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| <b>Number:</b>            | OH&S 18.02.1 |
| <b>Revision Date:</b>     | 2014.03.10   |
| <b>Biology Lab Safety</b> |              |

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## 1. PURPOSE

- 1.1. To provide guidelines to students and instructors of the basics of laboratory safety and point out the most common types of safety hazards in a biology laboratory at Thompson Rivers University (TRU).

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**This document is NOT a complete listing of the safety hazards in a chemistry laboratory, or any laboratory, but rather it plays the role of alerting the student to the possible safety hazards in the laboratory.**




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## 2. SCOPE

- 2.1. This procedure applies to students and employees at TRU working in the Biology department.

## 3. PRECAUTIONS

### **POTENTIAL HEALTH & SAFETY HAZARDS**

| HAZARD                                  |                                                                                     | TO PROTECT YOURSELF                                                          |
|-----------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>ELECTRICAL HAZARD</b>                |  | Do not attempt to service electrical equipment.<br>Consult Facilities        |
| <b>EXPOSURE</b> to zoonotics, allergens |  | Wear the recommended PPE, even for short duration tasks                      |
| <b>EXPOSURE</b> to hazardous chemicals  |  | Wear PPE and read the MSDS before use.<br><i>MSDSs are available on-line</i> |

## 4. ASSOCIATED DOCUMENTATION

| <u>Doc. Number</u> | <u>Doc. Title</u>               |
|--------------------|---------------------------------|
| OH&S 8.04.1        | Incident Investigation Form     |
| OH&S 18.03.1       | Biology Student Competency Form |
|                    |                                 |
|                    |                                 |

## 5. PROCEDURES AND RESPONSIBILITIES

### INSTRUCTORS

- 5.1. Have charge of a laboratory and authority over students working in the lab.
- 5.2. The Instructor of a laboratory has overall responsibility for safety in the laboratory.
- 5.3. It is the Instructor's responsibility to ensure that students and new employees are aware of the safety rules and follow them and that the following training has been provided:
  - 5.3.1. an appropriate safety orientation when individuals are first working in the laboratory,
  - 5.3.2. generic and specific WHMIS training as needed for chemicals encountered in biology,
  - 5.3.3. Radiation Safety Training,
  - 5.3.4. training on special or unusual hazards in the lab, and
  - 5.3.5. training in the use of laboratory specific emergency equipment and emergency response.
- 5.4. Records of training must be kept on file with biology and a copy sent to OHS.
- 5.5. Additionally Instructors will complete incident investigation reports for every incident or injury that occurs in his/her lab. After the report is complete a copy will be sent to the OHS Department. Incidents to be investigated include, but not limited to:
  - 5.5.1. spills,
  - 5.5.2. fires,
  - 5.5.3. incidents requiring first aid or medical attention, and
  - 5.5.4. near misses.

### STUDENTS

- 5.6. When in the laboratory students are responsible to:
  - 5.6.1. follow all applicable safety rules and practices,
  - 5.6.2. use and wear the required PPE,
  - 5.6.3. report all incidents,
  - 5.6.4. report all unsafe conditions, and

5.6.5. complete recommended occupational health screening programs.

### **GENERAL LABORATORY HEALTH AND SAFETY REQUIREMENTS**

- 5.7. No eating or drinking in the laboratory. Consume food and drink only in properly designated areas.
- 5.8. Applying cosmetics and handling contact lenses is not allowed in laboratories.
- 5.9. Use the appropriate personal protective equipment (PPE) at all times. Refer to the PPE procedure for more information.
- 5.10. Use laboratory equipment for its designated purpose.
- 5.11. Confine long hair and loose clothing.
- 5.12. Use a proper pipetting device – **absolutely no pipetting by mouth.**
- 5.13. Avoid exposure to gases, vapors, aerosols and particulates by using a properly functioning laboratory fume hood.
- 5.14. Wash hands upon completion of laboratory work and removal of protective equipment including gloves and laboratory coats. A vigorous hand washing with mild soap for 20 seconds is appropriate.
- 5.15. Fix unsafe conditions (employees) or report to the lecturer conducting the laboratory (students).
- 5.16. Know the location and correct use of all available safety equipment.
- 5.17. Determine potential hazards and appropriate safety precautions before beginning new operations and confirm that existing safety equipment is sufficient for this new procedure.
- 5.18. Avoid disturbing or distracting other workers while they are performing laboratory tasks.
- 5.19. Ensure visitors to the laboratory are equipped with appropriate safety equipment.
- 5.20. All hazardous chemicals must be correctly and labeled correctly according to Workplace Hazardous Materials Information Systems (WHMIS) requirements.
- 5.21. Drugs must be stored and dispensed according to the requirements set by the Veterinary Drugs Directorate of Health Canada.
- 5.22. The Material Safety Data Sheet (MSDS) will be consulted before using an unfamiliar chemical.
- 5.23. Proper waste disposal procedures will be followed.

