

The Fabrication Lab

**Handling Biological Materials**

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| **SAFE WORK INSTRUCTION** |
| **Handling Biological Materials** |
| Activity Authorisation / Supervision | Use of the fabrication lab - Wet Lab is permitted after completing the relevant induction, but subsequently under general supervision and does not require specific authorisation.  |
| Description of the Activity | The Fabrication lab delivers a range of activities to participants which involve the culture, growth, harvest and post-harvest manipulation of biological materials and living organisms. These include practical, hands-on instruction in:* The establishment and maintenance of Kombucha cultures
* The harvesting, cleaning, treatment and drying of Kombucha pellicle
* The use of dried and wet Kombucha pellicle in manufacture of various artefacts
* Growth and preservation of fungal cultures
* Growth and use of slime mould cultures
* Isolation of DNA from human and other samples
* Preparation of biological materials for microscopy
* Growth and use of commercially available bacterial cultures, including extraction and manipulation of DNA
* Use of natural materials for dying
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| Tools, Equipment, Materials and Consumables  | 1. Kombucha, fungal and bacterial starter cultures
2. Nutrient solutions, including commercial formulations, agar plates, tea infusions, coffee infusions, liquid plant nutrient solutions, all including sugars (table sugar, molasses, and others)
3. Small and large capacity plastic or glass growth containers (from petri dishes to 25L growth vessels)
4. Measuring, transfer and disposal containers (plastic or glass)
5. Scalpels, forceps, probes and loops
6. Microscope slides, cover slips and mounting fluids
7. Urns and electric kettles
8. Spirit flames
9. Bunsen burner
10. Microwave
11. Electronic balance
12. Sterilizable workspace (plastic workbox)
13. Washing machine
14. Infection control and cleaning chemicals (including acetic acid (vinegar) solutions, domestic anti-bacterial agents, alcohol sprays and wipes, detergents, sodium metabisulphite sterilizing solutions)
15. Post-harvest treatment reagents including vegetable oils (linseed, canola, coconut), Vaseline, fabric dyes, sodium bicarbonate
16. Post-harvest treatment technologies, including sewing equipment, cutting and carving tools, laser cutter
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| Interim Safety Assessment (ISA) | An Interim Safety Assessment (ISA) must be completed and approved by a Program Coordinator before commencement of an activity when:1. The activity will not be facilitated by an SLQ staff member or inducted contractor.
2. The activity will not be conducted in and around The Edge or on SLQ premises *(see SWI for Activities to be Conducted Off-site or in a Public Space).*
3. The activity requires the use of tools, equipment, materials or processes not detailed in Section 2 or 3.
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| Hazards associated with equipment /machinery/technique /process | Most activities in this skill area occupy a low risk profile with the majority of activities taking place in controlled environment of The Edge’s Basement Wet Lab. The general risks associated with these standard activities include:1. Trips, slips and falls
2. Electric shock
3. Hot liquid spills (boiling water)
4. Ergonomic
5. Personal safety (splashes, skin irritation, stick injuries and cuts)
6. Communicable disease from co-participants
7. Exposure to environmental hazards (including allergens)
8. Exposure to chemical hazards (acids, cleaning chemicals, microscopy stains and mounting media)

 Workers and participants are also exposed to other risks due to specific processes and materials that are employed in activities using biological materials. Risk of injury from task specific processes and materials listed in Section 3 include:1. The range of hazards (contact, inhalation, ingestion) associated with chemicals, including acids, sterilizing and cleaning agents
2. Exposure to hazardous allergens and potentially infectious agents (eg: fungal spores, and others dependent on individual sensitivities).
3. Exposure to particular ergonomic hazards involving lifting and transport of large containers of liquids.
4. Blade and piercing injuries when using scalpels, needles and probes
5. Burns from naked flames
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| Before Starting  | 1. Check workspace for general tidiness and especially potential slip hazards from spilled liquids.
2. Obtain Hot Work permit if urns or other heating equipment is to be used (not required for microwave)
3. Ensure all required equipment and materials are in the workspace and ready for use in the session, including waterproof disposal containers if required
4. Have sharps disposal container ready if required
5. Where possible re-route cables trailing across walkways. Use cable trays or gaff were unavoidable.
6. Storage or consumption of food and drink in activity spaces is to be avoided.
7. Encourage ergonomic work practices and encourage regular breaks.
8. Encourage good manual handling practices (remove excess liquids before lifting, request assistance where possible) and provide appropriate equipment (dolly carts, trolleys) to assist with larger loads.
9. Address interpersonal difficulties according the *Patron Responsible Behavior Policy* and seek assistance from VSOs or SLQ staff member on duty.
10. *VSO Daily Procedures* and the *Fabrication Lab Daily Procedures* include regular wiping down of all tables, keyboards, mice and computer screens with antibacterial wipes. However if you have particular concerns do not hesitate to collect wipes from reception and rewipe these surfaces.
11. **Ensure all powered (240v+ corded) tools/ devices to be used in a workshop have a current tag test sticker.**
12. **Ensure PPE, safety / fire fighting equipment is in place and ready for use.**

