

Water Information

* **Monty C. Dozier**

Assistant Professor and Extension Water Resources Specialist

Introduction

Water is needed by all living things, but humans have special needs. We have learned to use water in a multitude of ways and to process water for use and reuse. What we have learned to do with water has made our lives easier in many ways. However, our uses of water give us the responsibility for protecting it for ourselves and future generations.

How we use water:

1. **Energy Production:** Waterwheels and hydro-electric turbines are examples of ways that water is used to produce energy and do work. Many heating and cooling systems use water to transfer heat.
2. **Transportation:** Many of the world's major cities are located on waterways because water transportation is one of the oldest ways of moving goods and people.
3. **Moving Waste:** Water is used to move waste from where we don't want it. Examples of moving waste with water include steamcleaning, washing and transporting sewage from homes and industries.
4. **Recreation:** We all enjoy using water for fishing, swimming, boating and jet skiing. What would life be like without water slides and swimming pools?
5. **Manufacturing Processes:** Water is used throughout industries to manufacture goods, cool equipment, process foods and transport waste products of the manufactured goods.
6. **Drinking:** Water is required to live. It is recommended adults drink at least 2 to 3 quarts of water per day.
7. **Food:** Not only do we use water to drink, but we harvest recreationally and commercially, millions of tons of shellfish and finfish annually from the world's fresh and salt waters for food. Water in the form of precipitation and irrigation is also used to grow foods we eat, such as fruits, vegetables, and food grains, and fiber for the clothes we wear, such as cotton.



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The Nature of Water

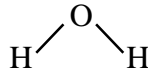
Water is essential to life and natural processes on earth.

Water's Importance to Life

Nearly three-fourths of the human body is made of water. Water aids the body in digesting and circulating food, eliminating wastes, and regulating temperature. A person needs at least five pints of water a day to do these things. Other living things such as pets, livestock and wildlife need water for similar reasons.

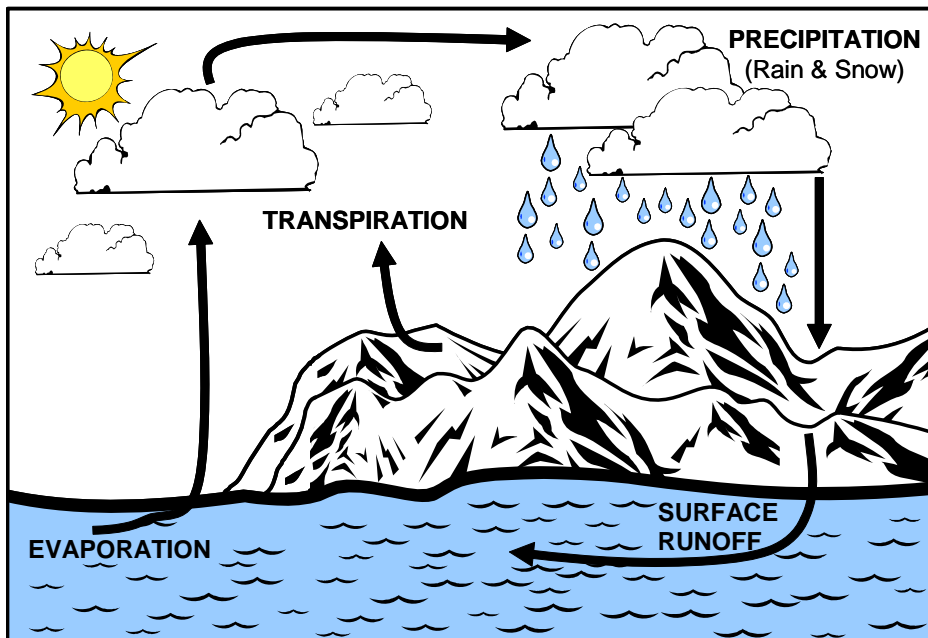
Water's Natural Processes

1. **Forms of Water:** Water is made of one molecule of oxygen attached to two molecules of hydrogen. Water is present in three forms- solid, liquid and gas. Temperature causes water to change forms. When water is frozen, molecules hold together tightly. As water heats up, molecules loosen their bond until they separate into visible vapor (**evaporation**), moving upward into the atmosphere to cool again, bond with other bits of vapor (**condensation**), and fall to earth once more (**precipitation**). This is the molecular representation of water:



Water is made up of two hydrogen atoms bonded to one central oxygen atom.

2. **The Hydrologic Cycle:** Water is used over and over again through the never ending cycle of evaporation, condensation and precipitation. This is called the hydrologic cycle. When water evaporates from the ocean and condenses over the land as rainwater, hail, sleet or snow it replenishes surface waters (lakes, rivers and streams). Precipitation and surface water is absorbed into the ground and is called groundwater. Groundwater and surface water flow back to the ocean. Plants take up water mainly through their roots, and some of this water is lost from the plant to the atmosphere through **transpiration**.



3. **Water's Action to Change the Surface of the Earth:** Water shapes the land by washing away (eroding) rock and soil. Erosion created the Grand Canyon and our own Palo Duro Canyon near Amarillo. Erosion also carries valuable soil from farms. Floods can destroy homes, farms, buildings, bridges and highways. Too little water is called a drought. During severe droughts many plants and wildlife die. The dried soils can also be blown away by the effects of wind which is called wind erosion.
4. **Water's Ability to Clean Itself:** **Surface water** in its natural state has the ability to clean itself. Surface water is an ecosystem and every member of this system has a job to do to keep the water clean. Some members of the ecosystem include one-celled bacteria, algae, and more complex plants and animals. Bacteria break down waste products in water into simple foods for algae and aquatic plants. In turn, these things are eaten by aquatic animals.

Living aquatic plants and algae manufacture oxygen for animals to breathe, but when they die in large numbers in water, the decomposition removes oxygen from the water and kills fish. Wastes produced by all the organisms fuel the cycle. In a healthy aquatic environment, there is just enough food and oxygen for the plants and animals that live there. When wastes from outside the ecosystem are added, the ecosystem becomes imbalanced. Water pollution can cause plant and animal death. Too much pollution can lead to waters that are unsuited for growth of plants and animals and can render waters unfit for recreational uses.



Uses of Water

Water is used to manufacture things we use every day- toothpaste, medicine, televisions, soap, cars, telephones, paper, clothing, plastic bags and gasoline to name a few. We also drink and use water in our everyday lives.

1. It takes 40,000 gallons of water (150,000 liters) to make one ton of steel.
2. It takes 150 gallons of water (570 liters) to make just one copy of a Sunday newspaper.
3. Oil companies use about six gallons of water for every one gallon of gasoline they produce.
4. It takes about 770 gallons of water to refine one 43 gallon barrel of petroleum.
5. It takes 75,000 gallons of water to produce a ton of high grade paper.
6. It takes 600,000 gallons of water to produce a ton of synthetic rubber.
7. It takes 44,000 gallons of water to produce the steel in one car.
8. It takes 1,000 gallons of water to produce a ton of sugar.
9. The American automobile industry uses 400 billion gallons of water to produce 5 million cars each year.
10. The consumption of water nationwide is 2,000 gallons per person per day, including industrial use.
11. It is recommended that an adult consume 183 to 274 gallons of water per year.
12. An average family of four uses about 240 gallons of water per day or a total of 88,000 gallons of water per year.





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