Tishk International University
Faculty of Applied Science
Department of Nutrition & Dietetics
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General Chemistry Lab(1)

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Chemistry

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.

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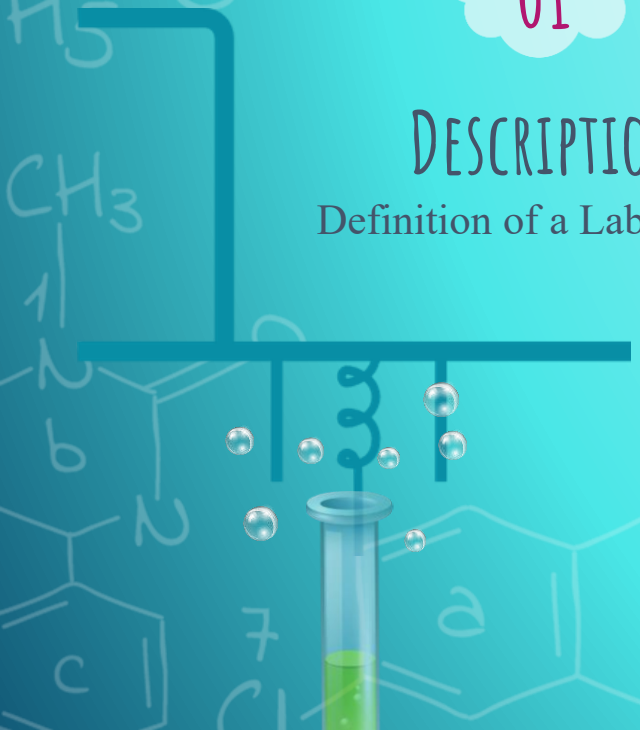
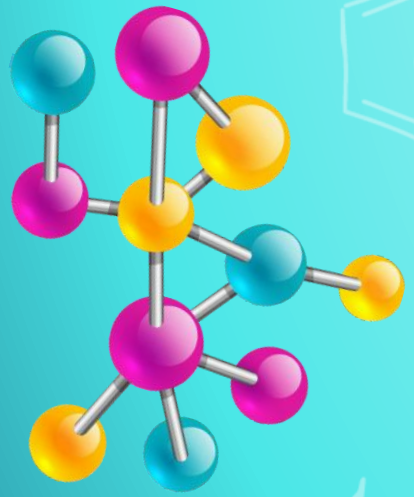




01

Definition of a laboratory

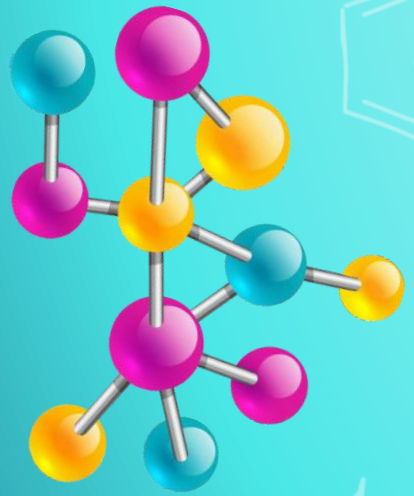
Definition of a laboratory

The meaning of LABORATORY is **a place equipped for experimental study in a science or for testing and analysis, a** laboratory can be a place of,

- Specialized research
- Clinical or diagnostic evaluation
- Teaching or learning

Laboratories are commonly used in many scientific disciplines across the University ranging from health sciences to biological and physical sciences.

A place providing opportunity for experimentation, observation, or practice in a field of study.



02

Safety RULES

Working safely in the Laboratory

Research and scientific laboratories often present a wide range of hazards to researchers and students.

Having in place specific procedures for laboratories is crucial in ensuring the safety of staff and students who work in these areas.

Laboratory Safety Rules

- ✓ Food and drink (including drinking from water bottles) must not be consumed in laboratories.
- ✓ Unauthorized entry or experimentation in the laboratories is strictly forbidden.
- ✓ Staff and Postgraduates wishing to use the laboratory out of normal work hours must obtain their supervisor and the laboratory manager's permission.
- ✓ All researchers must be aware of the conditions required for the safe handling of substances and specimens being handle.

