiful white objects with a tail. They move slowly across the sky.



A comet is made of ice, frozen gases, rocks, and dust. When a comet moves close to the Sun, it gets warmer. The Sun pushes material away from the comet. That's what forms the tail. When a comet gets far from the Sun, its tail fades away.

Most comets come from the Kuiper (KY-per) Belt. Others come from much farther away.

## Conclusion

We've taken a quick trip through the solar system. On our trip, we've seen many things. Now you know how the Sun produces its light. And when you see the Moon or Venus, you'll know more about them, too.

Our solar system is full of wonders. You can see some of these things for yourself with a backyard telescope.

Think about what lies beyond our solar system. There must be many other wonders out there!



An artist's idea of planets in another solar system



## Glossary

<b>asteroids</b>	irregularly shaped rocks that orbit stars (p. 12)
<b>comets</b>	space objects made of ice and dust that orbit a star and develop a long, bright tail as they near their star (p. 14)
<b>craters</b>	holes in the ground caused by the impact of an object from space (p. 8)
<b>dwarf planets</b>	nearly round objects that orbit a star, are smaller than a planet, and are not satellites of another object (p. 17)
<b>gas giants</b>	large planets that are mainly made up of gases (p. 7)
<b>gravity</b>	the force that pulls all objects toward each other (p. 6)

<b>moons</b>	solid objects that travel around a planet; natural satellites (p. 8)
<b>orbiting</b>	revolving around another object (p. 6)
<b>planets</b>	very large objects that orbit a star (p. 4)
<b>solar system</b>	a group of objects in space that orbit a star (p. 4)
<b>stars</b>	bodies in outer space, made of hot gases, that shine in the night sky (p. 5)

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