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| Personal protective equipment (PPE) to be used | 1. Appropriate clothing and foot-ware should be worn at all times during this activity.
2. Disposable Gloves are provided for those with sensitive skin, and should be always used when manipulating live cultures of fungi and bacteria
3. Wash hands thoroughly with supplied hand soap after completing the activity.
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| Emergency procedures | 1. If cultures show visible signs of contamination (mould growth), inform the supervisor and avoid using the material until contamination is removed.
2. First aid kits are located at Reception, the Back of Lab 4, The Edge staff office, SLQ Reception and the Cultural Centre Security Office.
3. The Cultural Centre Security office phone number is 07 3840 7216.
4. All incidents, **including near misses**, are to be reported to VSO or staff member on duty.
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| Step by step procedures for task  | 1. When using cleaning solutions, sterilizing agents, microscopy materials and anti-contamination treatments, read and implement the instructions for safe use provided by the manufacturer
2. Have sterilization solutions in suitable containers on hand to take used instruments, and empty at the end of the procedure. Do not leave equipment in sterilization containers on benches or in work areas after completing the activity.
3. Plan workflow and have suitable equipment on hand when using hot liquids. Allow nutrient solutions to cool after preparation and before use both to protect the operator and prevent damage to the cultures. Handle heated containers with the mitts provided.
4. Prepared media, samples and work in progress should be stored in labelled containers, with date and contents clearly marked. Ownership should also be indicated.
5. Ensure growth containers are stable and easily accessible when transferring growth media and removing waste.
6. Limit opening of growth containers while culturing to avoid contamination of both cultures and the workspace.
7. Where possible, actively growing cultures should be housed in closed growth chambers, with appropriate warning signs
8. Check growth containers regularly for signs of contamination, and if observed, bring to the attention of the supervisor for treatment.
9. After harvesting Kombucha pellicle, transfer to a solution containing anti-fungal and anti-bacterial agents sterilize the cultures and prevent growth of contaminants.
10. Transfer of fresh Kombucha pellicle will involve potential spills, which should be avoided by using appropriately located transfer containers. Clean up any spills immediately and deploy wet floor warning signs as needed.
11. Wash used containers and equipment at the end of use. Do not leave dirty equipment on benches, and clean surfaces after use with sterilizing agents if necessary (eg: alcohol solutions, disinfectant). Dispose of single use equipment and contaminated probes appropriately, using sharps disposal or bagging before discard in the general waste stream.
12. Where possible ensure work is secured positively to the workbench before applying any force in the use of any cutting tools (eg: scalpels, knives, Dremel).
13. Wash hands after and during procedures that involve exposure to growth media, live cultures and harvested material.
14. Staff and Participants are not to introduce electrical/ electronic equipment or devices to an activity space that has not been deemed safe prior to the commencement of the activity.
15. **Members of the public (participants) may use the Wet Lab after successfully completing a Wet Lab Induction and under the supervision SLQ staff and or contractors expressly authorized to supervise Participants.**
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| Clean-up procedures  | 1. Participant benches will be cleaned down of any operation and all equipment is to be returned to its place in the cupboards.
2. Floors need to be mopped if spills occur, and wet floor warning signs deployed.
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| Waste disposal procedures  | 1. Liquid waste is to be flushed down the sink, followed by sufficient water to leave the area clean
2. Wet or dry Kombucha or fungal material can be disposed by wrapping in a plastic bag and then disposal in the general waste bins.
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| Record keeping  | NA |
| Prepared by: Date: | Peter Musk, Science Catalyst, The Edge5th November 2015 |
| Approved by, Date: |   |
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