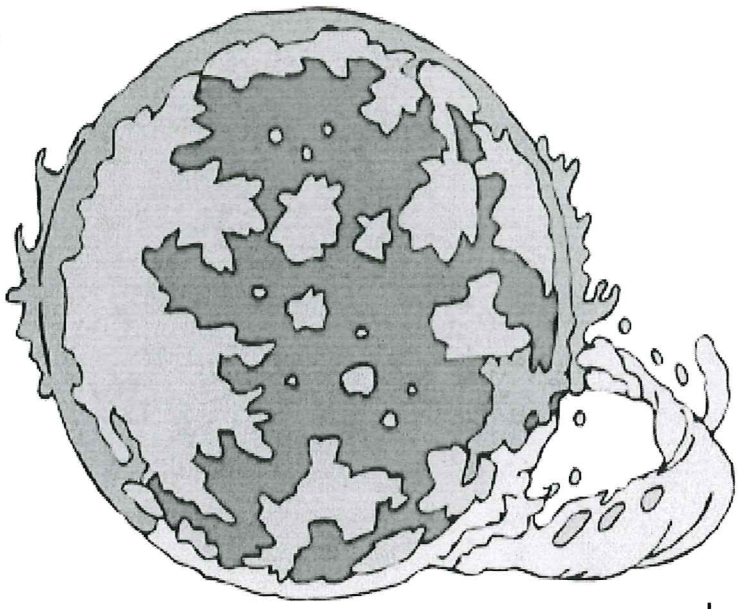
Name: _____

The Sun

by **Cynthia Sherwood**



You may have heard people use the term "solar energy." They're probably talking about the technology that powers a house or heats a swimming pool. But there's only one place that you can find true "solar energy"—the sun!

Without the sun, there wouldn't be life on earth. The sun provides us with both light and heat. It's at the very center of our solar system, with all eight planets revolving around it. The planets' moons, thousands of asteroids, and trillions of comets also revolve around the sun.

From earth, we see the sun as a bright yellow dot in the sky that's sometimes hidden by clouds. But the sun is actually a glowing ball of fiery gas. The part of the sun that we see has a temperature of 10-thousand degrees Fahrenheit (5,600 degrees Celsius). Inside the sun, at its core, the temperature is 27-million degrees (15-million Celsius).

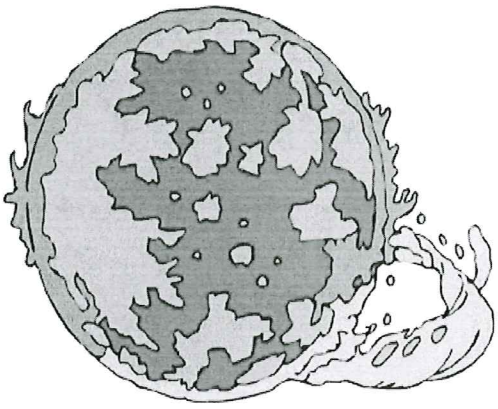
The core is where the sun's incredible energy is created. The temperature is so extreme that nuclear reactions take place and energy travels to the surface of the sun. That energy is then released as light and heat. It takes a million years for energy produced in the sun's core to reach its surface.

Besides being hotter than we can even imagine, the sun is amazingly big. You could fit more than a million Earths inside the sun! But believe it or not, the sun isn't anywhere close to being the biggest object in the universe. The sun is actually a star, just like the others you see at night. It's about average in size when compared to other stars. But to us here on earth, there's nothing average about the sun!

Name: _____

The Sun

by **Cynthia Sherwood**



1. Where is the sun located?

- **a.** the center of the universe
- **b.** the center of the galaxy
- **c.** the center of the solar system
- **d.** the center of the Earth

2. How hot is the sun's surface? How hot is the sun's core?

_____

3. The sun is....

- **a.** the largest known star
- **b.** an average-sized star
- **c.** a small star
- **d.** the hottest known star

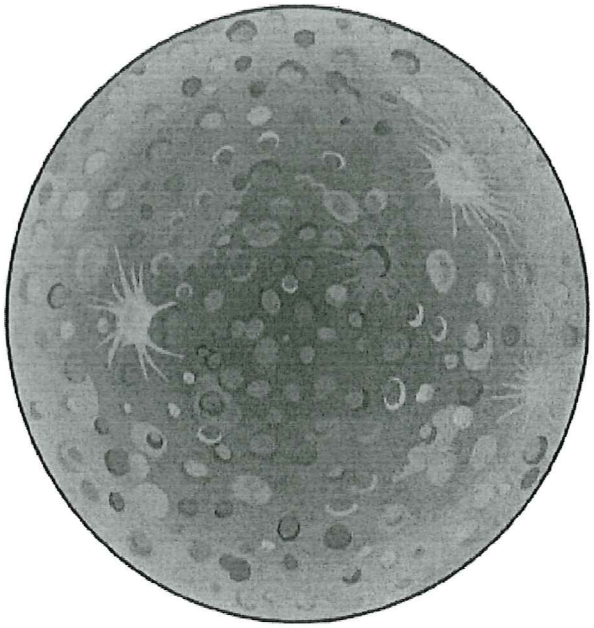
4. Match the words on the left with the definitions on the right.

