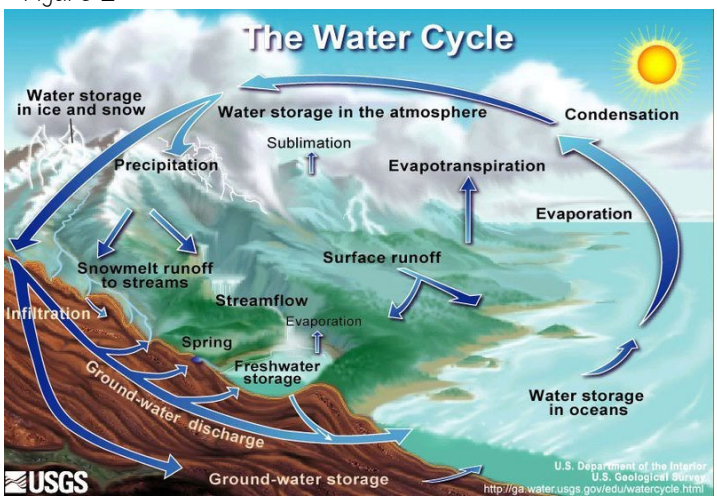
Earth's Waters

Section 1: Earth: The Water Planet

Figure 1



Water is essential for living things to grow, reproduce, and carry out many important life processes. The hydrosphere includes all the water on and beneath Earth's surface as well as water in the atmosphere. About 97% of Earth's water is saltwater found in the oceans, while only 3% is freshwater. Most of this fresh water is frozen in large masses of ice near Earth's poles. Water in the atmosphere is mostly found as water vapor, an invisible gas.

Water has several unique properties that make it important for life on Earth. A water molecule is composed of two hydrogen atoms and one oxygen atom, represented by the chemical formula H_2O. Water is also a **polar molecule**, meaning one end of the molecule has a slightly positive charge, and the other end has a slightly negative charge. Because of this polarity, the positive hydrogen end of one water molecule is attracted to the negative oxygen end of another, causing water molecules to stick together.

One result of this attraction is **surface tension**, which occurs when molecules at the surface of water pull tightly together, forming a thin "skin." This property helps raindrops form and causes water to bead up on surfaces like a car's windshield. Water is also known as a **universal solvent** because it can dissolve many different substances, including certain solids, liquids, and gases. Another property, **capillary action**, allows water to move through narrow spaces, such as pores. This process helps water travel upward through plant stems and into their leaves.

Water can exist in three states of matter: solid, liquid, and gas. When liquid water changes into water vapor, the process is called **evaporation**. When water vapor cools and changes back into liquid water, the process is called **condensation**.
Water constantly moves through Earth in a process called the **water cycle**. The **Sun** provides the energy that drives this cycle. During **evaporation**, heat from the Sun causes liquid water—especially in oceans—to change into water vapor and rise into the atmosphere. As the water vapor cools, it condenses into tiny droplets that form clouds. When the droplets become large and heavy, they fall back to Earth as **precipitation**, which can include rain, snow, sleet, or hail. Plants also release water

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vapor into the air through a process called **transpiration**, in which water escapes through small openings in their leaves.

Together, these processes continuously recycle water through the atmosphere, land, and living organisms, helping to renew Earth's supply of fresh water.

Review:

1. Identify three properties of water that make it so unique.
2. What is the difference between evaporation and condensation?
3. What is the water cycle?