- 5.24. Refer to the on-line Work Alone procedure on the action to be taken if working alone in the building.
- 5.25. Unattended laboratory work should be kept to a minimum. It must be visited periodically with a sign posted adjacent to the equipment outlining the procedure being done alone with the name and phone number of a contact person. The sign will indicate the date and time the work was started, when it is expected to be completed and when it was last checked.
- 5.26. When using needles, glass pipettes, glass slides and cover slips, scalpels and appropriate precautions should be taken to avoid percutaneous injuries. These items should be disposed of immediately after use by placing them in an appropriate puncture-resistant container. Bending, recapping or clipping of needles is prohibited. If recapping is absolutely necessary, a mechanical device or the one handed scoop method must be used.

## **EQUIPMENT**

### **AUTOCLAVES**

- 5.27. To be effective the steam must penetrate the wrapping. The length of time required for sterilization of biological material is determined by the quantity of the load, the volume of liquid in the load and the density of the material.
- 5.28. Read the operating manual carefully.
- 5.29. Post the operation procedures near the autoclave.
- 5.30. After the pressure has been released, open the door only slightly to allow steam to escape before unloading.
- 5.31. Wear insulated gloves when unloading the material.
- 5.32. Monitor all autoclaves routinely for efficacy and maintain records.

### **DRYING OVENS**

- 5.33. Volatile materials should not be dried in a conventional laboratory oven unless the oven has continuous ventilation of the atmosphere inside the oven.
- 5.34. "Explosion proof" drying ovens with rear blow-out panels should be used for volatile materials.
- 5.35. Bimetallic strip thermometers should be used for monitoring oven temperatures. Mercury thermometers should not be mounted through holes in the tops of ovens.

## **ELECTROPHORESIS**

- 5.36. Check continuity of the ground on a regular basis and document.
- 5.37. Post warning signs regarding voltage.

## **MICROSCOPES**

- 5.38. Wipe the stage, eyepieces and focus adjustment controls with an appropriate disinfectant routinely and in the event of a spills or contaminations.
- 5.39. Inspect cords, plugs, etc, regularly.
- 5.40. To change a fluorescent high pressure mercury bulb, e.g. immunofluorescence microscope, wear a face shield and gloves and follow directions carefully.

## **MICROTOME**

- 5.41. Use safety guards.
- 5.42. Always lock the hand wheel when microtome is not attended.
- 5.43. Remove blades or knives when microtome is not attended.

## **PIPETTES**

- 5.44. Take steps to minimize generation of aerosols (expel liquids down the side of the tube, perform in biological safety cabinet)
- 5.45. Clean and disinfect pipetting aids when contaminated and on a regular basis.
- 5.46. Shorter pipettes may be helpful for work in a biological safety cabinet.
- 5.47. Use appropriate pipetting aids and use in a correct manner.

## **REFRIGERATORS**

- 5.48. Do not store flammable or combustible liquids in a domestic refrigerator.
- 5.49. Use only an explosion-proof refrigerator.

## **WATER BATHS**

- 5.50. Unplug before filling or emptying.
- 5.51. Clean on a regular basis and document.
- 5.52. Check continuity of the ground on a regular basis and document.

## CHEMICALS

### 5.53. Formaldehyde:

**5.53.1.** Continued exposure to this irritant vapor will cause permanent damage to the lungs, skin and eye tissues.

**5.53.2.** In the presence of reactive chlorides, including hydrochloric acid, the potent carcinogen bis-chloromethyl ether is formed even from dilute formaldehyde vapor.

## 6. RECORDS/VERIFICATION OF UNDERSTANDING

### 6.1. Records:

**6.1.1.** Incident Investigation Records

**6.1.2.** Biology Student Competency Forms

### 6.2. Verification of Understanding:

**6.2.1.** A training master log will be maintained by ....

## 7. SUMMARY OF CHANGES

| Revision # | Date | Change (include section #) | Issued By      |
|------------|------|----------------------------|----------------|
| 1          | 2012 | NEW                        | OHS<br>Manager |
|            |      |                            |                |
|            |      |                            |                |
|            |      |                            |                |