**LABORATORY SAFETY REGULATIONS FOR**

**RESEARCH AND HONOURS PROJECTS**

**A. GENERAL LABORATORY SAFETY REGULATIONS**

**(I) Physics Laboratory & STEM Laboratory**

1. Three-pin plugs which comply with the safety standard (BS 546 or BS 1363) should be used. The connections between electrical appliances and three-pin plugs should be made with three-core flexible cables of adequate current rating.
2. Keep the use of adaptors and extension units to a minimum. No adaptor should be inserted into an extension unit and vice versa. Do not connect one extension unit to another. If necessary, use acceptable three-pin adaptors and extension units (BS 546 or BS 1363) with shutters and pin holes which are either rectangular or round in shape. Do not use more than one adaptor or extension unit at one socket outlet as this may cause overloading.
3. Do not use plugs, adaptors or extension units with cracks, signs of loose parts or signs of overheating (e.g. discoloration, charring or deformation).
4. Cables and wires should be appropriately installed or fixed to prevent tripping hazards.
5. Students must be made aware of the great danger resulting from bodily contact with a “live” electrical outlet. They should not handle electrical appliances when their hands, feet or bodies are wet or when they are standing on a wet floor.
6. Electrical appliances should not be used in wet places such as areas in close proximity to sinks.
7. Ensure that the voltage rating of an electrical appliance matches with the voltage of the power supply before use.
8. Switch off the appliance and/or the power supply before the plug is withdrawn or inserted.
9. An electrical appliance which gives even the slightest shock should be repaired immediately. A faulty appliance should never be used until the fault is satisfactorily rectified.
10. In general, electrical appliances should not be left switched on unattended.
11. Flammable liquids should not be stored near electrical equipment because their vapors can be ignited by an electric arc or a spark.
12. Charging of secondary cells such as lead-acid batteries should be carried out in a well-ventilated area.
13. Any experimentation requiring the use of high voltage is safer if the floor is covered with effective insulating materials.
14. Nobody should be allowed to work alone in a room when using high voltage equipment.
15. A suitable screen or barrier for protection against electric shock should be provided whenever necessary.
16. All high voltage equipment should always be kept clean.
17. It is essential to ensure that there is a large current-limiting-resistor in series with the positive terminal, fitted into the extra high tension (EHT) power supply.
18. Ensure there is no protruding or exposed metal parts on the plugs when connecting to the EHT power supply.
19. Always connect the negative terminal to the earth terminal of an EHT power supply unless otherwise instructed.
20. Users should always switch off the EHT power supply before making adjustments to the circuit.
21. The Van de Graaff generator can produce extremely high voltage. Generally the equipment is reasonably safe as the current is at the microampere level, but some people (e.g. those with weak hearts) are susceptible to health risk. The generator should be discharged before making any alteration and the chassis of the generator should be properly earthed.
22. When handling of Radioactivity Sources, the following rules shall apply:
23. Sources shall be handled with care and unnecessary handling of sources should be avoided.
24. Sources shall be transported between the laboratory and their place of storage within the same school premises in their dedicated containers.
25. Sources shall only be handled by tongs or forceps. Teachers should note that specially designed tongs for the safe handling of sources are available from commercial suppliers.
26. Alpha-emitting radioactive sources shall be handled with extreme care because of the necessarily fragile nature of their construction.
27. Sources should whenever possible be kept at a distance greater than 30 cm from the user, and should be pointed away from the human body.
28. Students are not allowed to use 3D Printer, Laser Cutting Machine and any kinds of electric powered tools without staff supervision.

**(II). Chemistry Laboratory**

1. Chemical safety goggles must be worn in the laboratory at all times when performing an experiment. Anyone not wearing eye protection in the lab may be subject to disciplinary action by the faculty member or teaching assistant in charge of the course.
2. Teaching and technical staff members of the Department have the authority to dismiss student(s) from a laboratory section for working in an unsafe manner.
3. Long hair and loose clothing should be confined when in the laboratory. Appropriate clothing must be worn in the laboratory. In particular, long pants and a T-shirt with short sleeves (or something equivalent) should be worn. The shirt or blouse must cover the midriff area such that no skin is visible, and the shoulders must be covered. Long sleeves are acceptable provided they do not represent a hazard by being too loose. No sandals or open toed shoes are allowed. Any loose clothing must be restrained in a suitable manner. A student will be dismissed from laboratory if she/he is not dressed appropriately.
4. Eating, drinking, smoking, entertainment and fun activities are not allowed in any laboratory.
5. Contact lenses are not allowed to be worn in the chemistry laboratory classes.
6. Familiarize yourself with the location of safety equipment which including fire extinguishers, safety showers, eye washes, and first-aid kits, emergency exit routes, and other safety practices.
7. Some operations must be carried out in a fume hood to minimize exposure to hazardous chemical vapors. Certain reactions may require additional precautions. Know the types of and the use of personal protective equipment available for your laboratory operation.
8. Wash your hands often when performing laboratory work, and wash them thoroughly upon leaving the laboratory.
9. Mouth pipette of chemicals must not be allowed. A pipette bulb or aspirator for pipetting chemicals should be used.
10. In the case of an injury:

