Safety and Housekeeping

Manual for TVET Laboratories

MINISTRY OF EDUCATION

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Introduction

Safety is a fundamental concern in technical and vocational educational and training (TVET) laboratories. In recent years, strides have been made to ensure a safe learning environment for all users of laboratories through the various technical and vocational syllabuses and curricula which have guided the teaching and learning process.

This safety and housekeeping manual is intended to serve as a resource to guide the management of, or minimise potential risks during practical instruction in the TVET laboratories. This publication should be readily accessible to teachers throughout the school year and they should become thoroughly familiar with its contents.

This manual has been carefully prepared with current and relevant information. It has been reviewed by classroom teachers and industry specialists to ensure the accuracy of its content. However, the manual cannot describe every safety issue in every possible educational setting. Teachers and other school officials are encouraged to use this manual as a guide to safety and as a resource in obtaining more detailed information relating to specialist laboratories and equipment that may need additional safety requirements.

Purpose

The Ministry of Education's Safety and Housekeeping Manual for Technical and Vocational Education and Training (TVET) Laboratories is designed to serve as a guide in the operation and maintenance of TVET laboratories in the Jamaica's public education system. This manual will:
outline the responsibilities of stakeholders including administrators, teachers and students

- Alert instructors to the dangers and risks to themselves, the students, and visitors
- Provide instructors with knowledge to make the laboratory a safe environment
- Provide examples of important records and forms for evidence of compliance
- Provide a framework for teachers to infuse safety awareness and safety training in daily instructional practice

Roles and Responsibilities of Stakeholders

Safety is a shared responsibility. A safe laboratory programme requires participation by stakeholders to include administrators, TVET teachers/ instructors and students.

School administrators should:

- Provide all stakeholders with the Ministry of Education's Safety and Housekeeping Manual for TVET Laboratories
- Make available to instructional and support staff the Ministry of Education's Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Manual
- Ensure that all stakeholders adhere to established safety and house-keeping guidelines
- Establish a safety and housekeeping committee to monitor compliance with the MoE TVET safety and housekeeping guide-lines
- Manage the human resources to maintain teacher/ pupil ratio for TVET practical classes (1:20)
- Provide health and safety educational opportunities (to include first aid training) for TVET staff members
- Equip TVET laboratories with adequate, appropriate and well maintained tools and equipment
- Equip all laboratories with a fire extinguisher and ensure that instructors/teachers are familiar with its proper use
- Equip all laboratories with a first aid kit

- Ensure practical classes are facilitated by persons who are competent in occupational health and safety matters. Regular training/information sessions should be held.
- Establish disciplinary and/or administrative action to be taken in the event of breaches to the school's safety and housekeeping policy

Head of Department/Supervisor should:

- Ensure that the general layout of the technical and vocational laboratories reflects the MoE laboratory standards and the requirements as stipulated in these guidelines
- Ensure that a tool management checking system is in place
- Ensure that there is adherence to the established safety and housekeeping guidelines
- Develop and maintain an inspection and a maintenance schedule for laboratories (see appendix C)
- Ensure teachers/instructors monitor adherence to the established safety and housekeeping guidelines
- Ensure that equipment, tools and other materials are labelled and secured
- Provide technical advice to the school administration as it relates to area of specialisation

- Ensure that all users of the laboratory are aware of the school's established emergency procedures
- Ensure that all laboratories are equipped with adequate and appropriate safety devices and materials
- Maintain a safe storage/handling and disposal system in accordance with the regulation in MoE's Guidelines for the Management of Hazardous Materials & Equipment and Disposal of Hazardous Waste
- Conduct periodic safety audits to ensure that the guidelines are being followed
- Promote safety awareness and best practices inside as well as outside the laboratory.

Instructor/Teacher should:

- Establish lab rules and monitor compliance in order to achieve adherence
- Promote good hygiene in the classroom
- Display safety rules/signs at appropriate points in each laboratory
- Ensure that students receive the relevant safety instructions prior to engaging in any laboratory exercise
- Guide the selection of the most appropriate tool and technique for the execution of a given task
- Infuse safety education in lessons to include movement in the lab, use of tools and emergency procedures

- Allow sufficient time (3-5 minutes) at the end of each lesson to facilitate cleaning up.
- Ensure that the laboratory has adequate and appropriate receptacles for disposal of waste
- Ensure that hazardous equipment, tools and materials are secured and made accessible to students only under supervision
- Exercise care to prevent infestation of rodents and disease-causing insects
- Enforce adherence to safety rules by demonstrating the correct procedures for use of tools, equipment , materials and personal protective equipment (PPE)
- Ensure that students are adequately supervised while using equipment and tools
- Ensure that students comply with the established standards for the use of personal protective equipment (PPE)
- Identify hazards and eliminate or reduce the risk of hazards
- Bring to the attention of the head of department any broken or obsolete furniture, equipment or tools
- Maintain the laboratory as a clutter free environment
- Maintain up-to-date records e.g., equipment and stock inventories, log books, incidents and accidents etc.
- Ensure that students are supervised while performing practical activities in the laboratory

Students should:

- Comply with regulations governing the use of PPE.
- Obey all safety rules and regulations
- Work sensibly to acquire positive attitudes towards safety.
- Understand the procedures for operating tools and equipment before using them.
- Report to a teacher any accident, injury or defective furniture, tools or equipment
- Always operate equipment and tools under the supervision of your teacher

School's Safety and Housekeeping Committee

A safety and housekeeping committee should be established in the school with specific responsibilities to ensure the safety and health of all students and teachers who are engaged in the daily activities of the technical and vocational programmes in the respective departments.

Composition of Safety and Housekeeping Committee

The committee shall comprise of one (1) representative of each TVET department. A chairman is to be elected by members of the committee. The chairman shall convene meetings, once per term, to address health and safety issues.

