Lab. of Medical Chemistry

First stage

Collage of Dentistry

SAFETY OF CHEMICALS
PART 1&2

by

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Chemical safety refers to the comprehensive set of practices , protocols , and regulations designed to protect human health and the environment from the potential risks associated with chemical substances.

TYPICAL MEASURES ON A LABEL

Do not breathe vapors

Use in well-ventilated areas

Keep container closed when not in use

Avoid contact with skin

Wash thoroughly with soap and water after handling

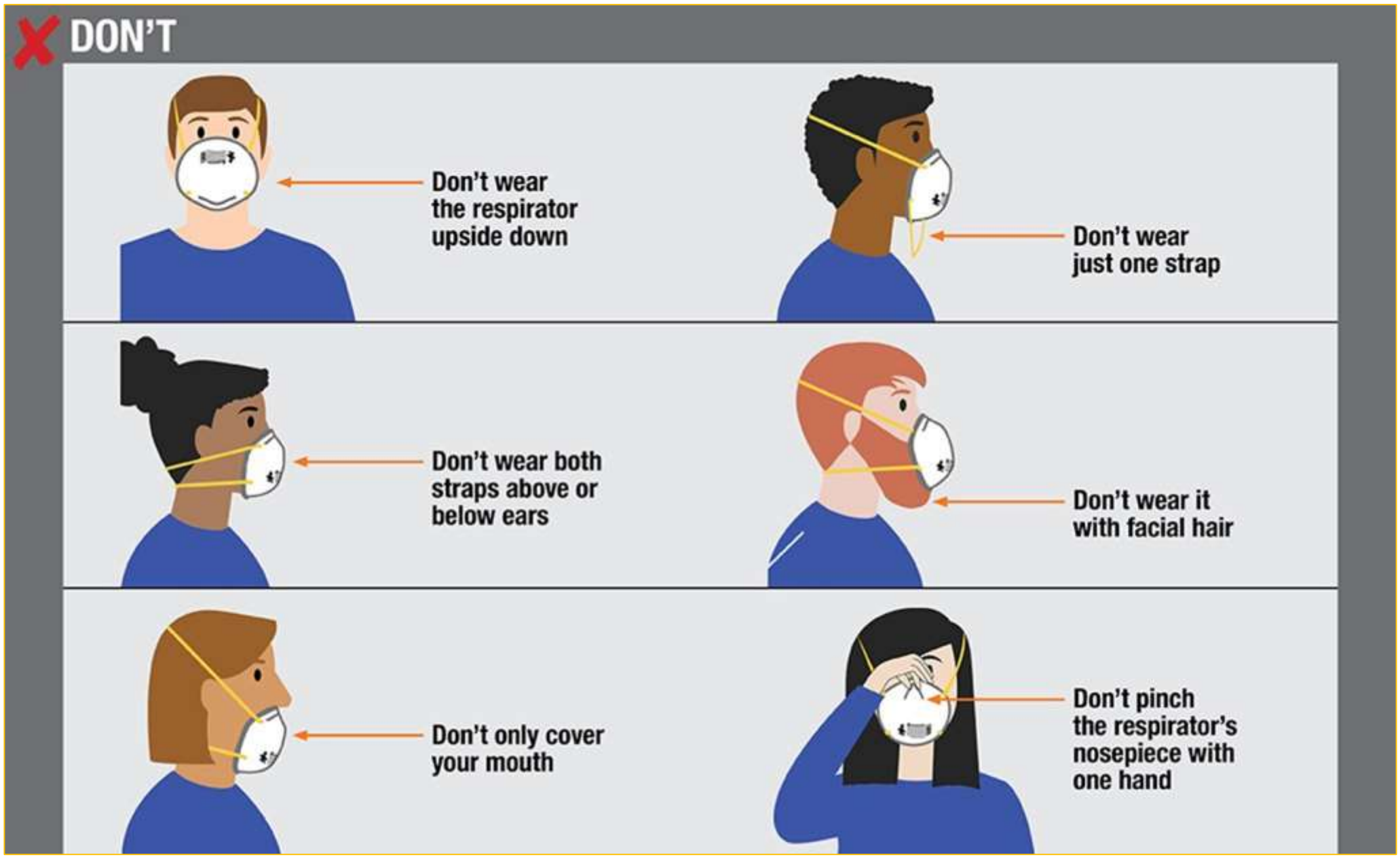
EXPOSURE CONTROLS, PERSONAL PROTECTION

- Respirator
- Gloves
- Eye protection
- Protective clothing
- Ventilation
- Special work and hygiene practices that should be followed

