Handling & Maintenance of Microscope

Microbiology I

Importance of the Microscope

- Important for hematology, microbiology, TB, and malaria testing.
- Compound microscope used in bacteriology, biology, and medicine to examine minute objects such as bacteria, other unicellular organisms, and plant and animal cells and tissue.
- Advances in fluorochrome stains and monoclonal antibody techniques caused growth in use of fluorescence microscopy in both biomedical analysis and cell biology

Microscope Parts

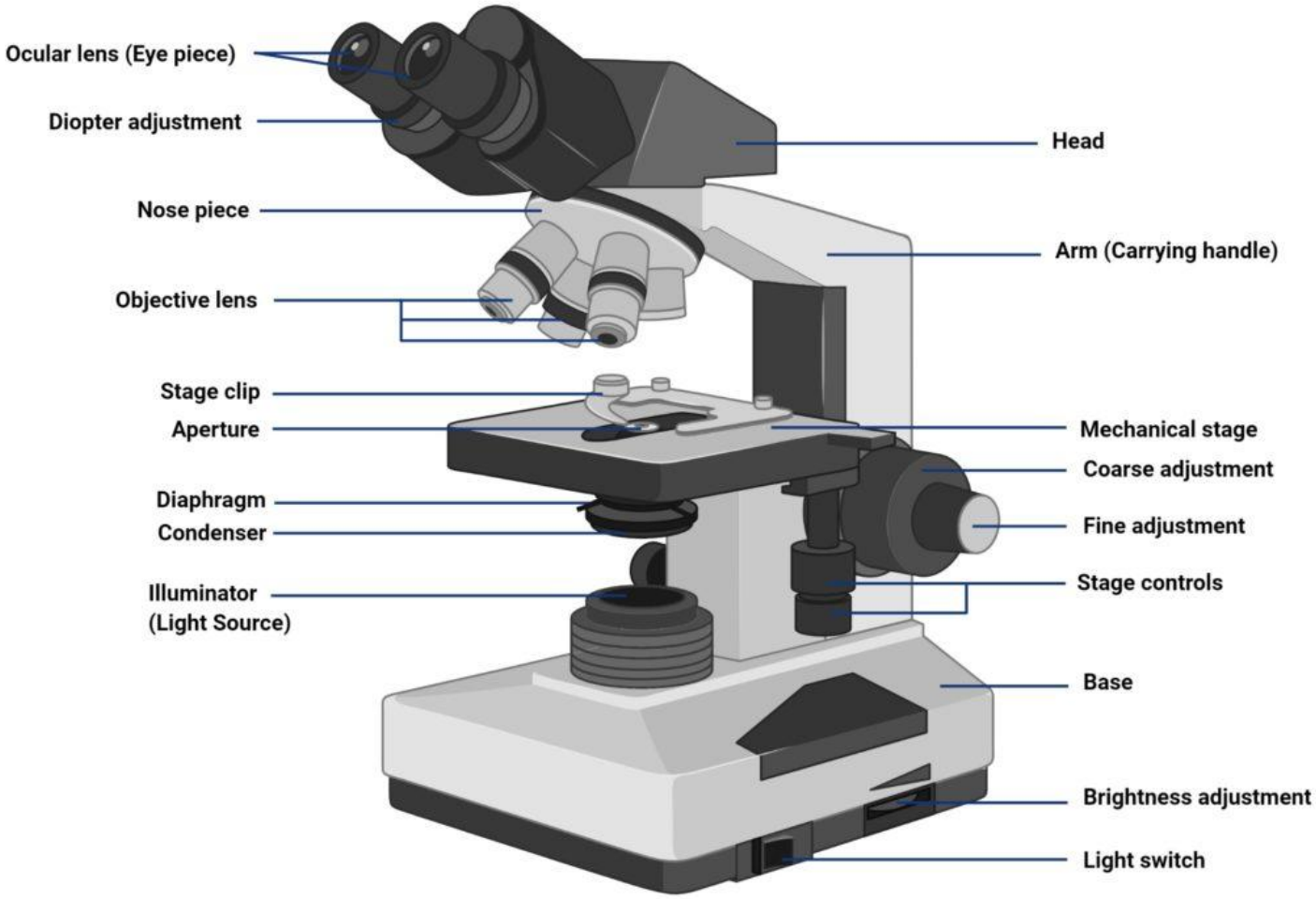


Figure: Parts of a microscope, Image Copyright © Sagar Aryal, www.microbenotes.com

Cleaning the Microscope

Routine Cleaning Supplies:

