Exploring our solar system

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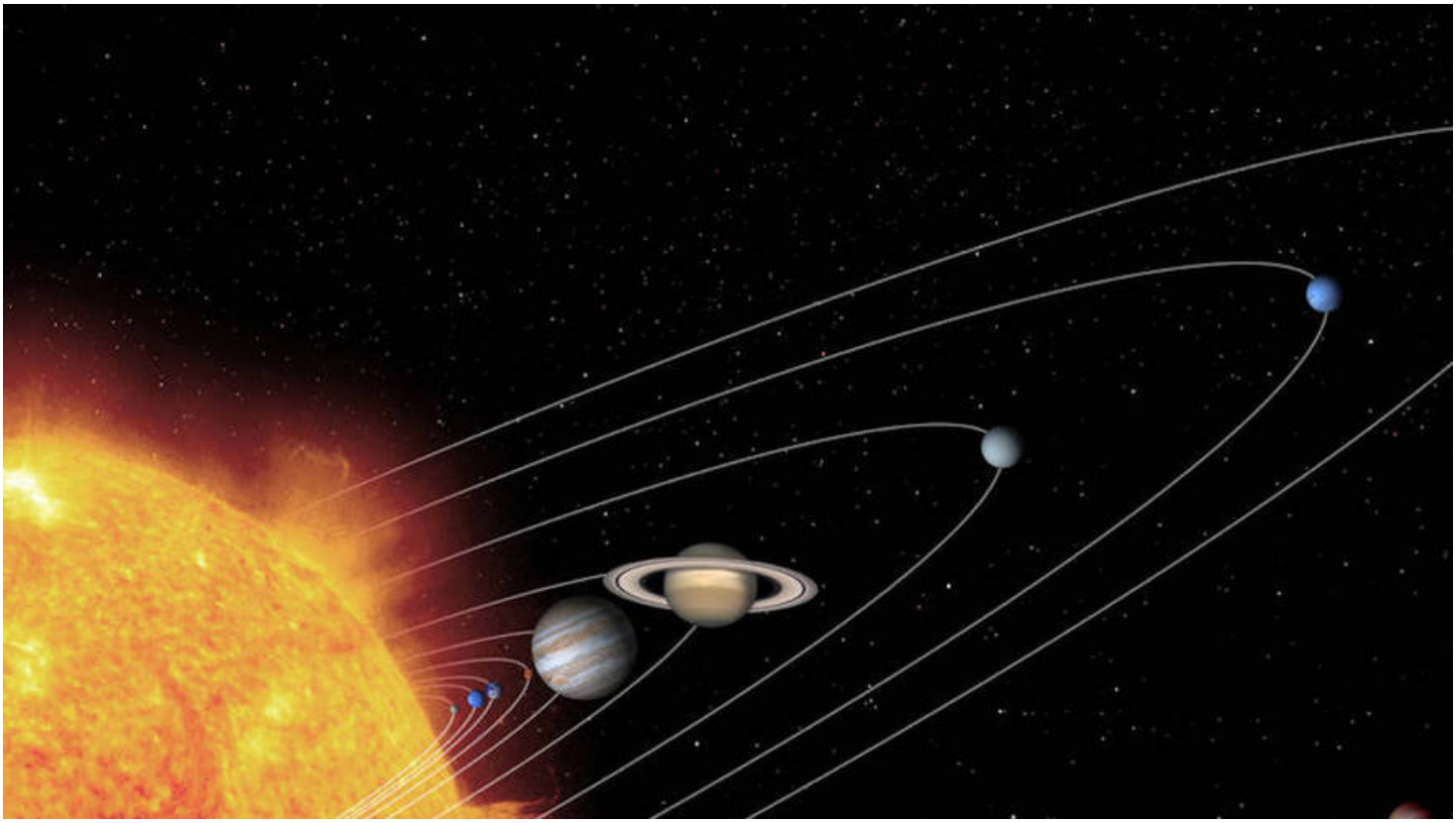

TOP: Photo of the solar system, June 21, 2016. NASA/JPL-Caltech/T. Pyle (SSC).

A solar system is a star and all of the objects that travel around it, such as planets and moons. Most stars have their own planets. Scientists believe there are many solar systems. Solar systems can also have more than one star. Some have two stars or more.

The solar system that is home to Earth is on the edge of the Milky Way. This is a galaxy, or system of stars, gas and dust. The solar system is made up of the sun and everything that orbits around it. This includes the eight planets and their moons. There are also pieces of rock like asteroids flying around. Comets are also flying through the solar system. They are like dirty snowballs of dust, ice and gas.

