Meet Our Solar System

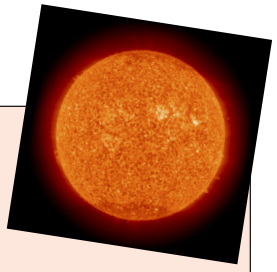
Remember, kids—planets, stars, comets, and asteroids can't really talk. But if they could, here is what they might say!

"Hi, Earth children! My name is the Sun. You see me almost every day! I am part of a big family called the solar system. Planets, asteroids, and comets are also part of the solar system! You can see some of my planet friends in the solar system at night—and if you have a telescope you can see almost all of them. But how well do you really know us? Let's find out! I'll ask you some questions. Tell a partner what you think the answer is:

Solar System Question Game

1. Another name for me is star. I am _____ .
2. I am the fastest planet. I am _____ .
3. I am the hottest planet. I am _____ .
4. You live on me. I am _____ .
5. People wonder if there is life on me. I am _____ .
6. I am a rock floating between Mars and Jupiter. I am _____ .
7. I am the largest planet. I am _____ .
8. I have more rings than any other planet. I am _____ .
9. I am the only planet tipped on my side. I am _____ .
10. I am now the eighth planet from the Sun. I am _____ .
11. I am now the ninth planet from the Sun. I am _____ .
12. Sometimes you can see my tail. I'm not a planet. I am _____ .

"Great guessing! Now we (my solar system friends and I) would like to introduce ourselves. After we tell you a little bit about us, we are going to play the Solar System Question Game again, and you can see if you have gotten to know us better!



"I'll go first since I am the center of the solar system," said the **SUN**. "Another name for me is star. Not to brag, but I am magnificent. If it weren't for me, there would be no heat or light in the solar system," said the Sun.

"Hey Sun, I think it's my turn now," said **MERCURY**. "The Sun (also known as star) is my best friend—even though sometimes he thinks he is too cool for everyone else, or in his case, maybe too hot," said Mercury.

Anyway, we became such good friends because I am the closest planet to him. I am the first planet from the Sun. I am fast—real fast compared to the other planets. You see, all the planets go in a circle around the Sun, like cars going around a racetrack. It is called an orbit. And you should see me orbit! I cruise through my orbit at a speed of 31 miles per second. Say 'elephant.' In the time it takes you to say the word 'elephant,' I have traveled 31 miles!" said Mercury.

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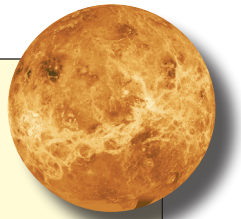
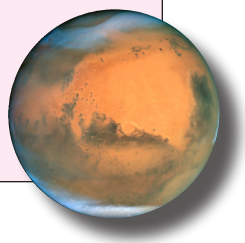
Meet Our Solar System



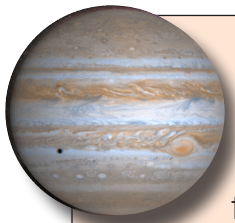
"Excuse me, not to be rude, but may I please introduce myself now?" said **VENUS**. "My name is Venus. I am the second planet from the Sun. I am the hottest planet, with temperatures as high as 900 degrees. In addition to being hot, I am quite bright! If you are looking at the night sky from Earth, I am the brightest object in the sky after the Sun and the Moon," said Venus.

"I'm next! Hi, I am **EARTH**. I think you know me pretty well. I am the third planet from the Sun. You are sitting on me right now! You surely know that I have one moon. Lots of amazing plants, animals, and wonderful children live on me, and hopefully take care of me! Have a nice day!" said Earth.

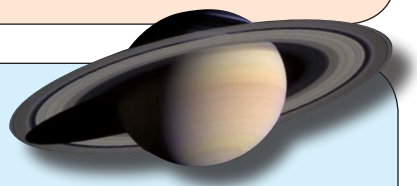


"My turn! How do you do? I'm **MARS**. I am the fourth planet from the Sun. I feel close to Earth because it is my neighbor planet. I am special because Earth people always wonder if there is life on Mars. Hey children, do you want to know whether or not there is life on Mars? Lean forward, and I'll tell you. Closer. Closer. Nope, I am just kidding. I want to keep it a mystery, so you will keep visiting me with your rovers and I can get to know you better!" said Mars.

