Activity 2.1

Opposites Attract

Three-fourths of the earth's surface is covered by water.

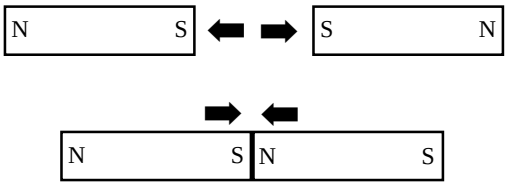
Materials/Equipment

two small bar magnets
scissors
colored yarn
two colors of construction paper
tape or glue

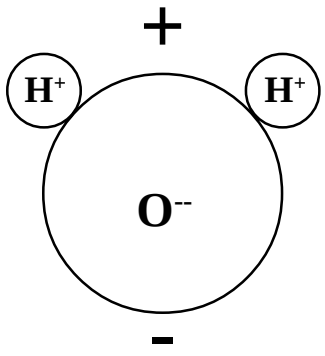
Time Required: 10 to 15 minutes

Procedure

1. Identify the north and south poles of the small bar magnets. Have a participant try to press the two magnets together with the same poles next to each other. Note that they repel each other quite strongly and considerable force is needed to hold them close. Then attempt to press the north end of one magnet to the south end of the other. Have the participants describe what happens and lead them to conclude that opposites attract.



2. Have each participant cut one large circle from colored paper to represent an oxygen molecule and cut two smaller circles from another color of paper to represent hydrogen molecules. Using glue or tape, construct "water molecules" by placing the two "hydrogen"atoms on one end of the "oxygen" atom at an angle of approximately 100 degrees (actually 105 degrees). This results in a silhouette similar to the familiar "Mickey Mouse" head with ears. After participants have made their water molecules, they can attach them together with the "hydrogen" ends associated with the "oxygen" ends of other molecules to form either a chain or a sheet. The cohesiveness of water comes from the weak electronic attractions between the polar molecules.



Extension

When materials dissolve in water, the polar molecules orient themselves to place the appropriately charged ends of water molecules close to the molecules of the solute that is being dissolved. With table salt, for example, the positively charged sodium (Na^+) ion is surrounded by the negatively charged ends (oxygen) of water molecules, while the negatively charged chloride (Cl^-) ion is surrounded by the positively charged ends (hydrogen) of water molecules. This places the solute in a matrix of water molecules, keeping it in solution. When nonpolar or neutral molecules are encountered (like oils or other hydrocarbons), they do not mix with the water because of their lack of charge and relative lack of electromagnetic activity.