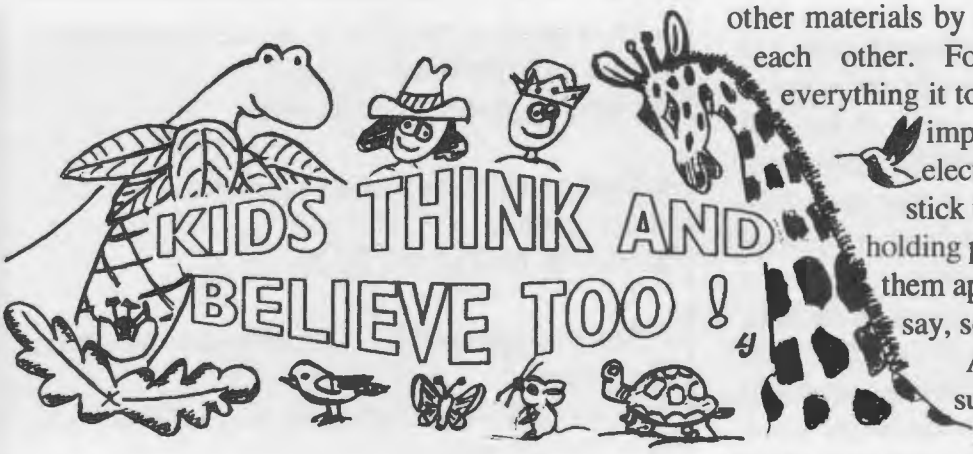

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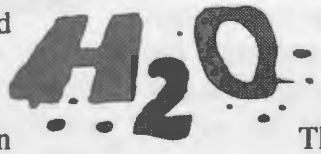
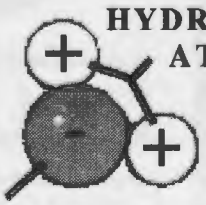
The most simple of things can show God's incredible design - two hydrogen atoms attached to one oxygen atom - the chemical makeup of water. At first, water might seem fairly simple; but as we will see, God designed water to work in some very special ways.



Water is unique (one and only). It occurs naturally in all three states of matter; solid, liquid, and gas. All are essential for life. The solid form is ice, snow, and frost. We can't see water as a gas because gas is invisible. But it is there as water vapor in the air. Water can evaporate (or disappear) with the help of heat. Plants also release water vapor into the air. Even people breathe out water vapor. Liquid water is the most familiar form of water. It is what runs out of the tap. It is found as rain, streams, rivers, ponds, lakes and oceans. It makes up the largest part of the weight of plants, animals and man. Water is everywhere!

Of all the known liquids, water is by far the best solvent. In other words, more substances can be dissolved in water than in anything else. God created water molecules with an interesting placement of atoms. Two hydrogen atoms with a positive (+) electrical charge are attached to an oxygen atom with a negative (-) charge in the shape of a V (with an angle of 104°). Since opposite electrical charges attract (+ to -), this means that one side of the water or the other will stick itself to molecules of other substances, such as minerals, vitamins, oxygen and other gases, depending on their electrical charge. Water dissolves other materials by tearing their molecules away from each other. Fortunately, water can't dissolve everything it touches. If it did, it would be almost impossible to carry! These same electrical charges make water molecules stick to one another too, with very strong holding power. It takes a lot of energy to pull them apart to change the water's state from say, solid to liquid, or liquid to gas.

WATER MOLECULE



As a result, water has a very high surface tension. In other words, water is "sticky" and elastic. It tends to bunch up in drops rather than spread out in a thin film. Surface tension is responsible for capillary action, which allows water (and things it dissolves) to move through the roots of plants and through the tiny blood vessels in our bodies.

Water has a high specific heat index, which means it must lose a lot of energy in order to cool down. It also absorbs a lot of heat before it begins to get hot. That makes it very good for doing things like cooling your car's radiator. The high specific heat index also helps regulate the rate at which air changes temperature. This is why the temperature change between the seasons is slow and gradual rather than fast and sudden, especially near the oceans. Land heats up and cools down much faster than water. The different temperatures of land and water help create wind, which keeps our air fresh. God thought of everything!