"Greetings, I am an **ASTEROID**," said a big potato-shaped rock. "Millions of asteroids float between Mars and Jupiter. When we crash into each other and get smaller, we are called meteoroids. You might have seen one of us as a shooting star," said the asteroid.



"Wow, I thought my turn would never come," said **JUPITER**. "Now I forget what I was going to say. Oh yeah, my orbit is the fifth from the Sun, and I am super special. I am the largest planet. I also have the most moons—more than 60! In fact, one of my moons is larger than Mercury and Pluto, no offense. A lot of Earth people think that only the planet Saturn has rings, but I have rings also—three of them. They are hard to see, but they are there," said Jupiter.



"Salutations," said **SATURN**. "My orbit is the sixth from the Sun. I have gorgeous, spectacular, lovely, incredible rings, if I do say so myself. Want to know a secret? If you were right up close to my rings, you would see that they are really made of billions of chunks of ice and rock. Some chunks are as small as a grain of sugar and others are as large as a house," said Saturn.

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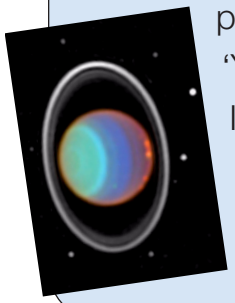
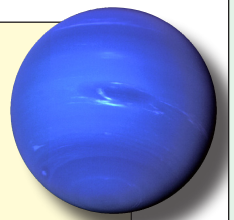
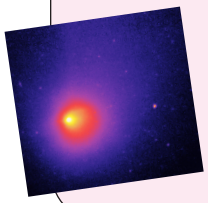
Meet Our Solar System



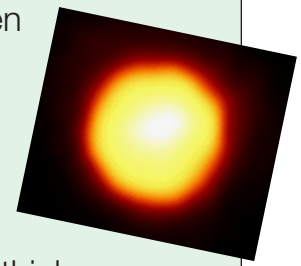
"Howdy doody, I am **URANUS**, and I am the seventh planet from the Sun. My name is pronounced 'YOUR a nus' in case you were wondering. I guess what makes me special is that I am tipped on my side compared with the other planets. I have a pretty blue color, and I also have a thin set of rings," said Uranus.



"Now it is time for me to introduce myself. Hi, I am **NEPTUNE**. I am the eighth planet from the Sun. In about 230 years, Pluto will be the eighth planet from the Sun for a while. Isn't that weird? The shapes of our orbits (our paths around the Sun) will make Pluto closer to the Sun for 20 years," said Neptune. "I have something in common with Jupiter, Saturn, and Uranus. I have rings just like they do. They are thin, but I do have them!"



"Hey, don't forget about me," said the **COMET**. "I am a cruising comet, one of many in our solar system. I am made of ice, rocks, gas, and dust, and I am famous for having a tail when I get near the Sun. It must look really cool from Earth, because I have heard that Earth people talk about it a lot, and say 'wow' when they see it," said the comet.



"Yeah, I am so excited to introduce myself. Hi, **PLUTO** here. I am currently the ninth and last planet from the Sun, but as you heard, I'll be the eighth planet in about 230 years," said Pluto. "Earth's Moon is actually larger than I am, so I am a small planet. People on Earth had a contest to name me when I was first seen from Earth through a telescope. The New York Times newspaper thought I should be named Minerva. An 11-year-old girl thought I should be named Pluto. I am glad the little girl won! Some Earth people think that I shouldn't be called a planet, because my orbit is different from all the other planets, and I am so small. They say I may be a member of a body of small objects on the outer edges of our solar system. I say — I am what I am, a round ball going in an orbit around the Sun. Call me what you will!"

"So Earth children, you have now met many of the major objects in our solar system," said the Sun. Now let's go back up to the Solar System Question Game and see if you have gotten to know us better. It has been a pleasure to meet you! (Read the Solar System Question Game questions again.)

Answers: 1. Sun 2. Mercury 3. Venus 4. Earth 5. Mars 6. asteroid 7. Jupiter 8. Saturn 9. Uranus 10. Neptune 11. Pluto 12. comet

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Teacher's Page

The reading and writing activities on this poster can be downloaded from http://discovery.nasa.gov

TIPS

Here are some ways to use this poster to teach your students about the solar system.

