

THE UNSINKABLE POTATO & OTHER AMAZING CHARACTERISTICS OF ICE AND WATER

Here's a cool trick that will show why it's easier for an object to float in the ocean than it is in a fresh-water pond.

First, fill a large glass to within a couple inches of the rim with hot tap water. Using a spoon, ease a fresh potato slice into the water. It will come to rest at the bottom of the glass because it has a greater density than water. Next, stir some table salt into the water until the potato slice rises. The salt increases the water's density, making it heavier, volume for volume, than the potato slice. As a result, the potato slice now floats.

Amazing Items to Discuss Concerning Water and Ice

- Discuss the interesting concept of floating. What floats and why? Try it out. Can your students guess what will float and what will sink? Does it make a difference what the liquid is that you're using to float the solid? Think about density and how dense the liquid is to answer this question.
- Ask if anyone has seen David Letterman try floating all kinds of objects on his show in a big pool of water on stage.
- Why does ice float? Usually solids are heavier than liquids. Why is water so special? The reason why ice is lighter than water is that a certain mass of ice occupies more space than the same mass of water. This is related to "hydrogen bonding".

Hydrogen bonding

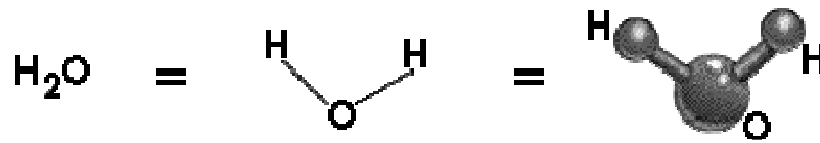
A water molecule is composed of two hydrogen atoms (H) and one oxygen atom (O). The atoms of hydrogen and oxygen are bound by sharing their electrons with one another. This bond is called a "covalent bond". However, since oxygen atoms pull electrons more strongly than hydrogen atoms, the oxygen atom in a water molecule has a slightly negative charge and the hydrogen atoms have a slightly positive charge. So adjacent water molecules are attracted to one another through the slightly negatively charged oxygen atoms and the slightly positively charged hydrogen atoms. This interaction is called "hydrogen bonding". Hydrogen bonding is much weaker than covalent bonding, however, this type of bonding has a large total effect because there are so many hydrogen bonds.

- Make water molecule models using clay and toothpicks. *Form little balls out of the clay using one color for hydrogen atoms and one color for oxygen atoms. Then use the toothpicks to connect the "atoms" together to form a water molecule. (This activity can also be done using gumdrops instead of clay.)* This will help show the qualities of the atoms comprising the water molecule.

What does a water molecule look like? All substances are made up of millions of tiny **atoms**. These atoms form small groups called **molecules**. In water, for



example, each molecule is made up of two hydrogen atoms and one oxygen atom. The formula for a molecule of water is **H₂O**. "H" means hydrogen, "2" means 2 hydrogen atoms, and the "O" means oxygen. Here is a picture of what water looks like.



- Discuss the movie Titanic and the floating iceberg that hit the ship and brought it down.
- What would happen if ice didn't float? How would that affect the polar ice caps?

