

The Properties of Water (pages 6–11)

The Structure of Water (page 7)

Key Concept: The positive hydrogen ends of one water molecule attract the negative oxygen ends of nearby water molecules. As a result, the water molecules tend to stick together.

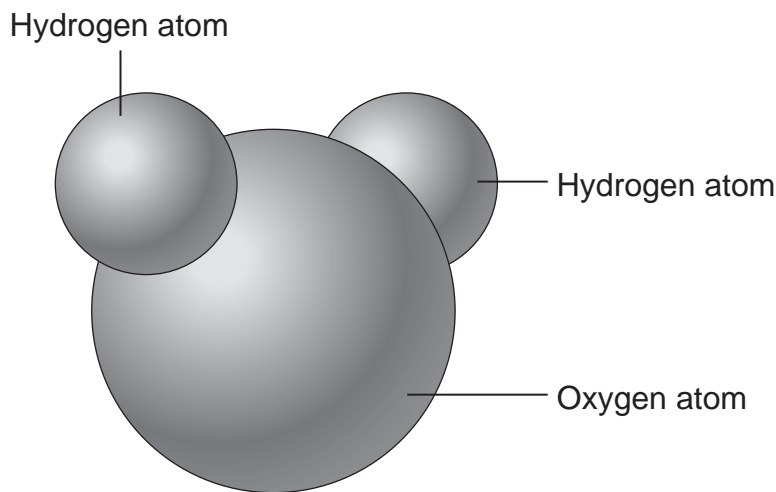
- Atoms join together to form molecules. A water molecule is made up of two hydrogen atoms attached to an oxygen atom.
- Water is made up of polar water molecules. A **polar molecule** has electrically charged areas. The oxygen end of a water molecule has a negative charge. The hydrogen ends each have a positive charge.
- Polar molecules are like magnets. In magnets, opposite poles attract each other. In polar molecules, atoms with opposite charges attract each other.

Answer the following questions. Use your textbook and the ideas above.

1. A molecule that has electrically charged areas is called a(an) _____ molecule.
2. Circle the letter of each sentence that is true about the structure of water.
 - a. Water is made up of polar water molecules.
 - b. A water molecule contains two hydrogen atoms.
 - c. A water molecule contains two oxygen atoms.

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3. The picture below shows a water molecule. Circle the part of the molecule that has a slight negative charge.

**Key Properties of Water** (pages 8–9)

Key Concept: The properties of water include capillary action, surface tension, the ability to dissolve many substances, and high specific heat.

- **Capillary action** is the combined attraction among water molecules and between water molecules and other molecules. One result of capillary action is that water rises in a tube.
- **Surface tension** is the tightness across the surface of water. Some insects can even walk across water because surface tension keeps them from sinking.
- Many substances dissolve in water. A **solution** is a mixture that forms when one substance dissolves in another. The substance that does the dissolving is called a **solvent**. Because so many substances dissolve into water, water is called the “universal solvent.”
- **Specific heat** is the amount of heat needed to increase the temperature of a substance by 1°C. Different substances have different specific heats. Water needs a lot of heat to increase its temperature—water has a very high specific heat.

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Answer the following question. Use your textbook and the ideas on page 5.

4. Draw a line from each term to its meaning.

Term	Meaning
capillary action	a. a mixture that forms when one substance dissolves into another
surface tension	b. the substance that does the dissolving
solution	c. the amount of heat needed to increase the temperature of a substance by 1°C
solvent	d. the combined attraction among water molecules and between water molecules and other molecules
specific heat	e. the tightness across the surface of water

Changing State (pages 10–11)

Key Concept: Ice is solid water, the familiar form of water is a liquid, and the water vapor in the air is a gas.

- Water is the only substance on Earth that commonly exists in all three different states of matter—as a gas, a liquid, and a solid.
- Liquid water can become a gas when it is boiled. It can also become a gas by evaporation. **Evaporation** is when molecules at the surface of a liquid change into a gas.

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- The way a gas changes into a liquid is called **condensation**. When you fog up a window by breathing on it, you see the effects of condensation.
- When water freezes, water changes from a liquid to a solid. When ice melts, water changes from a solid to a liquid.

Answer the following questions. Use your textbook and the ideas on page 6 and above.

5. Read each word in the box. In each sentence below, fill in the correct word.

evaporation precipitation condensation

- a. The process by which a gas changes into a liquid is called _____.
- b. The process by which molecules at the surface of a liquid change into a gas is called _____.

6. Complete the table about how water changes state.

How Water Changes State		
Type of Change	Starting State	Ending State
Melting	solid	liquid
Boiling	a. _____	gas
Evaporation	liquid	b. _____
Condensation	c. _____	liquid
Freezing	liquid	d. _____