

## Super Water! (Properties of Water)

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Look on the ground! It's a liquid! It's an earth material! It's water! Water, the most important substance that comes from the earth, has many observable properties that make it one of the most amazing liquids known to mankind. Not only is it necessary for the survival of humans and animals, but also it is one of the few liquids that can dissolve many different types of solids. Since water dissolves certain substances so well, pure water exists very rarely in nature. Due to this major characteristic, scientists call water a universal solvent. Most natural water carries dissolved solids like salt. Water is also the only material that is found naturally on the Earth's surface in all three states of matter: liquid, solid, and gas. Let's take a look at water's many properties.

Water has transparency, which means that you are able to see clearly through water. This is one property that allows scientists to determine if certain solids have completely dissolved in water. Another property of water is shapelessness. If you poured water into a bowl that was shaped like a teddy bear, you would have water that looked like a teddy bear. However, once you pour the water out, it would not be shaped like a teddy bear (unless you are still imagining things). Since water takes on the shape of its container, it can be used to measure the volume of irregular objects.

Water also has movement or flow. Scientists classify water as a liquid because it can be poured, and it can flow or move over surfaces. Water always flows downhill unless there is a force or machine to push it uphill. The steeper or more slanted the hill, the faster the water will flow down that slope or hill. Pumps and siphons are used to raise water from a surface whether below ground or above ground. A siphon uses the pressure of the water to raise the water to another level. Pumps rely on air pressure to move water to a higher level. Imagine a hot summer day, and your parents have turned on the sprinklers in your yard. You notice that the water is moving upward and at times, in different directions. Not only are you getting wet as you run through the sprinklers, but also a larger area of your parents' lawn is getting water. If you were to take out the water hose, turn it on, and lay it on the grass, the water would just flow across the surface of the grass. You would also notice that a smaller area of the grass would be watered due to the shortened reach of the water's flow.

Other properties focus on the way water reacts to different surfaces. When you pour water onto a rug, it appears to disappear leaving behind only a spot. The rug absorbed or soaked up the water. If you place a drop of water on your kitchen counter, you may notice that the counter does not absorb the water. Instead, the water beads or forms a sphere. This drop forms a skin-like surface when it meets the air. Water in cups and in lakes also forms the same tight surface. This is due to the water molecules attracting to each other. In the middle of a drop of water, the molecules pull toward each other in all directions equally. However, on the surface the molecules are pulled into the water which tightens the surface of the water. Scientists call this phenomenon surface tension. If you pour water into a cup and carefully place a sewing needle flat on the water's surface, you would find that it does not sink to the bottom. The tight surface of the water allows the needle to float without sinking. If you were to place the needle into the cup so that it was not lying flat (point first), the surface of the water would be broken, and the needle would sink. Insects called water striders use water's surface tension to actually walk on water.

Although you would not put water in the same category as a "superhero," water is still one of the most amazing substances on the earth. Our bodies are made up of water, and water is used in most of our body systems (like circulatory and digestive). Over 70 percent of our world is covered by water. (That would be about three slices of a four-piece pizza pie. The one piece left over would stand for the amount of land on the earth.) Water's many properties allow it to do amazing things and to be used in amazing ways. One could say it is a scientific "Super Substance."



Name \_\_\_\_\_



Date \_\_\_\_\_

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### Questions

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- \_\_\_\_\_ 1. Water is classified as a \_\_\_\_\_ because it can dissolve many substances.
- A. regional solvent
  - B. universal solvent
  - C. super solvent
  - D. regular solvent
- \_\_\_\_\_ 2. Water can not be used to measure the volume of irregular shapes because it has a definite shape.
- A. False
  - B. True
- \_\_\_\_\_ 3. The clear appearance of water is called \_\_\_\_\_.
- A. surface tension
  - B. transparency
  - C. shapelessness
  - D. emergency
- \_\_\_\_\_ 4. Water's ability to change directions is due to \_\_\_\_\_.
- A. the use of sprinklers
  - B. the use of trenches and ditches
  - C. the use of pumps and siphons
  - D. the use of slanted surfaces
5. What is surface tension?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_ 6. Water is the only substance on earth that occurs in the three states of matter.
- A. True
  - B. False
7. Water is flowing down Hill A. There is also water flowing down Hill B, which is steeper than Hill A. Which will get to the bottom quicker, the water flowing down Hill A or Hill B?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_ 8. Water striders can walk on water due to the water's \_\_\_\_\_.
- A. volume
  - B. transparency
  - C. shapelessness
  - D. surface tension

