Information about Water

Haywards Heath & District Probus Club

Water, water everywhere – without it, none of us would be here

Water is found in all living things, whether at the bottom of the ocean or in the driest desert. Water has made life possible on Earth. Because of this, astrobiologists (the name given for scientists who search for life on other planets) think our best bet for finding life elsewhere is to search for water.

The existence of water is essential for life on Earth. Humans can live about a month without food but only about a week without water. It takes about 12 gallons per day to sustain a human (considering all uses for water, like drinking, sanitation and food production). There is a lot of water on our planet - an estimated 326 million trillion gallons of it. Water regulates the Earth's temperature and the temperature of the human body.

Picture Credit: "Preventing frozen pipes - running water" by State Farm is licensed under CC BY 2.0

Drinking water (also known as *potable water*) is water considered safe for humans to drink or use in food preparation. The amount of drinking water required to maintain good health varies depending on physical activity level, age, health-related issues, and environmental conditions. For those who work in a hot climate, up to 16 litres a day may be required. Typically, tap water meets drinking water quality standards in developed countries, even though only a small proportion is actually consumed or used in food preparation.

The water industry helps deliver water to homes in various cities and countries around the world. Treatments such as purification, sewage management, filtering, distillation and plumbing, make water safe for human consumption. Inorganic minerals generally enter surface water and groundwater via stormwater runoff or through the Earth's crust. Treatment processes also lead to the presence of some minerals. Examples include calcium, zinc, manganese, phosphate, fluoride and sodium compounds. Various trace elements are present in virtually all potable water, some of which play a role in metabolism. For example, sodium, potassium and chloride are common chemicals found in small quantities in most waters, and these elements play a role in body metabolism. While beneficial in low concentrations, other elements such as fluoride can cause dental problems and other issues when present at high levels.

In the next section, you will find some interesting information about water.

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Interesting information about water

Some of these facts will surprise you, but they are all fascinating:


Picture Credit: "Dinosaur roaming in Alberta" by FrankMaurer is licensed under CC BY-NC-SA 2.0

- There is about the same amount of water on Earth now as there was millions of years ago. The water from your tap could contain molecules that dinosaurs drank.
- Water has three different states, liquid, solid and gas.
- Water is made up of two elements, hydrogen and oxygen. Its chemical formula is H2O. Each molecule of water is made up of two hydrogen atoms bonded to a single oxygen atom.
- 30% of freshwater is in the ground.
- 1.7% of the world's water is frozen and therefore unusable.
- 96.5 per cent of Earth's water is in our oceans and rivers and covers 71 per cent of our planet's surface. At any given time, a minuscule percentage (about 0.001 per cent) is floating in the atmosphere above us.
- Just 3.5 per cent of Earth's water is fresh—that is, with few salts in it. Freshwater is found in lakes, rivers, streams, groundwater and glaciers (over 68 per cent of Earth's freshwater is locked up in ice and glaciers, and another 30 per cent is in groundwater).
- Water from the sea or ocean is called, unremarkably, seawater. On average, every kilogram (2.2lb) of seawater contains around 35 grams (1.2 oz) of dissolved salt.
- The saltiest water on Earth is found in Antarctica in a small lake named Don Juan Pond.
- The freezing point of water lowers as the amount of salt dissolved in it increases. With average levels of salt, seawater freezes at -2°C (28.4 °F).
- When solids form, atoms usually get closer together to create something denser. This is why most solids sink in water. But solid water, or ice, is less dense, which is unusual. The water molecules form rings when water freezes. All that space makes ice less dense, which is why it floats.
- The word water usually refers to water in its liquid state. The solid state of water is ice, while the gas state of water is known as steam or water vapour.
- All the water on planet Earth came from comets and asteroids. Comets are mostly water ice. Scientists hypothesise that water came here about four billion years ago in a period called the *Late Heavy Bombardment* (thought to have occurred approximately 4.1 to 3.8 billion years), although no consensus exists.
- 85% of the world population lives in the driest half of the planet.
- It is claimed that 80% of all illness in the developing world is water-related.
- Water is the only substance found naturally on Earth in all three forms: liquid, gas, and solid.
- The human brain is 70% water.
- Water is a big part of the blood that brings nutrients to all our cells. We use it to get rid of wastes. It helps us regulate our body temperature. It acts as a shock absorber for our brain and spinal cord.
- Water can dissolve more substances than any other liquid, including sulphuric acid. It makes a good solvent with many sugar, salts and acids easily dissolving in it. On the other hand oils and fats don't mix well with water.
- A jellyfish and a cucumber (and probably watermelons) are each 95% water.