CONT.

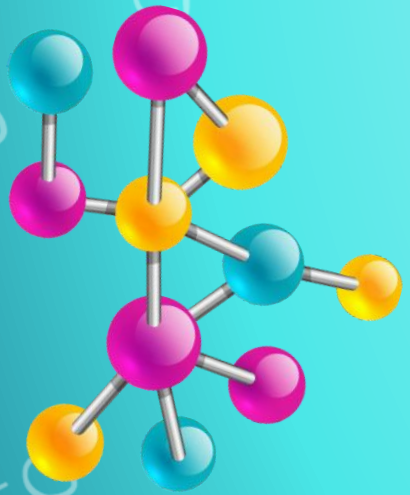
- ✓ Be aware of the safety facilities of the laboratory, i.e. location of safety showers, eyewash stations, fire extinguishers and emergency exits.
- ✓ Working spaces are to be kept clean. Broken glass sharps, and laboratory waste must be placed in the marked bins in the laboratory.
- ✓ No waste is to be left or placed in the sinks, and under no circumstance must waste be placed down the sink, unless authorized to do so.

CONT.

- ✓ All spillages must be cleaned up immediately after they occur.
- ✓ Be aware of burning Bunsen burner by noting a hollow burning sound and/or the absence of a blue cone of unburnt gas.
- ✓ No samples are to be taken from, or brought into, the laboratory without the permission of your Supervisor or the Laboratory Manager.
- ✓ Pipetting by mouth is strictly prohibited.
- ✓ Defective equipment or broken glassware must be reported to the laboratory manager.

CONT.

- ✓ Radioactive sources (e.g. laser, UV radioactive substance or arc lamp) must only be used following the direction and supervision of the supervisor or laboratory manager or radiation safety officer.
- ✓ Sitting on laboratory benches is prohibited. Never run in the laboratory or along corridors.
- ✓ Cover any open wounds e.g. cuts, dermatitis on hands.
- ✓ Always wash hands thoroughly before leaving the laboratory.



03

Personal Protective Equipment (PPE)

PPE is commonly acknowledged as a way to safeguard workers in situations where all other hazard management measures have been implemented but there is still a chance of harm.

PPE is the last line of defense or barrier between you and the dangerous material you are handling, so keep that in mind. When working in university laboratories, you must wear the bare minimum of personal protective equipment (PPE):


REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)
Tied Hair
Safety glasses
Lab coat
Gloves
Long pants
Closed shoes
(Image by LabXchange © The President and Fellows of Harvard College)

Enclosed Shoes (no bare feet, or sandals)

Lab Coat (must be individually issued, worn at all times when working in the lab, removed before leaving the lab and laundered regularly and when contamination is suspected).

The 3 following additional PPE is provided and should be used where required / instructed / determined by a risk assessment:

- ✓ Safety Glasses / Goggles must be worn when working with hazardous chemical solutions where there is a risk of splash to your eyes or when instructed to do so by your Supervisor or the Lab Manager.
- ✓ Gloves
- ✓ Dust Mask / Respirator

Face Shield must be worn when working with volatile hazardous chemical solutions (e.g. concentrated acids), dangerous substances that could strike/splash the face/eyes or there is a risk of solution explosion or instability causing a splash to the face/eyes and when there is a risk of dangerous objects striking the face/eyes, such as particles, glass or metal shards.

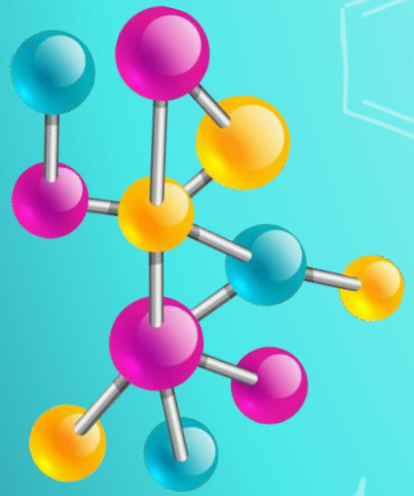
First Aid

- ✓ All accidents must be reported immediately to the supervisor/laboratory manager and recorded on the Injury, Illness and Incident Database.
- ✓ Eye injuries, whether caused by chemicals or mechanical injury or splash with a material, eye injuries are always serious. The treatment requires immediate and prolonged flushing with water (20 minutes minimum) at the eyewash station. Medical advice should be obtained for an eye injury.

