جامعة المستقبل
AL MUSTAQBAL UNIVERSITY
كلية العلوم

# LAB Of Analytical Chemistry

1st Grade

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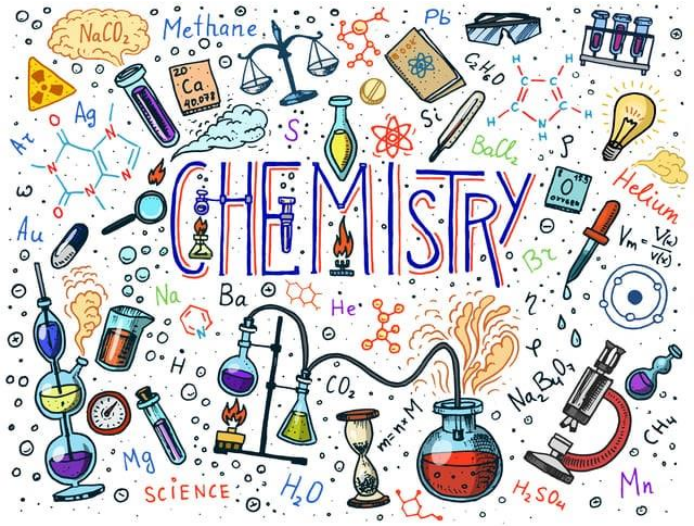
Lecture 1: General Introduction (Chemicals)

Department of Medical Biotechnology

# Introduction

Chemistry is the science that deals with the materials of the universe and the changes these materials undergo. Understanding most other fields of science requires an understanding of chemistry.

الكيمياء هو العلم الذي يتعامل مع المواد الموجودة في الكون و التغييرات التي تخضع لها هذه المواد. فهم معظم مجالات العلوم الأخرى يتطلب فهم الكيمياء.




Matter is anything that has mass and takes up space.

# What is laboratory or lab?

A room or building equipped for scientific experiments, research, or teaching

# Types of Chemicals Every Lab Needs

## Solvents

are substances that dissolve solutes to form solutions. For Example water, acetone.

## Reagents

are substances or compounds that bring about chemical reactions examples of reagents include sodium hydroxide (NaOH)

## Acids and Bases

Acids give protons(H+)and turn dyes red, while bases accept protons and turn substances blue. Examples like hydrochloric acid (HCl) and sodium hydroxide are essential in titrations and analyses.

# Chemical Experiment

The purpose of a chemical experiment is to familiarize with the chemicals and tools used in the laboratory, as well as to understand the nature of the lab. This is achieved through scientific methods, which include:

الغرض من التجربة الكيميائية هو التعرف على المواد الكيميائية والأدوات المستخدمة في المختبر، وكذلك فهم طبيعة المختبر. ويتم ذلك من خلال الأساليب العلمية

1. Safety in the lab.
2. Obtaining accurate experimental results.
3. Understand how to handle the results based on the requirements of the experiment.
4. Prepare a report based on the provided template.
5. Clean the tools and workspace, and store all materials and equipment in their designated places.

١. السلامة في المختبر.

٢. الحصول على نتائج تجريبية دقيقة.

٣. فهم كيفية التعامل مع النتائج بناء على متطلبات التجربة.

٤. قم بإعداد تقرير بناءً على النموذج المقدم.

٥. تنظيف الأدوات ومساحة العمل، وتخزين جميع المواد والمعدات في أماكنها المخصصة.

