

كلية المستقبل الجامعة

قسم هندسة تقنيات
الأجهزة الطبية



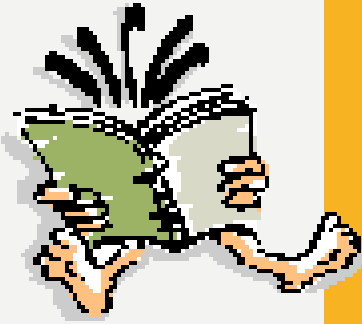
CLINICAL CHEMISTRY - INSTRUMENTATION & TECHNOLOGY



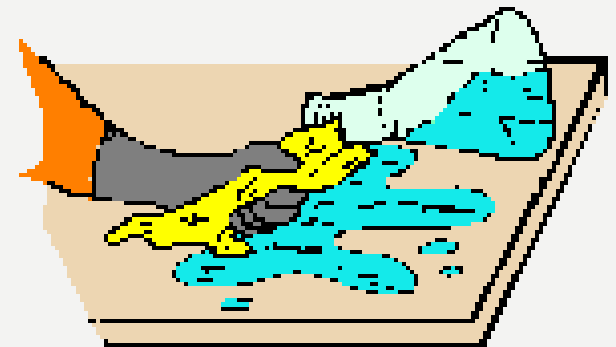
LEC.1: SAFETY IN THE SCIENCE LAB

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GENERAL SAFETY RULES



1. Listen to or read instructions carefully before attempting to do anything.
2. Wear safety goggles to protect your eyes from chemicals, heated materials, or things that might be able to shatter.
3. Notify your teacher if any spills or accidents occur.



GENERAL SAFETY RULES



4. After handling chemicals, always wash your hands with soap and water.
5. During lab work, keep your hands away from your face.
6. Tie back long hair.



GENERAL SAFETY RULES

7. Roll up loose sleeves.
8. Know the location of the fire extinguisher, fire blanket, eyewash station, and first aid kit.
9. Keep your work area uncluttered. Take to the lab station only what is necessary.



GENERAL SAFETY RULES

10. It is suggested that you wear glasses rather than contact lenses.
11. Never put anything into your mouth during a lab experiment.
12. Clean up your lab area at the conclusion of the laboratory period.
13. Never “horse around” or play practical jokes in the laboratory.

Lab Safety: Everyone Is Responsible!

SAFETY SYMBOLS



Eye Protection



- Wear safety goggles when working with chemicals, flames, or heating devices.
- If a chemical gets in your eye, flush in water for 15 minutes and notify the teacher.

Sharp Objects



- When using knives or other sharp objects always walk with the points facing down.
- Cut away from fingers and body.

Electrical Safety



- Do not place a cord where someone can trip over it.
- Never use electricity around water.
- Unplug all equipment before leaving the room.

SAFETY SYMBOLS

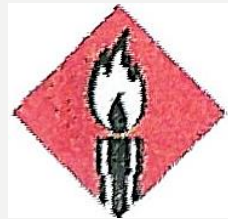


Animal Safety



- Only handle living organisms with teacher permission.
- Always treat living organisms humanely.
- Wash your hands after handling animals.

Heating Safety



- Tie back hair and loose clothes when working with open flames.
- Never look into a container as you are heating it.
- Heated metal and glass looks cool, use tongs or gloves before handling.
- Never leave a heat source unattended.

SAFETY SYMBOLS

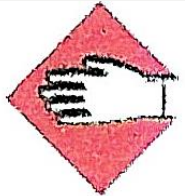


Chemical Safety



- Read all labels twice before removing a chemical from the container.
- Never touch, taste, or smell a chemical unless instructed by the teacher.
- Transfer chemicals carefully!

Hand Safety



- If a chemical spills on your skin, notify the teacher and rinse with water for 15 minutes.
- Carry glassware carefully.

Plant Safety



- Do not eat any plants in lab.
- Wash your hands after handling plants.

SAFETY EQUIPMENT



- Fire Extinguisher – Located in outside classroom door and in the computer lab

To operate the fire extinguisher remember **P-A-S-S**

P- Pull the Pin

A-Aim the hose at the base of the fire from 5-6 feet away.