- Commercial lens tissue for optics
- **Caution:** Do not use paper towels or other rough paper products.
- Cotton swabs with wooden shaft (optics)
- 70% isopropyl alcohol
- Dilute methanol is satisfactory
- Mild detergent and soft cloth

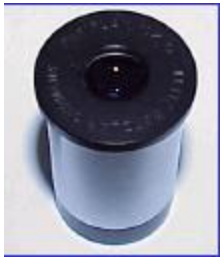
Care and Maintenance of the Microscope

Good preventive maintenance and care includes:

- Regular cleaning of oculars and objectives.
- Avoid damaging oculars and other optics with eye make-up or other debris.
- Careful handling to avoid abrupt motions.
- Protect from direct sunlight, high temperature, humidity, dust and vibration.
- Use appropriate materials to clean the lenses.
- Cover when not in use with vinyl or plastic dust cover.

Cleaning Oculars and Objectives

- Unplug the microscope
- Wash hands



- Remove dust from optical glass surfaces
- Carefully remove eyepieces, objectives, condenser, and filters–one at a time
- Excessive rubbing can cause damage to iridescent coating on lens
- Clean and replace as completed
- Do Not take eyepiece or objectives apart

Replacing Microscope Bulb

- Unplug microscope and allow bulb to **cool**
- Carefully place microscope on its side
- Open bulb house; use tissue to remove bulb
- Use tissue (to avoid fingerprints) to pick up new bulb
- Insert new bulb and close bulb house

Setting the Koehler Illumination

- Plug in microscope and turn on illuminator.
- Rotate nosepiece to lock 10X objective in place.
- Place smear on stage and center it under the 10X objective.
- Open the field diaphragm all the way and close condenser diaphragm all the way.
- Move up (rack up) stage to its highest position.
- Adjust the oculars for interpupillary distance so that only one circle of light is seen.
- Rack up condenser as high as possible

- Close field diaphragm half way and focus smear at 10X
- Close field diaphragm until diameter of illuminated image is smaller than the field of view.

- Lower condenser with positioning knob until you have a sharp, focused image of the edges of the field diaphragm.

- Adjust condenser using centering screws so that the circle of light is centered in field.

- Open field diaphragm until illuminated image is just larger than the field of view. If more light is needed, use the transformer.

- Koehler illumination is now set. It is important not to move the condenser up or down or change the field diaphragm.

Operation of the Microscope:

Examining Smears

- Put smear on stage and center it under the 10X objective
- Adjust intensity of the light to a comfortable level with the transformer.
- Open condenser diaphragm about 70% to achieve a good balance of resolution and contrast.
- Adjust oculars for inter-pupillary distance so that when looking with both eyes only one circle of light is seen

Examining Smears (continued)

- Adjust sharpness of image by moving adjustment ring on adjustable ocular.
- Once 10X focus is achieved, rotate nosepiece so that the 40X objective is in place.
- Readjust the intensity of light to a comfortable level using the transformer.
- Use the fine adjustment knob to focus up and down through the different planes of the field.

Microscope Problems – Troubleshooting 1

Problem: Black Field

Possible Causes:

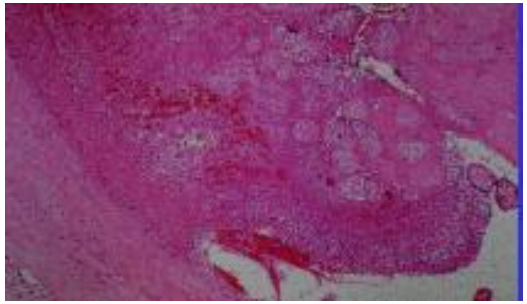
- Microscope not plugged in
- Power not available at outlet
- Illuminator not turned on
- Bulb burned out
- Objective not clicked into place
- Condenser too low with diaphragms closed

Microscope Problems – Troubleshooting 2

Problem: Field only partially illuminated

Possible Causes:

- Objective not clicked into position
- Condenser not centered correctly
- Condenser too low
- Field diaphragms closed too much



Microscope Problems – Troubleshooting 3

Problem: Difficulty focusing with 10X objective

- Possible Causes:
- Wrong objective in place
- Objective not screwed into place
- Not in correct plane of focus

Microscope Problems – Troubleshooting 4

Problem: Difficulty focusing with 40X objective

- Possible Causes:
- Not in correct plane of focus
- Not initially focused at 10X

Microscope Problems – Troubleshooting 5

Problem: Blurry image at 10X or 40X

Possible Causes:

- Dirty objective
- Dirty slide
- Dirty coverslip

Problem: Ground glass appearance

Possible Causes:

- Condenser too high