In the event of chemical or biological spills on the skin, the affected area must be washed with copious quantities of water.

Sharps injuries– Notify supervisor/lab manager immediately. Wash the wound and encourage bleeding. Seek medical treatment.

If you are feeling unwell or dizzy when participating in an experiment, stop immediately, sit down and notify supervisor/lab manager.



04

Materials used

Glassware and Equipment Used at Lab

There are qualitative and quantitative glassware that are used at laboratory and the mentioned are some of glassware and equipment that are used at lab:

1. Beaker is used to transfer liquids and dissolving solid in liquid solution and their volume is not accurate.

2. Watch glass is used to weigh solid chemical.

3. Glass rod is used to mix solutions and dissolve solid in liquid

4. Cylinder is used to transfer liquids and their volume is not accurate.

5. Funnel is used to transfer liquid and for filtration.

6. Conical flask is used to transfer liquid and for titration. Their volume is not accurate.

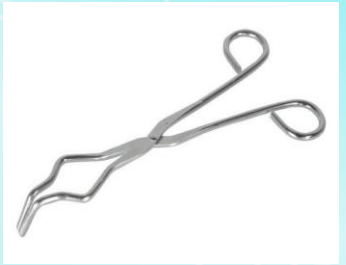
7. Washing bottle is used to clean laboratory glassware and other equipment. They are filled with appropriate cleaning liquids, and poured over the tool that needs to be cleaned.

8. Reagent bottle is container made of glass or plastic or borosilicate with stopper and is intended to contain chemicals in liquid or powder form for laboratories.

9. Test tube is used for qualitative analysis for small amount of solution form

10. Centrifuge tube is used within centrifuge to separate solid from liquid.

11. Tong is used for picking things up without touching them with hands or fingers.



12. Test tube holder is used for holding a test tube in place.

13. Centrifuge is used to separate solid from liquid or liquids that have different weights.

14. Dropper is used to transfer small quantities of liquid.

15. Litmus paper is used to distinguish between acids and bases.

16. Filter paper is a quantitative paper used for filtering.

17. Spatula is a stainless-steel utensil, used for scraping, transferring, or applying powders and paste like chemicals.

18. Petri dish usually made of glass and is used for scientific experiments, especially in chemistry and biology laboratories

19. Bunsen burner is a single open gas flame equipment, which is used for heating, sterilization and combustion.

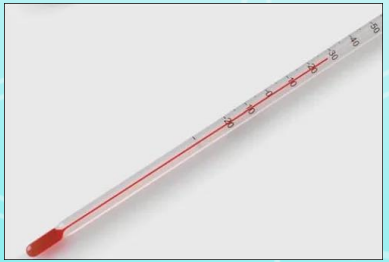
20. Sensitive balance is an analytical balance that is so sensitive and can detect the mass of a single grain of a chemical substance.

21. Rough balance is used for pre-weighing samples to determine the mass approximately.

22. Water bath is made from a container filled with heated water to incubate samples in water at a constant temperature over a long period of time or to enable certain chemical reactions to occur at high temperature.

23. Hot plate is a portable self-contained table top small appliance that features one, two or more electric heating elements, used to heat solution and substances.

24. Thermometer is a device that measures temperature or a temperature gradient



25. Volumetric Flask is used for precise dilutions and preparation of standard solutions.

26. Burette is a graduated glass tube with stopcock at one end, used in quantitative chemical analysis to measure the volume of a liquid and in titration reaction.

27. Graduated pipette is used to transfer small volumes of liquid and it is not calibrated for any particular volume.

28. Bulb pipette is used to transfer small and accurate volume of liquid because it is calibrated for any particular volume.

29. Pipette filler is used to safely fill a pipette with solution.

30. Stand is a piece of scientific equipment, to which a clamp can be attached to hold glassware.

31. Clump is a device to hold an objective to stand.

32. Distilled water apparatus is used to produce distilled water.

QUESTIONS?