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 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?
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.
Our Moon

by Cynthia Sherwood

Jupiter and Saturn have more than sixty moons each. Neptune has thirteen. Mars has two. But if somebody says “the moon,” we know exactly what they’re talking about. It’s Earth’s moon, our closest neighbor in outer space.

The moon is the second brightest spot in the sky, after the sun. It orbits around the Earth once a month, going through “lunar phases.” Sometimes the moon will look like a skinny curved sliver called a “crescent.” Later, it becomes a glowing full moon. These phases are caused by the changing angles of where the Earth, moon, and sun are relative to one another.

The moon might be the closest thing to us in space, but it’s still far, far away—about a quarter of a million miles away! It’s also much smaller. About fifty moons could fit inside Earth. Temperatures can be extreme — as hot as 250°F or as cold as minus 250°F.

That’s why astronauts had to wear special spacesuits when they first landed on the moon. Besides protecting them from the extreme temperatures, the suits provided enough oxygen for the astronauts to breathe.

July 20, 1969 is one of the most important dates in history. It’s when America’s Apollo 11 astronauts landed on the moon. The first man to walk on the moon was Neil Armstrong. Right afterward, he said some of the most famous words ever: “That’s one small step for man, one giant leap for mankind.”

You might ask your parents, grandparents, or teachers where they were when we first landed on the moon. If they were born and weren’t too young, they’ll remember. Life has never been quite the same here on Earth now that we’ve explored our closest neighbor in space.
Our Moon
by Cynthia Sherwood

1. The moon is about...
   a. 500,000 miles from Earth
   b. 250,000 miles from Earth
   c. 25,000 miles from Earth
   d. 100,000 miles from Earth

2. What famous words did Neil Armstrong say when he first stepped on the moon?

   ____________________________________________________________
   ____________________________________________________________

3. According to the information in the article, name two reasons astronauts who landed on the moon needed to wear special space suits.

   ____________________________________________________________
   ____________________________________________________________

4. Chelsea's mom was born in 1968. When Chelsea asked her mom where she was when Neil Armstrong first landed on the moon, her mom said, "I'm not sure."

   Why do you think Chelsea's mom said this?

   a. Chelsea's mom wasn't born yet.
   b. Television had not been invented yet.
   c. Chelsea's mom was too old to remember it.
   d. Chelsea's mom was too young to remember it.

5. Which statement is true?
   a. Saturn has fewer moons than Mars.
   b. Earth has more moons than Neptune.
   c. Neptune has fewer moons than Jupiter.
   d. Mars has more moons than any other planet.
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!
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
Planets and Dwarf Planets
by Shauna Hutton

Wow! Technology has improved so well in the last several years that we keep finding more and more objects in our solar system! Because of this, scientists have had to come up with new categories for objects in space. This included reclassifying Pluto as a dwarf planet, in 2006.

The eight planets in our solar system are classified as inner planets (Mercury, Venus, Earth, and Mars) and outer planets (Jupiter, Saturn, Uranus, and Neptune).

The International Astronomical Union (IAU) gives the new definition of planet as an object in space that:

- is in orbit around the sun
- is nearly round in shape
- has cleared the neighborhood around its orbit
- is not a satellite

Each planet travels around the sun in a specific path, called an orbit. “Clearing the neighborhood around its orbit” means there are no objects similar to the planet at roughly the same distance from the Sun. In other words, a planet is not located in an asteroid belt or surrounded by clusters of other space objects.

A satellite is an object that revolves around a larger planet. They can occur naturally, like the moon of a planet, or they can be man-made, like the Hubble Space Telescope.

There are currently five dwarf planets listed. They are: Ceres, Pluto, Eris (pronounced ee'-ris), Makemake (pronounced mah-keee-mah-kee), and Haumea (pronounced hah-oomy-ah).

Eris was a very important discovery in 2005. Since it was larger than Pluto, some astronomers thought it should be considered a planet. However, since Pluto and Eris are located in an asteroid belt, other astronomers began to think maybe Pluto and Eris were both very large asteroids. In 2006, Astronomers decided it was time to update the current definition of a planet and create the new category of dwarf planets.

