

### Water's Unique Qualities

By Cindy Cranford

Water is the only natural substance on Earth that is found in all three states — liquid, solid (ice), and gas (steam and water vapor). Earth's water is constantly changing, based on Earth's normal temperatures.

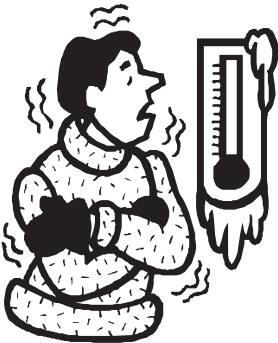


The best-known form of water is its liquid form. Water is in its liquid form when its temperature is anywhere between 0 and 100 degrees Celsius ( $^{\circ}\text{C}$ ). On the Celsius scale, water's freezing point is 0 degrees and its boiling point is 100 degrees. Water's freezing and boiling points are the baseline with which temperature is measured. (Water freezes at 32 degrees Fahrenheit [ $^{\circ}\text{F}$ ] and boils at 212 $^{\circ}\text{F}$ .)

When water reaches its boiling point, 100 $^{\circ}\text{C}$ , it becomes an invisible gas known as vapor. When the temperature of the vapor gets below 100 $^{\circ}\text{C}$ , it reaches its condensation point. At this point, the vapor changes back into liquid water.



Freezing occurs when water falls below the temperature of 0 $^{\circ}\text{C}$  and the water coagulates (thickens). This is one of water's most unique characteristics. It expands in size by 9 percent as it changes into its solid form known as ice. Frozen water is less dense than water in its liquid form, making it light enough to float in a liquid. When water in its solid form reaches a temperature above 0 $^{\circ}\text{C}$ , it returns to its liquid form. This process is known as melting.



Water has a high specific heat index. This means that water can absorb a lot of heat before it begins to get hot. That is why water is valuable to industries and is extremely helpful in acting as a coolant in a car's radiator. The high specific heat index of water also helps regulate the rate at which air changes temperature. That is why the temperature change between seasons is gradual rather than sudden.

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## The Challenges – Teacher Resources

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### Student Response Questions

#### *Water's Unique Qualities*

##### Multiple Choice

1. In what form will we find water if it is at a temperature of 10° Celsius?
  - a. Vapor
  - b. Liquid
  - c. Ice
  - d. Gas
2. Determine the meaning of the term “coagulates” in the following sentence:  
Water coagulates when its temperature falls below 0° Celsius.
  - a. Melts
  - b. Freezes
  - c. Evaporates
  - d. Condenses
3. In what form will we find water at 200° Celsius?
  - a. Solid
  - b. Liquid
  - c. Gas

### Reading Response Questions

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- Short Response

When water's temperature is below 100° Celsius, it reaches its condensation point. Use information from the text to explain what happens to the state of water when it reaches its condensation point.

- Short Response

Use details from the text to explain what is meant when we say Earth's waters are constantly changing based on normal Earth temperatures.

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