



5-Minute Refresher: PROPERTIES OF WATER

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Properties of Water— Key Ideas

- Water covers about 70% of Earth's surface and makes up 50-80% of human body weight, depending upon age, sex, and fat distribution.
- Water cycles constantly through evaporation, transpiration, precipitation, and storage at or below Earth's surface.

Properties of Water— Key Ideas

- The addition or subtraction of thermal energy (heat) causes water to change phases.
- Water boils/condenses at 100° C and melts/freezes at 0° C. Water is the basis for the Celsius temperature scale.
- Water is the only substance commonly found as a solid, liquid, and gas on Earth's surface.
- Solid water (ice) forms a crystalline structure that is less dense than liquid water. This allows water to freeze over at the top while remaining liquid underneath.
- Water has a high heat capacity, so a lot of thermal energy can be added to it before its temperature increases.

Properties of Water—Learning Objectives for Grades K-3

- Water exists as solid ice and liquid form.
- Water carries soil and rocks from one place to another.

Properties of Water—Learning Objectives for Grades 4-6

- Water is found almost everywhere on Earth in one of the three states of matter.
- Water can shape the land it moves.
- Fresh water is only a tiny fraction of Earth's water supply, most of our water is salt water from the ocean.

Properties of Water—Prior Knowledge K-2

- Students should be able to recognize images of water as a liquid and solid on Earth.
- Students should be able to explain water in terms of precipitation they have observed.
- Students should be able to identify water sources on Earth.

Properties of Water—Prior Knowledge 4-6

- Students should have some knowledge of the physical states of matter and be familiar with the terms for phase changes: freezing, melting, evaporating, and condensing.
- Students should be able to explain that water carries soil and rocks from one place to another

Properties of Water— Common Misconceptions

- The amount of water on Earth changes constantly.
 - **Reality:** The water cycle constantly moves and redistributes water throughout Earth’s surface and atmosphere. The water present on Earth today is the same water that has been present for billions of years, though specific areas may experience droughts or floods. Water pollution, however, can destroy water resources for human use or make them extremely costly to purify.
- Water is not a chemical.
 - **Reality:** All substances are made of atoms and molecules, so all substances, including water, are chemicals.

Properties of Water— Common Misconceptions

- Water has a freezing point of 0° C and a boiling point of 100° C in all conditions.
 - **Reality:** The freezing and boiling point of all liquids changes if the pressure changes. The Celsius scale is calibrated for the freezing and boiling point of water at Earth’s sea level. However, unless your classroom is at a high elevation, your students will not notice a difference.
- Ice’s ability to float on water is a common phenomenon.
 - **Reality:** Water is one of the few substances with the unique property of having the solid form be able to float on the liquid form. If this were not true, aquatic animals would not be able to survive when surface temperatures went below 0° C.

Properties of Water— Additional Information

Waves, wind, water, and glaciers all break rock and soil into smaller particles and move them around. These processes change rocks and the surface of Earth. Some are more efficient agents of erosion than others. To learn more, check out the hands-on activity **Erosion Rates** at the following link:

http://siemensscienceday.discoveryeducation.com/activities/erosion_rates.cfm