_____ **1.** solar energy	**a.** center, inside of a ball-shaped object
_____ **2.** solar system	**b.** heat, light, or electrical power made from the sun
_____ **3.** core	**c.** the sun, and all of the things that orbit around it

Name: _____

Mercury

by **Cynthia Sherwood**



Mercury is the planet nearest the sun. It's so close that if you were standing on Mercury, the sun would appear two and a half times bigger than what it looks like from here on Earth.

Even the best sunscreen wouldn't be enough on Mercury. The sun's rays are about seven times stronger than on Earth. Mercury is dry, very hot, and practically airless. Mercury is also the smallest planet in our solar system. Because it's often blocked by the glare of the sun, Mercury can be hard to see without a telescope.

Mercury is named after a Roman god who was a messenger known for his speed. As a planet, Mercury moves around the sun faster than any other. It revolves around the sun about once every 88 Earth days.

Did you know...

Even though Mercury is the closest planet to the sun, it is ***not*** the hottest planet!

Venus, the second planet from the sun, has hotter temperatures than Mercury. This is because Venus has a thick layer of clouds that trap in heat like a blanket.

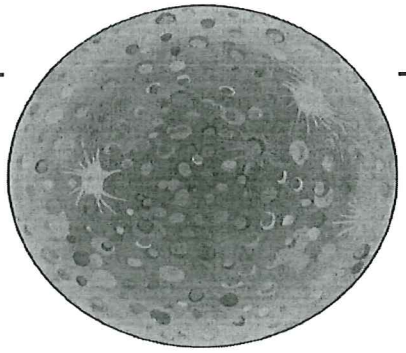
Mercury is made up of rock with iron at its core. Its surface looks a lot like our moon, with many craters. Radar images from Earth show that craters at Mercury's north and south poles may contain frozen water, or ice. Scientists couldn't believe it at first. Parts of Mercury reach 800 degrees Fahrenheit (460 degrees Celsius), so they definitely didn't expect to find ice! But it turns out the poles of Mercury are always in the shade of the sun, so they remain extremely cold.

By the way, you'd never be able to enjoy a blue sky on Mercury. Because there's no atmosphere, the sky always appears black. You might even see stars—during the daytime!

Name: _____

Mercury

by **Cynthia Sherwood**



1. Why is Mercury usually hard to see without a telescope?

_____

2. Mercury is the closest planet to the sun, but Venus is the hottest. Why?

_____

_____

3. Mercury was named after the Roman god of speed. Why is this an appropriate name for the planet?

_____

_____

4. How is it possible for Mercury to have frozen ice?

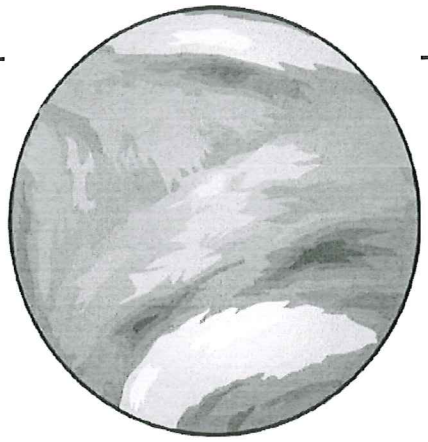
a. Mercury is a cold planet.
b. Mercury has a different type of ice that can form in warm temperatures.
c. Parts of Mercury are cold because they always face away from the sun.
d. Mercury has ice because it moves so quickly around the sun.

5. What does the underlined word mean in the sentence below?

Because there's no <u>atmosphere</u>, the sky always appears black.

a. layer of air or gas
b. living things
c. soil or craters
d. volcano activity

Name: _____



Venus

by **Cynthia Sherwood**

Did you know that Earth has a twin? It's Venus, the second planet from the sun. Venus is the planet that comes closest to Earth, even though it's still very far away—about 24 million miles (about 39 million kilometers). Venus is almost the same size as Earth and is made up of similar material, so that's why scientists call it Earth's twin.

Venus is Earth's opposite in other ways. Because it's much closer to the sun than Earth, Venus is extremely hot on its surface—about 870 degrees Fahrenheit (400 degrees Celsius). That's hotter than any other planet. It's even hotter than most ovens! Venus is also very dry. Scientists think Venus used to have a lot of water, just like Earth, but it all boiled away from the heat. Much of Venus is now covered by volcanoes. It has the most of any planet and some are huge—up to 150 miles (241 kilometers) long.

Although astronauts have never landed on Venus, several spacecraft without people on board have visited. Those spacecrafts have taken very detailed pictures of Venus. The most famous one was named "Magellan" and it orbited Venus for four years, ending in 1994. Using radar, Magellan made detailed maps of almost all of Venus's surface.

When you look into the night sky, you can often spot Venus. That's because it's the brightest thing you can see, except for the sun and moon. Venus is sometimes called the "Morning Star" or "Evening Star" because it appears brightest shortly before sunrise and shortly after sunset.

Venus is unique among our solar system's planets in one unusual way. It's the only planet to rotate clockwise on its axis, in the same direction that you'd see the hands of a clock move. All the other planets turn in the opposite direction, known as "counter-clockwise."