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Essential for protection
- Lab coat
- Gloves
- Safety goggles
- Face shields
- Respirators (if needed)

DON'T


Don't wear the respirator upside down
Don't wear just one strap
Don't wear both straps above or below ears
Don't wear it with facial hair
Don't only cover your mouth
Don't pinch the respirator's nosepiece with one hand

GLOVES

Chemical Gloves: Designed to repel liquids and fluids, the outer shell of chemical gloves is fully coated to resist penetration and soak through of liquids as well as to resist chemical degradation.

Disposable Gloves: Disposable gloves are primarily used in the food and health industry to prevent product contamination of bodily fluids, bacteria, etc. They are commonly made with Nitrile, and sometimes, latex .

Chemical

- Common materials: nitrile, neoprene, latex, PVC
- Resists liquid and chemical penetration
- Can resist chemical degradation

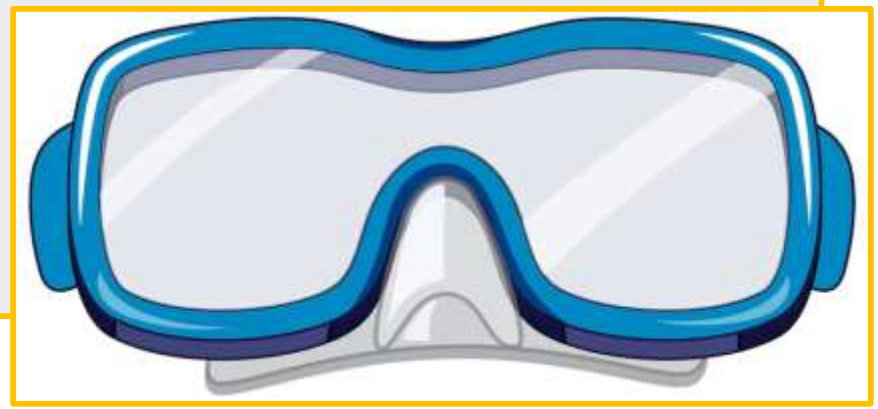
Disposable

- Common materials: nitrile, latex, polyethylene
- Prevents cross contamination

EYE PROTECTION

- protecting eyes from, chemicals. Some common eye hazards include:
- gases
- fumes
- vapors

Three main types of eye protection exist, each with advantages and disadvantages. They are safety glasses, goggles, and face shields. Safety Glasses: Safety glasses have shatter-resistant lenses made of materials like polycarbonate or propionate plastic with side shields



Safety Glasses: Safety glasses have shatter-resistant lenses made of materials like polycarbonate or propionate plastic with side shields.

Goggles: Goggles may be vented or non-vented.

Face Shield: Face shields are not stand-alone eye protection. They protect the entire face with goggles on under the shield to catch any liquids that might have made it past the shield.

TYPES OF CHEMICAL HAZARDS

a. Physical Hazards

- Flammable substances (e.g., ethanol)

- Explosive chemicals

- Reactive materials

b. Health Hazards

- Toxic substances (e.g., cyanide)

