Lab Safety

The lab instructor will provide a statement to be signed by the student confirming that the following rules and regulations have been read by the student and summarized by the lab instructor. It also indicates that the student will comply with these rules and regulations and any later additions to them. The student is advised to consult this information frequently and to inquire about points that are not clear.

In any laboratory, safety is of paramount importance. The experiments you will perform are designed to minimize hazards, but dangerous materials are involved and accidents can happen. The safety rules given below are meant to prevent accidents and to minimize injuries. Failure to comply with the rules will result in penalties that may involve being ejected from the lab and given an unexcused absence and a grade of zero for the experiment(s).

EYE PROTECTION

In labs, there is the potential for spills and splashes of corrosive chemicals and explosions involving broken glass. Getting a chemical in your eyes can be agonizing, even if it would cause no problem anywhere else on your body. (Think about soapy water!) Of course, your eyes are more susceptible to major injury than other parts of your body. For these reasons, eye protection is crucial in the laboratory.

You will be issued a pair of safety glasses or goggles during check-in. **You must wear safety glasses at all times while in the laboratory.** If you wear glasses, safety glasses must be worn over them. If you have prescription safety glasses with side shields, or safety glasses from a job or other activity, you may wear them instead of the university-issued glasses. This may require approval by the lab coordinator.

Wearing contact lenses in lab is strongly discouraged. If you wear them, you must wear safety glasses as well. You must also sign a waiver stating that you understand the dangers involved and will not hold the university liable if they result in an injury.

Refusal to wear eye protection will result in penalties. These can range from point deductions to dismissal from the laboratory, depending on the severity or frequency of the offense.

CLOTHING AND PERSONAL ITEMS

Students are urged to dress with potential lab hazards in mind. Clothing should protect as much of the body as possible. Clothing may have to be immediately removed if grossly contaminated with chemicals or ignited. The following rules apply:

1 Shirt must cover shoulders, frontal area, and extend approximately 6” below the waist

2 Pants must extend to ankles (no tights, leggings or capri pants)

3 Torso must be covered when bending (no bare midriffs)

4 Shoes must cover toes and heels (no flip flops)

5 Long hair must be tied back

6 Loose clothing must be restrained

7 All radios and headsets are forbidden in the lab.

During warm weather, this policy becomes troublesome, but will be enforced. If you arrive for lab improperly dressed, you will be given 10 minutes to obtain proper clothing and return. If you fail to do so, you will **not** be admitted to the laboratory. You will be considered absent without an excuse, and will receive a zero for the day's experiment(s).

Do not bring excess personal items into the laboratory where they may be subject to damage or destruction. The chemistry department is not responsible for such items and cannot replace any damaged or destroyed personal items, including clothing.

HANDLING CHEMICALS

The easiest routes for possibly dangerous chemicals and vapors to enter the body are via inhalation or ingestion. Avoid inhalation of fumes of any kind. No eating or drinking in the laboratory. Never bring food into the lab and never taste any chemicals in the lab. Also, do not place your mouth on any piece of equipment in the laboratory.

Treat all chemicals in the lab as toxic substances. Keep them off your skin and clothes. Many chemicals are thought to pose special risks to unborn children, especially during the first few months of pregnancy. To minimize this risk, consult your instructor if you are pregnant. For additional information on the properties of laboratory chemicals, consult the Material Safety Data Sheet (MSDS) on that chemical or another resource.

MATERIALS SAFETY DATA SHEETS (MSDS)

Full safety data on all chemicals used in the laboratory are included in their Material Safety Data Sheet (MSDS). This includes toxicology, detailed first aid and proper disposal and handling instructions. MSDS sheets are available on some chemical distributor web pages or by calling any chemical distributor or manufacturer of the chemical in question.

CHEMICAL HAZARDS LABELS

To provide quick visual information about the hazards found in certain areas, the Health-Fire-Reactivity square was developed. The square, or diamond, consists of four areas that provide information about the specific hazards of substances.