- Ask students to join you for a read aloud with paper and pencil (or crayons). Read "Meet Our Solar System." After each page (poster panel), ask the children to draw what they picture. Then allow the children a few minutes to share what they drew with you or a partner. (This activity helps children learn to visualize as they read—a powerful strategy to increase reading comprehension.)
- Read "Solar System Mysteries." After each page (poster panel), ask the children what they wonder about what they just heard. Ask students to turn to a partner and share what they wonder. (This activity helps student learn to question as they read—another effective strategy to improve reading comprehension.)
- Ask the children to brainstorm questions that they have about the solar system. Organize the children into teams. Have each team choose a question that they have about the solar system, and discuss how they would try to find the answer. Each team can name their "pretend" mission. Have each team share their ideas with another team, and then have a few teams share with the class. (Younger children can plan and share orally, while older children can write out their ideas before sharing them.)
- Teach children some of the mnemonic devices used to memorize the order of the planets; for example, **M**y **V**ery **E**ducated **M**other **J**ust **S**howed **U**s **N**ine **P**lanets or **M**y **V**ery **E**arly **M**orning **J**am **S**andwich **U**sually **N**auseates **P**eople. Then put the children in teams. Have each team think of their own method or mnemonic device to remember the current order of the planets from the Sun.
- Have groups of third or fourth graders read "Meet Our Solar System" as a reader's theatre for K–2 students. Have the children think about what expression and tone they want to use to "play the part" of each solar system object.

INTERNET RESOURCES

The NASA Portal — http://www.nasa.gov

NASA's gateway for programs and services for the general public and the education community. Please visit the "For Educators" and "For Students" sections for current information on educational opportunities and materials.

NASA Solar System Exploration — http://solarsystem.nasa.gov

Our solar system and NASA's missions to explore it.

Cassini Education K–4 Literacy Program — http://saturn.jpl.nasa.gov/education/edu-k4.cfm

This program uses reading and writing to encourage interest in scientific discovery.

NASA Space Science Education Research Directory — http://teachspacescience.org/

Space science products for use in classrooms, science centers, and planetariums.

NASA Space Place — http://spaceplace.nasa.gov

Games and activities that make science fun for younger kids.

NASA Discovery Program — http://discovery.nasa.gov

All of the Discovery space exploration missions, some featured in this poster, have developed educational products based on their science goals. Visit the "Missions" section for links to each mission's home page, then go to "Education."

This poster is designed for students in grades K–4, using reading and writing to encourage basic awareness of and interest in our solar system. It is aligned with the following standards:

NCTE Standards for the English Language Arts

- *Students adjust their use of spoken, written, and visual language to communicate effectively with a variety of audiences and for different purposes.*
- *Students apply knowledge of language structure, language conventions, and genre to create, critique, and discuss print and nonprint texts.*
- *Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.*
- *Students use spoken, written, and visual language to accomplish their own purposes.*

National Science Education Standards

Physical Science — Position and motion of objects
Earth and Space Sciences — Objects in the sky