- Irritants and corrosives

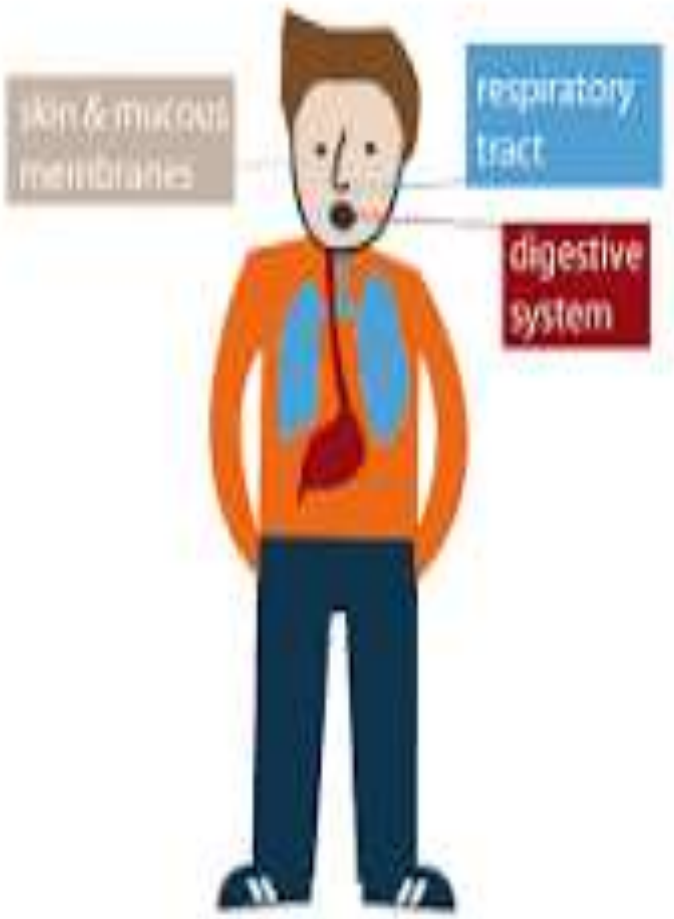
c. Environmental Hazards

- Chemicals harmful to aquatic life
- Pollutants affecting soil and air

ROUTES OF EXPOSURE

Chemicals can enter the body through:

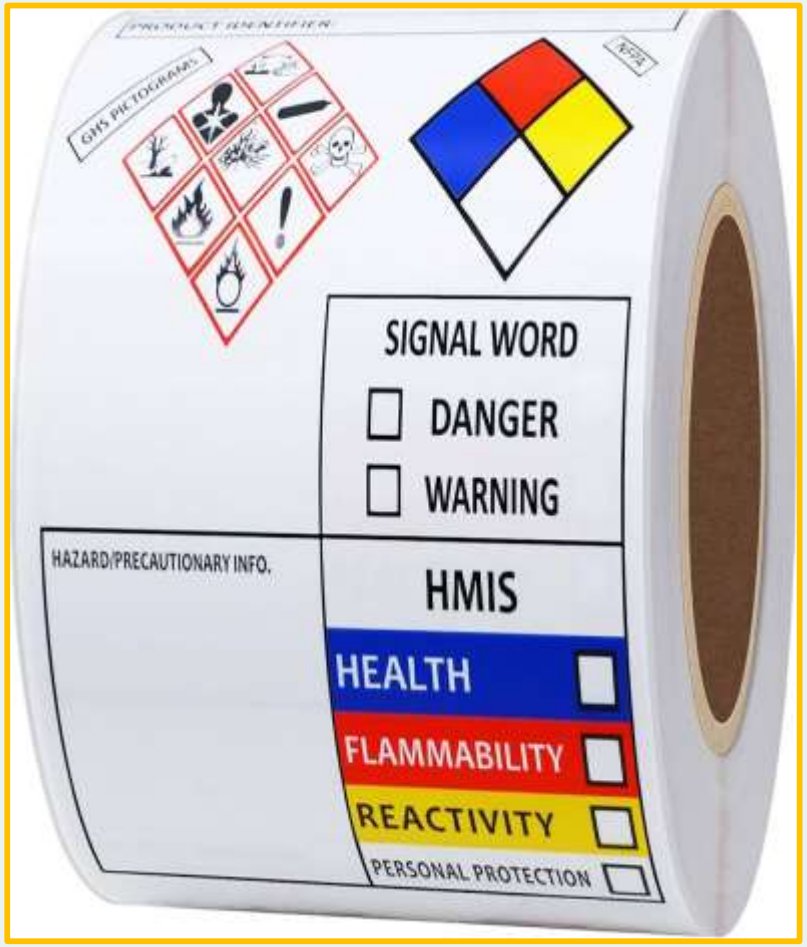
- Inhalation (breathing gases or vapors)
- Ingestion (swallowing)
- Skin contact
- Injection (through cuts or sharp objects)



SAFETY DATA SHEET (SDS)

Contains detailed information about:

- Identification of the chemical
- Hazard identification
- Composition
- First-aid measures
- Fire-fighting measures
- Handling and storage
- Exposure controls



SAFE HANDLING OF CHEMICALS

Always read labels before use

- Do not mix chemicals unless instructed
- Use fume hoods for volatile substances
- Never taste or directly smell chemicals