# Treatment with Chemical Materials

1. Use only the required amount of chemicals and avoid waste.

١. استخدم فقط الكمية المطلوبة من المواد الكيميائية وتجنب الهدر

2. Do not return unused chemicals to containers to prevent contamination.

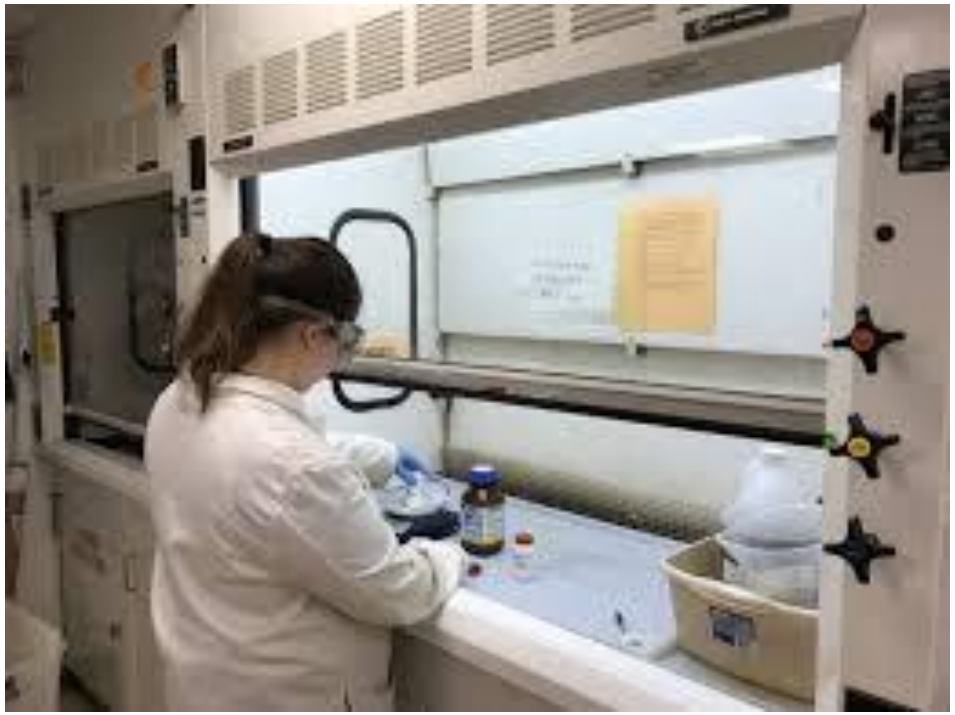
٢. لا تعيد المواد الكيميائية غير المستخدمة إلى الحاويات لمنع التلوث.

3. Handle toxic chemicals carefully; avoid inhaling harmful fumes or tasting chemicals.

٣. التعامل مع المواد الكيميائية السامة بعناية. تجنب استنشاق الأبخرة الضارة أو تذوق المواد الكيميائية

4. Always add acid to water slowly, never the reverse, to avoid explosions.

٤. قم دائمًا بإضافة الحمض إلى الماء ببطء، وليس العكس أبدًا، لتجنب الانفجارات.



5. Perform gas-releasing reactions or strong acid fumes in a fume hood.

٥. قم بإجراء تفاعلات إطلاق الغاز أو الأبخرة الحمضية القوية في الهود

# Safety and security in the laboratory

**Lab safety** refers to the practices and precautions taken to protect individuals from risks in a chemical, biological, or physical hazards.

**Security** focuses on protecting the lab from external threats like theft or sabot laboratory environment.

# Common Safety Symbols

**Health Hazard**: A cancer-causing agent (carcinogen) or substance with respiratory, reproductive or organ toxicity that causes damage over time (a chronic, or long-term, health hazard).

**Flame**: Flammable materials or substances liable to self ignite when exposed to water or air (pyrophoric), or which emit flammable gas.

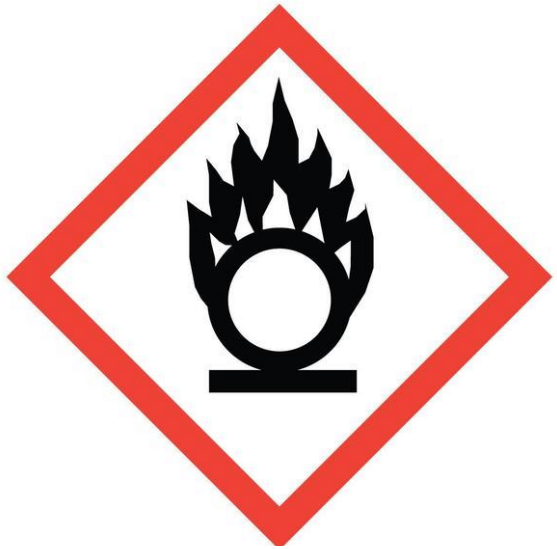
**Skull and Crossbones**: Substances, such as poisons and highly concentrated acids, which have an immediate and severe toxic effect (acute toxicity).

**Exclamation Mark**: An immediate skin, eye or respiratory tract irritant, or narcotic.

**Gas Cylinder:** Gases stored under pressure, liquified gases, and dissolved gases; such as ammonia, liquid nitrogen, or acetylene.

**Environmental Hazard**: Chemicals toxic to aquatic wildlife. (Non-Mandatory)

**Flame Over Circle:** Identifies oxidizers. Oxidizers are chemicals that facilitate burning or make fires burn hotter and longer.



**Exploding Bomb:** Explosives, including organic peroxides and highly unstable material at risk of exploding even without exposure to air (self-reactives).