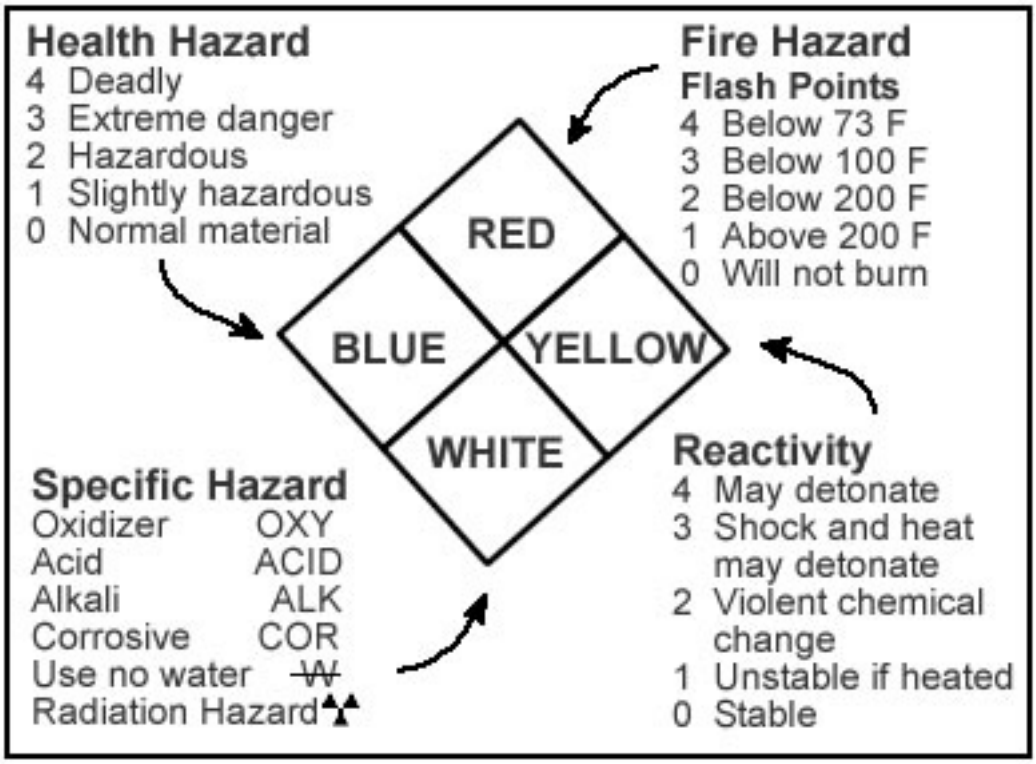

Figure 1

The four diamond colored label appears on many chemicals and solutions. Three of the four squares contain National Fire Protection Association (NFPA) codes identifying the relative risks. The codes range from 0 (lowest risk) to 4 (greatest risk). Please see the inset for more details on the NFPA square. Familiarize yourself with the square and be aware of the hazard information it provides.

If you look around as you visit various retail shops (hardware stores, automotive repair shops, swimming pool dealers) you will see these squares. You will also see them posted at various sites in the chemistry laboratory.

CHEMICAL LABELING

To prevent accidents in mixing of chemicals, you should always label your glassware according to its contents. Labels are provided in the lab for this purpose.

On the label, include:

- the name of the chemical or chemicals
- the concentration (if known)
- the solvent (what it is dissolved in)
- the date
- your name or initials

By properly labeling your glassware, you will reduce the chance that you will mix the wrong chemicals. Not only will this keep you safe, it may also save you time when you do not have to start a lab over again!

SOME GENERAL COMMENTS ABOUT LABORATORY HAZARDS

Broken glass:

Much of our equipment is made of glass, and glass does break. Broken glass should be swept up immediately. There are *glass waste boxes* in the lab near the door. Broken glass *should not* go into the regular trash. If you cut yourself on broken glass, notify your lab instructor immediately. First aid equipment is available in the stockroom.

Splash/spill:

Liquids and solutions present a hazard from spillage. This is probably the most common cause of lab accidents. It is also the major reason for our laboratory attire policy and our eye protection policy. All chemicals you handle should be treated as potential hazards. Acids, bases and organic solvents should be treated with extra respect. Memorizing the location of safety showers, eyewashes and sinks before you need them is in your best interest.

Inhalation:

Volatile organic solvents and concentrated aqueous acids can be irritating to your skin and mucous membranes, as well as having long term health effects. The hood system in the laboratory is designed to help remove harmful vapors from the lab air. Your lab instructor will tell you when it is appropriate to handle chemicals under the hoods.

Fire:

You will work with a few flammable materials. These should obviously be kept away from flames. They should also be kept away from hot surfaces like hotplates. You should make a mental note of where the fire extinguishers are when handling flammable materials

SOME GENERAL COMMENTS ABOUT CHEMICAL WASTE

Water supply:

The water draining from the building is treated as normal effluent by the city. We do not put any organic solvents or heavy metal ions into the sewage system. Normal non-toxic acids and bases are permitted in the water supply, when flushed down the drain with plenty of water.

Waste disposal instructions in the lab manual:

There are *waste disposal instructions* for each experiment in the lab manual. Some waste is collected in containers; some is put down the drain when permissible. It is important to follow these instructions.

Waste disposal:

All chemical waste producers, including small ones like the general chemistry laboratories, need

to constantly think about handling and treating chemical waste. Our experiments try to minimize the amounts of waste generated. Most waste we generate is taken by the university health and safety operation for incineration or disposal in a landfill.

EMERGENCY PROCEDURES

Alert the instructor immediately of ANY fire or accident!

Fire:

In the event that your clothing catches on fire, DO NOT RUN! STOP, DROP and ROLL to smother the fire.

Fire Alarm:

In the case of a fire alarm, turn off Bunsen burners, water and any hot plates, etc. Collect valuables such as purses and calculators and exit the building by way of the stairs. Evacuation routes are posted in each of the laboratories. Be familiar with your escape route before you need it. **In the event of a fire alarm, all students are required to meet with their instructor in a designated location.** Do not return to the building until a safety officer gives you clearance.

Injury:

Alert your instructor to any injuries that occur in the lab.

Chemical Spills:

If a small amount of chemical gets on your skin, wash the area with soap and plenty of water. If a large amount of corrosive chemical is spilled on your body, immediately get to the safety shower and pull the handle. If you should get a chemical in your eye, immediately go to the closest eyewash and flush the eye with water. If a small spill occurs on the bench top, unless it is a very corrosive substance, clean it up with a paper towel. For a larger spill or a corrosive substance spill, please alert your instructor. There are special spill clean up kits for these instances.