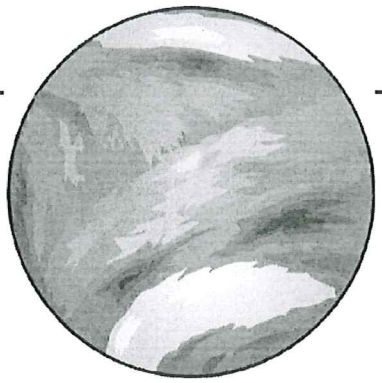
Did You Know...

Venus was named for the Roman goddess of love and beauty.

Venus is known as the "cloudy planet." The clouds on Venus aren't made from water like Earth clouds, they're made of a poison called "sulfuric acid."

Venus and Mercury are the only planets without moons.

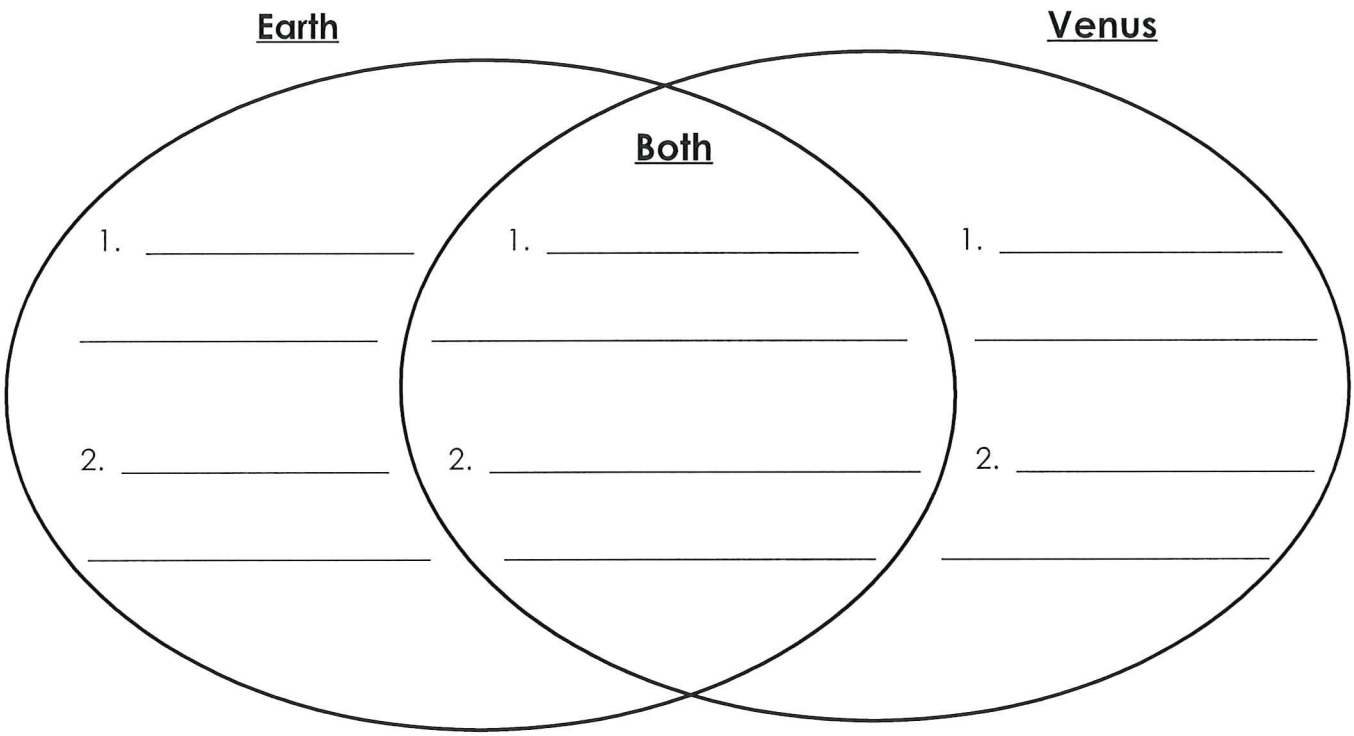
Name: _____



Venus

by **Cynthia Sherwood**

1. In the Venn diagram, list two ways Earth and Venus are alike, and two ways they're different.



2. Why is Venus sometimes called the "Morning Star" or the "Evening Star"?

_____

_____

3. Explain how the Earth's rotation is different from Venus'.

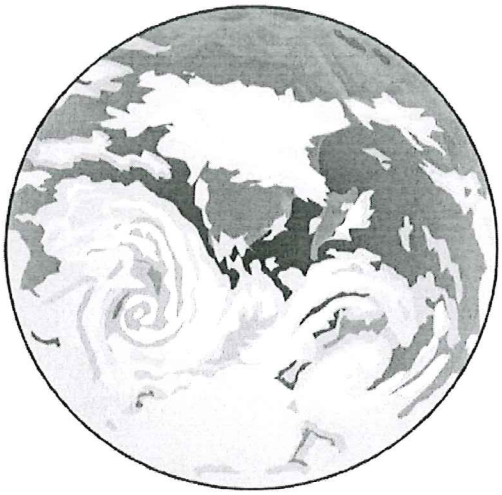
_____

_____

Name: _____

Earth

by **Cynthia Sherwood**



Earth is the "just right" planet. It's not too close to the sun and it's not too far away. That means Earth doesn't get too hot or too cold, unlike all the other planets. Because of its comfortable temperatures, Earth is the only place in the entire universe where we know that life exists. That makes Earth very special!

