

ENVIRONMENTAL HEALTH & SAFETY **RESOURCES** **AND SAFE PRACTICES**

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BIOSAFETY OFFICER



ACCREDITATION

THE UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE AND SCHOOL OF NURSING AWARDS **1.0 CONTACT HOUR** FOR NURSES WHO PARTICIPATE IN THIS EDUCATIONAL ACTIVITY AND COMPLETE THE POST ACTIVITY EVALUATION.

THE UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE AND SCHOOL OF NURSING AWARDS **1.0 HOUR OF PARTICIPATION** (CONSISTENT WITH THE DESIGNATED NUMBER OF AMA PRA CATEGORY 1 CREDIT(S)[™] OR ANCC CONTACT HOURS) TO A PARTICIPANT WHO SUCCESSFULLY COMPLETES THIS EDUCATIONAL ACTIVITY. THE UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE AND SCHOOL OF NURSING MAINTAINS A RECORD OF PARTICIPATION FOR SIX (6) YEARS.

DISCLOSURES

FULL DISCLOSURE POLICY AFFECTING CME ACTIVITIES: AS A JOINT ACCREDITED PROVIDER, THE UNIVERSITY OF VIRGINIA OFFICE OF CME/CE REQUIRES ATTESTED AND SIGNED GLOBAL DISCLOSURE OF THE EXISTENCE OF ALL FINANCIAL INTERESTS OR RELATIONSHIPS WITH COMMERCIAL INTEREST FROM ANY INDIVIDUAL IN A POSITION TO CONTROL THE CONTENT OF A CME ACTIVITY SPONSORED BY OCME.

DISCLOSURE SUMMARY:

NO ONE IN A POSITION TO CONTROL THE CONTENT OF THIS EDUCATIONAL ACTIVITY HAS DISCLOSED A RELEVANT FINANCIAL INTEREST OR RELATIONSHIP WITH ANY COMMERCIAL INTEREST

ACTIVITY CODE

- ACTIVITY CODE: 27052
- INSTRUCTIONS FOR CLAIMING CREDITS/CONTACT HOURS CAN BE FOUND [HERE](#).

OBJECTIVES

- Provide an overview of EHS resources with focus on Biosafety
- Review safe practices and procedures when handling biological materials, such as blood or body fluids
- Review appropriate handling of biological waste and sharps

ENVIRONMENTAL HEALTH & SAFETY MISSION

OUR FUNDAMENTAL MISSION IS TO SUPPORT THE RESEARCH, EDUCATION AND PATIENT CARE ACTIVITIES OF THE UNIVERSITY THROUGH PROMOTION OF A SAFE AND HEALTHY ENVIRONMENT.

WE ACHIEVE THIS BY PROVIDING HIGH QUALITY PROGRAMS, TRAINING, EVALUATION AND CONSULTATION DESIGNED TO MINIMIZE SAFETY, HEALTH, ENVIRONMENTAL AND REGULATORY RISKS TO THE UNIVERSITY COMMUNITY.

LOCATIONS



One Morton Drive



Special Materials Handling Facility

EHS CORE SERVICES

- **Biosafety**
- **Radiation Safety**
- **Fire Safety**
- **Chemical & Lab Safety**
- **General Safety**
 - **Indoor Air Quality**
 - **Ergonomics**
 - **Asbestos**
 - **Lead**
 - **Noise**
 - **Fall Protection**
 - **Laser**
- **Training & Education**
 - **In-person**
 - **Laboratory visits**
 - **Online modules**
- **Consultation**
- **Compliance Aid**
- **Waste Disposal**
- **Shipping**

EHS REGULATORY COMPLIANCE



LAB AND CHEMICAL SAFETY

- OSHA, EPA, Fire code requirements
- Advise on safe chemical use, storage and disposal
- Physical Hazards



ENVIRONMENTAL HEALTH & SAFETY

REGULATED WASTE DISPOSAL

- EPA
- NRC
- VA DEQ



ENVIRONMENTAL HEALTH & SAFETY

RADIOACTIVE MATERIALS

- Radioactive Materials & Radiation Producing Equipment:
 - Radioisotopes (C-14, H-3, P-32, etc.)
 - Irradiators
 - X-ray producing equipment
- Federal Regulations: U.S. Nuclear Regulatory Commission
- State Regulations: VA Department of Health – Division of Radiological Health
- Institutional: UVA Radiation Safety Committee
 - Radiation Safety Officer, Mike Welling



HAZARDOUS CHEMICALS

- Occupational Safety & Health Administration (OSHA)
 - Hazard Communication Standard 29 CFR 1910.1200
 - Safety Data Sheets (SDS)
 - Formerly MSDS
 - Hazard Communication Signs
 - Occupational Exposure to Hazardous Chemicals in Laboratories 29 CFR 1910.1450
 - Chemical Hygiene Plan
 - Chemical Safety Officer, Clarissa Lynch
- Environmental Protection Agency (EPA)
 - Hazardous Waste 40 CFR 260
- National & Virginia Fire Codes

ENVIRONMENTAL HEALTH & SAFETY



LYNCH, CLARISSA

Room(s): DEMO

CAUTION!
ADMISSION TO AUTHORIZED PERSONNEL ONLY!

When occupants are present, enter ONLY as instructed.
No Eating or Drinking except where posted by EHS.

Caution

Radioactive Materials

FIRE
4 D 4
HEALTH **REACTIVITY**
SPECIAL NFPA

BIOHAZARD

BSL-2

Additional Room Information & Special Entry Requirements

- Typical quantity of flammable liquid stored in this room: **3 gallons**
- Safety glasses must be worn inside the lab. (LYNCH, CLARISSA)

EMERGENCY CONTACTS

1. 434-982-4911 (M-F) SAM - SPM (LYNCH, CLARISSA)
2. 434-982-4911 (After Hours) (LYNCH, CLARISSA)
3. Environmental Health & Safety: 434-982-4911
4. Emergency Operator: 434-924-2012

This "Hazard Communication Sign" was created on: 04/21/2016.
To need a new sign or a copy of this "Hazard Communication Sign" call Environmental Health & Safety (434-982-4911). [Spec Mat Handling Fac: EHS - DEMO]



BIOSAFETY REGULATIONS

- OSHA Bloodborne Pathogens Standard 29 CFR 1910.1030
- CDC/NIH Biosafety in Microbiological & Biomedical Laboratories (BMBL)
- NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules
- Department of Health & Human Services/ US Department of Agriculture
 - Select Agent Regulations