(a). Notify your direct supervisor, or teaching assistant or technical staff immediately. All injuries, no matter how small, must be reported. A written accident report must be filed within 24 hours. If your direct supervisor is not immediately available, notify a substitute responsible authority within the Department.

(b). Your supervisor shall notify the proper personnel, the injured person will be transported to the health center or emergency room, and the injury will be examined and properly treated.

(c). If you get a burning sensation on your skin or in your eyes after laboratory hours, report to the health center or a physician, and explain your symptoms as well as its possible connection to your laboratory work.

(d). Chemical burning of the eyes should be treated by flushing with copious amounts of water for at least 15 minutes. It is necessary to hold open the eyelid during the flushing process.

(e). Chemical burning of the skin should be treated by extensive washing with soap and water.

(f). All chemical spills, glassware breakage, and fires must be reported to your supervisor.

(g). When large amount or high toxicity chemical spillage occurs, all students should leave the laboratory, and inform your supervisor immediately.

(h). If there is an extensive chemical spill on a person, use the safety shower. Remove all contaminated clothing. There is no room for embarrassment in emergency situations. It could be the difference between life and death.

(i). If your clothes are on fire, roll on the floor. Do not run to the fire blanket (located near the exit of each lab) or the shower.

1. Be well-prepared before entering the laboratory. Read and understand all laboratory procedures to identify possible hazards. If you are not certain about how to perform an operation safely, ask your supervisor or technical staff before starting the operation.
2. Be aware of what your neighbor is doing. If his/her actions indicate confusion or ignorance, inform your supervisor immediately.
3. Never leave glassware set up or a reaction unattended. Exceptions must have the approval of your supervisor or technical staff.
4. Read the reagent bottle carefully. Make sure you select the correct chemical reagent. Never pipet directly from a reagent bottle. Never put unused reagent back in the bottle – dispose of it properly.
5. All broken or cracked glass should be disposed of in marked containers in the laboratory. Never put broken glass in the waste paper can or general rubbish bin.
6. Dispose of chemical waste as directed by your laboratory supervisor and the chemical waste under the class below should never be mixed but disposed separately.
7. Spent acids
8. Spent alkalis
9. Spent non-halogenated organic solvents
10. Spent halogenated organic solvents
11. Clean up your work area completely when finished. Any chemical spills need to be dealt with immediately.
12. If you are assigned specific laboratory space, keep it neat enough to work effectively. All drawers under laboratory benches should be kept closed when working in the laboratory. Equipment signed out to individuals is the responsibility of that person -- the department is not responsible for any missing or broken equipment during the course of the year.
13. For the use of gas cylinders, the follow operations are not allowed for students:

(a). Operate high pressure cylinders alone.

(b). Assembly, disassembly of gas regulator, and moving of gas cylinders.