STORAGE OF CHEMICALS

- Store according to compatibility (e.g., acids separate from bases)
- Keep flammable materials in special cabinets
- Label all containers clearly
- Avoid exposure to heat and sunlight

CHEMICAL SPILLS AND EMERGENCY RESPONSE

Small Spills

- Use spill kits
- Wear PPE
- Clean immediately

Large Spills

- Evacuate the area
- Inform safety personnel

FIRST AID

Skin contact → wash with water

Eye exposure → rinse for 15 minutes

Inhalation → move to fresh air

Waste Disposal

- Never pour chemicals into sink unless allowed
- Use labeled waste containers
- Follow institutional and environmental regulations

LABORATORY SAFETY RULES

- Do not be drink in the lab and don't use the fridge for food
- Keep work places clean and free of unwanted chemicals
- wear gloves, lab coat, mask and glasses.
- Do not touch, taste, or smell any chemicals
- Tie hair and use closed shoes
- Do not use unlabeled bottle
- Work only with materials once you know their flammability,
- reactivity, toxicity, safe handling and emergency procedures
- Know emergency exits
- Report accidents immediately

- Never pipette by mouth; use mechanical transfer devices.
- Do not mix chemicals in the sink.
- If a chemical was splashed in your eye(s) or on your skin, immediately flush with running water for at least 20 minutes.
- Walk DON'T run in the lab.
- Keep exits and passageways clear at all times
- Turn off gas, water before leaving.
- Wash your hands before leaving laboratory

IMPORTANCE OF CHEMICAL SAFETY

- Protects human health
- Prevents accidents and injuries
- Reduces environmental pollution
- Ensures compliance with regulations

FIRE PROTECTION FEATURES

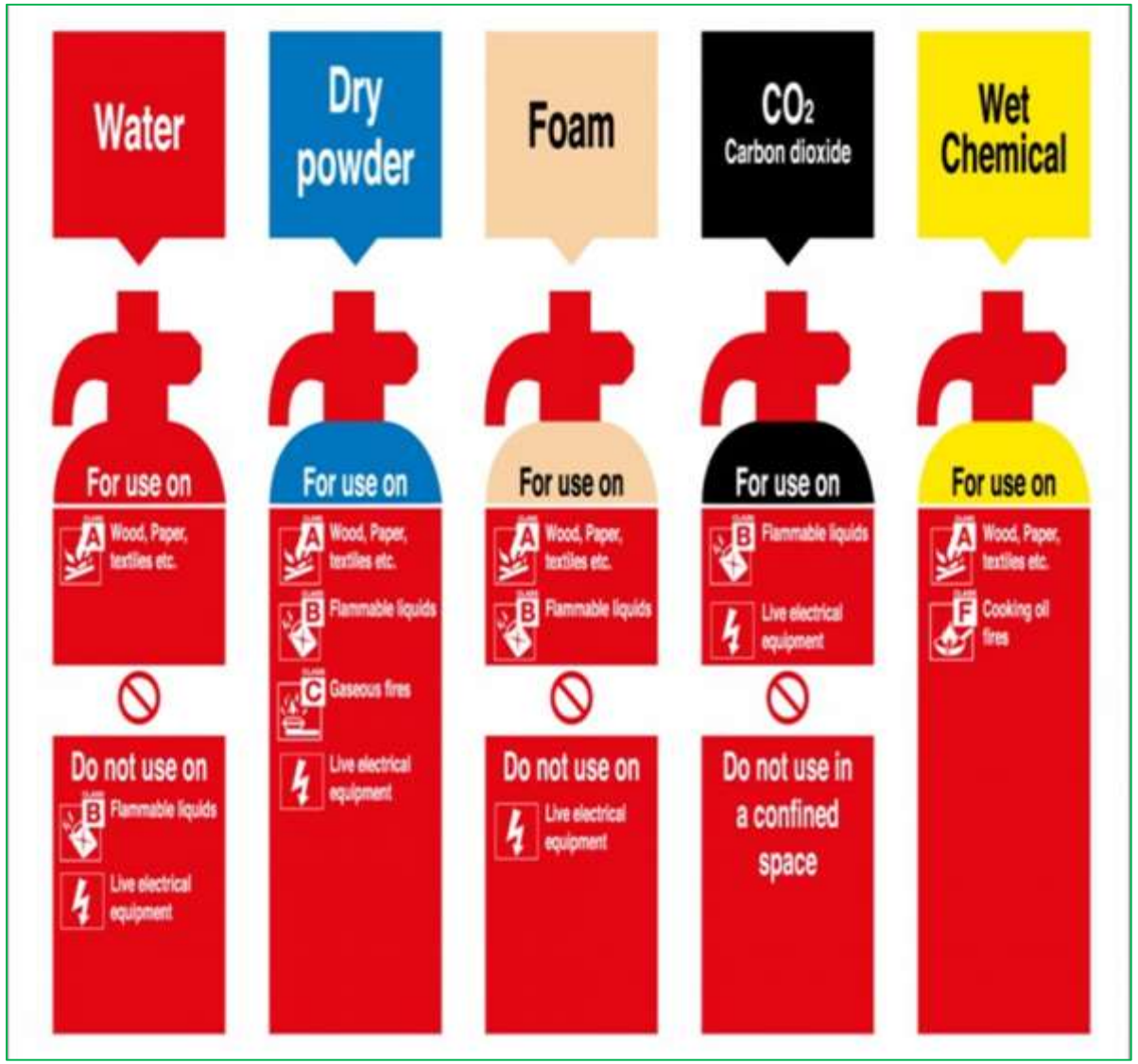
Sprinklers detect the presence of heat and automatically activate when the temperature threshold is reached (usually 68-69°C)