Size And Distance

The solar system goes far beyond the eight planets around the sun. It also includes the Kuiper Belt. This lies beyond the planet Neptune. The Kuiper Belt is a ring of icy objects. It includes the dwarf planet Pluto.

Beyond the Kuiper Belt is the Oort Cloud. This giant round shell surrounds the solar system. It has never been seen directly, but scientists believe it exists.

The Oort Cloud is made of icy pieces of space garbage. It is a thick shell of material where the sun's gravity ends. The Oort Cloud is very far away. It would take a space shuttle thousands of years to get there.

QUICK FACTS

Planets
Eight

Dwarf Planets
Five

Moons
Known = 149 | Provisional = 24
Total = 173

Comets
More than 3,400

Asteroids
More than 715,000

Formation

The solar system formed more than 4 billion years ago. It was created from a thick cloud of gas and dust. The cloud collapsed and formed a spinning, swirling disk. At the center of the disk, pressure began to build. Finally it released a huge amount of energy, creating the sun.

Farther out in the disk, material was also clumping together. These clumps smashed into one another, forming larger objects. Some of them turned into spheres, or ball-shaped objects. They became planets, dwarf planets and large moons. In other cases, they did not form planets. These bits and pieces are still flying around the solar system.

Structure

When the solar system formed, it was very hot in the middle. Near the sun, only rocky material could handle the heat. For this reason, the first four planets have solid, rocky surfaces. These planets are Mercury, Venus, Earth and Mars.

The planets farther away from the sun are made of ice and gas. Jupiter and Saturn are gassy planets. Uranus and Neptune are icy planets.

Exploration

About 400 years ago, scientist Galileo Galilei made some important discoveries. He used a new tool called a telescope. It let him see far into space. His discoveries supported the idea that all of the planets circle around the sun. At the time this was a new idea. Most people thought Earth was the center of the universe.

Since then, scientists have learned much more about the solar system. They have also learned more about what lies beyond it.

Significant Dates

1543: Nicolaus Copernicus publishes his theory of heliocentrism. This is the idea that the sun is the center of the universe.

1609, 1619: Johannes Kepler publishes three laws of planetary motion.

1610: Galileo Galilei publishes "The Starry Messenger." It describes the Earth's moon, Venus and four of Jupiter's moons.

1705: Edmond Halley finds similarities between comets seen in 1456, 1531, 1607 and 1682. He successfully predicts the return of the same comet in 1758.

1781: William Herschel discovers a new planet, Uranus.

1801–1808: The first four asteroids were discovered.

1846: Urbain Le Verrier and Johann Galle discover a new planet, Neptune.

1930: Clyde Tombaugh discovers a member of the solar system beyond Neptune, named Pluto. It is now considered a dwarf planet.

1977: Voyagers 1 and 2 launch from Earth. They begin their mission to explore the far reaches of the solar system.

2012: Voyager 1 enters interstellar space.

Quiz

1 Which answer choice BEST describes the structure of the article?

(A) A main topic is introduced; important details about that topic are explained.

(B) A problem is presented; several possible solutions are discussed.

(C) A question is introduced; some possible answers are explained.

(D) A claim is presented; supporting evidence is given to support the claim.

2 Which section of the article BEST helps you understand the history of space discoveries?

(A) "Formation"

(B) "Structure"

(C) "Exploration"

(D) "Significant Dates"

3 Read the selection from the article.

> *When the solar system formed, it was very hot in the middle. Near the sun, only rocky material could handle the heat. For this reason, the first four planets have solid, rocky surfaces. These planets are Mercury, Venus, Earth and Mars.*

Based on this selection, which of the following is TRUE?

(A) The four closest planets to the sun are too hot for life to survive.

(B) Planets made of stone and rock can survive hot temperatures.

(C) The four closest planets to the sun do not have any gas.

(D) The Earth is too close to the sun and humans will not be able to survive.

4 Which selection from the article BEST helps you understand how big the solar system is?

(A) A solar system is a star and all of the objects that travel around it, such as planets and moons.

(B) The solar system goes far beyond the eight planets around the sun.

(C) Beyond the Kuiper Belt is the Oort Cloud. This giant round shell surrounds the solar system.

(D) The Oort Cloud is very far away. It would take a space shuttle thousands of years to get there.