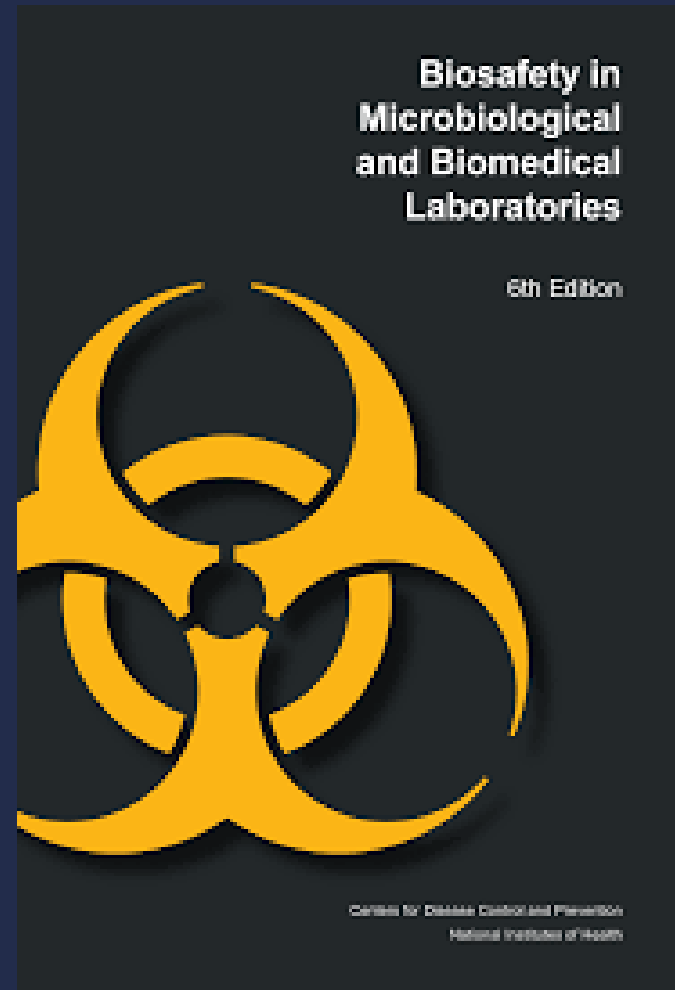


BIOSAFETY LEVELS (BSL)

- BSL1
- BSL2
- BSL3
- BSL4

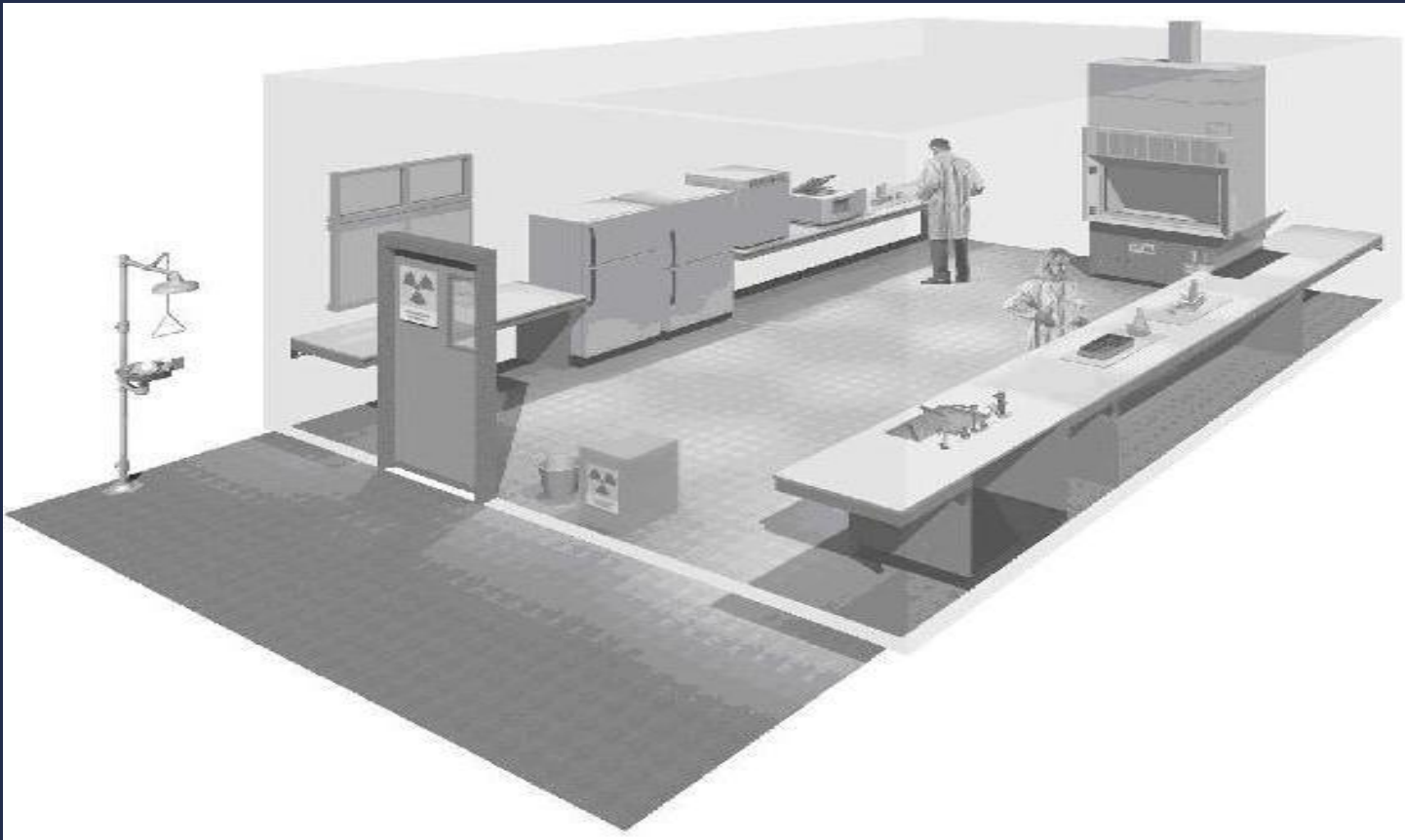
- ABSL1-4 (Animal)