Earth is unique in another way too. Living creatures must have water to survive. Since water covers about seventy percent of Earth's surface, our planet is an ideal place to support life in many different forms. The rest of Earth's surface is made up of seven land masses called *continents.*

Scientists say Earth is about four-and-a-half billion years old. Fossils show microscopic life first appeared about a billion years later. Evidence of the first human beings came much later—only about 200-hundred-thousand years ago. That's many millions of years after the dinosaurs became extinct.

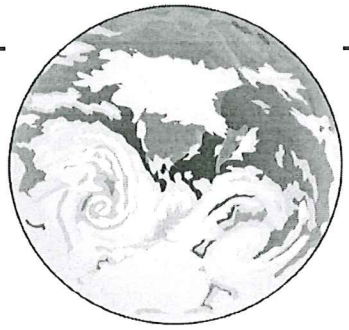
Earth is the fifth largest planet and the third planet from the sun, which is about 93 million miles away. It takes one year for Earth to travel completely around the sun. Earth also spins around like a top, going about a thousand miles an hour. You'd think we'd all need seat belts! Earth rotates around like this once every twenty-four hours, and that's what gives us night and day.

Earth is divided into several layers: the top part is called the *crust*, the part below that is called the *mantle*, and the part in the center is called the *core*. The core is solid and is probably made up of iron. Temperatures at the center of the core may be even hotter than the surface of the sun!

Scientists who study Earth are called *geologists.* Astronauts can also study Earth from space, adding to what we know about our unique and beautiful blue and green planet. Don't you feel lucky to live on the "just right" planet?

Name: _____

Earth



by **Cynthia Sherwood**

1. Complete the following sentences with information from the article.

Seventy percent of the Earth's surface is covered in _____.

Earth is _____ years old.

Earth is the _____ planet from the sun.

Earth is the _____ largest planet in our solar system.

Earth is _____ miles away from the sun.

2. What causes night and day on Earth?

a. The rotation of Earth.
b. Earth orbiting the sun.
c. The moon moving around Earth.
d. Wind moving across Earth.

4. Which sentence correctly describes Earth's layers?

a. The crust is below the mantle.
b. The mantle is below the core.
c. The mantle is above the crust.
d. The mantle is below the crust.

5. Describe the temperature at the center of the Earth.

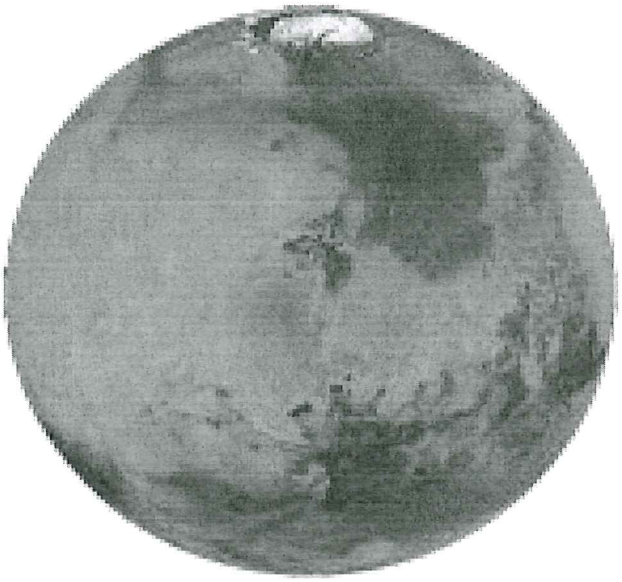
_____

Challenge: People have never walked on any planet besides Earth. (Astronauts have been to the moon, but that's not a planet.) On a separate sheet of paper, write a paragraph telling why you would or would not like to visit another planet.

Name: _____

Mars

by **Cynthia Sherwood**

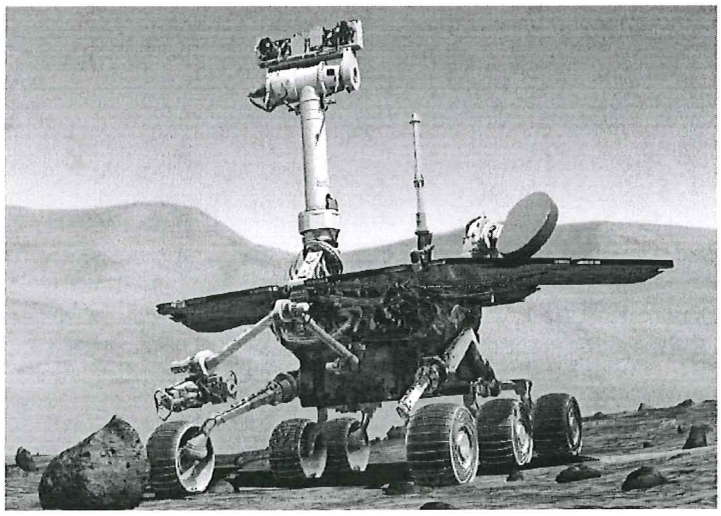


The "Red Planet"—Mars—is the fourth planet from the sun and one of Earth's next door neighbors. Mars was named after the Roman God of war because its reddish-orange color looks a little like blood. The special color actually comes from rust and other minerals in its soil.