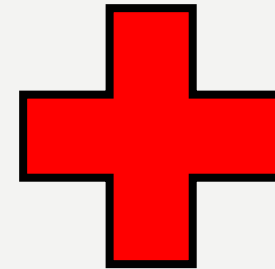
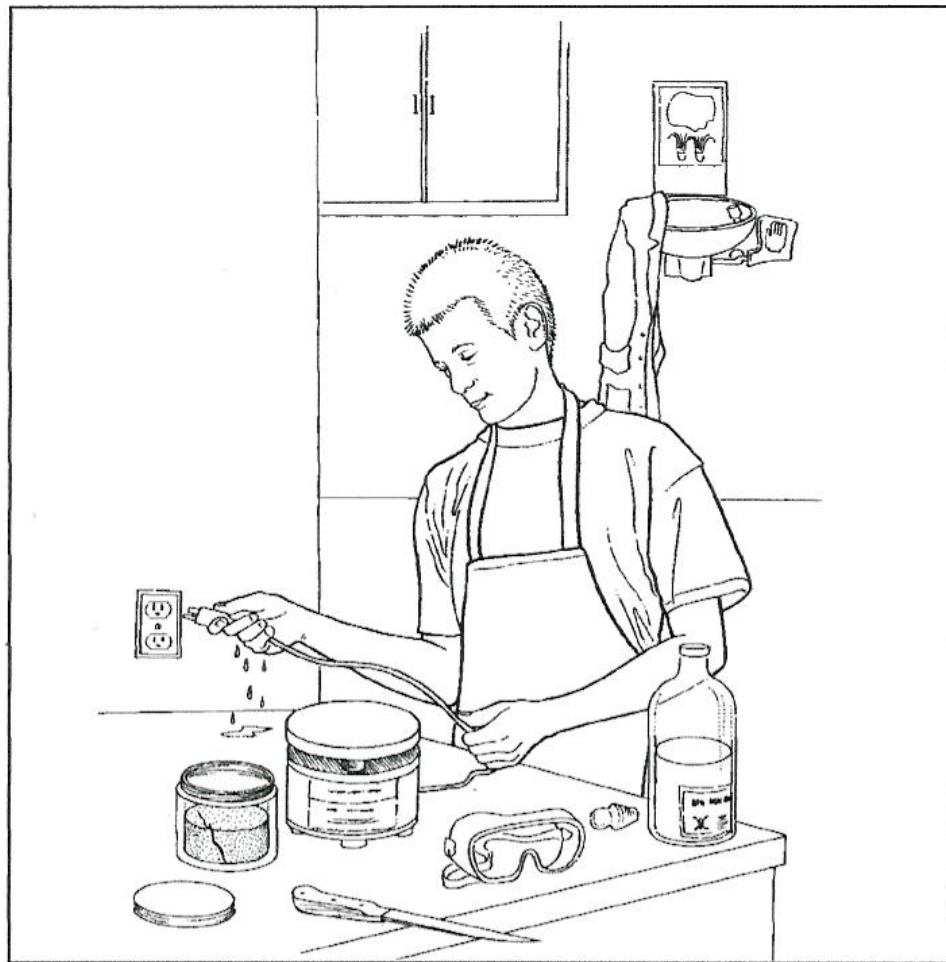
S-Squeeze the handle.

S-Sweep the hose back and forth across the fire.