- www.cdc.gov



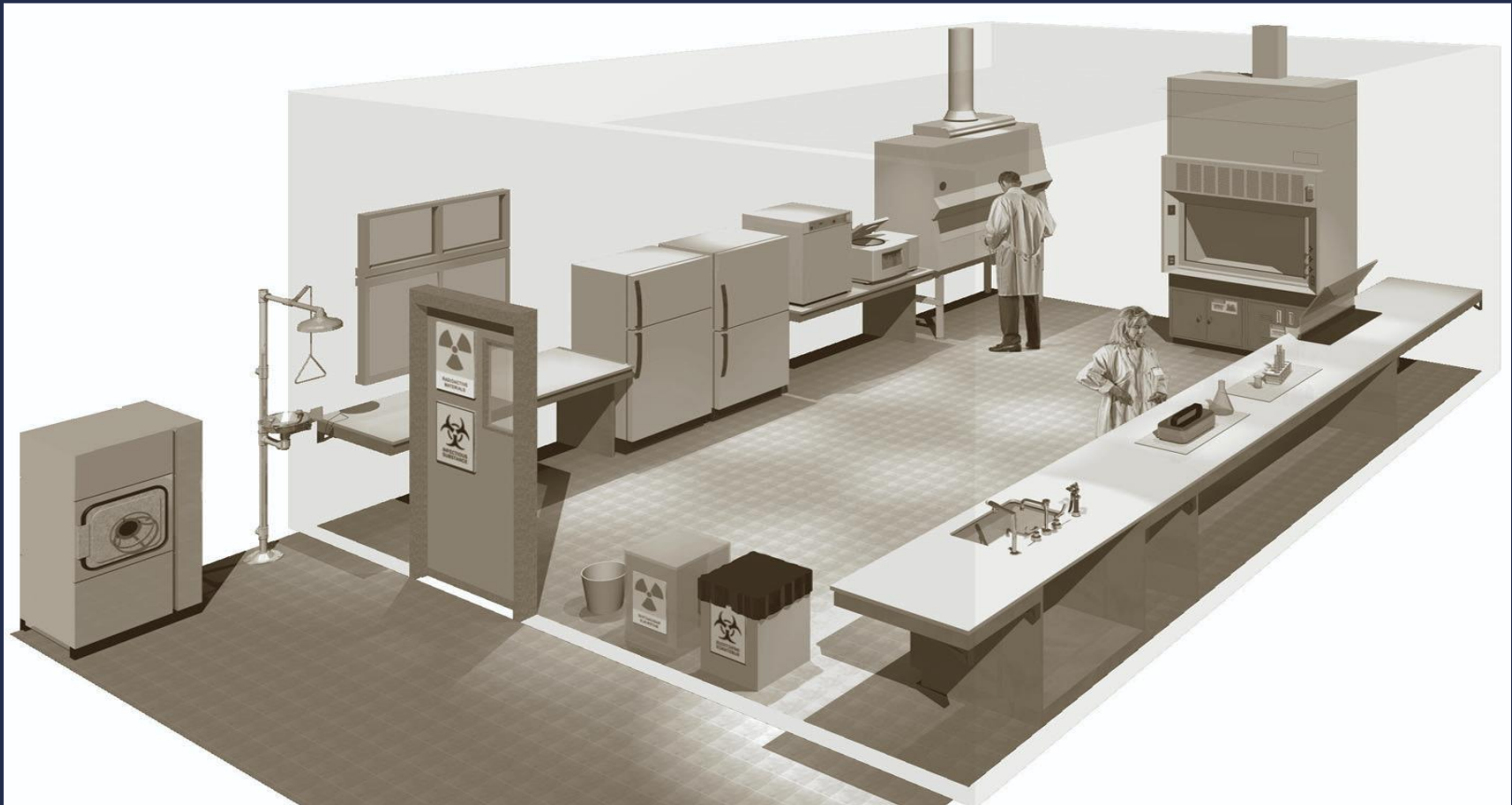
BIOSAFETY LEVEL 1

- Suitable for work involving well characterized agents not known to consistently cause disease in healthy adult humans, and present minimal potential hazard to laboratory personnel and the environment
 - Work is typically conducted on open bench tops using standard microbiological practices
 - Examples: E.coli K12, Bacillus subtilis, Canine adenovirus



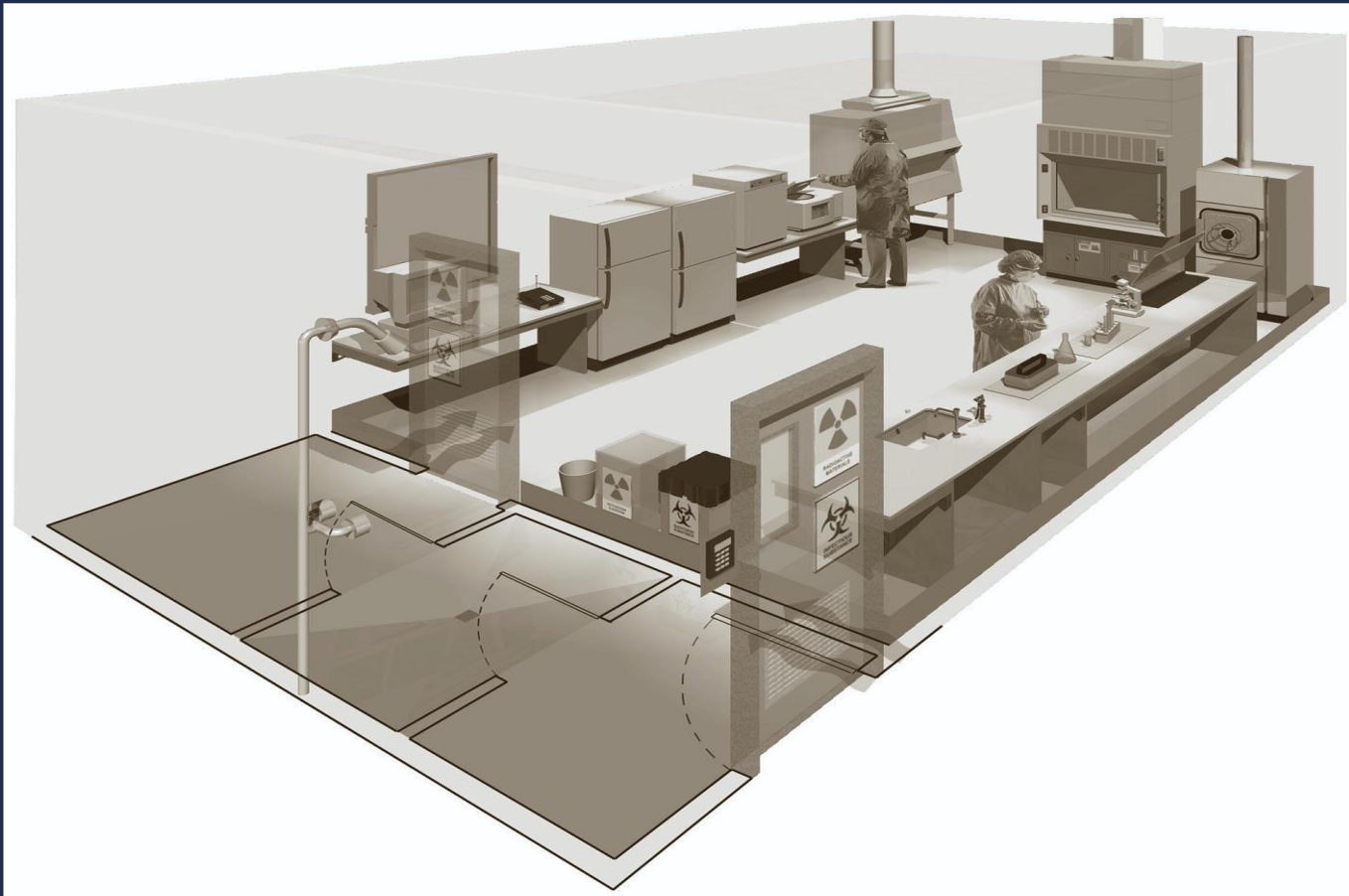
BIOSAFETY LEVEL 2

- Suitable for work involving agents that pose moderate hazard to personnel and environment
 - Requires personnel training in handling pathogenic agents, supervised by experienced scientists
 - Access to laboratory is restricted when work is being conducted
 - All procedures that may produce infectious aerosols or splashes are conducted in physical containment equipment, such as a Biosafety Cabinet (BSC)
 - Examples; Salmonella, Streptococcus pneumoniae, HBV, Toxoplasma gondii