The surface of Mars includes many amazing features. There's a canyon that's much deeper and longer than the Grand Canyon in Arizona. There's also a volcano that's the largest in our solar system. "Olympus Mons" volcano is fourteen miles tall. That's three times higher than Mount Everest! The base of Olympus Mons is about the size of the state of Missouri.

Scientists say there's strong evidence that water once flowed over the surface of Mars. They also think there still may be water in some places underneath the surface.

You may have read a book or seen a movie that featured "Martians." There's no evidence of any little green men on Mars, but some scientists do think they've found proof that tiny, microscopic creatures once lived on Mars. The evidence comes from meteorites found on Earth. Other scientists say they don't believe it, so we don't know the right answer.



Images Courtesy NASA/JPL-Caltech

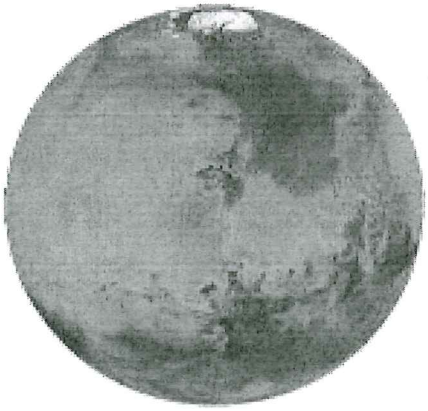
Scientists have sent radio-controlled robots to Mars. These machines, called rovers, have cameras, microscopes, and drills on them. Scientists can drive the rovers around the Red Planet, just like the radio-controlled toy cars many kids have on Earth. The rovers are actually able to send pictures back to Earth.

While rovers roam the planet every day, no person has ever set foot on Mars. NASA has made plans for a manned mission to take place decades from now. Perhaps then we'll learn the truth of whether there was once life on a planet besides Earth.

Name: _____

Mars

by **Cynthia Sherwood**



1. How did Mars get its reddish color?

_____

2. Have there ever been living things on Mars?

a. No
b. Yes
c. Only below the soil
d. Some scientists think so, but others aren't sure.

3. Which fact about Mars is true?

a. Mars is the only planet with soil.
b. Mars is the only planet with volcanoes.
c. Mars is the closest planet to the sun.
d. None of these facts are true.

4. What is Olympus Mons?

a. a canyon
b. a volcano
c. a crater
d. a moon

5. How many people have walked on Mars?

a. one
b. two
c. eleven
d. none

6. What is a Mars rover?

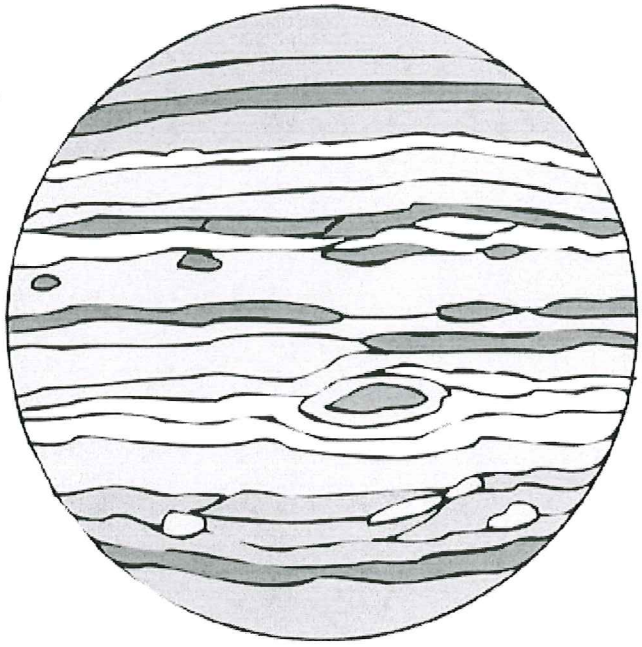
_____

_____

Name: _____

Jupiter

by **Cynthia Sherwood**



If Jupiter were a person, it might run around chanting "I'm number one! I'm number one!" That's because Jupiter is the largest planet in our solar system and the one that spins the fastest. It also has the most moons of any planet and the largest moon. Jupiter also has the strongest gravity of all the planets. Ancient astronomers knew what they were doing when they named Jupiter after the Roman king of the gods.

It would take about a thousand Earths to fill up Jupiter. But for a gigantic planet, Jupiter moves very fast. It rotates on its axis about every ten hours, compared to Earth which takes 24 hours. Jupiter takes about 12 years to orbit the sun.

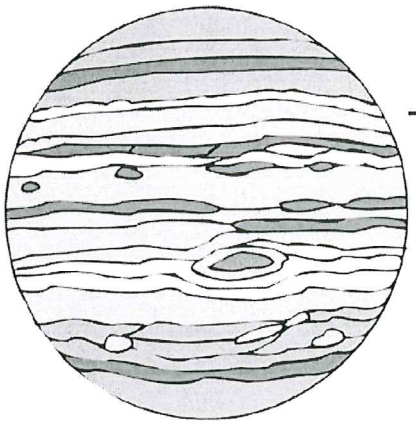
Jupiter isn't first in everything. It's the fifth planet from the sun and it's only the third brightest object in the night sky, behind the moon and Venus.

