Safety in Biology Laboratory Courses at the University of Texas of the Permian Basin

To the student: You are required to read, understand, and implement the safety precautions indicated in your laboratory manual or laboratory handouts. In addition to those summarized below. Your signature on the in class portion distributed by your instructor indicates your absolute willingness to abide by these precautions while you are in the laboratory.

1. **Work in the laboratory only as authorized by your instructor. Do not perform unauthorized experiments.**
2. **You are required to wear safety glasses as directed during some laboratory sessions. If required, safety glasses, including those designed to fit over prescription eyewear, will be provided to you. Use of ordinary eye glasses as a substitute for safety glasses or goggles will NOT be allowed at any time for any reason.**
3. **Learn emergency procedures and know the locations of the nearest exits, eye wash and safety shower.**
4. **If you are injured or if any type of accident or fire occurs, IMMEDIATELY call your instructor or other trained person for assistance.**
5. **Carefully read all instructions and thoroughly plan your work.**
6. **Wear appropriate clothing and shoes, no sandals in the lab. Tie back long hair or confine in some manner that keeps it behind your head.**
7. **Carefully read all labels on chemical bottles and familiarize yourself with the hazards using the MSDS. Use premixed lab reagents as directed in the instructions for specific laboratory exercises.**
8. **Do not eat or drink in the lab.**
9. **Never taste chemicals. Smell chemicals cautiously by wafting the vapors towards you.**
10. **When mixing or heating chemicals in a test tube, point the test tube away from people.**
11. **Do not use Bunsen burners or other sources of spark or flame in the vicinity of flammable liquids. Note that most organic solvents are flammable.**
12. **While mixing acid and water, always add the acid to the water, not vice-versa**
13. **Fill a pipet by using a pipet bulb or mechanical pipettor only. NEVER pipet by mouth**
14. **If a spill occurs during lab, refer it to your instructor or other trained person immediately.**
15. **Dispose of chemicals as directed by your instructor and in a manner consistent with federal, state and local hazardous waste disposal regulations. Receptacles will be provided as needed for their collection.**

16. **Dispose of broken glassware and metallic sharps in appropriate containers. Do NOT place in the regular trash for ANY reason.**
17. **Dispose of microbiological waste in an appropriate biohazard container.**
18. **Clean your work area thoroughly before leaving the lab**
19. **Respect at all times university lab furniture and equipment. Under no circumstances are you to improperly use equipment, purposely damage or vandalize any university property. Failure to respect university property can result in disciplinary action in accordance with *Falcon Guide, Student Conduct and Discipline, sections 1.37 and 1.310.***

A. **I have read carefully and understand all of the safety rules contained on this sheet.**
B. **I also agree to read all rules for specific exercises contained in the laboratory manual or laboratory handouts required for this course.**
C. **I recognize that it is my responsibility to obey them faithfully.**
D. **I realize that all chemicals are potentially dangerous; therefore, I will exercise care in handling them.**
E. **If I am unsure of the potential hazards of any chemical, I will discuss this with my instructor prior to using the chemical in question.**
F. **If I have a medical condition such as, but not limited to hypo- or hyperglycemia, diabetes, epilepsy, pregnancy, heart ailments, or any other medical condition which may cause sudden loss of consciousness, I certify that I am under a doctor's care and that my doctor has given me explicit permission to participate in this laboratory course.**
G. **I will inform my instructor of my condition at the beginning of the semester, or as soon as I am aware of the existence of the medical condition.**
H. **I FURTHER UNDERSTAND THAT I AM PERMIITED TO WORK IN THE LABORATORY ONLY WHEN IT IS UNDER THE SUPERVISTION OF A LABORTORY INSTRUCTOR, UNLESS SPECIFICALLY INFORMED OTHERWISE.**

Material Safety Data Sheets Explained

The following information is normally found in most MSDS.

1. Product Name and Identification

a. **Name of the chemical as it appears on the label.**
b. **Manufacture's name and address.**
c. **Emergency telephone numbers: can be used to obtain further information about a chemical in the event of an emergency**
d. **Chemical name or synonyms.**
e. **C.A.S. #: refers to the Chemical Abstract Service registry number which identifies the chemical.**
f. **Date of Preparation: the most current date that the MSDS was prepared.**

