Chemical Reactions

In a chemical reaction, there is a change in the way atoms and molecules combine. Signs of a chemical reaction include: color or temperature change, the production of light or electricity, or a new material.

Concepts
- Exothermic reaction - a chemical reaction that gives off heat and that may feel hot.
- Endothermic reaction - a chemical reaction that absorbs heat and that may feel cold.
- Equilibrium - a state reached when no further changes occur.
- Indicator - a chemical that changes color with changes in pH.
- pH - a scale that measures relative acidity and basicity.

Take-Home Activities
In the word search below, find these words to know:

- Acid
- Atom
- Base
- Bond
- Chemical bond
- Concentration
- Indicator
- Ion
- Mixture
- Matter
- Reaction
- Solution
- Temperature
- pH

Find these words to know:

- Exothermic reaction
- Equilibrium
- Concentration
- Indicator
- Mixture
- Bond
- Chemical bond
- Temperature
- Solution
- pH

ChemLab

© 2007 OMSI
Cloudy Globs
Can you make a white gel from two clear liquids?

Materials:
two small jars or glasses (about 4-oz.)
warm water
ammonia (in the spice aisle at grocery stores)
1/2 teaspoon measure
1 teaspoon measure

To do and notice:
1. Fill one jar half full with warm water.
2. Add ½ teaspoon alum. Stir or shake to mix the water and alum completely.
3. To the other jar, add 2 teaspoons ammonia.
   • What do the solutions look like in each jar?
   • Are the solutions clear or cloudy?
4. Pour the ammonia into the jar with water and alum.
   • What happens?
5. Allow the jar with the new mixture to sit for a while.
   • What do you see at the bottom of the jar?

A closer look:
Alum dissolves in water to make a clear solution. Ammonia (NH₃) reacts with water to make a clear solution of ammonium hydroxide (NH₄OH), or household ammonia. When you mix these two clear solutions together, they react to form a new compound.

Ammonia

Water and alum

A closer look:
When you mix vinegar and baking soda, their molecules interact and make new substances.

Baking soda, also called sodium bicarbonate, has the formula NaHCO₃. Vinegar, also called acetic acid, has the formula CH₃COOH. When they recombine they make sodium acetate (NaCH₃COO), water (H₂O), and carbon dioxide (CO₂).

Gas Production
Blow up a balloon!

Materials:
baking soda  tablespoon
small cup  vinegar
funnel
one plastic bottle (1 liter or 20 ounces)
one large balloon (8” or 9” size)

To do and notice:
1. Measure 2 tablespoons of baking soda. Pour the baking soda into the plastic bottle.
   • What does the baking soda look like?
2. Rinse and dry the tablespoon. Measure 3 tablespoons vinegar. Pour the vinegar into the small cup.
   • What does the vinegar look like?
3. Using the funnel, pour the vinegar into the balloon.
4. Attach the lip of the balloon onto the mouth of the bottle. Be careful not to spill the vinegar.
5. After the balloon is attached, lift the balloon to dump the vinegar into the bottle.
   • What do you hear?
   • What do you see?
   • What is happening to the balloon?