Responsibilities of Safety Committee

- Foster a culture of safety and good housekeeping within the school community
- Schedule and participate in regular inspection of equipment and facilities to identify unhealthy and unsafe practices
- Receive complaints from students and staff about concerns regarding their health and safety
- Investigate complaints and reported incidents of safety violations
- Follow-up to ensure correction is implemented
- Recommend corrective action to ensure that incidents do not re-occur
- Establish and promote health and safety education programmes within the school community assist in the emergency evacuation procedure perceived, or real

General Safety Guidelines for Laboratories

Pupil Teacher Ratio for TVET Laboratories

The recommended teacher/ pupil ratio for practical activities is 1:20.

Labelling

Colour-coding of symbols is recommended as follows:

DANGER	**Red**
CAUTION	**Yellow**
WARNING	**Orange**
BIOLOGICAL HAZARD	**Fluorescent orange orange-red**

- Safety signs should indicate the nature of the hazard
- Machines and operation zones should be marked with appropriate colour codes
- Entrance and exit doors should be clearly marked
- Ensure that containers used for the storage of chemicals and other materials are properly labelled
- Display in readily visible locations, signs that provide information to visitors and all users of the laboratory

Lighting

Ensure there is adequate lighting to perform specified task.

Ventilation

Ensure proper ventilation of laboratory.

Spraying

- Use appropriate PPE at all times when spraying
- Use appropriate equipment for application of chemicals
- Do all spraying outside of laboratory in well ventilated areas and away from ignition sources
- Ensure that chemical is mixed at the correct concentration for intended purpose (see Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Manual)

Cutting

- Ensure that cutting tools are properly sharpened
- Use appropriate tool for each task
- Ensure that each tool is sanitized/cleaned before use in keeping with its purpose

- Ensure all safety practices are observed in the use of each tool or equipment

Smoking/ Playing/Eating

Ensure that no one smokes, eats or plays in the laboratories.

Use of Cutting Tools/equipment

- Ensure that all safety practices are observed in the use of each tool or equipment
- Use appropriate tools of each task
- Ensure tools are properly sharpened

Lifting

Adopt correct postures when lifting and moving heavy or bulky equipment, or furniture, to avoid strain and injury (see references)

Electrical Considerations

- Electrical equipment/machines should have appropriate grounding
- Electrical circuits should not be overloaded
- Electrical tools and appliances should not be operated in wet and damp areas
- Avoid using electrical tools/equipment that spark, smoke or are hot to the touch when plugged in

- Avoid using extension cords which have to be placed along the floors
- Multi-plug strips may be used if they are protected with a circuit breaker
- Cover all electrical sockets
- Ensure that electrical wires are not exposed or hanging from the ceiling
- Turn off all electrical appliances/tools when not in use. If appliances/tools are heated, allow them to cool in a safe place before storage
- Electrical circuits and outlets should be properly labelled and switches enclosed and protected from traffic. Three way sockets should be fitted to the wall and protected from being damaged. Emergency stop buttons which shut down the power for all appliances and other equipment should be placed at strategic locations. This will allow easy access during emergency situations. Only authorised personnel should have access to the circuit breaker panel. These panels should be locked on the outer door.
- Check the wattage imprinted on an appliance before plugging it into the electrical outlet. Never connect more than 1600 watts in a general purpose circuit

- **RULE TO REMEMBER:** Never connect more than one heating or two motor driven appliances to an individual circuit. Refrain from overloading the circuit with **several** appliances on a multiple outlet
- Keep appliance in good working condition. Clean after use and check for frayed or worn cords and loose plugs
- Use the appliance only with its proper electrical cord. Attach cord to appliance first, then to electrical outlet. When unplugging, unplug from the electrical outlet first, then from the appliance
- Always grasp the plug, not the cord, when disconnecting an appliance from the electrical outlet
- Always disconnect appliance from the electrical outlet before cleaning
- Keep appliances close to electrical outlet
- Do not allow the electric cord to hang from the table or counter
- Buy appliances and cords that carry safety symbols which assure that the appliance and cord both meet safety standards

Fire Safety

Fire related warning signs and symbols should be prominently displayed and available to all staff and students. Laboratories that use combustible chemicals and heat generating equipment should be adequately ventilated and inspected regularly to prevent overheating.

Contact should be made with the local fire department so that they are acquainted with the school's facilities, location and specific hazards. Ensure that fire hydrants located in close proximity to schools are flushed at least once each year.

Fire extinguishers should be strategically mounted on a wall next to an exit in each laboratory. All fire extinguishers should be inspected monthly for discharge or damage. Up to date service tags should be affixed. Fire instructions should be prominently displayed and available to all staff and students. Establish critical control points for fire drills.

Fire alarms should be strategically located. Do not block access to, or visibility of fire alarm stations.

Fire drill practice must be conducted frequently, and all staff and students should be trained in fire drills. Practice drills.

First Aid

All laboratories should be outfitted with first aid kits. First aid kits should be strategically located and adequately and appropriately stocked with the necessary supplies relevant to injuries that are likely to occur. An inventory of First aid items should be kept with the kit. First aid kits should be inspected periodically and supplies replenished where necessary. An inventory of first aid items must be kept with the kit. The contents of the kit should be secured and accessible to authorized personnel only.

All TVET teachers/instructors should be trained and certified in administering first aid.

Use of Laboratory for Non-prescribed Activities

While there is recognition of the difficulty a number of schools are having regarding adequate classroom, the TVET laboratory must always be subject to the general guidelines regarding the use of all school laboratories.

The TVET laboratory should **NEVER** be used for activities such as house meetings and sport activities, as these inevitably cause displays to be damaged, furniture destroyed and unfinished work to be ruined.