**(III). Biology Laboratory**

1. Students should be familiar with the exercises and experiments that you will be doing before coming to laboratory.
2. Students should know your own allergies and be aware of the potential allergens (e.g. penicillin, pollen, latex, peanuts) that might be present in the laboratory. Take the necessary precautions to prevent allergic reactions.
3. Students should know where the shower, eyewash bath, and fire extinguisher are and how and when to use them.
4. Students should know where the first aid kit is.
5. Students should not put backpacks, bags, or other personal items on the lab bench. Keep them out of the way under the bench.
6. Students should follow all protocols (instructions for experiments and procedures) carefully.
7. Students should not taste or inhale (smell) reagents or chemicals and avoid getting reagents or chemicals on your skin.
8. Wash your hands before and after each laboratory session.
9. No food or drink in the laboratory, including water. If you are thirsty or hungry, leave the classroom.
10. Smoking is prohibited in all laboratories.
11. Report accidents and breakages or any equipment that is malfunctioning to your supervisor or technical staff. Do not attempt to clean up any spills or breakages yourself.
12. Long hair and flowing clothing can be dangerous in the laboratory because they can get caught. Open-toed shoes or sandals are not to be worn in the lab because reagents or chemicals might spill directly on your skin.
13. Be aware that we do not recommend wearing contact lenses in the lab.
14. Never remove chemicals, equipment, or parts of models from the laboratory. Anyone caught doing so is subject to disciplinary action.
15. Leave the lab in the same or better condition than when you entered. Put all microscopes back properly. Clean lab benches. Return all materials to the cart. Wash any glassware, slides, trays that you have used. Dispose of specimens in appropriate containers.
16. Before handling experimental kits and delicate equipment, first read the operating manuals and become familiar with the operation procedures. Handle all pipetting devices with special care to avoid formation of aerosols during transfer. Mouth pipetting is prohibited.
17. When handling of plants, students should avoid ingesting any plant materials used in experiments because some of them are poisonous (e.g. castor oil seeds), or contaminated with fungicides, pesticides, pollutants or spoilage microorganisms. Students should wash hands after handling plants.
18. Students who are known to be hyper-sensitive to pollen should not be encouraged to handle flowers. Proper precautions should be taken when working with flowers. When dealing with plant specimens that bear spines or thorns, care must be taken. Suitable protective gloves should be worn.
19. When using flammable solvents such as alcohols for extracting chlorophyll for chromatography, the student should take precautions to minimize fire risk. To prepare hot alcohol, students should not heat the tube of alcohol directly instead of immersing it into hot water bath.
20. In free-hand sectioning of plant specimens, students should take precautions when holding a razor to prevent cutting their fingers. Students do not use rusted or blunt razors and handle double-bladed razors with special care.
21. Students should wear chemical resistant gloves when handling fixatives, mountants and stains, macerating fluids which can be harmful, corrosive or flammable. Some chemicals can only be handled in a fume cupboard and not in open areas.
22. When working with microorganisms, students should wear protective gloves and laboratory gowns. All wounds and cuts on body surfaces should be covered with sterile dressings before starting microbiological experiments.
23. Students should always employ aseptic technique when working with microbial cultures. Before and after work, clean the bench surface with disinfectant as well as wash hands. All unwanted cultures should be sterilized and disposed of after experiment.
24. Students do not culture microorganisms from potentially dangerous sources such as sewage, human mucus, pus or faeces. Use non-pathogenic microorganisms only.
25. Students should always practice aseptic technique in inoculation. Immerse an inoculating tool, such as an inoculating loop and knife, in 70% alcohol before flaming, (but not in the reverse order, to prevent ignition of fire).
26. Student should always sterilize the inoculating tool immediately after use to avoid spread of the microorganism and contamination of the workplace.
27. Student should using permanent felt pen or wax pencil to label the base of the petri dish sampled with microorganism rather than the lid to avoid mix-up in case the base gets separated from the lid.
28. Students are not encouraged to do microbial culture transfer experiments.
29. Students are not encouraged to handle microbial spillage instead of reporting to their supervisor or teacher or laboratory technicians immediately. When clearing up the mess, protective gloves and masks and laboratory gowns should be worn.
30. The spillage should be covered with a towel soaked in disinfectant (e.g. hypochlorite). The towel should be left in place for 15 minutes and then swept into a suitable container. The contaminated area should also be disinfected as appropriate. In case the skin comes into contact with the spillage, wash with liquid soap and water immediately and thoroughly. Seek medical help if necessary.
31. Unwanted cultures should be destroyed by steam under pressure (autoclave) or immersing in disinfectant for several hours before disposal. All apparatus contaminated with microorganisms or waste materials should also be treated in the same way before disposal.
32. After finishing each microbiology practical, the bench surface should be wiped with disinfectant (e.g. 70% alcohol, 1:10 bleach solution) immediately.
33. Wash hands thoroughly with liquid soap and water after microbiological work. For drying purposes, paper towels are preferred and used ones have to be disposed of in a waste container with lid.
34. When handling animals and animal products, students should wear protective gloves and laboratory gowns. Any wounds on body surfaces should be covered with sterile dressings. After practical work, all bench surface and instruments should be cleaned with disinfectant. Hands should be washed thoroughly with liquid soap and water.
35. Students should not be allowed to handle live animals.
36. Students who are ill should not come in contact with animals, as some human infections may also be transmitted to animals.
37. Students should seek medical treatment promptly in case of accidental injury while handling rats, cages, soiled bedding, etc.

