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Observing Chemical Changes

Target:

Students will learn to observe chemical changes and make both qualitative and quantitative observations.

Background:

In Chemistry, you should be watching for changes when you do lab experiments. Some changes will be obvious, such as a dramatic color change. Some will be almost undetectable, as in the slow reaction of oxygen with iron to form rust. Sometimes there will be no change at all, but this observation of "no change" is as important as observations of change.

It is important that the observation you make in the lab be as specific and informative as possible. For example, suppose you have observed a gas being given off as a result of a chemical reaction. You should write your observation at "gas formed" rather than "it fizzed". Whenever possible, try to quantify (measure) the changes you observe. If you think the mass has decreased, use the available equipment to find out how much the mass decreased. If you observe, "material became hotter," use the thermometer to determine how much the temperature changed.

All matter is solid, liquid, or gas. If two liquids are mixed and a gas is produced, a chemical reaction has occurred. Likewise, if two liquids are mixed and a solid is produced, a chemical reaction occurred. If a color change is observed or a change in temperature occurs without adding or removing heat, these are chemical changes as well. However, if a solid simply changes into a liquid as when ice melts, this is a change in the phase of matter. It is a physical change, not a chemical reaction.

Materials:

spot plate	calcium chloride	0.05M sodium hydroxide
small test tubes	soluble starch	solution
stirring rod	1M strontium nitrate	iodine solution
10 mL graduated cylinder	solution	phenolphthalein solution
safety goggles	1M sodium sulfate	0.1M sodium hydrogen sulfite
lab apron	solution	solution
ammonium chloride	sodium bicarbonate	0.1M potassium iodate solution
calcium carbonate	1M acetic acid solution	

Procedure

1. Put on your safety goggles and lab apron.
2. In this experiment, you will be asked to make observations. While you are making observations, think about how some of them might be quantified. Be careful to note the phase of the matter you are asked to use.
3. Create a data table that allows you to record the necessary data, both qualitative and quantitative.
4. Using the small test tubes, mix the following chemicals in the amounts listed. Stir each mixture with a stirring rod, rinsing the stirring rod each time.
 - a. a "scoop" ammonium chloride + 5 mL water
 - b. a "scoop" calcium chloride + 5 mL of water

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- c. a "scoop" sodium hydrogen carbonate + 5 mL acetic acid
- d. a "scoop" calcium carbonate + 5 mL acetic acid
- 5. Using a spot plate, mix the following chemicals in the amounts listed. Stir each mixture and rinse your stirring rod each time.
 - a. 5 drops of sodium hydroxide solution + 1 drop phenolphthalein solution
 - b. 5 drops acetic acid solution + 1 drop phenolphthalein solution
 - c. a pea-sized amount of starch + 10 drops of water + 1 drop of iodine solution.
 - d. 5 drops of strontium nitrate + 5 drops potassium sulfate solution
- 6. Record all you observations in a data table (you make a table)
- 7. If your results are in doubt, repeat the parts of the experiment that you would like to double check.
- 8. Before leaving the lab, clean up ALL materials and wash your hands thoroughly.

Post-Lab Report

See Mr. Noble for details