Where the TVET laboratory is temporarily used as a classroom, the following MUST be observed:

- No student should be allowed into the room unless under the supervision of a teacher or his/her proxy
- The teacher who wishes to use the room must manage his/her class in such a way so as not to destroy, damage or deface any work, equipment, tool, material or furniture in the room
- At the end of the class, the teacher should lock the door and return the key to a staff member from the respective department and report any accident or wilful destruction, defacing or damage to any work, tool, equipment, material or furniture.

Such report should be made on the incident/accident report form and reported to the head of the department who will record it in the department's log book.

Use of Personal Protective Equipment (PPE)

All users of the laboratory must comply with the established standards for the use of personal protective equipment (PPE) for each technical and vocational department.

Head Protection

Appropriate head protection should be worn for all practical activities. Materials used for hair enclosure shall be fast drying, non-irritating to the skin when subject to perspiration and capable of with-standing frequent cleaning. It shall not be reissued from one person to another unless it has been thoroughly sanitized.

Foot Protection

Appropriate footwear should be worn for all practical activities. Teacher MUST ensure that students participating in activities which expose them to electrical hazards or falling or rolling objects wear appropriate footwear. Only closed up shoes must be worn in the laboratory.

Hand Protection

Appropriate hand protection should be worn as required. Selection of the appropriate hand protection should be based on the task to be performed, the duration of use and hazards and potential hazards identified.

Hearing Protection

Hearing protection should be worn when students and teachers are exposed to prolonged noise resulting from noise generating equipment.

Eye Protection

Appropriate eye or face protection should be worn when users of the laboratory are exposed to:

- Flying objects or particles
- Dusts
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapours
- Glare
- Injurious radiation
- Electrical flash

Safe Breathing Apparatus (Respirator)

Safe breathing apparatus should be worn when students are engaged in activities involving toxic fumes for example, batik and automotive body sprays.

General Safety and Housekeeping Guidelines

Good housekeeping in laboratories is essential in order to reduce risks of accidents and injuries. Routine housekeeping should be done to ensure that work areas are free of sources of hazards.

- Check to ensure that tools and equipment are in good working condition before use
- Keep entries and exits clear
- All gas cylinders must be properly secured in keeping with industry standards.
- Containers into which chemicals have been transferred, from an original container, must be labelled
- Do **NOT** use or operate any equipment and tools without permission
- Do **NOT** lay tools on operating machinery or equipment Work areas and equipment should be left in a clean and safe condition after use
- Do **NOT** use laboratory floors and work table tops for storage of equipment and materials

Cleanliness and Organisation of Space

- Floors, windows, walls and doors should be cleaned frequently to prevent build up of cobweb, dirt, dust, grease or grime
- Laboratory floors and bench areas should be free of clutter
- Work areas and equipment should be left in a clean and safe condition after use
- Work areas should be wiped down as necessary, especially immediately following a spill
- The immediate surroundings of the lab must be kept free of rubbish and unnecessary materials
- All furniture and equipment are to be arranged in an orderly fashion
- Laboratory floors should be kept clean, dry and in good condition
- All spills should be wiped up immediately to prevent slips
- Corridors and aisles should be free of tripping hazards such as cables and cords
- Work tables should be kept clean, organised, free and clear of any materials which can pose a health hazard or cause an accident
- Laboratory layout must be in accordance with the established standards
- All laboratories should have a designated room/cupboard for storage
- Use appropriate measures to protect laboratories from rodent infestation

- Ensure laboratories are in keeping with Government of Jamaica's public health requirements

Personal Hygiene Practices

- All users of the lab should have ready access to washing facilities
- Students should be taught personal hygiene rules and practices
- Hands should be washed immediately after handling hazardous materials
- At the end of all work procedures, wash hands thoroughly with soap and water

Work environment

- The level of illumination should be consistent with established standards
- All work areas must be adequately ventilated to allow for circulation of fresh air and prevent fumes, dust and other impurities from affecting the health of users of the laboratory
- Storage and display shelves should be kept clean and organised with heavy items stored on the lower shelves, lighter ones on the upper shelves

Materials/Tools/Equipment/Furniture

- Clean tools and equipment after use and return to designated storage place
- Adhere to the Regulations Regarding Management of Government Property (see references)
- Return tables, stools/chairs in laboratories to their correct position at the completion of each session
- Establish schedule for stock taking of all equipment and arrange for repairs
- Remove broken chairs, tables and any other furniture that will cause injury
- Periodically review currency of information regarding the safe use and care of appliances and equipment
- Inspect appliances and equipment regularly to be certain that they are in safe, proper operating condition
- Maintain a safe storage/handling and disposal system in accordance with regulation as outlined in the MoE Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Waste
- Follow manufacturer's recommendations regarding use and servicing of tools and equipment
- Ensure that each tool is sanitized/cleaned before or after use in keeping with its purpose

- The computer laboratory should be air-conditioned and properly sealed to eliminate excessive dust from destroying the equipment
- Equipment such as monitors, keyboards, system units and printers should be covered when not in use
- Anti-virus software should be installed on all computer systems and regularly updated
- An uninterrupted power supply unit (UPS) should be installed on all computer systems. If UPS is not installed on each computer, it should be identified and secured at an appropriated location in the laboratory

Recordkeeping

The following documents are to be kept in laboratory:

- **Log Book** – A book for recording notable happenings relative to the operation of the laboratory. This may include important visits to the laboratory, critical staff activities, servicing of equipment, etc.
- **Inventory** – An updated inventory of all tools, materials and equipment in the department
- **Schedules** - A calendar of all laboratory schedules to include activities such as general cleaning, maintenance of equipment, inventory updating, rearranging of displays, safety reinforcement activities, etc.

