Name_____ Date_____

Weird Water

Water is weird! The properties of water that make it special allow life as we know it to exist on Earth. Water is found on Earth in all of its three states: **solid**, **liquid**, and **gas**. When water is below freezing it is a solid like ice or snowflakes. When water changes from a solid to a liquid that is called **melting**. When water is heated above its boiling point it becomes a gas, like the steam that comes off a cup of hot chocolate. This process is called **evaporation**.

Water behaves differently from most other liquids. Most liquids contract and get smaller as they are cooled down. Water contracts at first but once it is cold enough it expands to form a solid. Solid water (ice) is less dense than liquid water which makes ice float. This allows fish and other animals to live in lakes during the winter. When it gets cold ice forms on the top of the lake and the animals can still live in the liquid water underneath.

Water molecules are made up of two **hydrogen** atoms and one **oxygen** atom. Water molecules are held together by **bonds**. These bonds create **charges** on the water molecule that attract it to other things. Water is attracted to other water which is called **cohesion**. Cohesion is what makes water bead up into a droplet when you drop it onto a surface like wax paper. Water is also attracted to other things. This is called **adhesion**.

Cohesion and adhesion work together to allow water to climb up against gravity. You can see this for yourself by putting a straw into water and watching the water "climb" up the straw. The water molecules are attracted to the straw, so they move closer to it and pull other water molecules along with them. This is part of what allows a plant to take in water through its roots and move it up through the stem to its leaves. Cohesion and adhesion also help blood to move around in your body through very tiny blood vessels.

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Weird Water (Cont'd)

Cohesion, the attraction of water to water, causes something called **surface tension**. You have seen surface tension in action if you have ever seen a water strider on the surface of a pond. The water strider is heavier than water but it can stay on top because of surface tension. The water molecules at the surface are "holding" each other together.

You can try a very simple experiment at home to see surface tension in action. Put some water in a cup or bowl and then very carefully try to float a pin or a paper clip on the surface. It may take a few tries, but it will float on top even though it is heavier than the water. This is because of surface tension. Once you get it floating, add a few drops of liquid dish soap to the water and you will see the object fall. The soap disrupts the cohesion and breaks the surface tension.

Water also has a high **specific heat**. This means that it takes a lot of energy to heat water up. You may have noticed this if you have ever heated water in a metal pot on a stove. The metal pot has a lower specific heat than water and gets hot quicker than the water inside it. This is why water is used in the radiators of cars to help keep cars cool as they run. This also helps to keep temperature changes gradual on land that is next to a large body of water.

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Weird Water Questions

1. True or False. Water has special properties that are important to life on Earth.

2. When water changes from a solid to a liquid that is called _____.

3. Evaporation is when water changes from a _____ to a gas.

4. Ice floats on top of liquid water because it is _____.
   a. more dense
   b. less dense

5. How does the density of solid water allow animals to live in bodies of water during the winter?

6. What are the two different types of atoms found in a water molecule?

7. The fact that water is attracted to other water is called _____.

8. Cohesion and _____ work together to help water move upward from plant roots to leaves.

9. Water striders can stay on the surface of water because of surface _____.

10. It takes a lot of energy to heat water. This is because water has a high
    a. density
    b. mass
    c. specific heat
    d. color

Name_____ Date_____

Weird Water Answers

1. **True** or False. Water has special properties that are important to life on Earth.

2. When water changes from a solid to a liquid that is called **melting**.

3. Evaporation is when water changes from a **liquid** to a gas.

4. Ice floats on top of liquid water because it is _____.
   a. more dense
   b. less dense

5. How does the density of solid water allow animals to live in bodies of water during the winter? **Ice floats on the surface of the water and animals can survive in the liquid water beneath.**

6. What are the two different types of atoms found in a water molecule? **Hydrogen and oxygen**

7. The fact that water is attracted to other water is called **cohesion**.

8. Cohesion and **adhesion** work together to help water move upward from plant roots to leaves.

9. Water striders can stay on the surface of water because of surface **tension**.

10. It takes a lot of energy to heat water. This is because water has a high
    a. density
    b. mass
    c. specific heat
    d. color