2. Hazardous Ingredients/Identity Information

a. **Hazardous ingredients: substances which, in sufficient concentration, can produce physical or acute or chronic health hazards to persons exposed to the product. Physical hazards include fire, explosion, corrosion, and projectiles. Health hazards include any health effect, even including irritation or development of allergies.**
b. **TLV: refers to Threshold Limit Value. A TLV is the highest airborne concentration of ta substance to which nearly all adults can be repeatedly exposed, day after day, without experiencing adverse effects. These are usually based on an eight hour time weighted average.**
c. **PEL: refers to the Permissible Exposure Limit: The PEL is an exposure limit established by OSHA.**
d. **STEL: refers to the Short Term Exposure Limit. The STEL is a 15 minute time weighted average exposure which should not be exceeded at any time during a workday. A STEL exposure should not occur more than four times per day and there should be at least 60 minutes between exposures.**
e. **LD50 (lethal dose 50): lethal single does (usually oral) in mg/kg (milligrams of chemical per kilogram of animal body weight) of a chemical that results in the death of 50 % of a test animal population.**
f. **LC50 (lethal concentration 50): concentration dose expressed in ppm for gases or micrograms of material per liter of air for dusts or mists that results in the death of 50%of a test animal population administered in on exposure.**

3. Physical/Chemical Characteristics

Boiling point, vapor pressure, vapor density, specific gravity, melting point, appearance, and order; all provide useful information about the chemical. Boiling point and vapor pressure provide a good indication of the volatility of a

material. Vapor density indicates whether vapors will sink, rise or disperse throughout the area. The further the values are from one (the value assigned to atmospheric air), the faster the vapors will sink or rise.

4. Fire and Explosion Hazard Data

a. **Flashpoint: refers to the lowest temperature at which liquid give off enough vapor to form an ignitable mixture with air.**
b. **Flammable or Explosive Limits: the range of concentrations over which a flammable vapor mixed with air will flash or explode if an ignition source is present.**
c. **Extinguishing Media: the fire, fighting substance that is suitable for sue on the substance which is burning.**
d. **Unusual Fire and Explosive Hazards: hazards that might occur as the result of overheating or burning of the specific material.**

5. Reactivity Data

a. **Stability: indicates whether the material is stable or unstable under normal conditions of storage, handling and use.**
b. **Incompatibility: lists any materials that would, upon contact with the chemical cause the release of large amounts of energy, flammable vapor and gas, or toxic vapor or gas.**
c. **Hazardous Decomposition Products: any materials that may be produced in dangerous amounts if the specific material is exposed to burning, oxidation, or heating, or allowed to react with other chemicals.**
d. **Hazardous Polymerization: a reaction with an extremely high or uncontrolled release of energy, caused by the material reacting with itself.**

6. Health Hazard Data

a. **Routes of Entry:**

Inhalation- breathing in of a gas, vapor, fume, mist or dust.

Skin absorption- a possible significant contribution to overall exposure by way of absorption through the skin, mucous membranes, and eyes by direct or airborne contact.

Ingestion – the taking up of a substance through the mouth.

Injection- having a material penetrate the skin through a cut or by mechanical means.

b. **Health Hazards (acute and chronic):**

Acute- and adverse effect with symptoms developing rapidly.

Chronic- an adverse effect that can be the same as an acute effect, except the symptoms develop slowly over a long period of time or with recurrent exposures.

c. **Carcinogen: a substance that is determined to be cancer producing or potentially cancer producing.**
d. **Signs and Symptoms of Overexposure:**
   The most commons symptoms or sensations a person could expect to experience from overexposure to a specific material. It is important to remember that only some symptoms will occur with exposures in most people.
e. **Emergency and First Aid Procedures**
   Instructions for treatment of a victim of acute inhalation, ingestions and skin or eye contact with specific hazardous substance. The victim should be examined by a physician as soon as possible.

7. Precautions for Safe Handling and Use

a. **Spill Clean-up: includes methods to be used to control and clean up spills. Also includes precautions such as to avoid breathing the vapors avoiding contact with liquids and solids, removing sources of ignition, and other important considerations. May also include special equipment used for the clean-up.**
b. **Waste Disposal Methods: acceptable and prohibited methods for disposal as well as dangers to the environment.**
   Note: These are methods recommended by the chemical manufacturer and are not necessarily in compliance with federal, state, or local regulations.
c. **Other Precautions: any other precautionary measures not mentioned elsewhere in the MSDS**

8. Control Measures

a. **Respiratory Protection: whenever respiratory protection is needed, the type required and special conditions or limitations should be listed.**
b. **Ventilation: if required, the type will be listed as well as applicable conditions of use and limitations.**
c. **Protective Gloves: when gloves are necessary to handle the specific material, the construction, design, and material requirements should be listed.**
d. **Eye Protection: when special eye protection is required, the type will be listed along with any conditions of use and limitations.**
e. **Other Protective Equipment or Clothing: lists items, such as aprons, not discussed elsewhere in the MSDS.**

Where to Find MSDS

MSDS may be found on the Internet at the following sites:

http://www.sigmaaldrich.com

http://www.fishersci.com

http://www.alfa.com

http://www.carolina.com