Water freezes at 32°F (Fahrenheit) and boils at 212°F. Water's freezing and boiling points are the standard by which temperature is measured: 0° on the Celsius (C) scale is the freezing point of water, and 100° C is it's boiling point.

Water is unusual in the way it freezes. Most liquids freeze from the bottom up: as they are cooled, their densities (how close the molecules are packed together) increase steadily. This means that the warmer layers, being "looser" or less dense, will always rise, and the cooler or "tighter", more dense liquid will sink to the bottom.

Fortunately, as water cools down, the top layer of water contracts or becomes denser ("tighter") and sinks to the bottom. Unlike other liquids, water reaches its maximum density at 39°F, well above its freezing point (32°F). At this temperature, water stops getting denser ("tighter") and actually starts to expand as it gets

colder. The top layer will become cooler, becoming less dense, but will not sink because the water below it is denser ("tighter"). If the air is cold enough, the water at the surface will become ice. This layer of ice will protect the lake from the cold air and thus prevent it from freezing solid (unless the winter is long and cold). By designing water in this way, God made it possible for fish to survive winters under the ice.

Is water necessary? Yes, it is life-giving. Without it, plants, animals, and people would die. We can live quite a long time without food, but without water, we would die in a matter of days. In Bible lands the people knew how very important water was. They knew they could not exist without it. Jesus, wanting them to understand how important he was, said to them, ***"Whosoever drinketh of this water shall thirst again: But whosoever drinketh of the water that I shall give him shall never* thirst*; but the water that I shall give him shall be in him a well of water springing up into everlasting life."*** John 4:13b-14. Water is necessary for our physical life. Jesus is necessary for our spiritual and eternal life. Have you taken a drink from the cup of Jesus?

WATER QUIZ

It would be impossible for me to share everything there is to know about water (and I am sure that we don't know everything!). So let's see what you know. Can you answer the questions below? The answers (at end of page) might surprise you.

1.If we flattened out all the mountains and filled all the valleys so that the Earth's surface was smooth, how deep would the water in the oceans cover the Earth?
A. 20 ft. **B.** 1,000 ft. **C.** 1.5 miles **D.** 8 inches

2.The Earth is covered by how much water?
A. 33% **B.** 80% **C.** 50% **D.** 91%

3.How much of the Earth's surface water is fresh?
A. 25% **B.** 4.7% **C.** 2.8% **D.** 13.5%

4.How much of the Earth's surface fresh water is liquid?
A. 6% **B.** 15% **C.** 28% **D.** 44%

5. How much of the Earth's surface fresh water is locked up in the polar ice caps?
A. 15% **B.** 23% **C.** 72% **D.** 90%

6. How much of the Earth's liquid fresh water is under ground?
A. 98% **B.** 66% **C.** 8% **D.** 3%

7. The average home (2-3 people) uses how much water year?
A. 3,000 gals. **B.** 107,000 gals. **C.** 34,000 gals. **D.** 1,230,000 gals.

8.The average American uses how much water per day at home and work?
A. 27 gals. **B.** 46 gals. **C.** 91 gals. **D.** 170 gals.

ASK EUGENE

Oops! I'm out of room, so I won't be able to share your letters in this issue. It has been a busy wonderful summer, and to tell you the truth, I'm bushed! But what a great summer! Our children's ministry was able to see over 63 children put their faith and trust in the Lord Jesus. The Bible tells us that whenever anyone trusts in Jesus the Angels rejoice. Boy were they having a party this summer! Would you pray that these children might continue to study and be discipled in God's word, so that they might continue to grow in the Lord? Love Ya.....Eugene

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ANSWERS

1.C, 2.B, 3.C, 4.A, 5.D, 6.A, 7.B, 8.D

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