Dwarf planets are similar to planets except they don’t clear their orbit like planets do. The IAU defines a dwarf planet as an object in space that:

- is in orbit around the Sun
- is nearly round in shape
- has not cleared the neighborhood around its orbit
- is not a satellite

This is a very exciting time. New objects in space are still being discovered! Scientists say there will likely be more dwarf planets announced in the next few years. What will be the name of the next dwarf planet? What name would you choose?
Planets and Dwarf Planets
by Shauna Hutton

1. Name the four inner planets.
   ______________________, ______________________, ______________________, and ______________________

2. Name the four outer planets.
   ______________________, ______________________, ______________________, and ______________________

3. Name the five dwarf planets.
   ______________________, ______________________, ______________________, ______________________, and ______________________

4. According to the IAU, how is a planet different from a dwarf planet?
   ___________________________________________________________

5. According to the article, which object would not be considered a satellite?
   a. Earth’s moon   b. Hubble Space Telescope
   c. Pluto           d. Titan, Saturn’s largest moon

6. What is an orbit?
   ___________________________________________________________
The good microbes

Background knowledge
Microbes, or microorganisms, are living things that are often too small to be seen. Common types of microbes are bacteria, viruses, and some fungi. These organisms need food, warmth, and moisture to grow and reproduce. Some microbes feed on things that were once living, such as fallen leaves and dead animals, causing them to breakdown or decay. The decayed materials mix with soil, providing essential nutrients for plants to use. Without this process, the nutrients in the soil would run out. These types of organisms are called decomposers. They are the natural recyclers of living things on our planet. Microbes also help us make some of our foods, such as bread, cheese, yogurt, beer, and wine. They feed on the sugar in grain, fruit, or milk, giving these foods a special texture and taste.

Science activity
Donna put the following items into a large polythene bag. She took them out again after two weeks. In the boxes below, write D for the items that would have decayed and U for those that would be unchanged.

- Grass
- Plastic spoon
- Apple peel
- Cola can
- Tangerine
- Bread
- Leaves
- Nylon tights

Why have some of the items not decayed?

Science investigation
Take a large coffee can and obtain some soil, food samples, and non-food items. Bury the food and non-food items in different layers of soil placed in the coffee can. Add about 1/4 cup of water. Place a cover with punched holes on top of the can so air can get in. After 2–3 months, determine what has decayed.
Dinner at sea

Background knowledge
The ocean and the shoreline make up a habitat. Living things in this habitat have feeding relationships with one another. Animals that eat other animals are called carnivores. Animals that eat plants are called herbivores. Animals that eat both plants and animals are called omnivores.

Science activity
Use the descriptions of organisms and their eating habits in the table below to construct three food chains on a separate sheet of paper. Identify all of the carnivores and herbivores. Which organisms were producers?

<table>
<thead>
<tr>
<th>Name of organism</th>
<th>Description/eating habits</th>
</tr>
</thead>
<tbody>
<tr>
<td>plankton</td>
<td>microscopic mixture of small plants floating in the sea</td>
</tr>
<tr>
<td>seaweed</td>
<td>certain plants growing in the sea or on the seabed</td>
</tr>
<tr>
<td>mussel</td>
<td>a shellfish found on rocks that eats plankton</td>
</tr>
<tr>
<td>limpet</td>
<td>a shellfish found on rocks that eats seaweed</td>
</tr>
<tr>
<td>seal</td>
<td>eats fish, lobsters, and edible crabs</td>
</tr>
<tr>
<td>lobster</td>
<td>eats limpets and mussels</td>
</tr>
<tr>
<td>periwinkle</td>
<td>a shellfish that eats seaweed</td>
</tr>
<tr>
<td>mullet</td>
<td>a fish that eats seaweed</td>
</tr>
<tr>
<td>pollack</td>
<td>a fish that eats mullet</td>
</tr>
<tr>
<td>edible crab</td>
<td>a crab that eats periwinkles</td>
</tr>
<tr>
<td>oystercatcher</td>
<td>a bird that eats mussels</td>
</tr>
</tbody>
</table>

Science investigation
Go on a dinosaur hunting expedition on the Internet! Download pictures of carnivore, herbivore, and omnivore dinosaurs. Create 1–2 food chains that may have existed 65 million years ago.
Dinner in a woodland

Background knowledge
A woodland is a forest habitat containing trees, shrubs, herbs, and grasses. A food chain shows a particular feeding relationship in a particular habitat. Animals that eat other animals are called predators. In a woodland habitat, the owl is a predator. It eats mice. The mice are the owl’s prey. The prey becomes the food for the predator. The feeding relationships are usually more complex since most animals feed on more than one type of living thing. This type of relationship is called a food web.

Science activity
Many food chains exist in a woodland.

1. Look at the two woodland food chains below. Identify the producers, primary consumers, secondary consumers, and third order consumers. Label each organism by placing a P, PC, SC, or TOC in each square.