Safety and Housekeeping Emergency Response

All staff and students should be trained in the relevant emergency response procedures. **In the event of any emergency necessitating evacuation, the schools should ensure strict adherence. In the absence of such a plan, the following guidelines will inform response procedures in the case of an emergency in a TVET laboratory.**

Earthquake

- All staff and students should be trained in earthquake drills.
- Move away from buildings, trees and power lines if outside the laboratory
- Avoid using matches, candles or open flames
- Do NOT activate any electrical switch
- Turn off all gas and electrical power
- Identify and report the condition of all injured persons and provide first aid assistance as directed

Fire

- Activate a fire alarm
- Advise school's administration to contact the fire department
- Close all doors and windows in the immediate area
- Attempt to isolate and control the fire by using an appropriate fire

extinguisher

- If the fire is beyond control, abandon the area. Never re-enter area until approval is given by fire personnel
- Locate and report the condition of the premises and the obvious hazards
- Locate and report the condition of all injured persons, and provide first aid assistance as directed

Gas Leak

- Turn the electrical power off at the circuit breaker box and the gas supply at the gas valve
- Open all doors and windows for maximum ventilation and abandon the area. Do not use matches, candles or open flames to provide illumination
- Notify the school's administration

Inventory Control System

Each technical and vocational department should establish an inventory control system to:

- Enable accountability of tools, equipment and raw materials at any time;
- Enable the provision of up-to-date information about all tools,

equipment and raw materials in the care of each department

- Identify tools, equipment and raw materials that are underutilised or in surplus;
- Provide the current location of each item.

The head of each technical and vocational department along with the school bursar will:

- Supervise and conduct a termly inventory of equipment, tools and raw materials
- Establish record keeping and reporting procedures that will serve to maintain the school's inventory control system
- Educate teachers within each technical and vocational department on the inventory control requirements

Departmental Responsibilities in Inventory Control

Procedure for Receipt and Storage of Items for Departmental Use

Maintain a record of equipment, tools and raw materials received for use in each department. The information should include:

- Article/object/item
- Date of receipt
- Amount received
- Manufacturer
- Model

- Serial number
- Identify a **secure** area for the storage of all items for use in each department.
- Maintain a record of equipment, tools and raw materials that fall below the inventory level (see appendix for sample of stock card)

Disposal of Items

Items no longer useful should be reported to the bursar and a request made to have the item disposed of (see MoE Manual Guidelines to Schools for the Management of Hazardous Materials and Equipment and Disposal of Hazardous Waste*)*

Temporary Loan of Items

Temporary loan of equipment, tools and/or raw materials can be facilitated; however a temporary loan of equipment form **must** be completed prior to the removal of the specific item from its assigned location. The temporary loan of item must be for work related purposes only and approved by the head of the department. The loan form should be completed in two-part carbonized form. One copy is to be kept by the Bursar and the other retained by the departmental head**.**

Accident Reporting Procedures

Any accident or injury occurring in the laboratory should be reported by the teacher using the appropriate form. (see appendix)

Safety and Housekeeping Guidelines for Agricultural Education

Facilities

- Appropriate animal restraining facilities such as squeeze chutes, races or stanchions should be used humanely
- Provide proper housing condition for animals including floor space, ventilation and bedding
- Ensure that specialised facilities for pregnant animals are provided at the appropriate time e.g., farrowing crates, nest box
- Appropriate material should be used in fencing for animals

Storage and Handling of Materials and Supplies

Crop Production

Ploughing & Tillage

- Ensure that ploughing tools have proper handles.
- Tools such as hoe and mattock should be properly fastened to handle

Irrigating

- Ensure that correct pressure is used to prevent damage to pump, irrigation lines or crops
- For drip irrigation systems there must be an established programme for cleaning emitters

Harvesting

- Ensure that harvesting is in keeping with the intended use or target market.
- Withdrawal period for chemicals (see Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Manual.
- Managing fertilizers and pesticides :(see Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Manual).
- Waste management : (see Guidelines to Schools for the Management of Hazardous Materials & Equipment and the Disposal of Hazardous Manual).

Livestock Production

Handling and Restraining of Animals

- Use appropriate restraining equipment humanely when handling animals eg. alters, muzzles, shackles
- Where animals are transported/moved care should be taken to ensure safety of student/worker as well as comfort and safety of animals

Housing & Fencing

- Do not use material used for livestock housing or fencing that will put animals or workers at risk
- Where electrical fences are used all necessary precautions must be taken in handling same.

Sanitation, Health & Hygiene

- Use appropriate measures to protect animals from rodents
- Use quarantine and sanitation measures to prevent disease development
- Ensure correct public health practices are followed to prevent transmission of diseases among animal species and from animals to humans

- Ensure slaughtering facilities and operations are in keeping with public health requirements
- Chill slaughtered broilers to appropriate temperature before freezing
- Treat feed and other materials collected on the farm on a **first in first out** basis to minimise spoilage
- Follow manufacturers recommendations in using chemicals or medication for animals producing food such as meat, milk or eggs
- Dispose dead animals or waste in keeping with established protocol
- Careful calculation should be done in ordering feed to prevent spoilage or stale, mouldy feed being supplied to animals
- Practice safe and humane use of animal husbandry tools, such as hoof trimmers, electric shears, elastrators, dehorning tools, and scales

Milking

- Milking equipment should be sanitized after each milking session
- Milking machines should be checked for correct pressure and pulsation at the beginning of each milking session
- Udder of animals should be properly sanitized before milking
- All animals should be tested for mastitis before milking commences

- Animals diagnosed with mastitis should be managed to prevent spread of the disease.