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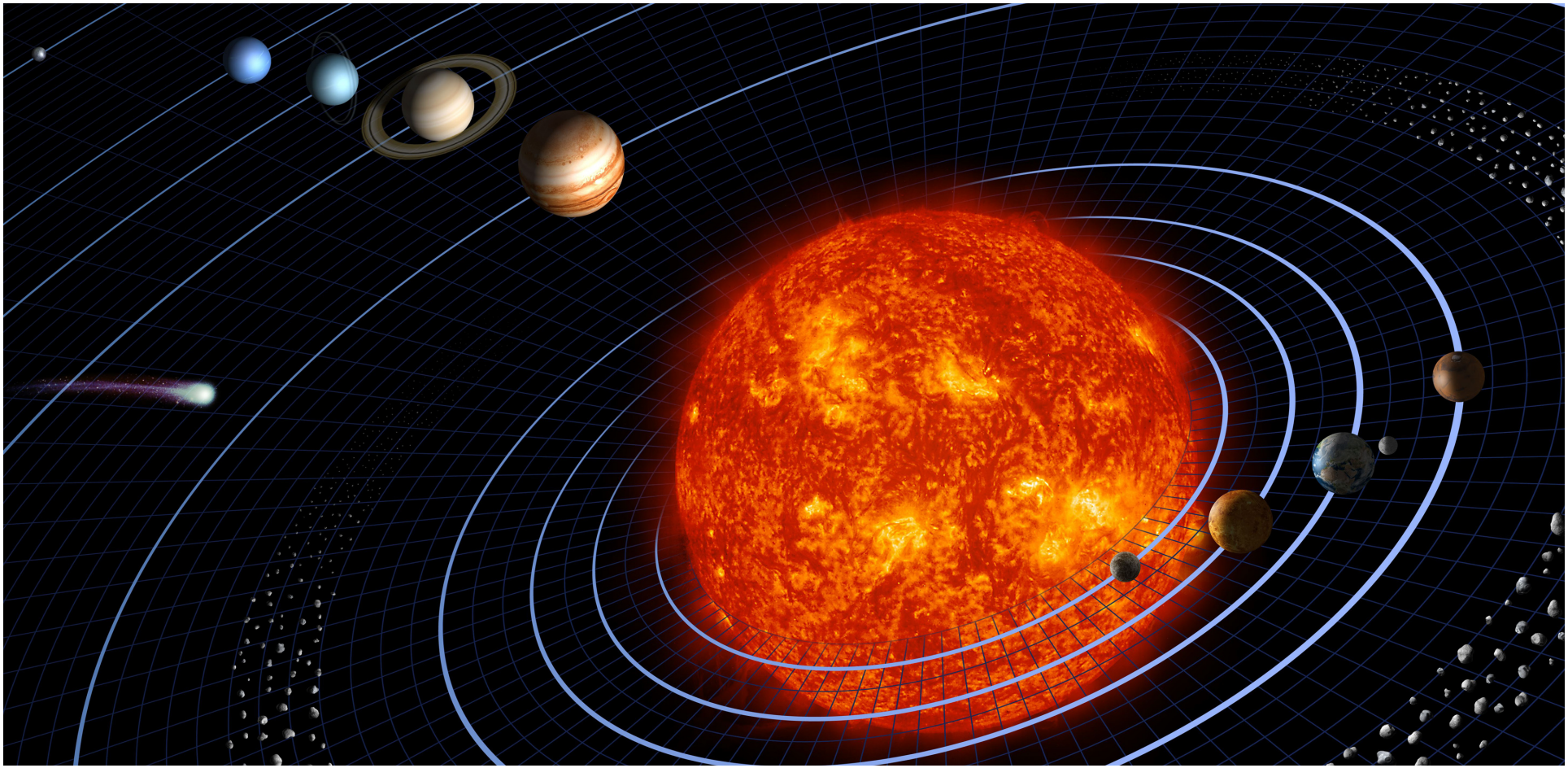
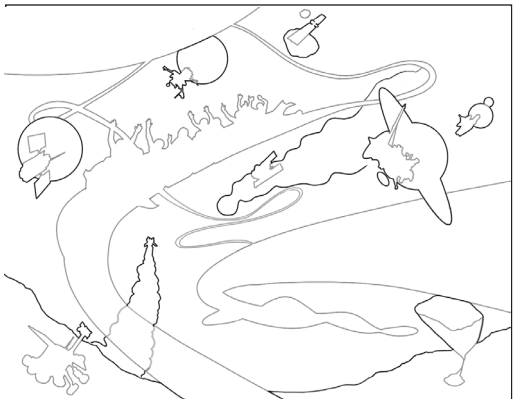
The Solar System





Key To the Cover

1. Spirit roving on Mars
2. Mars sample return lifting off
3. MESSENGER at Mercury
4. Galileo at Jupiter
5. Dawn at asteroid Ceres
6. Stardust at comet Wild 2 (pronounced Vilt 2)
7. Cassini at Saturn
8. New Horizons at Pluto
9. Huygens probe descending to Titan

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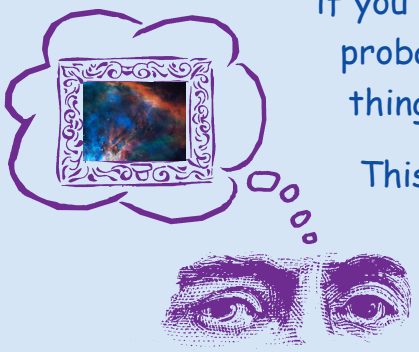
Student Activities

Here are some fun things to do with the solar system poster.

