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General lab safety rules and guidelines

1-prepare for an experiment

*Read and understand the experiment before entering the lab.

*Discuss and plan the experiment with yourteam.

2-wear comfortable protective clothing

*Wear PPE (personal protective equipment)

*Hair tied back

*No loose or baggy clothing

*Wear close-toed, flat-soled shoes

3-be responsible in the lab

*Log in and log out

*Wash hands and any lab instruments to be used before and after any lab activity

*Keep hands away from face ,boody, and mouth

*Don’t test , touch, or smell any thing unknown unless instructed to do so

*Don’t leave any experiment unattended

4-ask questions

*If you don’t understand directions or a procedure

*If you don’t know how to use equipment

5-be smart follow instructions carefully

6-use chemical , electrical equipment and glassware property

*Consult MSDS (material safety data sheet)

*Read lables on chemical containers twice

*Label all containers into which you put materials

*Take only what you need . do not return any unused chemicals to the bottle

*Dispose of chemicals only as directed by your teacher Don’t throw them into the sink

*Don’t store together incompatible chemicals

*Always pour acid into water ; never pour water into acid

*Don’t use your mouth to draw liquids into a pipette; use a pipette bulb

*Never point the open end of a heated test tube toward yourself or anyone else

*Waft fumes toward your nose by waving your hand over the mouth of the container if directed to smell a chemical

*Keep flame and flammable chemicals at least 20 ft (foot in second) apart

*Keep electrical equipment away from water

7-never fool around in the lab

8-keep work areas clean

9-no food \drinks in the lab

10-always report accidents to the lab personnel

11-ever work alone

12-never perform unauthorized experiments

13-know appropriate procedures for emergencies including the location and operation of all emergency equipment

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Sterilization

Sterilization:- process by which articles are freed of all microorganisims either in vegetative or spore state.

Disinfection:- process of destruction of pathogenic organism capable of giving rise to infection.

Antiseptic:- prevention of infection by inhibiting growth of bacteria.

Bacteriocidal agents:- able to kill bacteria.

Bacteriostatic agents:- prevent multiplication of bacteria and they may remain alive.

Sterilization **could be by physicl or chemical methods:-**

A-Physical methods:- include sunlight, drying, radiation(e.g.X-rays and other ionizing radiations), filtration and heat . the factors influencing sterilization by heat are:-

1-naturer of heat (a) dry (b) moist

2-temprechre and time.

3-number of organism present.

4-organisim sporing capacity

5-type of materials from which organism to be eradicated

1-Dry heat:- Sterilization by heat due to

1-protein denaturation.

2-oxidative damage.

3-toxic effect of elevated levels of electrolytes.

Dry heat involve:- red heat(e.g.loop), flaming (e.g. mouth of culture tubes), incineration(e.g. animal carcasses) and hot air oven:-sterilization by air oven requires temperature of 160C. for one houre. (e.g. glass Petri dish, glass test tube , flask pipette, etc. precautions 1- it must to be fitted with fans to ensure distribution of hot air. 2- It should not be overloaded. 3- Must be allowed to cool for about 2hours before opening the doors otherwise glass wares are likely to get cracked.

2-Moist heat:- Sterilization by moist heat due to denaturation and coagulation of protein

1- Steam under pressure (Autoclave):- materials for sterilization are exposed to temperature degree for suitable time at pressure (e.g. culture media, rubber goods, etc)

B-Chemical methods include:-phenol, soap and detergents, alcohol, acids and alkaline, distilled water, etc…

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Microscopes

1-compound microscope
2-Electron microscopy
3-Scanning probe microscopy
4-Fluorescence and light microscopy

Light or compound Microscope

The compound microscope uses lenses and light to enlarge the image and is also called an optical or light microscope .

Parts of the Light Microscope

A. EYEPIECE
Contains the OCULAR lens
B. NOSEPIECE and body tube
Holds the HIGH- and LOW- power,objective LENSES; can be rotated to change MAGNIFICATION. The function of body tube separates the objective and the eyepiece and assures continuous alignment of the optics.
C. OBJECTIVE LENSES
Magnification ranges from low 4X, high 10X, scanning 40 X, oil immersion 100 X
D. STAGE CLIPS
HOLD the slide in place
E. STAGE
Supports the SLIDE being viewed
F. LIGHT SOURCE
Projects light UPWARDS through the diaphragm, the SPECIMEN, and the LENSES
G. BASE
Supports the MICROSCOPE
H. DIAPHRAGM
Regulates the amount of LIGHT on the specimen
I. FINE ADJUSTMENT KNOB
Moves the stage slightly to SHARPEN the image
J. COARSE ADJUSTMENTKNOB
Moves the stage up and down for FOCUSING
K. ARM
Used to SUPPORT the microscope when carried

