

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Sections: \_\_\_\_\_ Group: \_\_\_\_\_ Score: \_\_\_\_\_

## EXPERIMENT

1

# MICROSCOPY

Upon successful completion the completion of the program the learners must...

Explain the fundamentals of cells and tissue through observation of commercially prepared tissue and cell specimen. Explain the different characteristics and function of microscopic structure of human cells tissues, and organs using light microscopy. The following discipline: integrity, critical thinking, honesty, creativity and concern for others

## COURSE OUTCOMES

## UNIT OUTCOMES

To achieve this unit a learner must:

To achieve this unit, the learner must:

1. Identify the different parts of a compound microscope.
2. Explain the function of each part of a compound microscope.
3. Properly focus a prepared slide with both dry and oil immersion objectives
4. Demonstrate the proper care and storage of the compound microscope

## TEACHING AND LEARNING ACTIVITIES

### Laboratory Experimentation

The laboratory scientist will be familiar with the different parts of a compound microscope in order to execute proper technique in microscope analysis. He will demonstrate this proper technique of microscopic viewing using a prepared smear in both dry and oil immersion objectives.

## PRE-ANALYTICAL PHASE

The site of the experiment should be sterilized. The laboratory scientist should wear personal protective equipment before the experiment.

The microscope should be placed on a clean, plain and stable surface. The voltage of the power supply should be inclined to that of the equipment. Proper handling and cleanliness of compound microscope should be observed at all times. Lens paper is provided in order to clean the objective and ocular lenses.

The laboratory scientist MUST be familiar with the following terms and use of the equipment. This activity provides concise information for light microscopy and the related histological stain appropriate with the tissue specimen

**Light Microscopy** is based on the interaction of light and tissue components and can be used to reveal and study tissue features (Mescher A.L., 2010). **Microscope** is an instrument used to observe microorganism that cannot be seen in the naked eyes.

**Histological stains** were made to make various tissue components conspicuous, but permit distinction on the cell organelles. Tissue components without negative charge stain more with basic dyes, known as **basophilic**; proteins with many ionized amino group, have the affinity for acidic dyes known as **acidophilic** (Mescher A.L., 2010).

## **ANALYTICAL PHASE**

### **Materials and Instrument**

Compound microscope  
Prepared slide  
Cedar wood oil

Lens paper  
Xylene  
Gauze

### **Procedure**

A. Get familiar with a compound microscope.

1. Locate the following parts

Ocular lens

Interpupillary adjustment and scale

Diopter ring adjustment

Revolving nosepiece

Objective lenses

Mechanical stage

Stage control knob (X and Y axis)

Observation tube adjustment

Arm

Condenser with iris diaphragm

Condenser focus knob

Coarse adjustment knob

Fine adjustment knob

Light source

Light intensity adjustment knob

Main switch

Base

B. Focusing the microscope

1. Plug in the microscope and turn on the microscope using the main switch.

2. Turn on the light source by rotating the light intensity adjustment knob.

3. Place the prepared slide on the mechanical stage. The slide should be centered in the aperture of the stage.

4. Use the scanner to locate the specimen for initial observation. Note: Make sure that the specimen is at the center of the field.

5. Change your objective by rotating the nosepiece to low power objective.

6. Change to high power objective. The higher the objective the higher the magnification. Use the coarse and fine adjustment knob to adjust the clarity of specimen's image.

7. Before changing to Oil Immersion, the laboratory scientist must apply a small drop of cedar wood oil on the specimen. Note: Do not use High power objective with cedar wood oil for this may damage the objective. If the HPO is used make sure to change it to LPO before adding cedar wood oil. Then rotate it to scanner then move to oil immersion objective. Use the coarse and fine adjustment knob to adjust the clarity of specimen's image.

C. Care and proper storage of microscope after use

1. Remove the excess oil on the objectives by using lens paper with 70% alcohol. This is to maintain the quality of the objective.