1

Read "Meet Our Solar System."

After you finish reading, draw what you picture. You can make more than one drawing if you would like (since you probably picture different things as you read).



This will help you become a better reader, because good readers often form pictures as they read.

2

Read "Mysteries of the Solar System."

After you finish reading, write other questions that puzzle you about the solar system.

Now choose a question that you have about the solar system, and write how you would try to find the answer.

3

There are some tricks to memorizing the order of the planets from the Sun; for example:

My Very Educated Mother
Just Showed Us Nine Planets

OR

My Very Early Morning Jam
Sandwich Usually Nauseates People

Write down your own way to remember the order of the planets from the Sun.

Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune Pluto

4

Draw the planets in the correct order from the Sun using the poster for help.

Then, to test yourself, try to draw them again in the correct order from memory.

5

Draw each planet and label it with information that you learn from reading this poster.

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Solar System Mysteries

Try to sit perfectly still. Don't move a muscle. Don't blink an eye. Guess what? You are still moving. Even though it may not feel like it, you are. Here's why.

You are sitting on planet Earth. And planet Earth is spinning around, like a ball spins on a pro basketball player's finger. The Earth spins around completely in one Earth day. (Close your eyes and try to picture Earth spinning around like a ball spinning on a pro basketball player's finger.) The planet Earth is also going around the Sun in an orbit, like a horse goes around on a carousel. (Close your eyes and try to picture Earth moving around the Sun like a horse going around a carousel.) But Earth does both at the same time. It spins and orbits. So you are moving with Earth, even though you can't feel it.

The rest of the planets in our solar system are also spinning as they orbit around the Sun. To picture how the planets orbit, picture holding a string with a ball on the end of it and swinging it around. Now picture holding 9 balls, all with strings of different lengths, and swinging them. That is sort of how the planets orbit, except they don't move in round circles, but more like oval orbits. Pluto swings at a little different angle than the rest of the planets. It takes Mercury 88 days to orbit the Sun. And it takes Earth one year (365 days). It takes Pluto 243 years.

If that is not enough spinning and orbiting for you, you can also try to picture the Moon spinning and orbiting around Earth. There are also over 135 other moons we know of in our solar system spinning and orbiting around the other planets. Remember, a planet orbits the Sun, and a moon orbits a planet. Both planets and moons spin.

And that is not to mention moving comets and asteroids! The Sun is also moving, along with everything else in the universe. It can make a person dizzy, imagining all this motion. Why is everything moving constantly? Does anything in the solar system ever stay still?

While you are trying to picture everything moving, you should also think about how far away everything is in our solar system. If you pretend that one step is the distance from the Sun to Mercury, you would have to take 1,180 steps to go from the Sun to Pluto.

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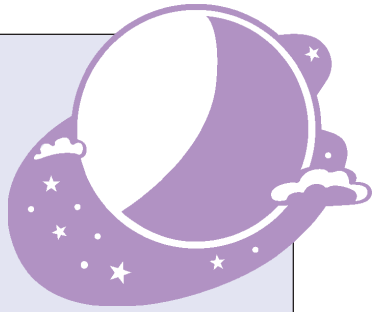
Solar System Mysteries

But wait, I don't think your brain has worked enough for one day. Let's think about other questions and mysteries that even scientists wonder about.



Why do some planets have no moons, like Mercury and Venus, and other planets have many moons, like Jupiter?

How were those moons created?

For that matter, how did the Sun, planets, comets, and asteroids form?

Why are some moons so strange? Like Iapetus, for example, which travels around Saturn. One half of this moon looks really white, and the other side looks really black! Why would that be?

How old do you think our solar system is?*

What will it look like on your 15th birthday?

What will it look like when you are 70?

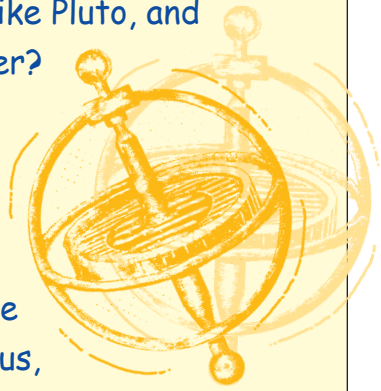
What will it look like in a million years?

*Scientists have determined that the solar system is 4.6 billion years old.