**** oil immersion** is a technique used to increase the resolution of a microscope.

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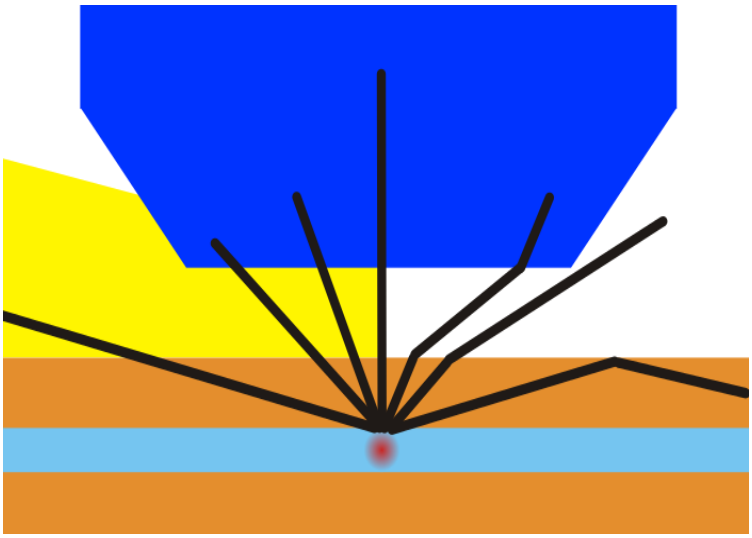
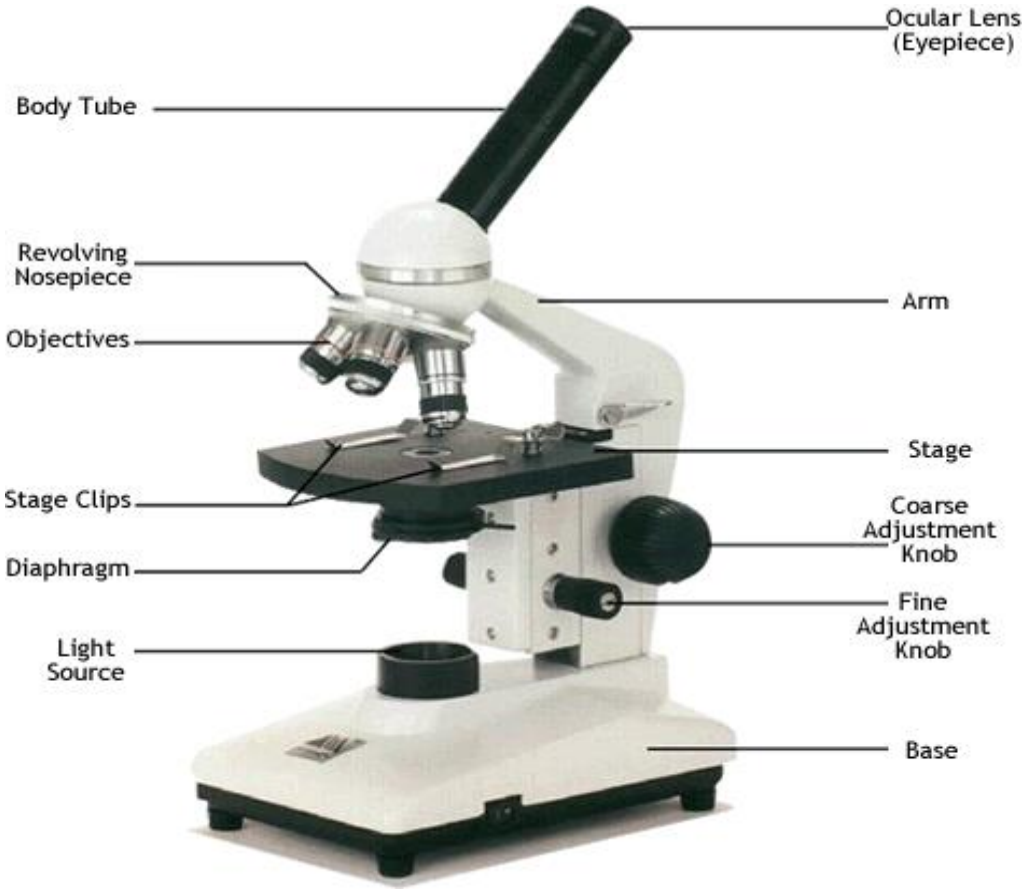
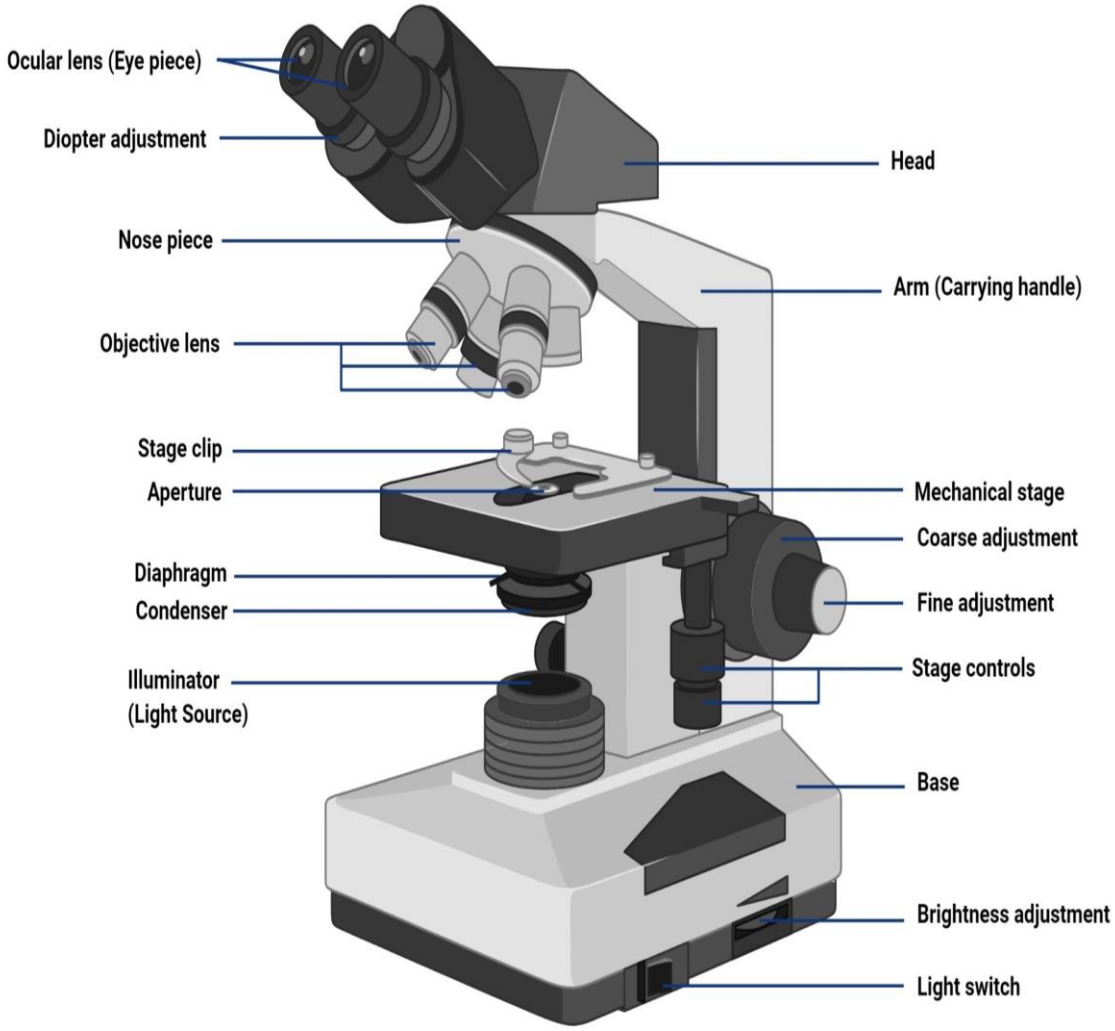