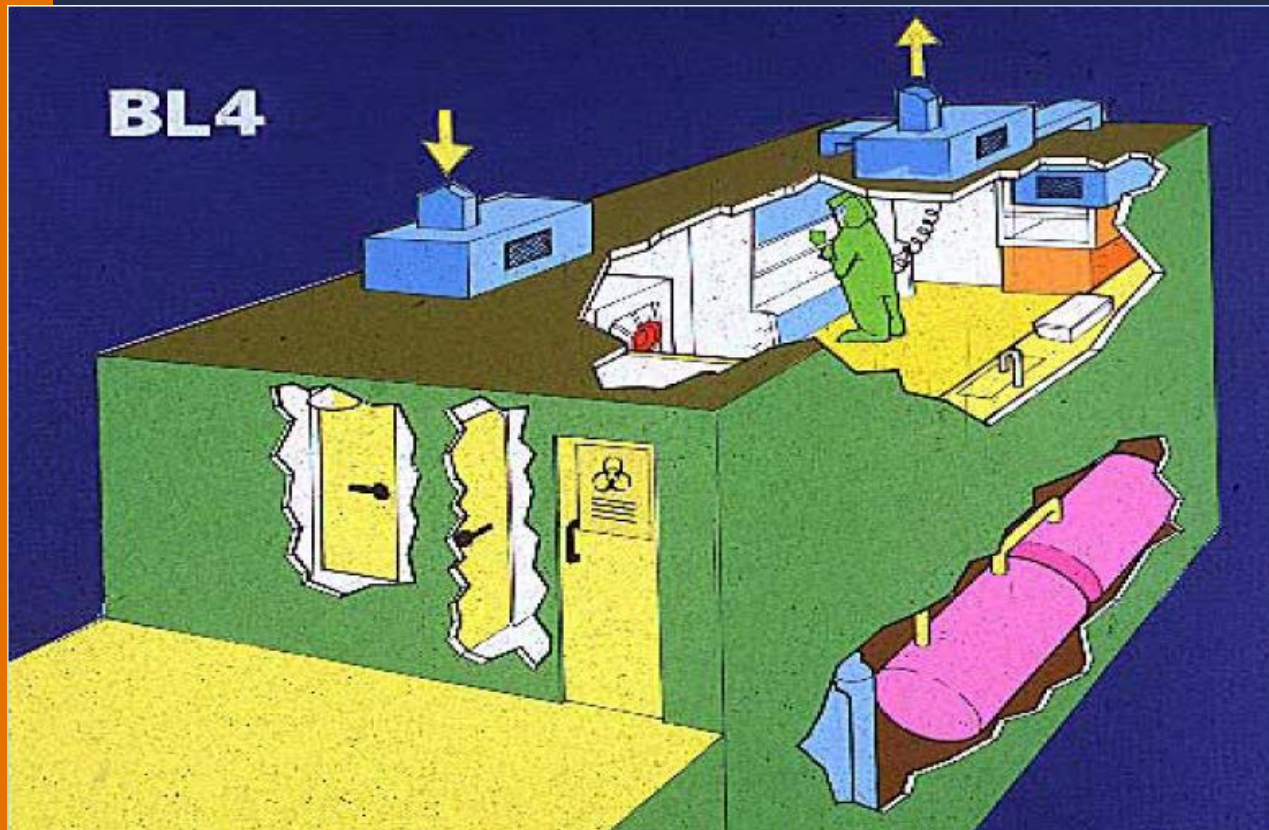
BIOSAFETY LEVEL 3

- Suitable for work involving agents that pose serious hazard to personnel and environment
 - Emphasis placed on primary and secondary barriers to protect personnel from potentially infectious aerosols
 - Examples: Mycobacterium tuberculosis, Anthrax, Yellow fever,



BIOSAFETY LEVEL 4

- Suitable for work involving agents that pose high risk of life-threatening disease that no vaccine or therapy is available
 - Facilities are usually separate buildings with specialized ventilation requirements
 - Examples: Ebola virus, Smallpox virus, Marburg virus



OSHA BLOODBORNE PATHOGENS STANDARD

29 CFR 1910.1030

- **Bloodborne Pathogen** – pathogenic microorganism present in human blood that can cause disease in humans
 - Includes other Body fluids, Tissues and Cells
- Requirements:
 - **Training**
 - Universal Precautions
 - Written Exposure Control Plan (ECP)
 - HBV Vaccination
 - Work Practices
 - Hazard Communication
 - Medical Services



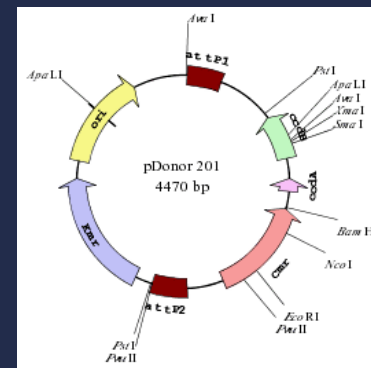
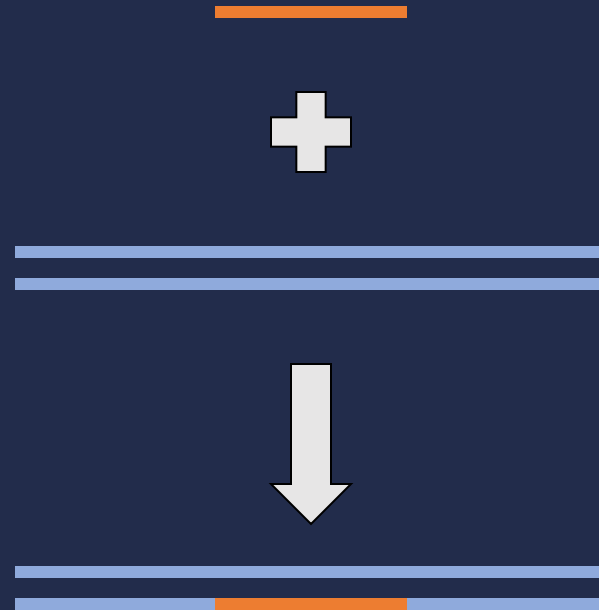
NIH GUIDELINES

- The NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules
- Apply to all agencies receiving grants from the NIH



RECOMBINANT DNA SIMPLIFIED

- Gene of interest
- Host/Recipient Genome
- rDNA



ENVIRONMENTAL HEALTH & SAFETY

INSTITUTIONAL BIOSAFETY COMMITTEE (IBC)

- Complies with CDC (BMBL) and NIH Guidelines
- Reviews safe conduct of rDNA
 - Human Gene Transfer/Therapy
 - Creation of Transgenic Animals & Plants
- Provide approval of use:
 - Human materials
 - Microorganisms
 - Toxins
 - Select Agents
- Biosafety Officer, Jennifer Kershner
- PI compliance
- Reports incidents and file an annual report to NIH Office of Science Policy (OSP)



BIOSAFETY PARTNERSHIP AT UVA

IBC:

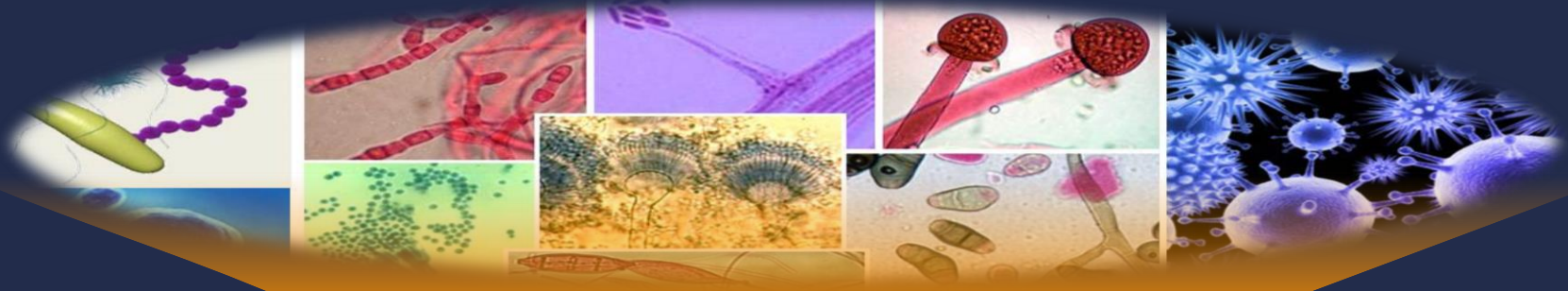


- Registering research with biological materials
- Recombinant DNA & Synthetic molecules

