



# OnGuard Safety Training

MAKING SENSE OF WORKPLACE SAFETY TRAINING

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## General Science Laboratory Safety

### Introduction

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Science is a hands-on laboratory class. Students will be doing many laboratory activities which require the use of hazardous chemicals.

Safety in the science classroom is the number one priority for students, teachers, and parents. Safety rules must be followed at all times.

### Identified Risks and Hazards

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#### **Chemical hazards:**

Toxins, corrosives, flammables, and reactives

#### **Biological hazards:**

Microbes, animals, plants, and genetically modified agents

#### **Radiation hazards:**

Ionizing and nonionizing radiation

#### **Physical hazards:**

Heating devices, noise, projectiles, fire, cold, etc.

#### **Electrical hazards:**

Fire and shock Airborne hazardous materials: Vapors, dust, etc.



## Pre- Operational Safety

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### Personal Protective Equipment (PPE)

**Goggles** - Ensure to clean the goggles first before using.



**Lab Apron** - Check if lab apron is available and clean.



**Gloves** - Inspect and test new gloves for defects. Wash hands before using gloves. Select the glove material based on compatibility with the chemicals you may contact.



**Mask** - Prepare mask for activities involving the use of chemicals and other fumes.

## **Laboratory Environment**

Know the locations and operating procedures of all safety equipment including the first aid kit, eyewash station, safety shower, spill kit, fire extinguisher, and fire blanket.

Know where the fire alarm and the exits are located.

Wear appropriate clothing: chemically resistant lab coats or aprons are recommended.

Do not wear shorts or short skirts (anything that would leave your legs bare and unprotected).

Do not wear high-heeled shoes, open-toed/heeled shoes, sandals or shoes made of woven materials. Shoes should cover the entire foot.

Confine long hair and loose clothing.

Jewelry should be removed.

## **Operating Safely**

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Wear appropriate eye protection, such as safety glasses, goggles, and/or a face shield at all times. Contact lenses should not be worn in the laboratory.

Always use lab apron inside the laboratory.

Always wear gloves when handling chemicals.

When pouring large quantities of hazardous chemicals, in addition to goggles, wear a face shield large enough to protect your ears and neck as well as your face.

Always use chemicals with adequate ventilation or in a chemical fume hood.

## **Emergency Response**

Know the procedure for sounding alarms. Be very familiar with the emergency evacuation procedures and escape routes.

Ensure that first aid equipment is available and ready for any emergency situation. First aid kits should be placed where they can be easily reached and can be easily seen.



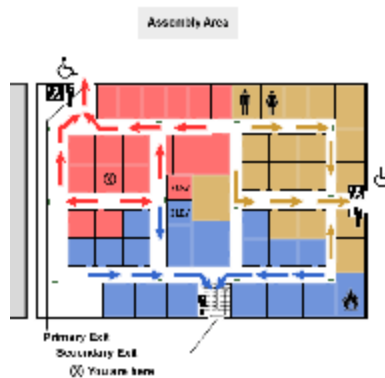
## Signage

Warning signs or labels should be displayed when specific hazards, such as radiation, flammable materials, biological hazards or other special hazardous conditions exist.

## Evacuation

Emergency evacuation floor plans are to be posted in clear view.

Identify the gathering area where evacuees would normally go.



## Fire Extinguishers

Be knowledgeable of the type and position of the fire extinguisher.



## Eye wash

Use the eye wash station only if chemicals come in contact with the eyes.

Eyelids have to be forcibly opened to ensure effective washing behind the eyelid. Be sure to wash from the nose out to the ear. This will avoid washing chemicals back into the eye or into an unaffected eye.

Flood eyes and eyelids with water for a minimum of 15 minutes. After the supervisor determines that the eyes are completely flushed, both of the victim's eyes should be covered with a clean or sterile gauze.



## Safety Shower

Remember that safety shower is used if large amounts of chemicals are spilled or splashed onto the skin or clothing.

Individuals should remove clothing, including shoes and jewelry, while under an operating shower.

## Maintenance

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### Housekeeping

Always inspect equipment and apparatus for weaknesses, cracks or damage before beginning any work.

Inspect electrical equipment and cords for frayed wiring or damage before use. Discard damaged equipment.

Keep the laboratory door closed.