Jupiter is one of the gas giants. Its surface is made of thick red, brown, yellow, and white clouds. One huge area of that surface is called the "Great Red Spot." That's where a storm three times bigger than Earth has raged for more than 300 years! Imagine winds stronger than a hurricane lasting for centuries.

Jupiter has at least 63 moons. Most are fairly small, but four are quite large. They were first discovered by the astronomer Galileo in the year 1610 using one of the earliest telescopes. The largest of Jupiter's moons is named Ganymede. It's even bigger than the planet Mercury!

Six space probes have traveled to Jupiter, so scientists have a lot of information about the planet. You can do your own study of Jupiter just by staring at the night sky. If you see a really bright star that's high in the sky, you're probably seeing Jupiter, the number one planet.

Name: _____



Jupiter

by **Cynthia Sherwood**

1. Tell whether each statement is true or false.

_____ Jupiter is the largest planet in our solar system.

_____ Jupiter spins faster than any other planet.

_____ Jupiter is the closest planet to the sun.

_____ Jupiter has the most rings of any planet.

_____ Jupiter is is the brightest object in our night sky.

2. What is the "Great Red Spot"?

_____

3. How long does it take Jupiter to travel around the sun?

_____

4. How long does it take Jupiter to rotate around on its axis?

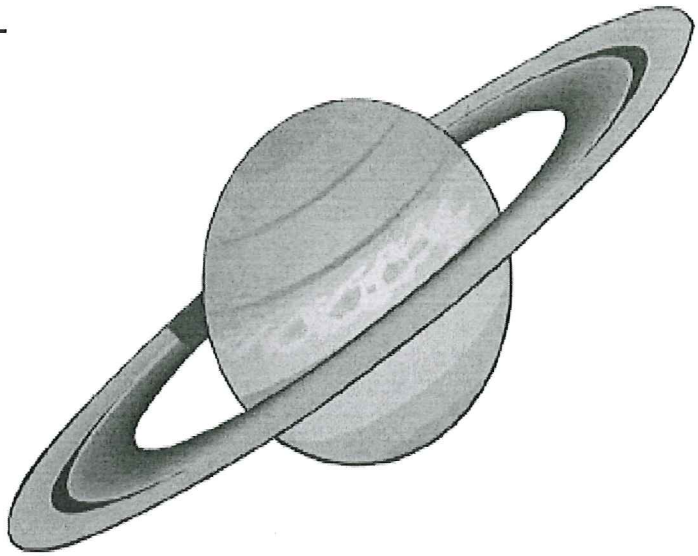
_____

Challenge: How many years ago did Galileo discover Jupiter's moons? Use your Math skills!

Name: _____

Saturn

by **Cynthia Sherwood**



If you don't count Earth, the most beautiful planet in our solar system may be Saturn. Saturn has seven thin rings that surround its middle but don't actually touch it. The rings are made of billions of pieces of ice and can only be seen with a telescope.

You can spot the rest of Saturn using only your eyes. It's the second largest planet in the solar system and it's the third brightest planet in the sky. It usually looks yellow.

Saturn is the sixth planet from the sun and is named after the Roman god of Agriculture.
Scientists believe Saturn is a giant ball of gas, with no solid surface. Inside they think there's a hot solid core of rocky material, surrounded by an outer core of gas. Saturn is considered one of the four "gas giant" planets.

If you've ever been through a hurricane, you know what extremely strong winds are like. But even a hurricane is nothing compared to the winds on Saturn. Its strongest winds blow at more than a 1,000 miles per hour (1,600 kilometers per hour)! Saturn is also quite cold because it's so far from the sun. The temperature is about 285 degrees below zero Fahrenheit (minus 176 Celsius).

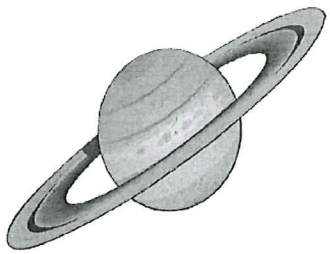
In 2004, a spacecraft named the "Cassini" began to orbit Saturn. This was the first in-depth and close-up view of the planet. Cassini has given us amazing pictures of Saturn, its rings, and its moons. Scientists have discovered that Saturn's largest moon—named Titan—is similar to Earth before there was life.

By the way, if you were born on Saturn, you'd have to wait a long time for your birthday to arrive. The length of a Saturn year is 29.5 Earth years, because that's how long it takes Saturn to rotate around the sun.

Name: _____

Saturn

by **Cynthia Sherwood**



1. Write **yes** or **no** to answer each question.

Can you see Saturn's rings without a telescope? _____

Can you see Saturn without a telescope? _____

Is Saturn the third planet from the sun? _____

Is Saturn the only "gas giant" planet? _____

Is Saturn the second largest planet in our solar system? _____

2. Why is Saturn so cold?

_____

4. What do scientists believe is in the middle of Saturn?

_____

5. Which would not be a good nickname for Saturn?

a. the "Ringed Planet"
b. the "Windy Planet"
c. the "Beautiful Gas Planet"
d. the "Blue-Green Planet"

Challenge: One Saturn year equals 29.5 Earth years. Is you were three years old on Saturn, how old would you be on Earth? Use your math skills!