Slaughtering

- Ensure that water for scalding chickens is at the correct temperature
- Where wood fire is used, a thermometer should be used to test the temperature periodically
- Ensure that there is no crowding around work areas such as tables or wash bins
- Hot water source, such as scalder, should not have more than one student assigned at any time

Safety and Housekeeping Guidelines for Business Education

Accidental injuries in the business laboratories are usually not as severe as in other areas; however, safety practices should be enforced to reduce hazards and injury to its users. The Business Education Department should depict an office environment where cleanliness, safety, order and maintenance are ensured. The appropriate furniture and equipment should be selected and arranged to optimize the learner's well-being and overall performance.

Ergonomic Guidelines for Computer Related Activities

Monitor

- Monitor should be positioned approximately an arm's distance of 75 cm (30 inches) from the user
- Top of the monitor screen should be aligned at or slightly below eye level
- Appropriate methods or devices should be used to control screen glare when computers are being used
- The work space should be set up so that there is no need to twist the neck

- A paper holder should be used to place letters or books semi-vertical and at eye level.

File Cabinets

- File cabinets should be equipped with have safety stops
- Only one filing drawer should be opened at a time
- File drawers and other equipment should **not** extend out into aisles
- Card index files and heavy objects should **not** be kept on top of file cabinets

Furniture

Desks/Counter (Computer)

Use a properly designed computer desk/counter with a built-in tray to hold the keyboard and mouse. There should be adequate space to manipulate mouse and keyboard comfortably.

Chairs

- A fully ergonomic chair with height and angle adjustability for both the back and the seat should be selected
- Adjustment features on chairs should be maintained so that they work properly

Managing Technological Breakdown

- Computer hardware or software failure detected should be reported to the supervising teacher immediately
- If the failure involves computer hardware, combustible materials should be removed from the immediate area
- Do not turn off the device unless the failure will create additional damage to hardware or software if the device is left operating. The lab technician should trace the source of the failure
- Turn the device off if the failure will create further damage to hardware or software if the device is left operating

Tools

- Ensure that guards are installed on all paper cutters
- Pointed implements, such as thumb tacks, should be stored with points concealed
- Pencils, pens, letter openers, knives or scissors and other sharp items should be stored in an appropriate container with points downwards

Piles

- Reams of papers, boxes, students workbooks and others materials should not be placed on floors or piled precariously on desks and tables.

- Implement a paper recycling programme to cut down on paper clutter and build up

Guidelines for Industrial Education

Housekeeping and safety are crucial components of industrial arts education lab management. An environment that is organised with these components in mind, will not only provide a safe work, space but also serve to enlighten administrators, teachers and students of standards which are critical to the overall operation of the lab.

Facilities

- Ensure that work areas are free of waste materials, such as wood shavings, chips, waste wires and other materials, created as a result of practical operations
- Clean machines, such as table saws, lathes, and drill press of dust, chips and burrs after use
- Organise heavy duty equipment and furniture, including machines and work benches, to allow adequate space for teachers and students to operate machines and other equipment as well as to facilitate easy cleaning of all areas in the laboratory
- Clean parts, sharpen blades and oil moveable parts of all categories of tools
- Mount appropriate safety signs over stationary heavy duty equipment to remind operatives of safe practices

- Paint demarcation lines around machines indicating danger zones in accordance with lab standards

Emergency Equipment

- Provide fire extinguishers in each lab – CO2 extinguishers only to be used on electrical fires
- Strategically locate fire extinguisher for easy retrieval
- Provide wash sink to wash off corrosive chemicals and to flush wounds
- Install in the main lab: bench, power supply and breaker panels

Tools and Equipment

- Identify blown fuses or circuit breakers as evidence of equipment malfunction and rectify these kinds of situations before replacing spare parts.
- Use vacuum systems if at all possible on sanding equipment to reduce the emission of dust particles.
- Provide support devices such as 'V' Blocks for round and irregular stocks when using equipment such as the drill press and band saw.
- Sensitise laboratory users to the appropriate stance/position to be taken when operating any equipment. e.g. impact wrenches, table saws, lathes, welding, soldering etc.

- Ensure that all machines are equipped with appropriate guards
- Provide appropriate safety gear for all students to carry out operations such as welding and soldering
- Provide additional welding clothing to prevent burns from ultraviolet and infrared rays as in the case of arc welding. E.g. 12 density shade helmets for *TIG* and *MIG* welding
- Provide appropriate screens to protect others before welding commences
- Ensure that all machine parts are tightly secured before use especially in the case of rotating machines such as the milling machine, lathes, and drill press etc.
- Provide table brooms to remove chips and rags to wipe down machines as in the case of the lathe and the milling machine
- Enforce safety rules governing the use of keys and wrenches on rotating machines such as the lathe
- Outline appropriate steps to be taken in carrying out basic maintenance of all machines

Categories of Safety Considerations for Tools and Equipment

Operational Procedures

Students should be sensitised about the overall operation of machines in the lab before they are allowed to carry out any task on them. Formal sessions should be conducted by teacher informing students of machine components, principles of operation, safety considerations and basic maintenance.

Machine Guarding

Machine guarding is critical to the safety of operators. Instructors should ensure that the machine guard is in place before a practical operation is carried out. A guard is a barrier that prevents the entry of the operator's hands and fingers into any part of a machine or piece of equipment where they may be cut, or caught between moving parts, between moving and stationary parts, or between the material and moving parts of the machine.

Stability of Machines

All machines (stationary power tools) should be firmly fixed to the floor in order to reduce the risk of accidents and inaccuracies due to vibration. Periodic checks should be done to ensure that this standard is maintained.

Firmness of Cutters/Blades

A loose cutter/blade could cause serious injuries. Ensure that these machines components are firmly installed before any work is carried out on machines in the industrial technology labs.

Adjustments to Machine Parts

Most machines in the industrial technology lab operate at high speeds (especially rotating machines). All adjustments to machines should be done before they are turned on. Instructors should ensure that no attempt is made to adjust any part of a machine while it is in motion. Power tools such as routers, jig saws and drills should be plugged out before blades/bits are changed.

