Name_____ Date_____

Systems

Systems surround us and touch of every part of our lives. You are a member of a family system. Your family is a member of a community system. You are also a member of your classroom system, but your class is a member of the school system.

What is a system?

A system is a collection of things (people, animals, plants, objects, or even a combination of these) that work together to achieve a purpose. Think of a computer. Can we call it a system? Yes, certainly. It is a group of things including a keyboard, monitor, mouse, hard drive, CPU, and other parts that all work together for a purpose.

Different Roles in Different Systems

Everything is a member of more than one system. Just as in our first example, you are a member of a family and a class, you may also be a member of a team, a club, a group of friends, a group of people who all collect the same things, and countless other systems.

As a member of many systems, your role may be different in one system from what it is in the other systems to which you belong. As a member of your family, you are a son or daughter, and you follow the directions of your parents. As a member of your sports team, you perform according to your assigned position or duty. For example, you may be the pitcher of a baseball team, which is a completely different role than the one you have inside your family system.

A System and Its Parts

Let's go back to our computer example. When we say the word "computer" we are speaking of that system as a whole, not its individual parts. If I were to ask what a computer system does, you might say it connects to the Internet, is a place to check email, or is where you write a paper for class. In each case, you named something a computer system can do but none of the parts can do those functions alone. It is only as a system that those tasks can be done by the computer.

Systems of Interest to Scientists

In science, we study the many systems that make up the world around us. In addition to studying the systems, scientists examine how several systems may work together through their shared members.

The earth is home to countless systems. Each species of animal and plant has its own system to continue producing new members. Additionally, it depends on other systems to get the food, water, and shelter necessary for living. It is important to study these relationships, because, if a change occurs in one system, it will effect many other systems.

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The earth and its moon also form a system. This system is partially responsible for the tides in the oceans. The earth is also a member of the solar system. Earth is one of nine planets in our solar system but there are many other members. In addition to the planets and their moons, the sun, asteroids, and other space debris all are part of our solar system.

The sun in our solar system is one of millions of other stars that combine to form the Milky Way Galaxy. A galaxy is a system made of a group of stars and their solar systems. The Milky Way and countless other galaxies are known as the universe.

Connections and Contributions

All systems are interconnected with other systems. They depend on each other through their shared members. The well being of any member effects the well being of all of the systems to which it belongs.

If you moved away from your town, it would effect the your class, your team, and your friends. Your absence from your team may decrease its chance of winning games. Your absence from class may change how your fellow students learn because you are not there to participate.

The sun is billions of miles away, yet it is a part of most systems in nature. It supplies sunlight to plants, allowing them to make energy. Most animals get their energy from plants and many need sunlight to convert vitamins to a useable form. Even though it is far away, the sun is an essential member of the system that supports life on Earth.

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Applications

Think of a forest. A forest is a system. Each of its parts is essential to the survival of the system.

1. Identify 3 parts or things you find in a forest? List one in each of the three boxes across the top of the graph below.

2. In the next row, describe something that this member does to help the forest system survive.

3. In the bottom row, describe what the forest provides for this member.

Follow the given example:

Name a Member of the System	Molds, mushrooms, and other fungi			
What does this member give to the system?	Breaks down dead plants and return them to the soil			
How does the system help this member survive?	Trees and plants drop leaves or die which provides food for the fungi			

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Applications (continued)

4. A forest is a system but it is also part of other systems. Many animals spend part of their lives in the forest as well as time in open areas. Rain falls over both forests and fields as part of the water cycle, another system. The atmosphere is a system. What does the forest do as a member of the atmosphere (air) system?

5. We talked about many groups of which you are a member and how you have a different role in each of the systems to which you belong. Describe how your role is different when you are a team member compared to your role as a member of a group of friends.

6. As we said, computers are composed of keyboards, a mouse, monitor, CPU, modem, motherboards, memory, and many other parts. It is a system. We said that systems are part of other systems. How is a computer a member of a larger system?

7. Systems are made of groups of individual members. When you look at the system, you most likely are not aware of the characteristics of each member. How is the sun different as a member of our solar system from its role as a member of the Milky Way Galaxy?

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Sample Responses

1 - 3. Answers may vary.

Name a Member of the System	Molds, mushrooms, and other fungi	Trees	Squirrels	Birds
What does this member give to the system?	Breaks down dead plants and return them to the soil	Shade, housing, nuts	Spreads nuts and plants them	Eats insects that may harm tree
How does the system help this member survive?	Trees and plants drop leaves or die which provides food for the fungi	Members remove pests and spread seeds	Trees give shelter and food	Trees give shelter and food

4. The air/atmosphere surround the earth so includes the forest as well as open lands, meadows, pastures, cities, etc. The forest contributes to the atmosphere when the plants clean the air of carbon dioxide and replace the oxygen.

5. As a team member, the student may be a leader as a team captain. As a player covering a specific position, he/she may have a unique role such as catcher, shortstop, baseman, out field, etc. He may be considered the best at what he does. With friends, they are all on the same level, and generally, no one is superior to another (peers). Ideas and interests are shared equally.

6. A computer can be a part of a network, such as a school network, and share information within the school. A computer can also be a part of the internet/web.

7. In our solar system, the sun is though of as just that, a sun. It is in the center of the solar system and the other members move around it. It provides sunlight, heat, and energy to the other members. In the Milky Way, the sun is just one of millions of other stars. It is no longer the center and is not essential to the Milky Way like it is to our solar system.