Name: _____

Uranus

by **Cynthia Sherwood**

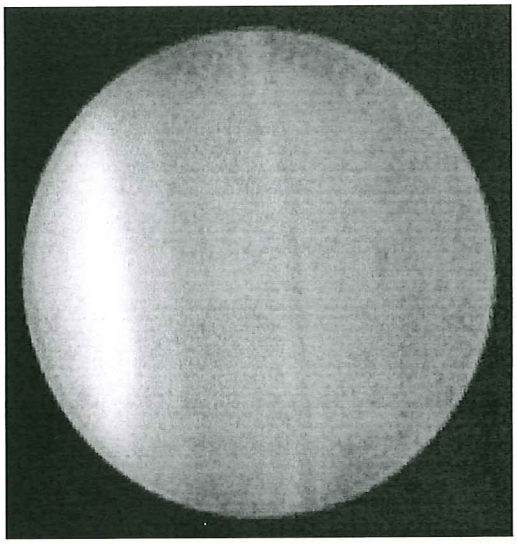


Photo of Uranus : NASA/Space Telescope Science Institute

Uranus is a giant icy ball of gas and liquid, with a solid center. It's the seventh planet from the sun and the farthest that you can see without a telescope. Although Neptune is even farther from the sun, Uranus is the coldest planet in our solar system. The temperature of its atmosphere is minus 350 degrees Fahrenheit (minus 212 Centigrade).

When viewed from space, Uranus is a pretty pale blue color. The color comes from clouds on its surface made up of tiny crystals of methane gas. Uranus also has rings like Saturn, though they aren't very noticeable. The rings are made of ice and rock.

Did you know....

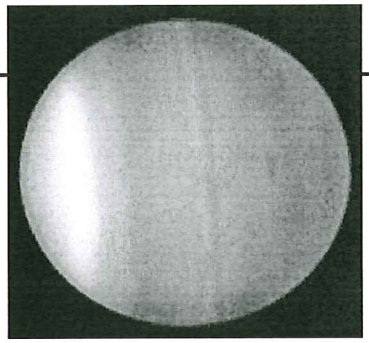
Uranus is a very windy planet. On the surface, hurricane-like winds are blowing at speeds of around 200 miles per hour (322 kilometers per hour).

Uranus is so big that 50 Earths could fit inside of it.

At least 21 moons orbit around Uranus, somewhat like a Ferris wheel. But the most unique part about Uranus is that it's tilted. On Earth, we have the North Pole and the South Pole. But everything is topsy-turvy in Uranus. Its poles are on its sides and it orbits the sun on its side. The strange way that it spins can mean nights on some parts of Uranus last more than forty years! Scientists think a planet as big as Earth may have crashed into Uranus at some point, tipping it onto its side.

There's another fun fact about Uranus—it's the only planet named after a Greek god instead of a Roman god. Uranus was the Greek god of the sky and the husband of Earth.

Name: _____



Uranus

by **Cynthia Sherwood**

1. What are Uranus' rings made of?

_____

2. According to scientists, why might Uranus be spinning on its side?

_____

_____

3. Which statement about Uranus is true?

a. Uranus has clouds.
b. Uranus is a very windy planet.
c. Uranus is the coldest planet.
d. All of these facts are true.

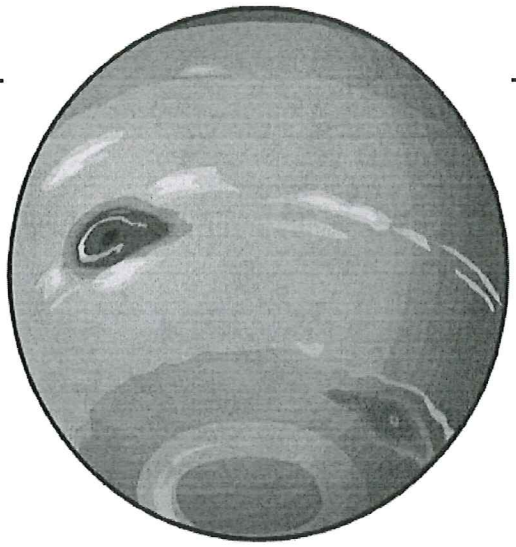
4. What gives Uranus its blue color?

a. water on the surface of the planet
b. clouds made of tiny crystals
c. bluish rocks and dust on the surface
d. the reflection of the sun

5. What part of Uranus is made of solid material?

a. the atmosphere
b. the poles
c. the center
d. All of Uranus is solid.

Name: _____



Neptune

by **Cynthia Sherwood**

Neptune is the eighth planet from the sun and the one that's the farthest away. (Pluto is even farther, but it doesn't count since most astronomers no longer consider it a planet.) Neptune is a cold, dark place that's the smallest of the gas giants. It was named after the Roman god of water and the sea.

Neptune is a ball of gas and ice, with a rocky core. Thick bright blue clouds cover its surface. They're made up mainly of frozen methane gas. Like the other "gas giant" planets, winds that blow Neptune's clouds around are very strong. Scientists say winds reach speeds of up to 700 miles an hour (about 1,120 kilometers per hour).

