

Water Phases



Water is essential for life.

Three States of Matter

Water is the only substance known to exist naturally in its three states (solid, liquid, and gas) within the range of temperatures on Earth. Solid water is **ice**, liquid water is the form we use most, and water in its gaseous form is **vapor**, or **steam**. The particles in a solid are fixed and move very slowly, only vibrating in place rather than moving past one another. For this reason, most solids retain a fixed shape and are relatively incompressible.



Water exists naturally on Earth in its three phases.



Earth's water is called the hydrosphere.

The Hydrosphere and the Water Cycle

All of the water on Earth is called the **hydrosphere**, and it moves around the planet in a path called the **water cycle**. Water falls to the Earth as precipitation. It freezes at 32°F (0°C) and below. At 32°F and above, ice melts. The colder temperature causes the particles to move more slowly and become fixed in a rigid structure, while at higher temperatures, particles speed up. An unusual property of water is that it expands as it freezes, making its solid form less dense than its liquid form. This is why ice floats on water; its relatively low density makes it positively buoyant. Bodies of water freeze from the top down and water does not conduct heat well, so the liquid water below the ice loses very little heat, often preventing entire bodies of water from freezing, thus protecting life below the surface.

Reading Sample



This section has been removed

With more heat energy, eventually water particles at the surface begin to break away from one another, rising into the air as water vapor or steam after overcoming the pressure of the atmosphere pushing down on them. This happens when water is boiled and is known as **vaporization**. It takes nearly seven times as much heat energy to vaporize water as it takes to melt it. The boiling point of water is 212°F (100°C) at sea level, or normal atmospheric pressure. At higher altitudes, atmospheric pressure is lower, and it is easier for particles to overcome it and escape the liquid state. As the Sun heats water bodies, it causes evaporation, turning some surface water into vapor. Air currents carry this vapor up into the atmosphere, where it cools, condensing into clouds, and falls again as rain, snow, or ice.

Reading Sample



This section has been removed

Reading Comprehension Questions

1. How
2. How much of the Earth is water?
3. In
4. What is the hydrosphere?
5. Summarize
6. What
7. At what temperature does water freeze? Vaporize?
8. Why

Extension Questions

9. How
10. Research water's importance for human life. Describe three roles of water in maintaining human health.
11. Research
12. Create an infographic detailing the information in this article. Check out canva.com for templates.

Reading Sample



This section has been removed

References

- Advameg, Inc. (2017). "Properties of Matter – Real-life applications." *Science Clarified*. Retrieved from <http://www.scienceclarified.com/everyday/Real-Life-Chemistry-Vol-1/Properties-of-Matter-Real-life-applications.html>.
- Martin, A. and McMinn, A. (2017, Feb 24). "The search for extraterrestrial life in the water worlds close to home." *PHYS.ORG*. Retrieved from <https://phys.org/news/2017-02-extraterrestrial-life-worlds-home.html>.
- United States Department of the Interior. (2016, Dec. 15). "Summary of the Water Cycle." *The USGS Water Science School*. Retrieved from <https://water.usgs.gov/edu/watercyclesummary.html>.
- United States Department of the Interior. (2018, Jul. 23). "The water in you." *The USGS Water Science School*. Retrieved from <https://water.usgs.gov/edu/propertyyou.html>.
- University Corporation for Atmospheric Research. (2012). "It's Just a Phase: Modeling the Phases of Water." *Center for Science Education*. Retrieved from <https://scied.ucar.edu/activity/ModelingPhasesWater>.