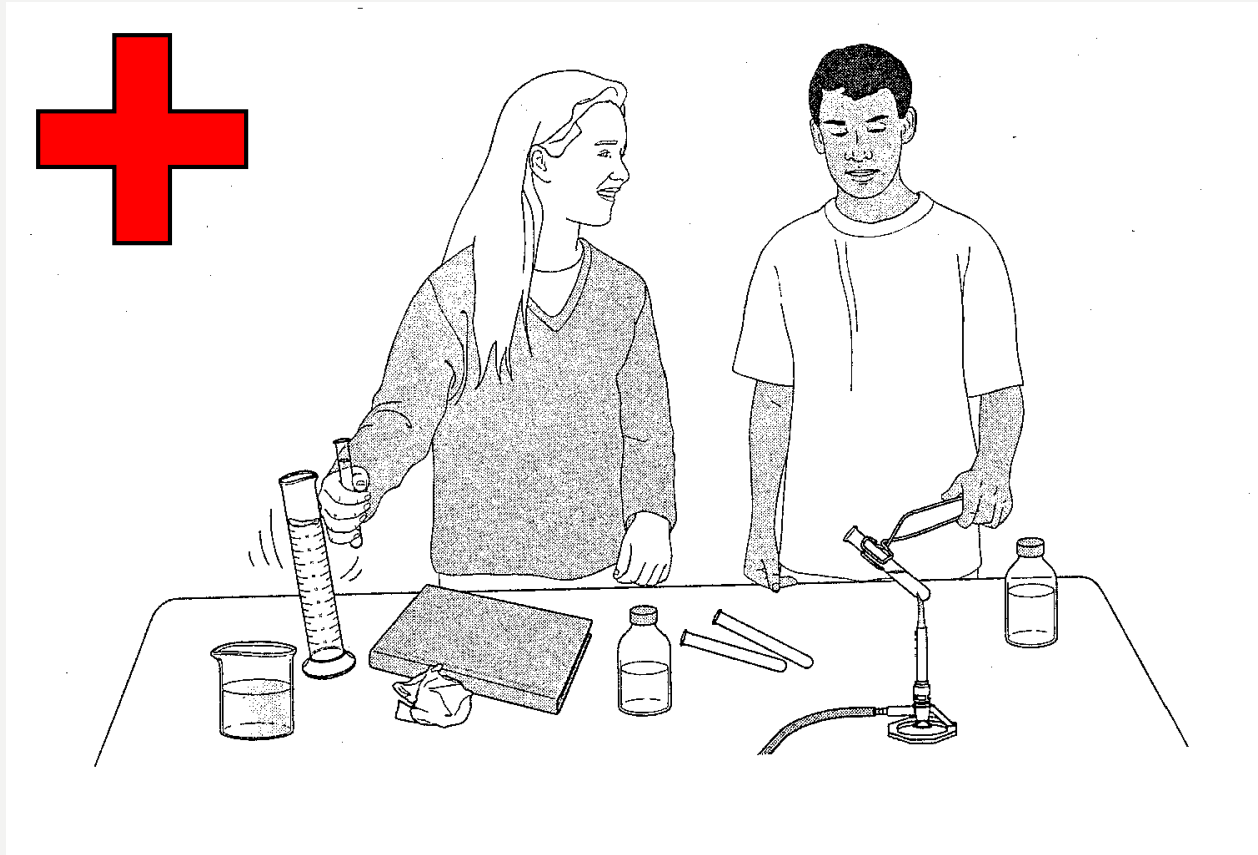
On Fire?

REMEMBER: Stop, Drop, & Roll

WHAT'S WRONG WITH THIS PICTURE?



WHAT'S WRONG WITH THIS PICTURE?



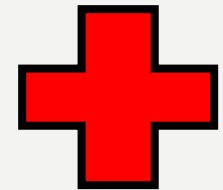
WHAT'S WRONG WITH THIS PICTURE?



WHAT TO DO IN AN EMERGENCY

If there is a fire or fire alarm

- Quietly get up and push in your chair.
- Walk toward the outside classroom door.
- Walk to the basketball court.
- Quickly line up in alphabetical order by last name.
- Remain in line until the drill is over.
- Remain silent throughout the entire alarm so that all people can hear important directions.

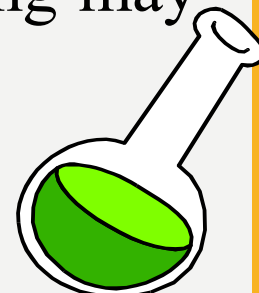


Lab Safety: Everyone Is Responsible!

GLASSWARE SAFETY



1. Chipped or cracked glassware should not be used. Show it to the teacher.
2. Broken glassware should not be disposed of in a classroom trashcan. There is a special glass disposal container for it.
3. When pouring liquids into glassware, make sure the container you are pouring into is resting on a table at least a hands breadth from the edge.
4. If a piece of glassware gets broken, do not try to clean it up by yourself. Notify the teacher.
5. Do not place hot glassware in water. Rapid cooling may make it shatter.



CHEMICAL SAFETY



1. Wear protective goggles whenever heating or pouring hazardous chemicals.
2. Never mix chemicals together unless you are told to do so (and then only in the manner specified).
3. Never taste any chemicals (you should never taste anything in the lab).



CHEMICAL SAFETY

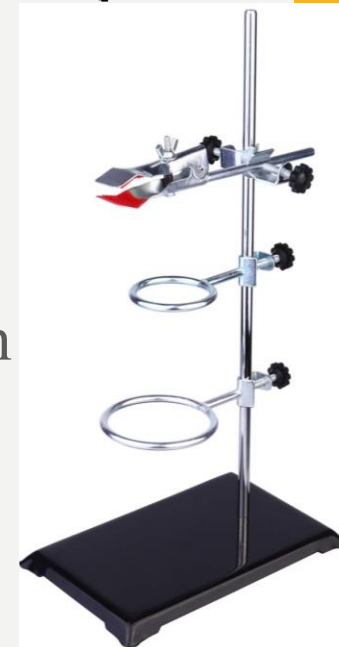
4. If you need to smell the odor of a chemical, waft the fumes toward your nose with one hand. Do not put your nose over the container and inhale the fumes.
5. Follow the instructions of your teacher when disposing of all chemicals.
6. Wash your hands after handling hazardous chemicals.