FIRE ALARM SYSTEMS

Fire alarm systems detect the presence of hazardous conditions and provide rapid notification via speakers and strobes to building occupants so that people can safely evacuate.

FIRE EXTINGUISHERS

Fire extinguishers can be used to extinguish small fires that are in their incipient stage. Most extinguishers contain a dry chemical agent that blankets the burning material and interrupts the chemical reaction, which controls or extinguishes the fire

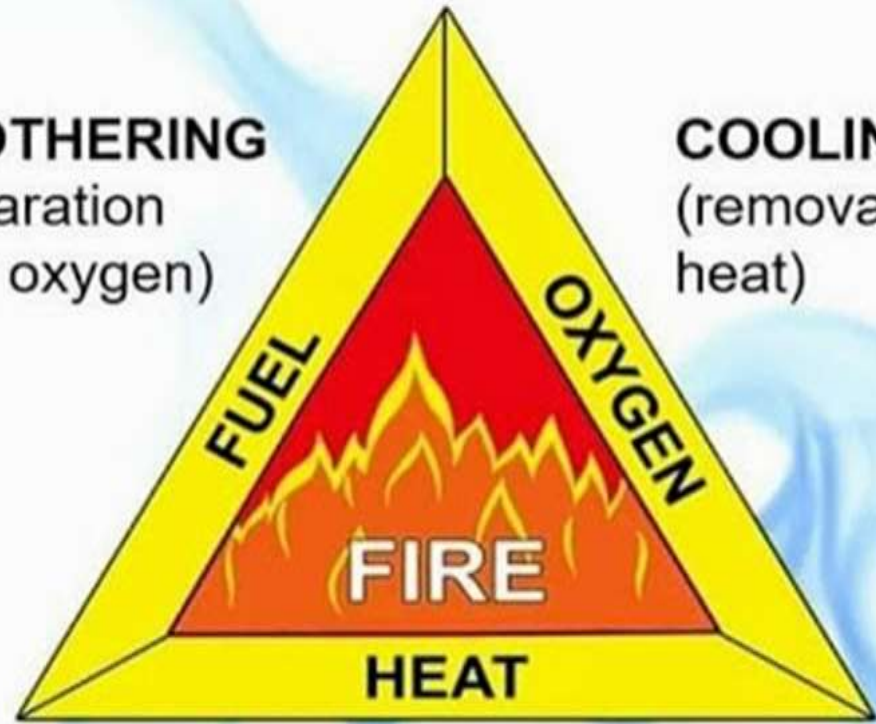


Fire Triangle

How can you extinguish a fire?