2. Turn off the microscope and unplug it.

3. Rotate the objective into the lowest power objective.

4. Remove the slide and clean the mechanical stage. Make sure all oil, dust or debris are removed.

## **POST-ANALYTICAL PHASE**

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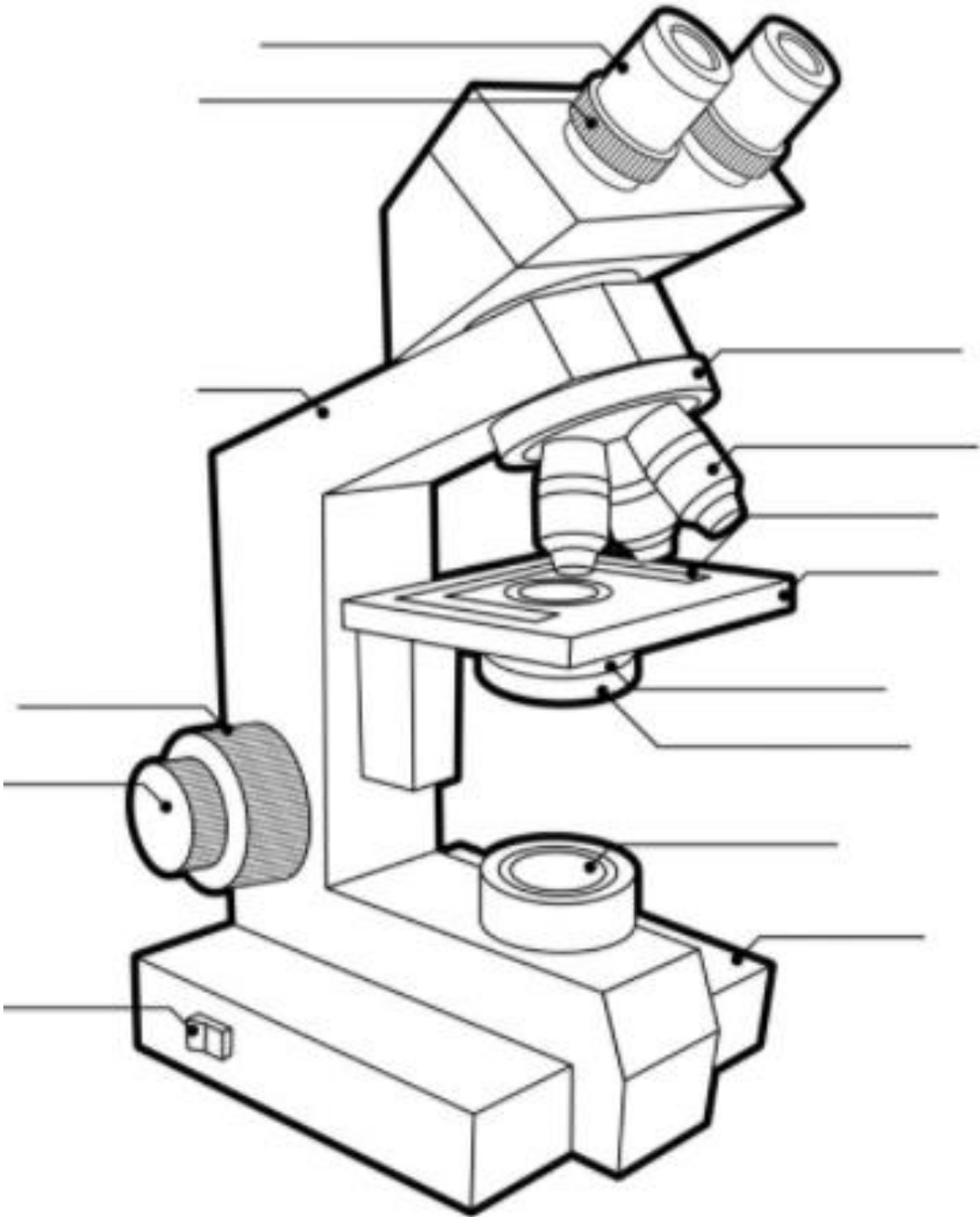
### **Storage of Microscope**

1. Prepare the microscope for storage and return it properly to storage cabinet
2. Clean and disinfect the work area before leaving.

### **Critical Thinking**

1. Discuss the magnifying parts of a microscope. Give their magnification.
2. Enumerate and discuss the illuminating parts of the microscope and give their respective functions.
3. Enumerate and discuss the mechanical parts of the microscope and give their respective functions.
4. Identify and describe the steps in tissue preparation

Label the parts of the microscope.