HEATING SAFETY

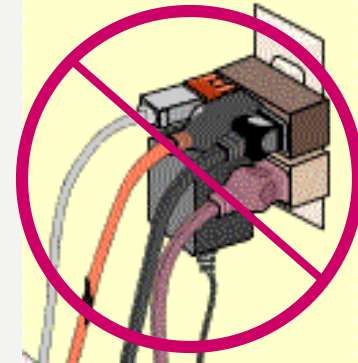


1. Use tongs and/or protective gloves to handle hot objects.
2. Never reach across an open flame or burner.
3. Always point the top ends of test tubes that are being heated away from people.
4. When heating a test tube, move it around slowly over the flame to distribute the heat evenly.
5. Only glassware that is thoroughly dry should be heated.
6. Heat glassware by placing it on a wire gauze platform on a ring stand. Do not hold it in your hand.



ELECTRICAL SAFETY in the Lab

- use a single plug for each electrical connection
- multiple plugs for additional connections should be avoided
- do not overload circuits



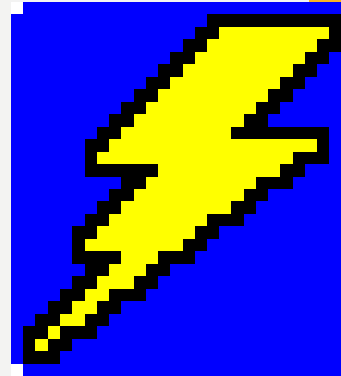
ELECTRICAL SAFETY in the Lab

- electrical equipment such as mixers or hot plates, should not be used near flammable solvents unless they are explosion proof
- never bypass any safety device on a piece of electrical equipment
- all electrical repairs should be made by qualified personnel



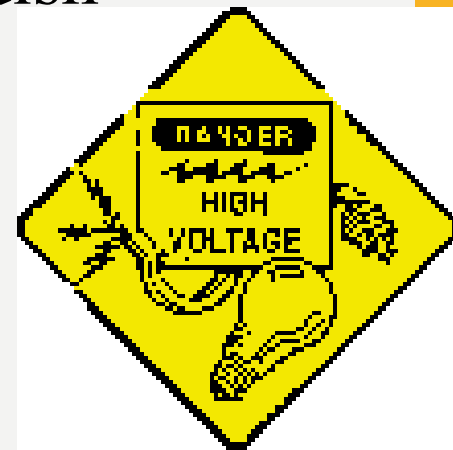
ELECTRICAL SAFETY IN THE LAB

Water can turn anything into an electrical conductor - don't stand in water or have water on your hands when using electrical equipment.



In case of an electrical fire, don't touch the burning object or douse it with water. Turn off power if possible. If it's small, extinguish it with a fire extinguisher.

Never use temporary wiring.



ELECTRICAL SAFETY IN THE LAB

5 Electrical Myths You Need to Know

1. Electricity takes the path of least resistance.
2. Electricity wants to go to ground.
3. If an electrical appliance or tool falls into water, it will short out.
4. It takes high voltage to kill.
5. Double-insulated power tools can be used in wet and damp locations.



GAS CYLINDERS

- Never use without formal training
- Minimise the number in a laboratory
 - Store externally whenever possible
- Cylinders are heavy and can do serious damage to you if they fall
 - Ensure that they are chained when in use
 - Move only with a cylinder trolley
- Use regulators & control equipment suitable for the gas concerned
- Consider the consequences if your cylinder leaks



CRYOGENICS

- Liquid gasses are extremely cold and can cause burns
- Liquid gases evaporate and many can cause asphyxiation
- If you need to take cryogenics in a lift, there are special procedures to follow – speak to your supervisor or a senior member of technical staff
- You must have special training to use them



FIRST AID

Injury: Burns

To Do: Immediately flush with cold water until burning sensation is lessened.



FIRST AID



Injury: Cuts, bruises

To Do: Do not touch an open wound without safety gloves. Pressing directly on minor cuts will stop bleeding in a few minutes. Apply cold compress to bruises to reduce swelling.



FIRST AID



Injury: The eyes

To Do: Flush eyes immediately with plenty of water for several minutes. If a foreign object is lodged in the eye, do not allow the eye to be rubbed.