SMOTHERING (separation from oxygen)

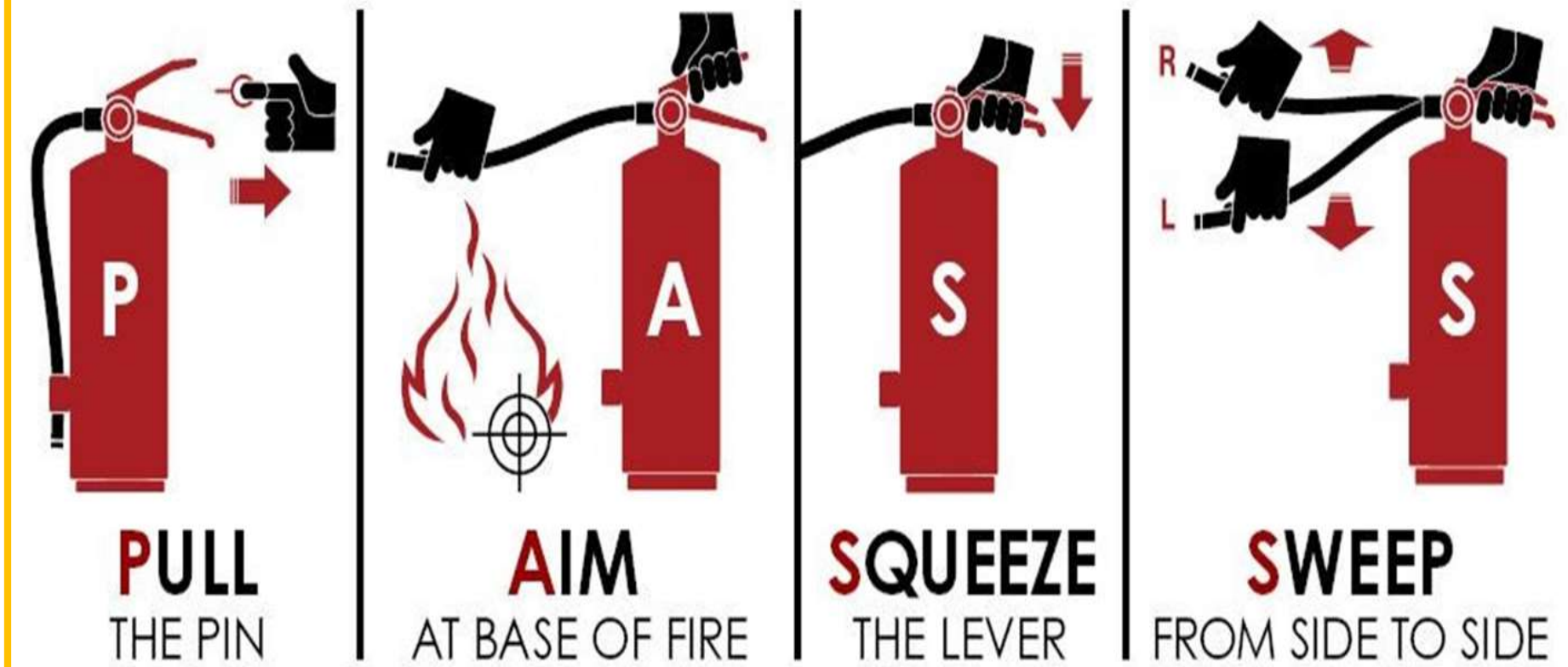
COOLING (removal of heat)



STARVING (separation from fuel)

TYPE OF FIRE / EXTINGUISHER	 WATER	 FOAM	 POWDER	 CO_2	 WET CHEMICAL
A Wood, Paper, Textiles	✓	✓	✓	✗	✓
B Flammable Liquids	✗	✓	✓	✓	✓
C Flammable Gases	✗	✗	✓	✗	✗
Electrical Fires	✗	✗	✓	✓	✗
F Cooking oils & fats	✗	✗	✗	✗	✓

HOW TO USE A FIRE EXTINGUISHER



PULL
THE PIN

AIM
AT BASE OF FIRE

SQUEEZE
THE LEVER

SWEEP
FROM SIDE TO SIDE

Chemical safety is a critical responsibility in any laboratory or workplace. Proper knowledge, awareness, and adherence to safety guidelines help prevent accidents and ensure a safe working environment.

Handling chemical fires is one of the most hazardous tasks

For civil defense forces.

Chemicals require specialized equipment due to the risks

of explosions , toxic fumes and environmental contamination.


THANK
YOU!