EHS Biosafety:



- Works closely with IBC to mitigate risks & prevent exposure
- Multitude of biosafety services



EHS facilitates these safety programs with oversight committees, providing a multitude of services

BIOSAFETY PARTNERSHIP

WITH ACUC AND IRB

Animal Care & Use Committee (ACUC):

- Registering research with animals
- Responsible for the oversight of animal care and use to ensure appropriate care, use, and humane treatment of animals being used for research, testing, and education
- Reviewed by IBC **First** if biological materials are involved

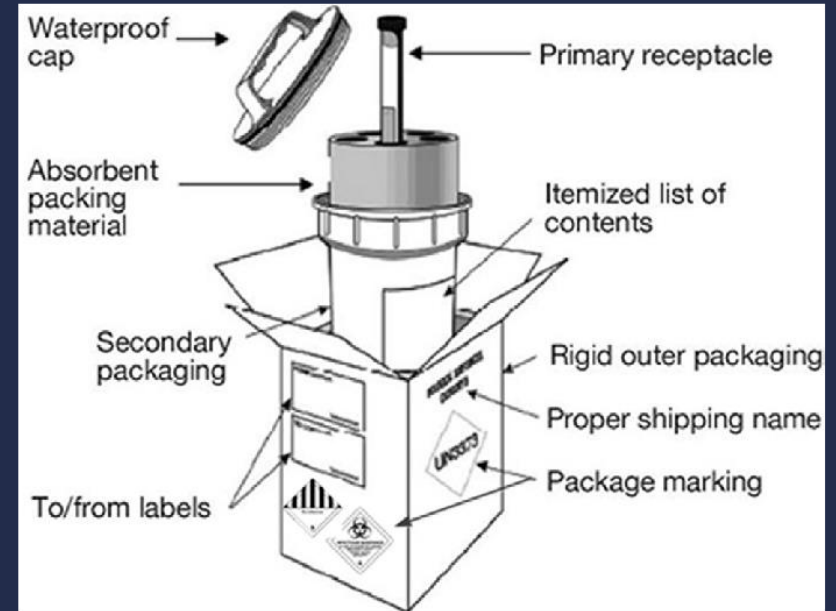
Institutional Review Board for Health Sciences Research (IRB-HSR):

- Reviews all medically related research involving human subjects conducted by UVA faculty, employees, and students
- Serves as the HIPAA Privacy Board for research involving Protected Health Information (PHI)
- Reviewed by IBC **First** if biological materials are involved, such as Human Gene Transfer (HGT) Products or collection of human samples



TRANSPORTATION & SHIPPING

- Department of Transportation (DOT) 49 CFR
 - Regulates shipping and transport of hazardous materials
 - Explosives
 - Gases
 - Flammables & Corrosives
 - Toxic & Infectious Substances
 - Radioactive Material
 - Miscellaneous (e.g. Dry Ice, GMO, GMMO)
- International Air Transport Association (IATA)



SHIPPING TRAINING

- Shipping Infectious Substances Training (IATA/DOT)
- Shipping Category B, Dry Ice and/or Exempt Specimens Training



TRAINING IS VALUABLE

- Search Training Records



ENVIRONMENTAL HEALTH & SAFETY
UNIVERSITY of VIRGINIA

Safety, Training & Record-keeping (STAR)

Welcome: **KERSHNER, JENNIFER (jmw4qs)**

What is Safety, Training & Record-keeping (STAR)?

- Safety, Training & Record-keeping (STAR) is an online application which will help faculty and staff to manage documentation of Federally required training and research related compliance data at the University of Virginia.
- In addition, the application will also help faculty and staff to manage documentation of any specialized training that they provide locally.

Can I manage data for someone other than myself?

- Yes! Start by selecting their name, then click "Next". If you receive an "Access Denied" message follow the on-screen instructions to gain access to that person's STAR data.
- If you do not see the name you are looking for, please call 434-982-4311.

Can someone else manage my STAR data?

- Yes! You may add them as a STAR Associate. STAR Associates can do everything you can do in the system.

Who should I add to my Personnel list stored in STAR?

- Persons who you directly manage.
- Persons who may utilize your laboratory, studio, and shop space (if your name is on [one of these door signs](#))

EHS CONSULTATION

- Welcoming new PIs
 - Providing new laboratory safety start up assistance
 - Research can begin quickly, while achieving compliance with regulations, guidelines, and policies
 - Call 982-4911 to set up an appointment



Clarissa Lynch,
Chemical Safety Officer



Jenni Kershner,
Biosafety Officer

SAFE LABORATORY PRACTICES **AND PROCEDURES**

ACTIVITY CODE

- ACTIVITY CODE: 27052
- INSTRUCTIONS FOR CLAIMING CREDITS/CONTACT HOURS CAN BE FOUND [HERE](#).

EMERGENCY SAFETY EQUIPMENT

- Know where your emergency equipment is located:
 - Eyewash
 - Shower
 - First Aid kit
 - Fire extinguisher
 - Telephone
 - Fire Alarm Manual pull station



PERSONAL PROTECTIVE EQUIPMENT

- Appropriate attire = long pants, closed toed shoes, etc.
- Lab coats or gowns
- Eye protection: Safety glasses, goggles, and faceshields
 - Plexiglass shields
- Gloves
- Surgical masks



LABORATORY SAFETY

- Basic Safety practices
 - Stay focused and aware of your surrounds
 - Don't work alone
 - No Food or Drink
 - Good Hygiene
 - Use proper storage/transport containers