**B. FIELD WORK/TRIP ACTIVATES**

1. Students should attend a briefing given by their corresponding teacher, instructor or coach on the field activities.
2. Students should be made aware of the terrain and other potential hazards, as well as the necessary safety precautions.
3. All participants, including staff, must understand their responsibilities and what action to take in the event of an emergency. The need regarding for the safety of oneself and others, as well as the need for calm behavior and common sense when encountering dangers, should be emphasized.
4. Students have to be reminded to follow the Country Code. They should also be advised not to collect specimens more than necessary. Protected or endangered species should not be collected.
5. Students have to be assigned to work in groups and the group size should be at least three, but room should be allowed for individual work/projects. A leader should be appointed for each group and each participant should be made aware of appropriate actions to take in times of emergency.
6. Students who are not physically fit or who are exempted from Physical Education lessons could also be exempted from an outdoor study trip or a field trip.
7. If a student needs to leave the tour temporarily, he/she must seek prior approval from the school through his/her parents. While he/she is away from the tour, the student must be accompanied by an appointed adult. The student must also inform the escort and other members of the tour where he/she wants to go, when he/she will return and how to contact him/her.
8. Students should be aware of where the first-aid kit is kept.
9. Students should carry individually suitable amounts of food and drinking water when on a whole day trip, unless these are easily available elsewhere.
10. Students should not work alone at the field site and should follow the instructions given by their corresponding teacher, instructor or coach on the field site.

**C. Unattended Experiments**

1. Laboratory operations involving hazardous substances are sometimes carried out continuously or overnight unattended. It is the responsibility of the people who design these experiments to ensure safety precautions are taken, particularly in the event of interruptions to utility services such as electricity, cooling water and inert gas.
2. Carefully examine how chemicals and apparatus are stored, considering the possibility for fire, explosion or unintended reactions.
3. Laboratory lights should be left on and signs should be posted at the laboratory door identifying the nature of the hazardous substance in use, emergency contact name and number.
4. Notify the Security Office and if necessary, arrangements should be made to periodically check on the operation by security guards.

**D. USE OF LABORATORIES AFTER OFFICE HOURS AND WORKING ALONE**

1. In general, students are not encouraged to carry out their laboratory work after normal office hours.
2. Staff and students want to work in laboratory after office hours should obtain approval from their supervisors in advance.
3. For safety reasons, staff and students must not be allowed to work alone in the laboratory after office hours, particularly when working with hazardous chemicals.
4. When conducting laboratory work after office hours, a form of ***Application for After Office Hour Laboratory*** should be completed, approved by their supervisors. A copy of the form should be submitted to Departmental Office for record.

**E. EMERGENCY CONTACTS**

1. Emergency Contact: **2948 8000** or ext. **8000**

2. Security Control Centre: **2948 8002** or ext. **8002**

**F. CAMPUS MEDICAL CLINIC**

1. Location: Administration Building (**A-1/F-09**)

2. Tel. number: **2948 6262**

**G. LABORATORY TO BE ACCESSED BY THE APPLICANT**

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| --- | --- | --- |
| **Room number** | **Lab-in-charge (e-mail)** | **Technician-in-charge (e-mail)** |
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**H. DECLARATION**

Please tick below where appropriate:

* I have read the above science laboratory rules and regulations, and I agree to follow them during any science course, investigation, or activity. By signing this form, I acknowledge that the science classroom, laboratory, or field sites can be an unsafe place to work and learn. The safety rules and regulations are developed to help prevent accidents and to ensure my own safety and the safety of my fellow students. I will follow any additional instructions given by my instructor/supervisor. I understand that my failure to follow these science laboratory rules and regulations may result in disciplinary action.
* It is confirmed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will not perform experiment and operate instruments in the SES laboratory and understood he/she will not be allowed to do so.

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| Program/Project: | Student/Staff name: |
|  | Student/Staff I.D. number: |
|  | e-mail address: |
| Lab Work Period: | Student/Staff signature: |
|  | Date: |
|  |  |
|  | Name of Supervisor: |
|  | Supervisor’s signature: |
|  | Date: |