Tissue:	Tissue:
Organ:	Organ:
Illustration:	Illustration:
Stain Used:	Stain used:
Tissue:	Tissue:
Organ:	Organ:
Illustration:	Illustration:
Stain Used:	Stain used:
Tissue:	Tissue:
Organ:	Organ:
Illustration:	Illustration:
Stain Used:	Stain used:

Tissue:	Tissue:
Organ:	Organ:
Illustration:	Illustration:
Stain Used:	Stain used:

### **ASSESSMENT CRITERIA FOR PASSING**

#### **Outcome**

**To achieve each outcome, the learner must demonstrate the ability to**

- 1. Identify the different parts of a compound microscope**
- 2. Explain the function of each part of a compound microscope.**
- 3. Properly focus a prepared slide with both high power objective and oil immersion objective.**
- 4. Demonstrate the proper care and storage of the compound microscope**

- A. Properly identify and label the different parts of a compound microscope.**
- B. Utilize the different parts of microscope in viewing the specimen.**
- C. Handle and store the microscope properly.**

### **ASSESSMENT STRATEGIES**

#### **Focus for assessment**

#### **ANECDOTAL NOTES**

Observe students as they participate in the activity. Note the extent to which students are able to make and talk about personal observation.

#### **OBSERVATION CHECKLIST**

Create an outcome-based checklist and share with students prior to beginning the activity. Use the checklist to assess if students are able to make and talk about personal objectives.

#### **RUBRIC**

Collaboratively create an outcome-based rubric with students. Use rubric to evaluate how well the students are able to understand cells.

## **ASSESSMENT STRATEGIES**

Betty A.F., Daniel F.S and Alice S.W., Bailey and Scott's Diagnostic Microbiology; Twelfth Edition. Pg 70

Henry R.W: Plastination – Dehydration of specimens. J. Int. Soc. Plastination 6:4, 1992

Mescher, Anthony L (2010). Junqueira's Basic Histology Text and Atlas, 12th edition, Mc-Greaw Hill Companies Inc

## **RUBRICS**

Critical dimension	1 REFER	2 BEGGINER	3 COMPETENT	4 PROFICIEN	5 EXEMPLARY
<b>Pre-analytical phase</b>					
<b>FACTOR 1 (Personal protective equipment)</b>	No PPE	Only 1 PPE is worn	Only 2 PPE is worn	Only 3 PPE is worn	Complete PPE is worn
<b>Analytical phase</b>					
<b>FACTOR 2 (Quality of Drawing)</b>	There are several erasures, smudged lines or stray marks on the paper which detract from the drawing.	There are few erasures, smudged lines or stray marks on detract from the drawing.	There are a few erasures smudged lines or stray marks on the paper, but they do not greatly detract the drawing.		Lines are clear and not smudged. There are almost no erasures or stray marks on the paper. Color is used carefully to enhance the drawing.
<b>FACTOR 3 (Proper use of microscope)</b>	Did not know how to use microscope.	Only few steps are followed properly.	Proper step are done in LPO but not in HPO and OIO	Majority of the procedures are done properly	All steps for microscopic analysis are done properly
<b>FACTOR 4 (Focusing)</b>	Was not able to focus the specimen.		Blurred focus of the specimen.		Clear image of the specimen.
<b>FACTOR 5 (Accuracy)</b>		Less than 85% of the assigned structure are drawn or labeled accurately.	86-94% of the assigned structure are drawn accurately and are recognizable.		95% or more of the assigned structures are drawn accurately and are recognizable. All structures are labeled correctly

<b>FACTOR 6 (Knowledge gained)</b>	Can't identify the parts of the microscope.	Student identified 5 out of 10 or less parts of the microscope.	Student was able to identify 6 to 7 out of 10 parts of microscope.	Student was able to identify 8 to 9 out of 10 parts of microscope.	Able to identify at least 10 parts of the microscope
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**Post-analytical phase**

<b>FACTOR 7 (Returning of microscope)</b>	Did not return the microscope.	Did not shift the objective to the scanner and did not clean the objectives.	Returned microscope improperly.	Properly returned the microscope.
<b>FACTOR 8 (Cleaning of work are)</b>	Left the work area without cleaning.	Was not able to dispose waste properly. Improper segregation of waste.	Dispose waste properly but did not disinfect the area.	Properly cleaned and disinfect the area.

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