   Plant □ → Woodmouse □ → Hawk □

   Plant □ → Insect □ → Shrew □ → Owl □

2. Name the hawk’s prey and the shrew’s predator in these food chains.

Science investigation
Do one of the following: make a food chain or web on a poster or a mobile; write a song or poem about a woodland food chain, or design and build a woodland food chain game and play it with your family and friends.
Friction is a force

Background knowledge
Friction is a force that slows things down. When two surfaces come in contact with one another, there is a frictional force. The amount of friction depends on a number of factors. Rougher surfaces create more friction than smooth surfaces. It is a lot easier to ride a bike on a newly paved road than on a dirt trail. The weight of an object pushing on the surface causes friction. The amount of surface in contact with another surface also affects the amount of friction. For example, wheels reduce the amount of surface contact.

Science activity
Gail covered a ramp with different materials and measured how far a wooden block slid on each surface before coming to a halt. Here are her results.

<table>
<thead>
<tr>
<th>Type of surface</th>
<th>How far the block slid after being pushed</th>
</tr>
</thead>
<tbody>
<tr>
<td>sandpaper</td>
<td>50 cm</td>
</tr>
<tr>
<td>glass</td>
<td>500 cm</td>
</tr>
<tr>
<td>wood</td>
<td>100 cm</td>
</tr>
<tr>
<td>plastic</td>
<td>300 cm</td>
</tr>
<tr>
<td>cardboard</td>
<td>90 cm</td>
</tr>
</tbody>
</table>

Which is the smoothest surface, and which is the roughest surface?

Explain how you worked out the answers to the question above.

Science investigation

Using a spring balance, test out the friction of various objects on a wooden ramp. Keep in mind that if you want to test the effect of different surfaces, the same object must be tested each time. Make sure to explain how you will use the spring balance to measure friction.
Whose home is this?

Background knowledge
Animals come in many different shapes and sizes. Most animals live in one type of environment because they are best suited to it. We say they are adapted to this environment. It provides them with food and water. For example, animals such as frogs, newts, and ducks have webbed feet to help them swim in the water. Squirrels have sharp claws to grip and long tails to help them balance as they scramble up and down trees.

Science activity
Look at the pictures. Explain how each animal is adapted to its habitat.

A desert fox lives in hot, dry places.

A mole burrows in dark underground tunnels.

An arctic fox lives in cold places.

A dormouse is active at night – it climbs shrubs and trees.

Science investigation
Go on your own “safari.” Make a list of animals found in your area. Take pictures of these animals or find pictures of them. Place these pictures on a poster and tell how each is adapted to its environment.
The right place to live

Background knowledge
Just as animals adapt to the places they live, so do plants. Plants are adapted to a wide variety of habitats. As a result, each plant has certain characteristics. Some are adapted to living on land while others live in water. Plants that grow on land usually have stiff stems to hold them upright, while water plants tend to have less rigid stems because the water supports them. Plants that live in dry climates like the desert have small or very few leaves. This cuts down on water loss through the leaves. Their stems may also be thick to store water. Plants that grow in shaded areas have large leaves to capture as much sunlight as possible.

Science activity
Look at the drawings below. Explain how each plant is suited to its habitat.

A cactus growing in a hot, dry area.

Pond weed growing just under the surface of water.

A daisy growing in mowed or grazed grass.

Look at these two dandelion plants. Which one do you think grew under a tree? Explain.

Science investigation

1. Take extra care - ask an adult to supervise you.

The pitcher plant and the Venus flytrap are examples of plants that eat insects. Use reference books and the Internet to do a report. Make sure to explain why the plant eats insects. Design and conduct an experiment to learn how a Venus flytrap captures insects.
Staying alive

Background knowledge
All living things display certain characteristics that separate them from non-living things. For example, animals need oxygen to breathe and food to produce energy. They move around to find food and shelter and to avoid danger. They also need to get rid of the waste products produced by their bodies. Animals grow and repair themselves when parts of their body are injured. They reproduce and can detect things in the environment through their senses of smell, touch, taste, sight, and hearing.

Science activity
Draw a line connecting each picture below to one of these three words: living (alive), non-living (never alive), or dead (was once alive). The first one has been done for you.

Living | Non-living | Dead

Science investigation
⚠️ Take extra care - ask an adult to supervise you.
Look for a snail or slug in your garden or local park. You may find one at the base of a wall or under some leaves. Observe the snail or slug carefully. What are some of the characteristics of life that you were able to observe? Carry out an investigation to learn more about the animal's food preferences. Observe how it moves on different types of surfaces, such as smooth or rough.