Oil immersion increases the resolving power of the microscope by replacing the air gap between the immersion objective lens and cover glass with a high refractive index medium and reducing light refraction




Ocular lens (Eye piece)
Diopter adjustment
Nose piece
Objective lens
Stage clip
Aperture
Diaphragm
Condenser
Illuminator
(Light Source)
Head
Arm (Carrying handle)
Mechanical stage
Coarse adjustment
Fine adjustment
Stage controls
Base
Brightness adjustment
Light switch

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Diagnostic microbiology an approach to laboratory diagnosis

Etiology of microbial disease may be established mainly by three methods:

1-micrscopy
2-culture
3-serology\skin tests

1- **Microscopy;** unstained microscopic examination is useful to demonstratetrophozoites of protozoa, eggs of helminths, pus cells, red blood corpuscles in body fluids and motility of bacteria Ziehl-neelsen staining is useful for demonstration of mycobacterium tuberculosis and lepra bacilli. Gram staining is useful in gonornhoea staphylococcus and infections caused by other organisms. Microscopy ia also usful for diagnosis of fungial disease and demonstration of inclusion bodies.

2-Culture: cultural examination includes isolation and identification of organism for identification we need colony morphology, biochemical tests , photogenecity or toxigenecity tests and differentiation of types of bacteria typing , phage typing.

3-serology: is useful in demonstration antibodes in the serum of patients the most common serological tests are

1-agglutination eg.(widal's test for enteric fever)
2-pricepitation test eg.(V.D.R.L. used for syphilis)
3-complement fixation test eg.wasserman test syphilis
4-indirect hemagglutination
5-ELISA

4-Skin tests: are not reliable diagnostic procedures the important example of skin test are Casoni test for the diagnosis of hydatid cyst ,tuberculin test for the diagnosis of tuberculosis.