Why are some planets so tiny, like Pluto, and some planets so huge, like Jupiter?

Why are some planets solid and rocky and others are swirling balls of gas?

Why do all the planets spin in the same direction, except for Uranus, which spins in the opposite direction?



There are a lot of fascinating questions. If you are curious about these mysteries, you are in luck! NASA decided that good mysteries deserve to be studied. So NASA told scientists to work together in groups to decide on a mystery to explore and to think about what they want to learn. Many teams send their ideas to NASA. Every couple of years one or two solar system mysteries are chosen and become a mission to space. This special program is called the NASA Discovery Program.

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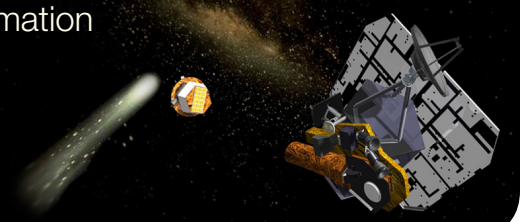
Solar System Mysteries

Here are some of the mysteries that NASA has chosen for its Discovery Program so far:

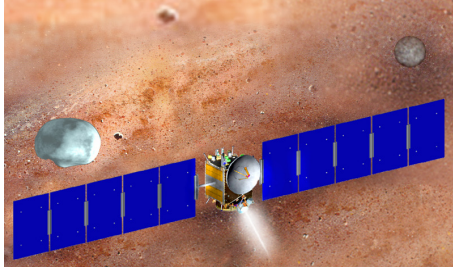
What is inside a comet?

A mission called Deep Impact put a spacecraft in a speeding comet's path, resulting in a spectacular crater about the size of a football stadium. Pictures and other information were sent back to Earth so we can see what the comet is made of.



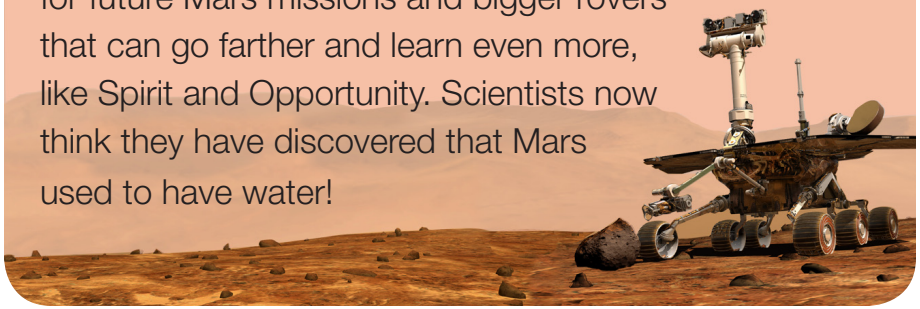
How did the solar system form?

Today we know that two of the oldest and biggest asteroids in the solar system are very different. A long time ago, one was cold and wet; the other was warm and dry. We think that they are about the same age. Scientists want to know all about these asteroids. A mission called Dawn will visit the asteroids Vesta and Ceres, look at one, and then the other, to find out why some asteroids and planets were formed and grew in different ways.



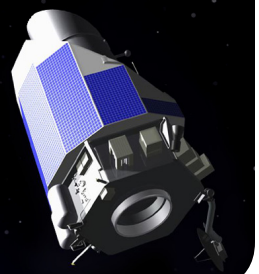
What is on the surface of Mars?

Scientists and engineers sent a little rover to explore the surface of Mars and send back beautiful pictures. This mission, called Mars Pathfinder, paved the way for future Mars missions and bigger rovers that can go farther and learn even more, like Spirit and Opportunity. Scientists now think they have discovered that Mars used to have water!



Are there other planets like Earth?

Many people wonder, "Are there others like us in the universe?" First, we need to find planets that are like Earth, but orbit other stars. The Kepler Mission will do just that with a special telescope that is able to notice a drop in the brightness of a star when a planet travels in front of it, blocking some of the star's light.



Some day, perhaps one of the mysteries that you are curious about will spark a mission into space!

This is a product of the NASA Discovery Program—http://discovery.nasa.gov. Developed by Shari Asplund, Discovery Program Education and Public Outreach Task Manager. Cover art by Michael Carroll. Content written by Alexa Stuart. Graphic Design by JPL Design Services.

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