HAZARD COMMUNICATION

- Label your work space



STORE CHEMICALS PROPERLY

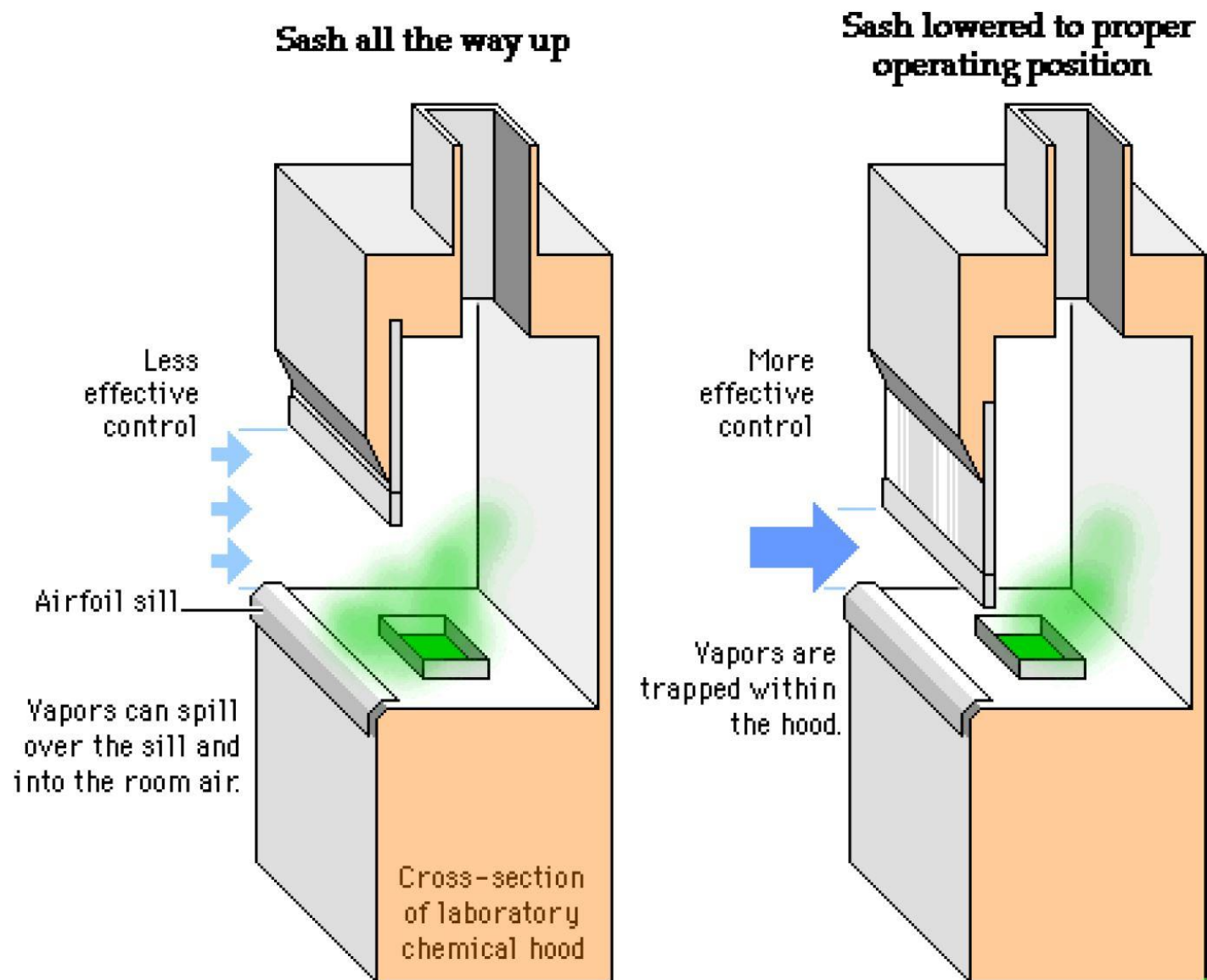


Chemical Hazard Always refer to the SDS	Flammable	Acid	Base	Oxidizer	Toxic
Flammable 					
Acid 					
Base 					
Oxidizer 					
Toxic 					

PRIMARY CONTAINMENT DEVICES



CHEMICAL FUME HOOD

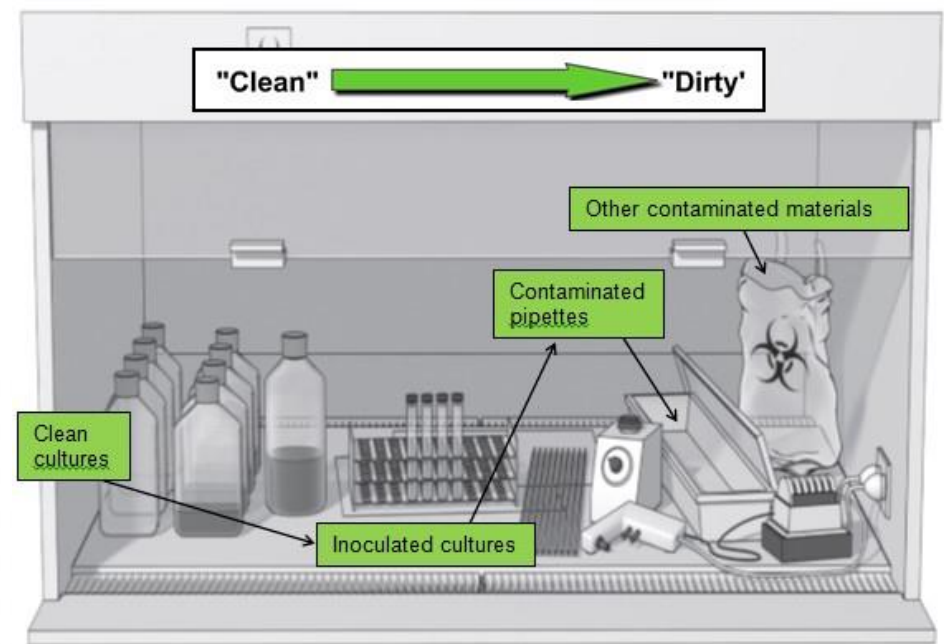
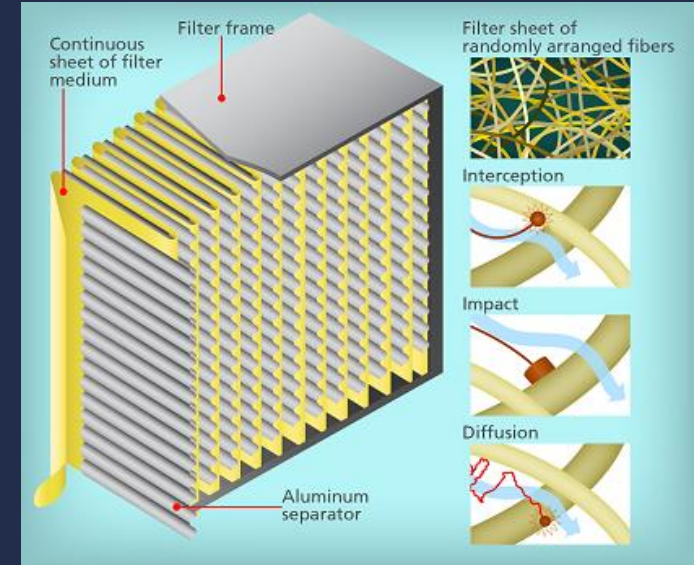


CHEMICAL FUME HOOD PROCEDURE

- Conduct all work at least 6 inches from the face of the hood
- Keep the hood sash closed as much as possible
- Keep hood slots and baffles free of obstruction
- Do not permanently store apparatus or chemicals in the hood. Store chemicals in an approved safety cabinet.
- Large equipment used inside the hood should be placed on blocks to allow airflow under the equipment.
- Do not put your head in the hood when contaminants are being generated
- Do not use the hood as a waste disposal mechanism (evaporation). Solvent bottles in the fume hood must be capped when not in use.
- Minimize foot traffic by the face of the hood
- Do not make fast movements when taking items in and out of the hood.
- Do not place electrical receptacles or other spark sources inside the hood when flammable liquids or gases are present

BIOSAFETY CABINET

- Can be found in some pharmacies, clinical microbiology lab, research labs, etc.