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- It takes 75 litres of water to make one pint of beer.
- An acre of corn will release 4,000 gallons of water per day in evaporation.
- About 6,800 gallons of water is required to grow a day's food for a family of four.
- Water weighs about 8 lbs. a gallon.
- NASA has discovered water, in the form of ice, on the moon.
- Only 0.007% of Earth's water is available to use for fuelling and feeding the seven billion people who live here.
- Hot water can freeze faster than cold water in some conditions. It's known as the '*mpemba effect*' – see HERE to discover why.
- While most people know that water boils at 100°C (212°F), this is at the normal conditions of sea level. The boiling point of water changes relative to the barometric pressure. For example, water boils at just 68°C (154 °F) on the top of Mount Everest while water deep in the ocean near geothermal vents can remain in liquid form at temperatures much higher than 100°C (212°F).
- Water covers around 70% of the Earth's surface.
- The three largest oceans on Earth are the Pacific Ocean (largest), the Atlantic Ocean (second largest) and the Indian Ocean (third largest).
- Found in the Pacific Ocean, the Mariana Trench is the deepest known point in the world's oceans.
- Ocean tides are caused by the rotation of the Earth and the gravitational pull of the Moon and Sun acting on ocean water.
- The longest river in the world is the Nile River, which is 6,650 kilometres in length (4,132 miles). The second-longest river globally is the Amazon River, 6,400 kilometres (3,976 miles) in length.
- The longest river in the USA is the Missouri River. At around 2,340 miles (3,770 km) long, it is slightly longer than the Mississippi River (2,320 miles). The two combine to form the longest river system in North America.

- The water cycle involves water evaporating (turning into a gas), rising to the sky, cooling and condensing into tiny drops of water or ice crystals that we see as clouds, falling back to Earth as rain, snow or hail before evaporating again and continuing the cycle.
- Water in the form of ice is found at the polar ice caps of the (Red) planet Mars. Some scientists have also suggested the possibility of liquid water on Mars.
- Pure water has no smell and no taste. It also has a pH level of around 7. In chemistry, pH expresses the acidity or alkalinity on a scale where 7 is neutral, lower values are more acid, and higher values are more alkaline.
- Water expands as it cools from 4°C to 0°C (above 4°C, it does the opposite). Water can burst water pipes in freezing conditions as it turns to ice and expands by around nine per cent.
- Most people worldwide have access to clean drinking water, but it is a significant problem in poorer areas of the world. Water pollution and low-quality water can lead to dangerous bacteria, diseases, and viruses like coli and Cryptosporidium.
- Drinking water is needed for humans to avoid dehydration. The amount you need each day depends on the ambient temperature, how much activity you are involved in and other factors.
- An important use for water is in agricultural irrigation - this is when water is added to the soil to assist the growth of crops.
- Water is used frequently by firefighters to extinguish fires. Helicopters sometimes drop large amounts of water on wildfires and bushfires to stop fires from spreading and limit the damage they can cause.

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- Electricity can be created from hydropower, which uses water to drive water turbines connected to generators. There are many hydroelectric power stations around the world.
- Water defies gravity – it forms droplets and likes to stick to itself and other things. Not all liquids do that, and the stickiness helps get water from the roots of plants up to the leaves. Water molecules travel up thin straws called *xylem* in the plant by holding onto each other and the walls of the tube. They are pulled upwards as water evaporates from the leaves at the top. See HERE.
- Water plays a prominent role in cooking as steaming and boiling food are well-known cooking methods.
- Water is also used for fun. Water sports are a popular recreational activity and include activities such as swimming, surfing, water polo, waterskiing, sailing and other boating sports. Frozen water (ice and snow) enables ice skating, ice hockey, downhill & cross-country skiing and snowboarding.

Sources and Further Information

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