At the end of the laboratory session see that:

- main gas outlet valve is shut off
- the water is turned off
- desk top, floor area, and sinks are clean
- all equipment is cool, clean and arranged and/or stored

## **Waste Disposal**

Never mix chemicals in sinks or pour down drains. Sinks are to be used only for water and those solutions designated by the supervisor.

Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in the proper waste containers, not in the sink.

Check the label of all waste containers twice before adding your chemical waste to the container.

Cracked or broken glass should be placed in the special container for "Broken Glass."

## **Operating Procedures**

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### **Access to Storerooms**

Students are never permitted in the science storage rooms or preparation areas unless given specific permission by their supervisor.

### **Safe Behavior**

Do not eat or drink in the laboratory.

Conduct yourself in a responsible manner at all times in the laboratory.

Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the supervisor before proceeding.

Never work in a laboratory alone. No student should work in the laboratory without an supervisor present.

When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.

Perform only those experiments authorized by the supervisor.

Never do anything in the laboratory that is not outlined in the laboratory procedures or by your supervisor.

Carefully follow all instructions, both written and oral. Unauthorized experiments are prohibited.

### **Use of Equipment**

Know how to operate the equipment required for an activity and use it for its intended purpose only.

Report damaged electrical equipment immediately. Look for things such as frayed cords, exposed wires, and loose connections. Do not use damaged electrical equipment.

When removing an electrical plug from its socket, grasp the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug or outlet.

If you do not understand how to use a piece of equipment, ask the supervisor for help.

### **Handling Chemicals**



All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemical unless specifically instructed to do so.

The proper technique for smelling chemical fumes (when instructed to do so by the supervisor) is to gently fan the air above the chemical toward your face. Breathe normally.

Check the label on chemical bottles twice before pouring any of the contents.

Take only as much chemical as you need. Smaller amounts often work better than larger amounts.

Never return unused chemicals to their original containers or bottles.

Never use mouth suction to fill a pipet. Use a pipet bulb or pipet filler.

Acids must be handled with extreme care. ALWAYS ADD ACID SLOWLY TO WATER, with slow stirring and swirling, being careful of the heat produced, particularly with sulfuric acid.

Flammable hazardous liquids should be handled over a pan to contain spills.

Never dispense flammable liquids anywhere near an open flame or source of heat.

Take great care when transferring acids and other chemicals from one part of the laboratory to another. Hold them securely and in the method demonstrated by the supervisor as you walk.

### **Reporting Accidents and Injuries**

Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the supervisor immediately, no matter how trivial it may appear.

If you or your lab partner are hurt, immediately call out and alert the supervisor. Everyone should turn off burners and prepare to help if needed.

### **Handling Glassware**

When handling cool flasks, grasp the neck with one hand and support the bottom with the other hand.

Lift cool beakers by grasping the sides just below the rim. For large beakers, use two hands: one on the side and one supporting the bottom.

Never carry bottles by their necks.

Inserting and removing glass tubing from rubber stoppers can be dangerous.

Always lubricate glassware (tubing, thistle tubes, thermometers, etc.) before attempting to insert them into a stopper.

Always protect your hands with towels or cotton gloves when inserting glass tubing into, or removing it from, a rubber stopper.

Examine glassware before each use. Never use chipped or cracked glassware and never use dirty glassware.

Do not immerse hot glassware in cold water; as it may shatter.

Do not pick up broken glass with bare or unprotected hands. Use a brush and dust pan to clean up broken glass.

Remove broken glass in sinks by using tongs for large pieces and cotton held by tongs for small pieces and slivers.

Before disposing of broken glass in a trash can, place the glass in a rigid container such as cardboard and mark it "Broken Glass."

### **Heating Substances**

**SHOULD THE BUNSEN BURNER GO OUT, IMMEDIATELY TURN OFF THE GAS AT THE GAS OUTLET VALVE.**

If you wish to turn off the burner, do so by turning off the gas at the gas outlet valve first, then close the needle valve and barrel.

Never reach over an exposed flame and never leave a lit burner unattended.

Light gas burners only as instructed by the supervisor.



Never leave anything that is being heated or is visibly reacting unattended.

Always turn the burner or hot plate off when not in use. You will be instructed in the proper method of heating and boiling liquids in test tubes.

Do not point the open end of a test tube being heated at yourself or anyone else.

Heated metals, glass and ceramics remain very hot for a long time. They should be set aside to cool on a trivet and then picked up with caution.

Use tongs or heat-protective gloves if necessary.

Determine if an object is hot by bringing the back of your hand close to it prior to grasping it.