BIO SAFETY CABINET PROCEDURE

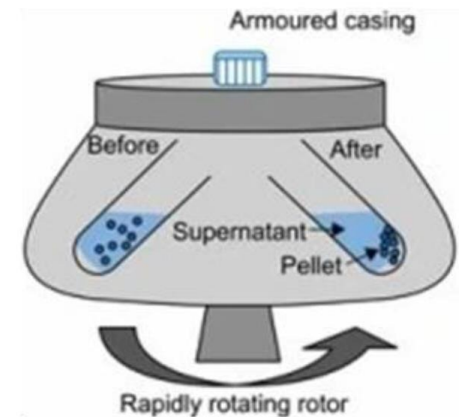
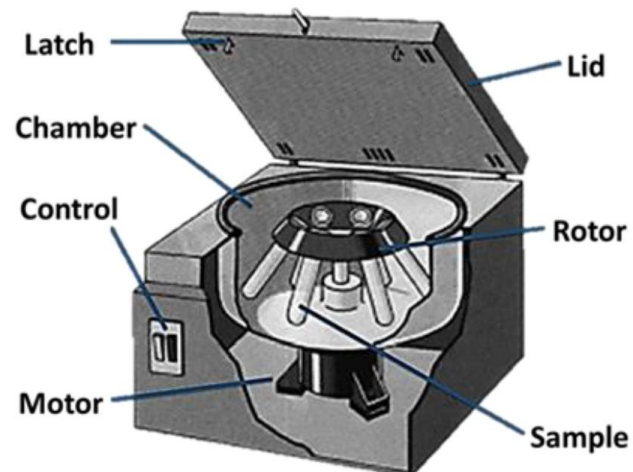
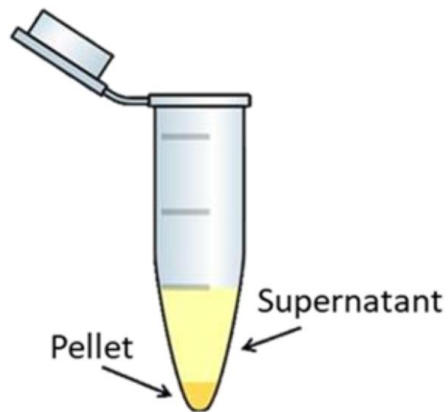
- Turn on the cabinet and allow to run for at least 15 minutes prior to beginning work.
- All work should be performed at least four (4) inches from the inside edge of the front grill.
- Work from clean to dirty. Avoid moving dirty items over clean ones to prevent cross-contamination of your experiment.
- Do not use open flame in the BSC
- Protect vacuum lines by using a HEPA filter and in-line disinfectant flask
- Dispose of waste materials in appropriate waste containers.
- Avoid repeatedly moving arms in and out of the BSC, which will compromise the air flow and containment
- After work is complete, wipe down all materials and surfaces with appropriate disinfectant before removing
- Allow the BSC to run for 15 minutes before turning it off.

BIOSAFETY CABINET MISTAKES

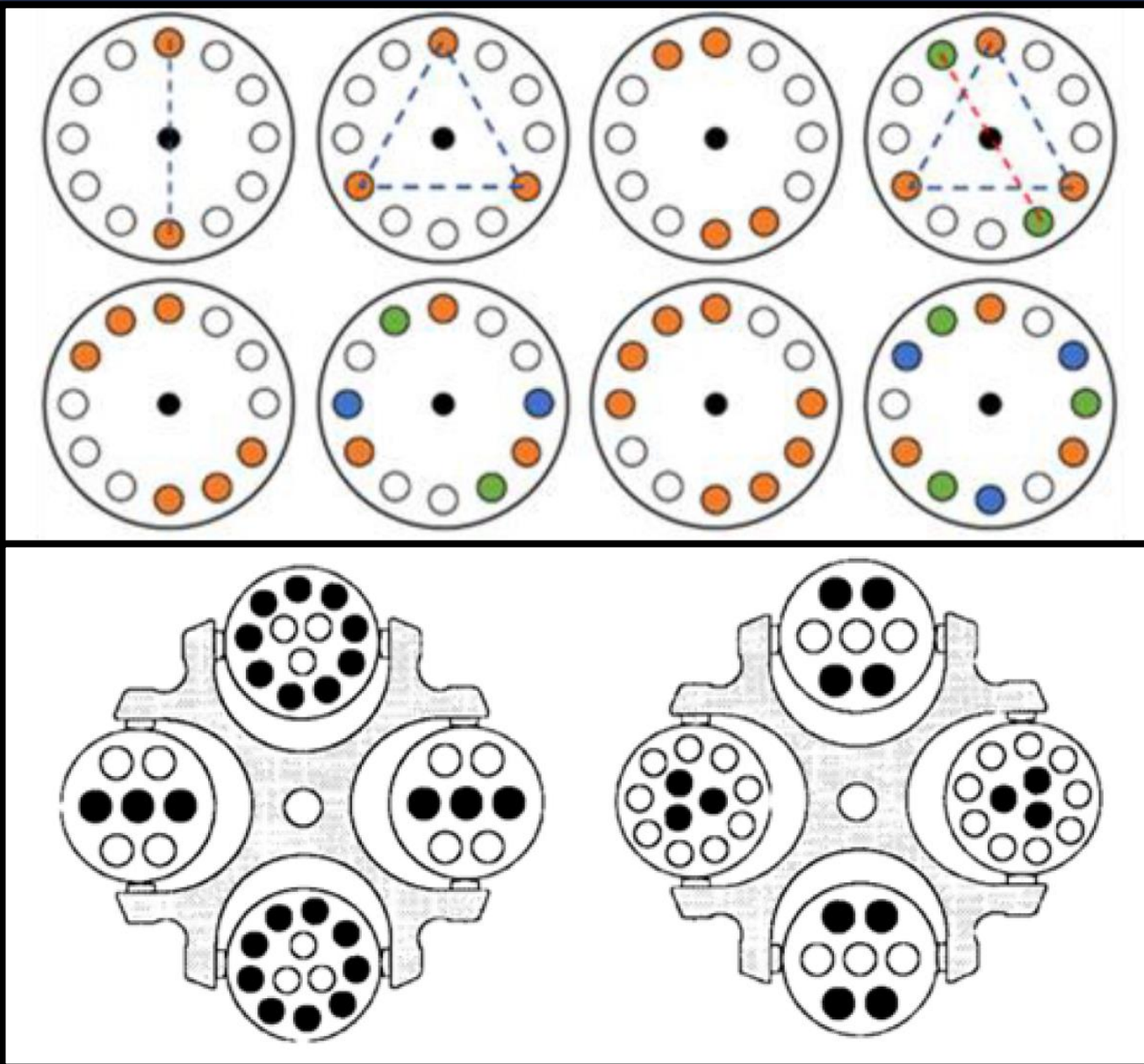


ENVIRONMENTAL HEALTH & SAFETY

CENTRIFUGES



CENTRIFUGE BALANCING



CENTRIFUGE PROCEDURE

- Never leave the centrifuge unattended until at operational speed
- If mechanical failure of the centrifuge occurs, immediately turn the centrifuge off and unplug
- Always use a centrifuge on a level and firm surface
- Never by-pass safety features
- Always wear the appropriate PPE
- Never open a centrifuge when it is running
- Allow the centrifuge to come to a natural stop
- Inspect all tubes and containers for cracks before using

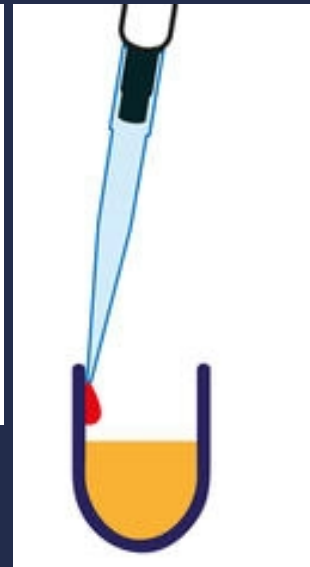
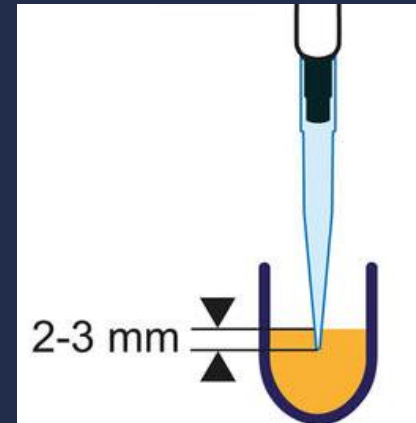
For BSL2 materials:

- Rotors must have aerosol containment (sealed/gasketed lid or safety caps) or used inside a BSC
- Wait 10 minutes after the rotor comes to a complete stop before opening the lid.