Cutting on Machines

In the case of machines such as the table saw, the appropriate fences should always be used. Free hand/unguided cutting is absolutely prohibited. Stocks between the blade and the fence should also be controlled until they pass the blade.

Machine Service

The servicing of machines is critical for efficiency and safety. A poorly serviced machine compromises the kind of accuracy required by the user, increases the chance of malfunction and increases the probability of an accident. Dull blades, unlubricated joints and moveable parts and a rusty machine table are some of the factors that constitute a poorly serviced machine. Instructor should ensure that basic maintenance is carried out to reduce machine operational risks and malfunction. Servicing of equipment should be done by qualified personnel.

Material Quality

In the case of timber, operator should be aware of staples, grit and other debris in the wood well as loose knots and severe checks when any form of cutting is to take place. Failure to check for irregularities could result in danger to the operator and damage to equipment.

Circuits

To prevent electric shock instructor should ensure that all circuits are de-energised before work commences. Pull the plug, turn off the breaker or disconnect the battery – follow lockout procedures. Teacher must be consulted before any work is carried out on live circuits.

Attachments for Dust Control

Appropriate dust covers/bags must be installed in order to reduce dust levels in the lab. Faulty dust collectors must be repaired and properly installed to reduce the case of respiratory illnesses. Appropriate safety gear should also be worn in this case.

Safety and Housekeeping Guidelines for Home Economics

Culinary, Personal Services, Hospitality and Tourism

Laboratories should exemplify the principles of good management in order to achieve safety for all users. The aim of this section is to provide updated information on safety guidelines related to these facilities, equipment and tools, materials and supplies and people. The advice and information provided are by no means exhaustive; teachers/instructors are encouraged to exercise great care and sound judgment in their daily teaching and general management of the laboratories so as to minimise the risks of accidents/incidents.

Facilities

- Work surfaces should be smooth, made from suitable and easily cleaned material to ensure cleanliness. There should be no cracks or open joints that might act as dirt traps. The recommended height for work surfaces should be between 34 and 36-inches.
- Proper waste disposal systems must be in place. Plastic containers are the most suitable for use. Each work station should have one container
- Food preparation laboratories should be outfitted with double doors

- Cooking gas cylinders should be stored in large containers outside the laboratory. A minimum of 2 containers should be allocated to each laboratory. The gas containers should be properly identified and preferably fenced off, so as to reduce access to unauthorised persons. Copper pipes which carry the gas should be checked constantly for leakage

Storage and Handling of Materials and Supplies

- The storage of materials, tools and equipment should be carefully arranged for safe and effective work, e.g., the storing of heavy articles should be placed at the bottom of the cupboard
- Store fabric scraps in bins or other secure containers with a lid.
- All pesticides, chemicals used in experiments on fabric and stain removal agents should be kept away from food areas in a secure place. These substances cannot be misused and taken by students without permission. Appropriate hazard warning symbols and identification labels should be attached
- Only limited supplies of acid, or other chemicals, or highly flammable liquids such as acetone, methylated spirits and white spirit used in cosmetology classes, fabric testing, stain removal and other work should be kept in stock.

Store these in plastic bottles, which do not break when dropped. All these should be labelled and kept in a locked cupboard or container

- Do NOT store poisonous substances into beverage bottles, cake tins, and jam jars etc. which may easily be mistaken to contain edible substances
- Do NOT store food items on the ground; they must be stored at least 6 inches off the ground
- All food items must be stored appropriately i.e. dry or cold storage
- If ingredient is to be stored in a container other than the original package, ensure that the container is properly labelled
- Food items must be stored in the designated area. Storage areas must be adequately secured and labelled
- Isolate scientific apparatus and chemical reagents from food preparation and clothing and textiles areas to prevent contamination of food and damage to fabrics
- Perform burning tests on samples of fibres or fabrics in a well-ventilated area.
- Do NOT use different chemicals together. Chemicals if mixed inadvertently can react together violently
- Do NOT use carcinogens, that is, chemicals causing or suspected of causing cancer e.g. benzene, carbon tetrachloride for removing stains

- Handle cleaning agents, disinfectants, bleaches and stain removers carefully. Avoid contact with the eyes at all times
- Rinse hands carefully after using detergents and chemicals to prevent skin irritation.

Clothing

Appropriate clothing for practical activities should be worn as required. These include laboratory coat/overall/apron. Clean clothing should be worn at the start of each practical activity. Avoid wearing loose clothing, ties or jewellry that may become snagged in equipment or may come in contact with hazardous materials. Earrings and rings should not be worn in food preparation laboratories

Cooking Tools and Equipment

- Turn handles of cooking utensils inward, on top of stove and work areas. As best as possible, match pot with burner size
- Check handles of utensils to be sure that they are securely attached
- Handle hot pans with dry potholders or kitchen mitts
- Do NOT use ceramic ware if the glaze is cracked
- Do **NOT** place hot cooking containers in an area where other people may come in contact with them

Cutting Tools and Equipment

- Keep handles of knives clean and free from grease
- Never use fingers or hands to test the sharpness of the cutting tools
- Use the right knives/scissors for the particular job
- Always use knives on a chopping board, cutting away from the body
- Place knives and scissors flat on the chopping board or the table when not in use
- When carrying knives/scissors, hold the points downwards.
- Take care when putting sharp blades into the washing up bowl and in removing them from the water
- Wash knives individually and store with blades pointing downwards either in a drawer or in a special rack. DO NOT store in sink
- Dry cutting equipment in the air after washing
- Avoid using tools which are found chipped, rusty or blunt
- Adequately guard blades on food grinders, choppers and slicers
- Unplug electric knife after use
- DO NOT play with sharp instruments