Neptune isn't quite as cold as Uranus, but its largest moon, Triton, is even colder. Triton has a surface temperature of minus 390 degrees Fahrenheit (minus 234 Celsius), which is the coldest known temperature in the solar system. Scientists think that Triton used to be a large comet that became trapped by Neptune's gravity.

How it Was Named...

Neptune was named for the Roman god of the Sea. Early astronomers may have named it after the sea god because of its deep blue color.

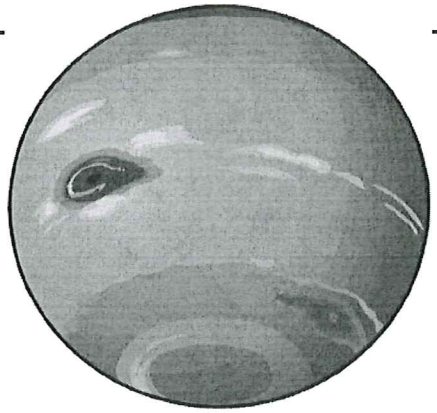
Because it's so far away, Neptune only has had one visit from a spacecraft. NASA's Voyager 2 flew by Neptune in 1989. Voyager discovered a huge storm on Neptune that it called the "Great Dark Spot," similar to Jupiter's "Great Red Spot." But later pictures from the Hubble Telescope found that the Great Dark Spot had vanished.

Luckily for us, Neptune and Earth don't have much in common. But one thing is very similar. The force of gravity pulling you down is almost the same on Neptune and Earth. Of course, if you tried to walk on Neptune, you'd be pulled in towards the center because there's no solid surface to stand on.

Name: _____

Neptune

by **Cynthia Sherwood**



1. How was Neptune's "Great Dark Spot" discovered?

_____

2. What was Neptune's "Great Dark Spot"?

_____

3. Why was Neptune probably named after the Roman sea god?

_____

4. How is Neptune and Earth similar?

   a. The are about the same size.
   b. They both have giant dark spots.
   c. They both have about the same amount of gravity.
   d. They are both very cold planets.

5. Which fact about Triton is true?

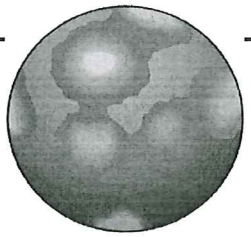
   a. Triton is a moon of Uranus.
   b. Triton is a tiny planet near Neptune.
   c. Triton is the windiest known place in the solar system.
   d. Triton is the coldest known place in the solar system.

6. Which planet is further from the sun than Neptune?

   a. Saturn
   b. Uranus
   c. All planets are farther than Neptune.
   d. There are no planets further than Neptune.

Name: _____

Pluto



by **Cynthia Sherwood**

Poor, poor Pluto. Scientists now say it's not a true planet. Since 2006, they have called Pluto a *dwarf planet*. They believe Pluto is too small and its orbit around the sun too irregular to be the ninth planet in our solar system.

Pluto is so far away from Earth that it can't be seen without a telescope. It was only formally discovered in 1930. That's when powerful telescopes took the first photographs of Pluto. The news made huge headlines throughout the world.

Scientists received hundreds of suggestions of what to name the new planet. An eleven-year-old girl from England had the winning idea—she suggested Pluto, the name of the Roman god of the underworld. She thought the name made sense because Pluto is such a dark and icy place. The girl won five British pounds for her idea, which equals about eight American dollars.

Moons of Pluto

So far, astronomers have found three moons that orbit Pluto.

Charon, the largest moon, was discovered in 1978.

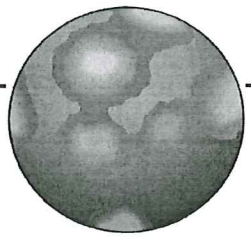
Two smaller moons were discovered in 2005. They were named Nix and Hydra.

Do you think astronomers will find any more?

Even today, scientists don't know very much about Pluto because it's so far away from us. They do know it has at least three small moons, and they think it's about one-fifth the size of Earth. Pluto is a brownish color and is covered with a thin layer of frozen methane gas.

Even if we could build a rocket that could travel to Pluto, we wouldn't want to stay for long. Because Pluto is so far away from the sun, its surface is one of the coldest in our entire solar system. If you ever cook with an adult, you know that it's common to set the oven to 375 degrees Fahrenheit (190 degrees Celsius). Pluto is 375 degrees too—but 375 degrees below zero!

Name: _____



Pluto

by **Cynthia Sherwood**

1. Tell whether each fact is true or false.

_____ Pluto is a brownish color.

_____ Pluto's temperatures reach up to 375 degrees Fahrenheit.

2. What are the names of Pluto's three moons?

_____

_____

3. How long ago was Pluto first discovered?

a. about 110 year ago
b. about 80 years ago
c. about 30 years ago
d. about 5 years ago

4. Pluto was named after...

a. an 11 year-old girl
b. the Roman god of the underworld
c. a famous scientist
d. a cartoon dog

5. Jimmy told his teacher that he was laying on the grass looking up at the stars last night when he saw Pluto in the sky. His teacher didn't believe him. Why?

_____

_____