

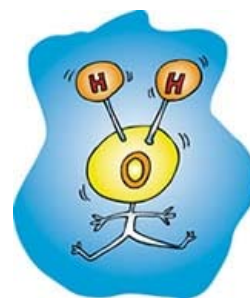
WHAT IS WATER?

Amazing facts about water – Q&A



1. How small is a water molecule? Water molecules are so small; you can't see them with your naked eyes. Imagine that one drop of water contains 1.67×10^{21} water molecules.

2. How does water 'stick' together? Water is a molecule made up of 2 hydrogen atoms bound to one oxygen atom. The hydrogen atoms are 'attached' to one side of the oxygen atom, resulting in a water molecule having a positive charge on the side where the hydrogen atoms are and a negative charge on the oxygen atom side. Since opposite electrical charges attract, water molecules tend to attract each other, making water kind of 'sticky'.



3. Why is water called the universal solvent? Water is called the universal solvent because it dissolves more substances than any other liquid. This means that wherever water goes, either through the ground or through our bodies, it takes along valuable chemicals, minerals and nutrients.

4. Is water found elsewhere other than Earth?

Water, in ice form, can be found in other places in the solar system:

- On the Moon.
- On the planets Mercury, Mars, Neptune.
- On the dwarf planet Pluto.
- On Satellites of planets, such as Triton and Europa.

But, water in its liquid form has, so far, only been found on Earth.



Properties of water – ACTIVITIES

Water has an impressive list of properties that make it stand out from many other substances on Earth. Try the activities below to find out what these properties are:

1. States of Matter

Use the table below to list places on Earth where you would find water naturally in one of the three states of matter. Use the same table to list the places where

you would find pure carbon, carbon dioxide and pure nitrogen naturally in one of the three states of matter.

Substance	Solid	Liquid	Gas
Water			
Pure Carbon			
Carbon dioxide			
Pure nitrogen			

Did you have trouble listing places where you would find water in all 3 states? What about the other substances?

2. Density of water

Place an ice block in a glass of water. What happens? Complete the following sentences: Liquid water is _____ than ice and so ice _____. All other solid substances _____ in their liquid forms.



It's a good thing that ice floats on water. In winter, some rivers and lakes freeze on the surface. If ice was denser than water, then the rivers and lakes would freeze from the bottom up, which would kill plants growing in them and starve most of the fish and other marine life.

3. Frozen water

Fill two plastic bottles of the same size so that they are three-quarters full. Mark where the water level is on the outside of the bottles. Place one bottle in the freezer overnight. What happened to the water level in the frozen bottle?

4. The Universal Solvent

Set up three glasses of water. Place a teaspoon of sugar into one glass, a teaspoon of salt into the second glass and a teaspoon of lemon juice in the third glass and stir – what happens?

5. pH of water

Using a piece of litmus paper, test the pH of tap water. What was the result?

Pure water has a neutral [pH](#) of 7, which is neither [acidic](#) nor [basic](#). Distilled water, which has had all of its impurities removed, is sometimes used for calibrating electronic pH metres in laboratories. How did your tap water compare? What might be in tap water that caused it to be either acidic or basic?

6. Heat index of water

Water has a high specific heat index. This means that water can absorb a lot of heat before it begins to get hot. This is why water is valuable to industries and in

your car's radiator as a coolant. The high specific heat index of water also helps regulate the rate at which air changes temperature, which is why the temperature change between seasons is gradual rather than sudden, especially near the oceans.

7. Surface tension

Get a shallow bowl of water and sprinkle talcum powder on the top of the water. Carefully add a few drops of washing up liquid to one side of the bowl. What happens to the talcum powder?

Water has a very high surface tension. In other words, water is sticky and elastic, and tends to clump together in drops rather than spread out in a thin film. You may like to think of it as if the water has a skin. When you placed the detergent in the water, the skin of the water was broken and the talcum powder moved to where the skin was intact.

8. Capillary attraction

Place a capillary (thin glass tube) into a glass of water. What happens?

Surface tension is responsible for [capillary attraction](#), which allows water (and its dissolved substances) to move up through the roots of plants and through the tiny blood vessels in our bodies. The narrower the tube, the higher water will climb.

9. Other properties of water

Brainstorm with a friend to see if you can think of any other unusual properties unique to water. Write them down and share them with your classmates. How many more did you think of? Can you think of a way to test if they are correct?

