	SKILLS CENTER **STANDARD OPERATING PROCEDURE**	**A BIOFIZZ** **PRODUCTON**
Lab Safety **Module Hours: 3**	**Effective Date: 04/14/2021** **PRQs**	**Revision # 1.1** **M. Stowell** **Checked: M. Guzie**

BACKGROUND

Lab safety and etiquette is paramount to a working laboratory. Proper safety procedures protect you and your fellow lab mates. This also ensures that all users of the laboratory feel safe knowing that personnel in the lab make safety a first priority.

1. PURPOSE

The purpose of this procedure is to understand the basic principles of lab safety and to be able to conduct wet lab work in a safe and productive manner.

2. SCOPE

This procedure applies to qualified skills center users.

3. RESPONSIBILITY

3.1. It is the responsibility of the user to understand and follow all safety guidelines in the skills center.
3.2. It is the responsibility of the user performing the procedure to fully document any deviations from current safety procedures.
3.3. It is the responsibility of the user to become trained in safety protocols and procedures.
3.4. It is the responsibility of all users to report any safety violations to either a student or faculty proctor.

4. DEFINITIONS

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4.1. Aerosol - Describes microscopic droplets that may contain infectious agents or toxins, similar to the droplets produced by a sneeze or a cough. Some laboratory procedures including sonication, centrifugation, vortexing, flow cytometry, fluorescence-activated cell sorting (FACS) and homogenization can produce aerosols. These procedures should only be performed within a primary containment device.
4.2. Antiseptic - An agent that kills or inhibits growth of microbes but is safe to use on human tissue (for example, iodine on a cut in the skin).
4.3. Biosafety Cabinet - A type of safety equipment used in biological laboratories that provides protection to the worker and/or materials through directed air flow or a fully sealed workspace.

4.4. Biorisk Assessment - A process used to identify acceptable and unacceptable risks and their potential consequences, including biosafety risks (risks of accidental infection) and laboratory biosecurity risks (risks of unauthorized access, loss, theft, misuse, diversion or intentional release). (WHO)

4.5. Decontamination - Disinfection or sterilization of articles contaminated with toxins or agents to make the articles safe for use or disposal.

4.6. Directional Air Flow - The flow of air from a positively pressurized space to a negatively pressurized space.

4.7. Disinfectant - A chemical agent that eliminates a defined scope of pathogenic organisms, but not necessarily all microbial forms (e.g., bacterial endospores).

4.8. Disinfection - The selective elimination of certain undesirable microorganisms to prevent their transmission to a susceptible host.

4.9. Doffed/Doffing - Describes the act of taking something off (e.g., doffing your gloves).

4.10. Donned/Donning - Describes the act of putting something on (e.g., donning a lab coat).

4.11. Efficacy - The ability to produce an effect. For example, a disinfectant must be efficacious against a particular infectious agent or toxin in order to be used against that agent or toxin.

4.12. EH&S – Environmental health and Safety.

4.13. HEPA Filters/HEPA Filtration - High Efficiency Particulate Air (HEPA) filters are used to efficiently remove microscopic particles, including biohazards, from the air stream. HEPA filters are used in biosafety cabinets and in laboratory airflow design.

4.14. HVAC System-The term used to describe the heating, ventilation, and air-conditioning systems of a building. The HVAC system includes the building supply and exhaust fans, the duct work, dampers, and the supply diffusor vents and exhaust vents in laboratories. Using fan speed and dampers, individual laboratories can create have the desired negative air flow into the lab from the common corridor (hallway outside of the lab). This negative air flow adds another layer of biocontainment.

4.15. Laminar Air Flow -The term describes unidirectional air, moving at a fixed velocity along parallel lines. The turbulence-free air forms a protective “curtain”. This moving “curtain” of air can be used as a barrier, preventing microscopic particles (including biohazards) from crossing the laminar flow air stream. Such particles will be caught in the air stream and directed to a HEPA filter for filtration to remove the particles from the air stream.

4.16. Negative Air Flow/Negative Pressurization - Negative air flow describes the process of exhausting more air from a space than is supplied. Negative pressurization is maintaining the barometric pressure of a room or space at a

pressure lower than its surrounding environment, which forces air to flow into the space from openings, such as under/around the door. This practice of maintaining negative air flow adds another layer of biocontainment (in addition to work done within primary containment devices). With air constantly being drawn into a laboratory, it is extremely difficult for a microscopic particle (including biohazards) to escape the room. Negative air flow also ensures that when the laboratory door is opened, air will flow into the laboratory instead of out of it.

4.17. Occupational Exposure - Any exposure to an infectious agent or toxin which occurs when a person is not a using appropriate personal protective equipment, during an equipment failure, or in an accident such as an animal bite or needle stick. This includes exposure of the skin, eye, or mucous membrane, needle sticks, inhalation, and contact with blood or other potential infectious materials that may result during the performance of a person's duties.