PIPETTING TECHNIQUES

1. Set pipette volume.
2. Gentle press new tip onto pipette. Hold pipette correctly.
3. Depress plunger to first stop
4. Immerse tip vertically into liquid and release plunger slowly
5. Place pipette tip at a 45° angle against tube wall. Press plunger to first stop
6. Press plunger to second stop to expel remaining liquid
7. Release plunger and remove pipette from tube
8. Dispose of tip into container/bag within the BSC



TRANSFER PIPETTE MEASUREMENTS



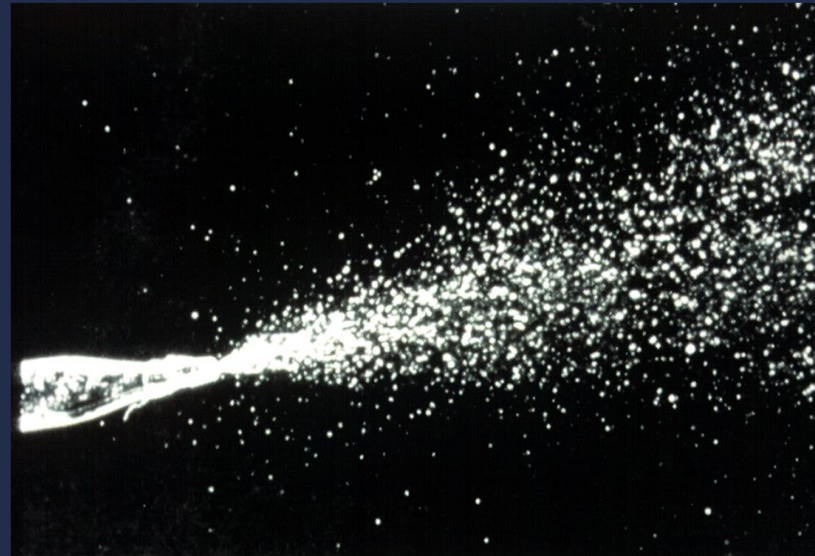
USING A TRANSFER PIPETTE

1. Select correct pipette.
2. Squeeze bulb and then immerse tip vertically into liquid
3. Release bulb slowly until you reach desired volume
4. Place pipette tip at a 45° angle against tube wall. Press bulb expel liquid
5. Remove pipette from tube
6. Dispose of tip into container/bag within the BSC

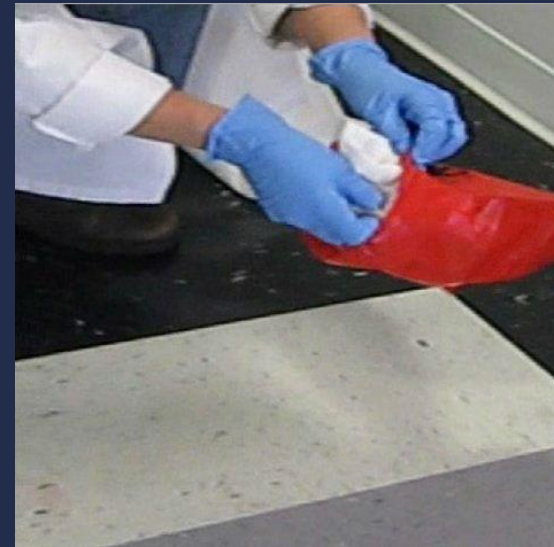
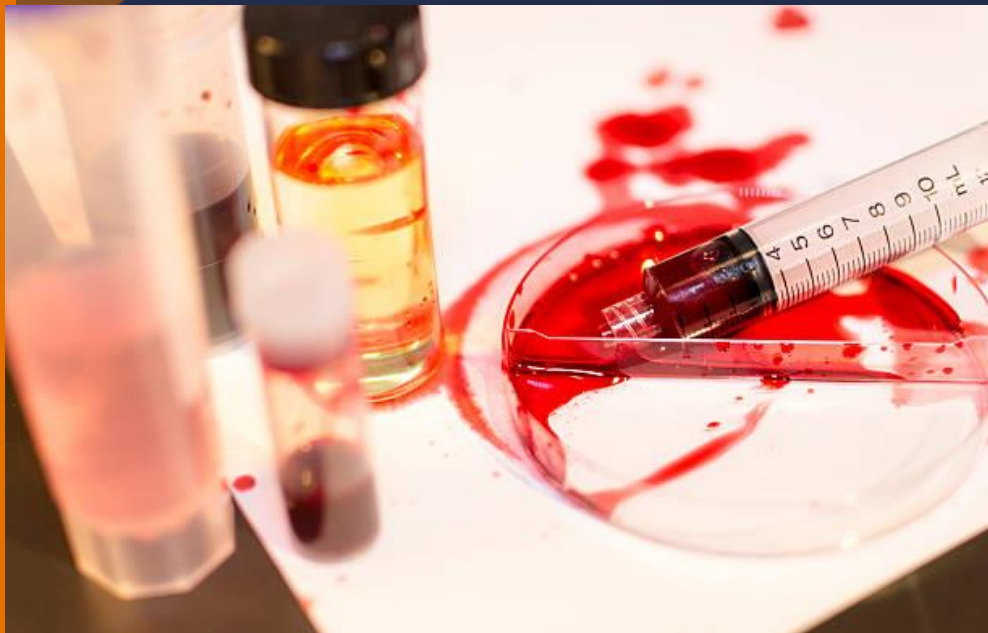


PIPETTING DOS AND DON'TS

- Never allow fluid to enter the pipetting device
- Do NOT forcibly expel materials from a pipette. This creates aerosols.
- Carefully eject disposable tip to minimize aerosol formation.
- Place reusable pipettes in a container with enough liquid disinfectant to cover them.
- Mouth pipetting is prohibited! Mechanical pipetting devices should always be used



SPILLS



REGULATED MEDICAL WASTE (RMW)

- Virginia Department of Environmental Quality (DEQ)
 - Regulates disposal of infectious or “biohazardous” waste
 - EHS performs most waste management, along with UVA Medical Center
- Stocks & materials contaminated with:
 - **Microorganisms** likely to be pathogenic to healthy humans
 - **Unfixed Human Materials**
 - **Other (contaminated disposables)**



RMW - SHARPS

- Always dispose in a Sharps container:
 - Needles
 - Syringes with Needles
 - Scalpels & Suture Needles
 - Glass Pasteur Pipettes
 - Lancets
 - Slides & Cover slips
 - Capillary tubes
 - Contaminated Broken glass & Other sharp items



INCIDENTS & REPORTING

- Report incidents and unsafe conditions to EHS, 982-4911
- Seek medical attention or consultation at
 - UVA WorkMed
 - Employee Health
 - UVA Emergency Room for severe injuries



RESOURCES

- [UVA ENVIRONMENTAL HEALTH & SAFETY](#)
 - [ehs.Virginia.edu](https://ehs.virginia.edu)
- [CDC LABORATORY TRAINING](#)
 - www.cdc.gov/labtraining
- [NIH Laboratory safety training](#)
 - www.safetytraining.nih.gov