Experiment 1 – Organic Laboratory Safety

In your introductory chemistry class, you learned about safety precautions for the general/inorganic chemistry laboratory. The organic chemistry lab involves some new hazards that weren't an issue in the general chemistry lab. Many organic compounds are very flammable. Because we do not want to inadvertently ignite chemicals and cause a fire or explosion, we will not be using Bunsen burners in the organic lab. When heating is required, we will use a hot plate with either a water bath or a sand bath.

Many organic compounds are toxic or carcinogenic, and so they must be used with adequate ventilation. You must work in a fume hood whenever you use chemicals with harmful vapors, so that you avoid breathing the vapors.

Proper waste disposal is also very important. Most organic chemicals are incompatible with inorganic chemicals, and certain mixtures can cause violent reactions. Therefore, it is very important that all organic waste be placed in properly labeled **organic waste** jars (in our labs, these have a **pink label**) and NOT in the inorganic waste jars. Never put organic waste down the sink.

Following is a list of laboratory safety guidelines. It is your responsibility to familiarize yourself with them and to follow these guidelines at all times in the laboratory.

Laboratory Safety Guidelines

In the organic chemistry laboratory:

1. **Do not use Bunsen burners or open flames.** Many organic compounds are flammable.
2. **Work with any volatile organic compounds in the fume hoods.** These fumes are toxic and you must limit your exposure to them.
3. **Put all waste containing organic chemicals in the organic waste jars.** Organic waste is incompatible with inorganic waste.

In all chemistry laboratories:

1. **Always wear safety goggles. Never wear contact lenses.** You must wear your goggles even when you are not working with chemicals, because other students around you may still be using chemicals, and they may have an accident. You must always wear your goggles on your eyes, and not on the top of your head or around your neck. Your laboratory instructor is required by law to make sure that you wear your goggles during lab.
2. **Do not eat, drink, or smoke in the lab.** Invisible chemical residues might contaminate your food or drink and you might accidentally ingest the chemicals.
3. **Do not wear open-toe shoes in the lab.**
4. **No unsupervised experiments are allowed.**
5. **Do not return excess chemicals to the original container.** You might contaminate the entire container inadvertently. Instead, offer the excess to another student.
6. **Avoid using cracked glassware.** It could break when heated.
7. **Never leave a hot plate or Bunsen burner unattended.**
8. **Dispose of all broken glass in the broken glass container.**
9. **Dispose of all chemicals in the appropriate waste container.**
10. **Always replace the lids and caps on reagent bottles.**
11. **Be aware of the location of all the safety equipment in the lab.** This includes the safety shower, the eyewash fountain, and the fire extinguisher.

12. **Never pipet by mouth.** Believe it or not, this was common practice many years ago. Use a pipet bulb instead.
13. **Wash your hands and your lab bench after each experiment.** You must wash your hands so as not to leave behind invisible chemical residues that could be ingested. Washing your lab bench insures that you don't leave any chemical residues behind for the next student.
14. **Report any accident, no matter how minor it might seem.**
15. **Report any accidental chemical spills to the instructor.**
16. **Avoid wearing dangling jewelry in the lab and tie back long hair.**
17. **Ask questions if you are ever unsure about a procedure.**
18. **Keep your personal chemical exposure to a minimum.** Keep your head outside of the fume hood. Wear gloves for skin protection if necessary.

Chemical Safety in the Home

Many household chemicals are very toxic and must be used and disposed of with caution. Always read labels of household products. Many of them are not appropriate for normal disposal methods because they are too toxic and harmful to the environment. Buy only the amount that you will use, and give any excess to a neighbor or friend. Proper storage is also important – store chemicals away from children and away from incompatible chemicals. Any flammable materials should be kept away from flames, sparks, and matches.

Questions

1. Why should anyone who enters the lab, even those who are not performing the experiment, wear safety goggles?
2. Why are sandals and open-toed shoes not recommended in the chemistry lab?
3. What precautions must you take when working with flammable chemicals?
4. Where must you dispose of waste organic chemicals after the experiment?
5. Why must you work with volatile organic compounds under the fume hood?
6. What should you do if you spill some acid on your hand?
7. What should you do if you accidentally get chemicals in your eyes?
8. What should you do if you spill some acid or other harmful chemical on your body?
9. Why shouldn't you leave a hot plate or Bunsen burner unattended?
10. What should you do if your neighbor's experiment catches on fire?
11. What should you do if a small beaker containing an organic solvent breaks?
12. A student dispensed too much of a chemical for a test she needed to perform. To keep from wasting the excess, she should return the excess chemical to the bottle. True or false? Explain your reasoning.
13. Draw a map of the laboratory, showing the locations of the following items in the lab room:
    a. the safety shower
    b. the eye wash fountain
    c. the fume hoods
    d. the deionized water faucet or jug
    e. the fire extinguisher
    f. the first aid kit
    g. the fire alarm
    h. the ring stands and clamps
    i. your desk
    j. the broken glass waste container