Sewing Tools and Equipment

- Ensure sewing machines are installed with finger guide/needle guards to prevent injury
- Beware of the danger of long hair (which should be tied back) and

loose clothing from trapping in the machine

- Place pins and needles in pin cushions or pin cases
- DO NOT place pins and needles in mouth
- Permanently equip each sewing machine with a guard which must be attached to the machine so that the operator's fingers cannot pass under the needle
- Close sewing machine carefully to avoid damaging electric cord.
- Avoid putting excessive weight or pressure on sewing machine

Pressing Equipment

- Place hot iron on the end on a suitable heatproof surface during use.
- Never test the heat of an iron using one's hand
- Do not add water to a plugged-in steam iron
- Allow the iron to cool before putting away
- Never leave hot irons unattended
- Position ironing boards that students have access to use without having to step over trailing flex
- Use a well-balanced, non-flammable ironing board
- Unplug iron after use

Gas Appliances

- Have the cooker or burner placed on a stable and level surface of a standard height (i.e. the cooking bench of the home economics laboratory)
- Store grease containers away from range, and clean oven and broiler pans to prevent accumulation of grease.
- Wash drip pans and burner caps in warm water and detergents regularly.
- Do not line the drip pan with aluminium foil as this might lead to ignition failure, and affect combustion efficiency
- Do not allow too much gas to accumulate in the oven before lighting it
- Wear suitable gloves for putting in and taking out food from the oven
- Do not touch the oven glass with bare hands during cooking

Electrical Appliances

- Use appliances for intended purposes only as directed by the manufacturer
- Keep any electrical appliance away from water. Do not immerse appliance in water unless labelled '***immersible***'

- Clean microwave ovens regularly and get them checked periodically to ensure that there is no microwave radiation leakage
- Place microwave ovens on non-combustible foundations, accessible from all sides and adequately spaced to permit the proper functioning of exhaust systems
- Insert beaters of electric mixer before plugging mixer into the power source
- Use utensils in the bowl of an electric mixer only when the mixer is not in operation
- Clean exhaust hoods and ducts regularly and guard fan blades that are 210 cm (7 feet) or less from floor
- Unplug all electrical appliances after use

Safety and Housekeeping Guidelines for Visual Arts

The laboratory should be spacious, equipped, organised, well ventilated and lit. It should also be clean, visually stimulating and safe. The arrangement of space is of great importance. The environment should inform and engage the viewer and every inch of space used productively for instruction and inspiration. An orderly and stimulating environment helps the student to achieve more optimally. The teacher needs to evaluate the learning environment continually and make any changes necessary to motivate student learning.

Facilities

Display Areas

- Display areas should be clean and free from all visual distractions
- The teacher should select works of art generated by the students that are stimulating; causing other students to want to express themselves visually
- The teacher should select works of art done by the students that are arranged in such a manner to create harmonies and mood in the lab
- Use white or neutral display boards
- Have some space where a class can display all their work and discuss it

- Have secure display cases for both two and three dimensional work near the main entrance
- Apply the principles of design to the overall ambiance of the room.
- Allow time at the culmination of each class for *clean up* and critique of work
- Ensure that waste (e.g. wax, clay, dyes, plaster and pulp) is sorted for disposal in keeping with established standards

Sinks

- Place sinks where there is adequate space for ease of use and for traffic flow
- Ensure that sinks are equipped with sediment traps
- Enforce proper use of the sinks. They should not be used as a receptacle for garbage
- Ensure that sinks are in adequate supply and large enough to facilitate specialised tasks e.g. washing screens, handling dyes and dyed fabrics

Lighting

- Ensure that there is enough white light which may be achieved by the choice of bulbs and number, size and placement of windows in the lab

- Seek to provide facilities to regulate lighting for activities such as drawing. Spot lights are recommended for this purpose.

Storage and Handling of Materials and Supplies

- Have students' projects stored where they can be easily accessed by the students.
- Make available adequate storage and drying racks
- Ensure that all student work (completed as well as unfinished) is **appropriately** stored
- Provide clay bins and wet cabinets for storage of clay and clay products
- Put *papier machè* projects to dry in well-ventilated area
- Establish appropriate drying yard for wet fabrics
- Do not use any asbestos-containing materials, lead based glazes, and benzene in the art room.
- Do all spray painting outside of lab in well-ventilated areas and away from ignition sources
- Where possible, use water-based, pre-mixed paints instead of solvent-based ones.
- Never put paintbrushes in mouth.
- Minimise exposure to clay dust by purchasing pre-mixed clay.
- Use prepared glazes free of toxic components.

- All kilns must be directly vented to the outside
- Small kilns should be raised at least a foot off the floor with refractory bricks underneath
- Packing and operation of a kiln should be conducted by trained professionals ONLY
- When using a hand-carving tool, keep hands behind the tool and cut away from body
- Do not overheat wax. Use a temperature-controlled crock pot or double boiler.
- Projects should be stored where they can be easily accessed by the students
- Make available adequate storage and drying racks
- Make available storage for supplies and for unfinished projects.
- Include deep and wide drawer type shelving
- Maintain a lockable space for "**teacher only**" access for materials and equipment that may be too hazardous or valuable to use without supervision or special instructions
- Use electrical appliances/tools to heat, mix, spray, burn, etc. in accordance with the manufacturers' safety instructions
- Ensure proper ventilation in the art room so that contaminants may be diluted and eventually removed from the air
- Ensure that each laboratory is equipped with furniture, tools and equipment appropriate to the task e.g. donkeys, easels, light boxes

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APPENDICES

APPENDIX A

Glossary

Safety	Freedom from danger, hazards or accidents which could result from the use of materials, tools and equipment
Housekeeping	Management and care of facilities, tools and equipment in a hygienic and environmentally friendly manner
Laboratory	For the purpose of this manual, the term laboratory is used to include workshop, studio or any other specialised facility designed to accommodate the practical activities related to TVET instruction
Personal Protective Equipment (PPE)	Refer to protective clothing, helmets, goggles, gloves or other garment or equipment designed to protect the wearer from health and safety hazards
Disaster	Any natural or man-made event or circumstance which can significantly impact the school's operations