4.18. Personal Protective Equipment (PPE) - Specialized clothing or equipment worn by a worker to provide protection against infectious agents or toxins.

4.19. Positive Air Flow/Positive Pressurization -The term describes supplying more air to a space than is exhausted. This forces air from a positively pressurized space to a negatively pressurized space. This can add another level of biocontainment by creating positively-pressurized corridors (hallways) that will provide directional airflow into the negatively-pressurized labs. This ensures that air is always flowing into labs such that when the laboratory door is open, air will flow into the laboratory instead of out.

4.20. Primary Containment Device - Specialized items designed to capture or contain infectious agents and toxins (biohazards). Biosafety cabinets are one example of a primary containment device. (DSAT)

4.21. Risk Assessment - The process of evaluating the risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether or not the risk(s) is acceptable. (CWA)

4.22. Sterile - Free from living microorganisms.

4.23. Sterilization - A process that will assure that the probability of an item being contaminated by a microbe to be equal to or less than one in a million (10–6).

4.24. Sterility Assurance Level (SAL) - The probability of a viable microorganism being present on a product unit after sterilization. SAL is normally expressed as 10-x. SAL of 10-6 is most often used for sterile devices and drugs.

4.25. Standard Operating Procedure (SOP) - Describes a "cook book" style of performing laboratory procedures. Each SOP is documented and laboratory workers are trained so that every laboratory worker performs every task the same, as designated by the SOP.

5. RESOURCES

5.1. BioRaft Training https://www.colorado.edu/ehs/training

6. MODULE MASTERY TASK

1. Complete the following BioRaft trainings at https://www.colorado.edu/ehs/training
    a. General Biosafety Training
    b. Lab Safety and Hazardous Waste Generator Training (Web)

2. Visit the Skills Center in Porter B044 and complete the Skills Center specific items below using the skills center map to mark any locations.

Where are the two nearest outside exits from the building?

Where is the nearest fire extinguisher?

Where is the nearest fire alarm pull station?

Where is the first aid kit located?

Where is the nearest eye wash located and describe how it functions?

If a hazardous substance gets in your eyes, how long should you flush them before seeking appropriate medical attention?

Where should the following lab waste be disposed?

plastic pipette tips –

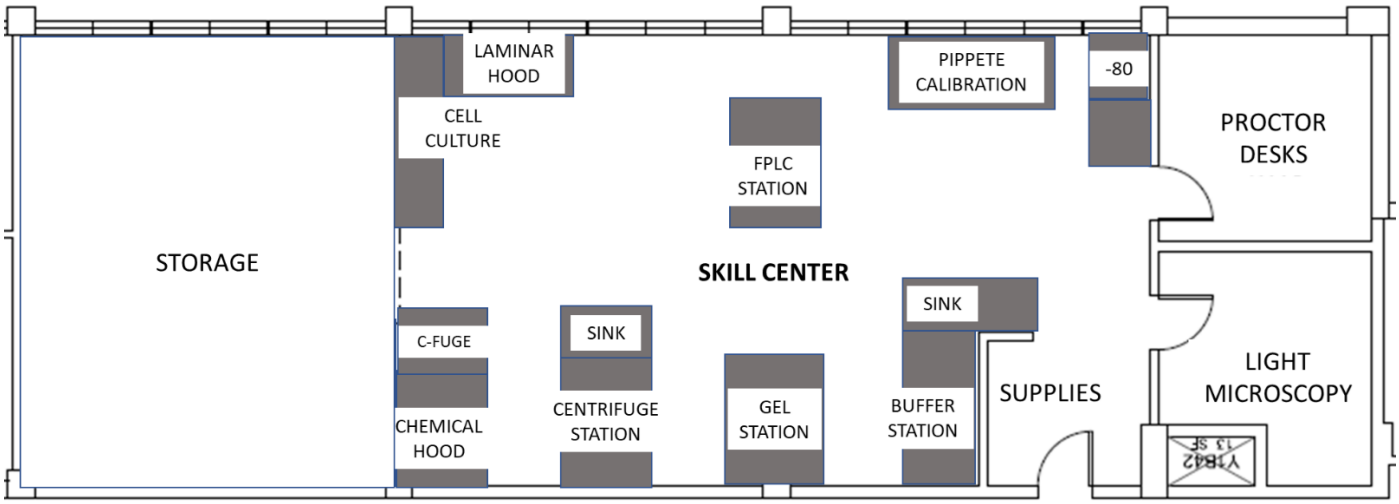
large pieces of broken glass –

media plates –

disposable gloves –

paper towels –

culture plates with cells-



3. Submit your MMT template with your Bioraft certificates embedded, questions answered and marked map of the SC lab.