APPENDIX B

Accident/Injury Report Form

Respond to question 1-4 for all incidents

When and where did the incident take place? _____

1. Was anyone injured? Yes_____ No _____
2. Give details of the incident. **Be specific** (who, what, how, where, when)

_____

_____

_____

_____

_____

Respond to questions 4- 9 for incidents involving injury

3. Is there any regulation recommended to prevent recurrence of this incident?
4. Name of persons injured. _____
5. Status of person injured. Student_ Teacher _ Other (specify)_____

   What was the nature of the injury? _____
6. Was first aid administered? Yes _____ No _____

   If yes, by whom and nature of aid? _____
7. Was there need for further medical intervention? Yes ____ No_____

If yes, give details (attending physician, medical centre/ hospital and treatment)

_____

_____

_____

_____

_____

_____

Report prepared by:

_____

Signature: _____ **Date** _____

APPENDIX C

Laboratory Inspection Checklist

Place a tick ☑ in the appropriate box for each criterion.

Inspected by: _____ Department: _____

Signature: _____ Date: _____

1.0	LAYOUT	Yes	No	N/A
1.1	Area is tidy and well kept			
1.2	Adequate storage areas are provided			
1.3	Floor is free of obstructions			
1.4	Floor/floor coverings are in good condition			
1.5.	Exits are remotely placed from each other			
1.6	Layout of furniture readily supports free access			

2.0	ENVIRONMENT	Yes	No	N/A
2.1	Temperature is comfortable			
2.2	Lighting is adequate			
2.3	Area is free of bad odour			
2.4	Noise level is acceptable			
2.5	Ventilation is adequate			

3.0	EMERGENCY PROCEDURES	Yes	No	N/A
3.1	Written procedures are posted in general area			
3.2	Staff are aware of procedures and know emergency personnel			
3.3	Staff are trained and records kept			
3.4	Extinguisher of appropriate type and size is close by (within 10m)			
3.5	Extinguisher checked and tag updated			
3.6	Alarm can be heard in the area			
3.7	Escape routes are free of obstructions and in good order			
3.8	Emergency and hazard signage are clearly visible			

4.0	FIRST AID FACILITES	Yes	No	N/A
4.1	Location of kits is known to staff			
4.2	Kit easily accessible			
4.3	Kit checked every 3 months			
4.4	Qualified first aid personnel are available			

5.0	GENERAL FACILITIES	Yes	No	N/A
5.1	Washing facilities are adequate			
5.2	Lockers are available for stuff			
5.3	Areas kept clean and sanitized			
5.4	Cleaning chemicals labelled			
5.5	Access to OHS information on notice boards, e-mails and web.			

6.0	MANUAL HANDLING	Yes	No	N/A
6.1	Frequently used items are stored for easy access			
6.2	Heavy items are stored at/or below waist heights			
6.3	Step ladder are available for accessing items stored on high shelves.			
6.4	Repetitive operations are minimised.			

7.0	ENVIRONMENTAL ISSUES	Yes	No	N/A
7.1	Conservation on the use of utilities (gas, water, electricity).			
7.2	Paper use is minimised double sided photo-copying and printing done and recycling encourage.			
7.3	Recycling bins are provided for separation of waste materials e.g. metals, plastic, paper (organic and inorganic)			

8.0	ELECTRICAL SAFETY	Yes	No	N/A
8.1	Equipment has current test tags			
8.2	Extensions leads are used only for temporary power supply			
8.3	Electrical circuit panels, outlets and switches are equipped with secure covers.			
8.4	Power leads kept clear of floor			
8.5	Tags used on faulty equipment			

9.0	GENERAL WORKSHOP	Yes	No	N/A
9.1	Staff trained in general workshop procedures and safe work practices			
9.2	Warning and safety signage is in place			
9.3	Procedure, plant and equipment manuals are current and available			
9.4	Food and drink not permitted			

10.0	PLANT/EQUIPMENT	Yes	No	N/A
10.1	Procedures in place for plant use			
10.2	Staff trained in safe plant use			
10.3	Equipment left on after hours has contact and emergency details			
10.4	Hazard signs and operation checklist placed on/near equipment			

11.0	PAINTING	Yes	No	N/A
11.1	Respiratory equipment is properly maintained and used as required			
11.2	Paint and thinner are stored appropriately			
11.3	Ventilation is appropriate for painting operation			
11.4	Written regulations are in place for all painting operations			

12.0	WASTE DISPOSAL	Yes	No	N/A
12.1	Written procedures for handling and disposing of waste are in place			
12.2	Staffs are trained in procedures.			
12.3	Labelled waste containers are provided			
12.4	Waste is segregated and store away from drains			
12.5	Spill kits are available			
12.6	Waste is recycled where possible			
12.7	Regular waste disposal is done to minimise waste on site			
12.8	Procedures are in place to transport waste across the compound			

13.0	CHEMICAL ASPECTS	Yes	No	N/A
13.1	Written procedures for chemical handling and storage are in place.			
13.2	Written procedures for chemical spillage and disposal are in place.			
13.3	Staff trained in chemical handling and aware of procedures and hazards.			
13.4	Containers are labelled with chemical name and hazard symbols			
13.5	Chemicals are stored correctly away from drains and in cool secure areas.			
13.6	Gas cylinders correctly stored and/or secured.			
13.7	Spill kits are available and regularly maintained.			
12.8	Current chemical inventory is maintained			
13.9	Procedures are in place to transport chemicals.			

Other Comments: