



Medical Laboratory

NTQF Level III

Learning Guide #45

Unit of competence: performing parasitological tests

Module Title: performing parasitological tests

LG Code: HLT MLT3 M07 LO3-LG-45

TTLM Code: HLT MLT3 TTLM 0919v1

LO 3: Set up and use microscope



Instruction Sheet	Learning Guide #3
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

Set up and use microscope

3. Microscope

- 3.1. Set up of a microscope
- 3.2. Parts and functions of a microscope
- 3.3. Adjust of a microscope light path
- 3.4. Placing sample on a microscope
- 3.5. Cleaning of microscope lenses

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- optimize resolution by setting up the light path
- select appropriate objectives and examine samples
- Ensure that the lenses are made clean
- adjust settings and alignment of the light path to optimize performance microscope
- place sample correctly on the stage



Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 19.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” in page 9.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your trainer for further instructions..
7. Submit your accomplished Self-check. This will form part of your training portfolio.
8. Read the information written in the “Information Sheet 2”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
9. Accomplish the “Self-check 2” in page 17.
10. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 2).
11. Read the information written in the “Information Sheets 3 and 4”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
12. Accomplish the “Self-check 3” in page 24.
13. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 3).



14. Accomplish the “Self-check 4” in page 37.
15. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-check 4).
16. If you earned a satisfactory evaluation proceed to “Operation Sheet 1” in page 12, “Operation Sheet 2” in page 20 and “Operation Sheet 4” in page 38,. However, if your rating is unsatisfactory, see your trainer for further instructions.
17. Read the “Operation Sheet 1, 2 and 4” and try to understand the procedures discussed.
18. Go to your trainer if you need clarification or you want answers to your questions or you need assistance in understanding a particular step or procedure.
19. Do the “LAP test” in page 51 (if you are ready). Request your trainer to evaluate your performance and outputs. Your trainer will give you feedback and the evaluation will be either satisfactory or unsatisfactory. If unsatisfactory, your trainer shall advice you on additional work. But if satisfactory you can proceed to Learning Guide # 3.



3.1. Set up and use microscope

- **Definition of terms:**

- A. **Microscope:** a magnifying instrument, which use to see objects that cannot seen by the necked eye.

- B. **Object:** Material examined Under the Microscope.

- C. **Specimen:** the part which represent the characteristic of whole

- **What is Microscope:** The Microscope is a magnifying instrument, which use to see objects that cannot seen by the necked eye. A Microscope is the most expensive and important piece of equipment used laboratories, forms 70–90% of the work in medical laboratory, a microscope is a magnifying instrument. The magnified image of the object (specimen) is first produced by lens close to the object called the objective .This collects light from the specimen and forms the primary image. A second lens near the eye called the eye piece enlarges the primary image, converting it into one that can enter the pupil of the eye.

- **Types of Microscope**

- **Bright field Microscope:** is the type of Microscope commonly used in medical laboratory in which visible white light its source of illumination.
 - **Dark field Microscope:** this form of Microscope used when maximum contrast is required, E.g. to visualize transparent objects. In dark-field (dark-ground) Microscope ,a black patch stop below the condenser or a central black- out area in a special dark-field condenser prevents direct light from entering the objective and therefore the field of view is dark .Instead of passing through the center of the condenser the light is reflected to stops to match their own Microscopes. If however this useful accessory is not available, a dark-field stop can be made in the laboratory.

Value of dark-field Microscope Dark-field Microscopes particularly useful for detecting:

- Motile *Treponema palladium* in chancre fluid.
 - Motile *borreliae* in blood.



- Motile leptospire in urine.
- Pathogenic microfilaria in blood. The sheath and nuclei can be clearly seen.
- Cryptococcus in cerebrospinal fluid. The capsule surrounding the cells can be seen.
- Vibrios' in specimens and cultures.
- **Florescence Microscope:** In fluorescence microscope, ultra-violet light which has a very short wave length and is not visible to human eye (or just visible deep blue light) is used to illuminate organisms, cells or particles which have been previously stained with fluorescing dyes called florochrome dye.
- **Electron Microscope:** The various components of the Microscope can be classified into four systems:
 - Support system
 - Magnification system
 - Illumination system
 - Adjustment system

Self-check 1	Written
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is Microscope? (2 points)
2. List different types of Microscope. (2 points)

Note: satisfactory rating is 4 points, unsatisfactory <2 points. You can ask your instructor for copy of correct answer.

Answer Sheet

1. _____
2. _____

Score = _____
Rating: _____



Name: _____

Date: _____

Information Sheet-2

Parts and functions of a microscope

3.2. Parts and functions of a microscope

3.2.1. Support system:

This consists of:

- the foot
- the limb
- Revolving nosepiece (objective changer)
- Stage
- Mechanical stage, which gives a slow controlled movement to the object slide.



Fig 3.1. Bright field Binocular Microscope with built in Illumination



3.2.2. **Magnification system:** This consists of a system of lenses, the lenses of the Microscope are mounted in two groups, one at each end of the long tube or the body tube.

- First group of lenses is at the bottom of the tube, just above the preparation under examination (the object), and is called the objective.
- The second group of lenses is at the top of the tube and is called the eyepiece.
- Objectives Magnification the magnifying power of each objective is shown by a figure engraved on the sleeve of the lens 10x objective magnifies 10 times; 40x objective magnifies 40 times; 100x objective magnifies 100 times.
- The x100 objective is usually marked with a red ring to show that it must be used with immersion oil. Some Microscopes are fitted with x3 or x5 objective instead of x10 objective.

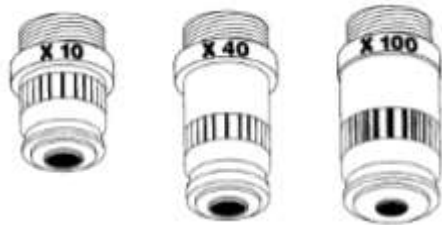


Fig. 3.2. Objectives of Microscope

- Numerical aperture (NA) it is relates to the resolving power of the objective. The higher the resolving power of an objective, the closer can be the fine lines or small dots in the specimen which the objective can separate in the image. The numerical aperture is also engraved on the sleeve, next to the magnification.
 - 0.25 on x10 objective
 - 0.65 on x40 objective
 - 1.25 On x100 objective.

The greater the numerical aperture, the greater the resolving power. Moreover, the greater the numerical aperture, the smaller the front lens mounted at the base of the objective.

The front lens of the x100 objective is the size of a pinhead, so handle it with care

- Working with immersion Oil



Fig 3.3. Working principle of oil immersion objectives

The sleeve on objectives may also display: The recommended length in millimeters of the tube (between the objective and the eyepiece) usually 160mm

- The recommended thickness in millimeters of the cover slip used to cover the object slide e.g. 0.16mm.
 - The screw threads of all objectives are standard, so the objectives in the revolving nosepiece are interchangeable
- A. Working distance the working distance of an objective is the distance between the front lens of the objective and the object slide when the image is in focus. The greater the magnifying power of the objective, the smaller the working distance.
- x10 objective: the working distance is 5 -6mm
 - x40 objective: the working distance is 0.5 – 1.5 mm
 - x100 objective: the working distance is 0.15 – 0.20mm



Fig. 3.4. Working distance Objective

- B. **Resolving Power:** The resolving power of an objective is its ability to reveal closely adjacent details as separate and distinct. The greater the resolving power of the objective, the clearer the image, The maximum resolving power of a good medical laboratory Microscopes about 0.25mm (the resolving power of the normal human eye is about 0.25mm).Immersion oil increases the resolving power by conserving many light rays that would be lost by refraction if a dry objective were used



C. Objective Magnification:

- Eyepiece Magnification The magnifying power of the eyepiece is marked on it.
- X5 eyepiece magnifies the image produced by the objective five times;
- X10 eyepiece magnifies the image 10 times.

D. If the object is magnified 40 times by the 40 objective, then by five times by the 5 eyepiece, the total magnification is: $5 \times 40 = 200$.

- To calculate the total magnification of the object observed, multiply the magnifying power of the objective by that of the eyepiece.
- Microscopes used in medical laboratories have a magnifying power of between x50 and x 1000.
- Certain eyepieces have a calibrated graticule. These eyepieces are used to measure the size of an object under the Microscope (e.g. protozoan cysts).

Self-check 2	Written
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Explain component of Microscope. (2 points)
2. What is total magnification? (2 points)

Note: satisfactory rating is 4 points, unsatisfactory <2 points. You can ask your instructor for copy of correct answer.

Score = _____

Rating: _____

Answer Sheet

1. _____

2. _____



Name: _____

Date: _____

Information Sheet-3

Adjust of a microscope light path

3.3. Adjust of a microscope light path

3.3.1. Illumination system Light source

- **An electric light source is preferable**, since it is easy to adjust. It is provided either by a lamp built into the Microscope beneath the stage, or by an external lamp placed in front of the Microscope.
- **Mirror:** The mirror reflects rays from the light source onto the object. One side has a plane surface, the other a concave surface, the concave side forms a low-power condenser and is not intended to be used if the Microscope already has a condenser.



Fig 3.5. Microscope Mirror

- **Condenser:** The condenser brings the rays of light to a common focus on the object to be examined. It is situated between the mirror and the stage. The condenser can be raised (maximum illumination) and lowered (minimum illumination). It must be centered and adjusted correctly.
- **Diaphragm:** The diaphragm which is found inside Condenser used to reduce or increase the angle and therefore also the amount of light that passes into the condenser.





Fig. 3.6. *A when diaphragm is opened to allow maximum light for high power objective B when diaphragm is closed to allow low light for lower power objective*

3.3.2. Adjustment system: This consists of:

- coarse adjustment screw
- fine adjustment screw
- condenser adjustment screw
- condenser centering screws
- an iris diaphragm lever
- mechanical stage controls
 - ✓ Coarse adjustment screw, this is the largest screw. It is used first to achieve an approximate focus.
 - ✓ Fine adjustment screw, this moves the objective more slowly. It is used to bring the object into perfect focus.
 - ✓ Condenser adjustment screw, this is used to raise the condenser for greater illumination or to lower it to reduce the illumination.
 - ✓ Condenser centering screws, There may be three screws placed around the condenser:
 - a. One in front,
 - b. One on the left and,
 - c. One on the right.

These are used to center the condenser exactly in relation to the objective.

- Iris diaphragm lever this is a small lever fixed to the condenser. It can be moved to close or open the diaphragm, thus reducing or increasing both the angle and the intensity of the light.



- Mechanical stage controls these are used to move the object slide on the stage: one screw moves it backwards and forwards and the other screw moves it to the left or right.

N.B. When a new Microscope is received in the laboratory, it is important to know how to set it up correctly. Remember to follow manufacture's manual.

Positioning the Microscope Place it on a firm level bench (check with a spirit level) of adequate size but not too high. The Microscope must be placed in the shade away from the window. Place a square felt pad under the Microscope. If no felt is available, use a piece of heavy cloth.

Setting up a lamp for the Microscope:

If the Microscope has a mirror, you can make a lamp to provide illumination. A porcelain holder for a light bulb is fixed on a wooden base and the whole is encased in a wooden or tin box with an opening for the light. Cut slits in the top of the box to enable the bulb to cool. Alternatively, a flap can be fitted above the opening to serve as a shutter. Use a 100W opaque electric bulb of the "daylight" type (blue-white).



Fig. 3.7. Setting up a Lamp for a Microscope

- **Binocular adjustment:** When a binocular Microscope is used, the inter pupillary distance (the distance between the pupils of the eyes) can be adjusted to suit the operator.
- **Focusing the eyepieces:** one of the eyepiece holders (usually the left) has a focusing collar. If the collar is on the left eyepiece holder, close your left eye and, using the x40 objective, bring the image into focus for your right eye with the right eyepiece. Then close your right eye and look through the left eyepiece. If the image is in focus, no adjustment is needed. If



the image is not clear, turn the focusing collar until it is in focus. The Microscope is now adjusted to suit your own binocular vision.

3.3.3. Depth of the Microscope field: The image is seen in depth when a low-power objective is used. When the high power objectives (x40, x100) are used, the depth of focus is small and the fine adjustment screw must be used to examine every detail from the top to the bottom levels of focus of the object observed (e.g. the different nuclei in a spherical amoeba cyst).

Images seen under the Microscope Remember that the circle of light seen in the eyepiece is called “the Microscopic field”. Images observed in the Microscopic field can be placed in relation to the hands of a clock. For example, a schistosome egg is placed at “2 o’clock” in Fig.

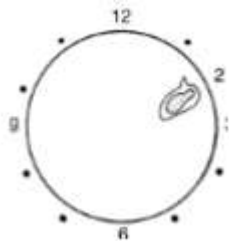


Fig. 3.8. *Establishing the position of Image under the Microscope*

The image seen is inverted by the lenses:

- Objects seen at the bottom of the Microscopic field are actually at the top.
- Objects seen on the left side of the Microscopic field are actually on the right. If you move the slide in one direction, the object examined moves in the opposite direction



Self-check 3	Written
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the use of condenser? (2 points)
2. What is the difference between monocular & binocular Microscope? (2 points)

Note: satisfactory rating is 4 points, unsatisfactory <2 points. You can ask your instructor for copy of correct answer.

Score = _____ Rating: _____

Answer Sheet

1. _____

2. _____

Name: _____

Date: _____



Information Sheet-4	Cleaning of microscope lenses
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3.4.Cleaning of microscope lenses

Routine maintenance and care of Microscope: Microscopes must be installed in a clean environment, away from chemicals. Workplaces should be well ventilated or permanently air-conditioned (intermittent use of air conditioners produces condensed water). The Microscope needs daily attention to keep it in good working order and thus to ensure reliable laboratory results. Optical instruments should not be kept for long periods in closed compartments since these conditions also favor fungal growth which can corrode optical surfaces. Special care is required in hot and humid climates.

- Cleaning the Microscope Microscopes are used to investigate biological tissues and fluids and must therefore be decontaminated and dirt must be cleaned at regular intervals, when not at work.
- Additional precautions to be taken in hot climates
 - Dry climates: In hot, dry climates the main problem is dust. Fine particles work their way into the threads of the screws and under the lenses. This can be avoided as follows:
 - ✓ Always keep the Microscope under an airtight plastic cover when not in use.
 - ✓ At the end of the day's work, clean the Microscope thoroughly by blowing air over it with a rubber bulb.
 - ✓ Finish cleaning the lenses with a soft camel-hair brush, a fine paintbrush or a blower. If dust particles remain on the surface of the objective, clean it with special lens tissue paper.



- **Humid climate:** In hot, humid climates and during the wet season in hot, dry climates, fungi may grow on the Microscope particularly on the surface of the lenses, in the grooves of the screws and under the paint, and the instrument will soon be useless. This can be prevented as described below. Always keep the Microscope under an airtight plastic cover, when not in use, together with a dish filled with blue silica to dry the air under the cover. (The silica will turn red when it has lost its capacity to absorb moisture from the air. It can be simply regenerated by heating in a hot-air oven or over a fire.) The Microscope must be cleaned daily to get rid of dust. These procedures must be carried out regularly, and are essential in conjunction with repair and maintenance procedures.



Self-check	Written
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is the three different forms of Objective? (2 points)
2. What is the use of Immersion Oil? (2 points)
3. Discuss microscope cleansing and daily maintenance. (3 points)

Note: Satisfactory rating – 11 points Unsatisfactory - below 11 points
You can ask you trainer for the copy of the correct answers.

Answer Sheet

Score = _____ Rating: _____

Name: _____

Date: _____

1. _____

2. _____

3. _____



Operation Sheet 1	Identify parts of a microscope
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The purpose of this activity is to enable you to practice. The purpose of this activity is to enable trainees to practice those skills necessary to Identify parts of Microscope of Microscope, and to achieve competency in these skills.

INSTRUCTIONS: This activity should be conducted in a training institution skills laboratory. Trainee's should review Learning Guide/check list for Identifying parts of Microscope before beginning the activity, the trainer should demonstrate the steps/tasks in each learning guide one at a time. Under the guidance of the trainer, trainees should then practice the steps/tasks in the Learning Guide/check for identifying parts of Microscope & of Microscope. Trainees should be able to perform the steps/tasks before skills competency is assessed using the Checklist for.

Conditions or situation for the operations:

This task should be performed in a well-organized skills laboratory which has an electric light source and water supply for accomplishment of the tasks at allowable period of time.

Resource/ materials

Tools and materials	
<ul style="list-style-type: none"> ○ TTLM(Laboratory Log Book Learning module ,Laboratory Manual Checklists ○ Reporting format 	<ul style="list-style-type: none"> ○ Cleaning materials
<ul style="list-style-type: none"> ○ Sample 	<ul style="list-style-type: none"> ○ Microscope
<ul style="list-style-type: none"> ○ SOP, 	<ul style="list-style-type: none"> ○ Slide
<ul style="list-style-type: none"> ○ Stationary (pen, pencil, marker, paper ...) 	<ul style="list-style-type: none"> ○ Cover slides
	<ul style="list-style-type: none"> ○ Sample container
	<ul style="list-style-type: none"> ○ Applicator sticks

Precaution: Operating with Microscope requires special care, because microscopy is Expensive material, and all universal precaution-in the medical laboratory should be followed.

Procedure-Learning guide/Checklist:



Rate the performance of each step or task observed using the following rating scale:

1. **Needs Improvement:** Step or task not performed correctly, out of sequence (if necessary), or is omitted
2. **Competently Performed:** Step or task performed correctly in proper sequence (if necessary) but participant/student does not progress from step to step efficiently
3. **Proficiently Performed:** Step or task performed efficiently and precisely in the proper sequence (if necessary)

Ser.No	Steps/Tasks	Needs improvement	Competently performed	Proficiently Performed	Remark
Get ready					
1	Wearing gown				
2	Washing your hand with soap and water				
3	Wearing glove				
4	Cleaning the working area				
5	Confirming the working area fit for purpose(i.e. safe to work)				
5	Arrange necessary materials& microscopy in appropriate place				
6	Identify Support component of Microscope				
7	Identify Magnification part of Microscope				
8	Identify Illumination part of Microscope				
9	Identify Adjustment part of Microscope				
10	Practice switching on/ of Microscope				
11	Practice placing Microscope At safe protected place at the end of day work				
12	Review SOP for operating Microscope				
	Identify all parts, set up, adjustment or focus maintenance ,with form				

Quality criteria:

During accomplishment Operating parts of Microscope the trainees should be :

- Able to Identify support parts of Microscope
- Able to Identify magnification part Microscope
- Able to identify Illumination part of microscope



Operation Sheet 2	Operate Parts of Microscope
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Purpose: The purpose of this activity is to enable you to practice. The purpose of this activity is to enable trainees to practice those skills necessary to Operate parts of Microscope of Microscope , and to achieve competency in these skills.

INSTRUCTIONS: This activity should be conducted in a training institution skills laboratory. Trainee's should review Learning Guide/check list for Operating parts of Microscope before beginning the activity, the trainer should demonstrate the steps/tasks in each learning guide one at a time. Under the guidance of the trainer, trainees should then practice the steps/tasks in the Learning Guide/check for Operating parts of Microscope & of Microscope. Trainees should be able to perform the steps/tasks before skills competency is assessed using the Checklist for. Operating parts of Microscope of Microscope.

Conditions or situation for the operations:

This task should be performed in a well-organized skills laboratory which has an electric light source and water supply for accomplishment of the tasks at allowable period of time.

Resources/ materials

Tools and materials	
<ul style="list-style-type: none"> ○ TTLM(Laboratory Log Book Learning module ,Laboratory Manual Checklists ○ Reporting format 	<ul style="list-style-type: none"> ○ Cleaning materials
<ul style="list-style-type: none"> ○ Sample 	<ul style="list-style-type: none"> ○ Microscope
<ul style="list-style-type: none"> ○ SOP, 	<ul style="list-style-type: none"> ○ Slide
<ul style="list-style-type: none"> ○ Stationary (pen, pencil, marker, paper ...) 	<ul style="list-style-type: none"> ○ Cover slides
<ul style="list-style-type: none"> ○ Applicator sticks 	<ul style="list-style-type: none"> ○ Sample container

Precaution: Operating with Microscope requires special care, because microscopy is Expensive material, and all universal precaution-in the medical laboratory should be followed.

Procedure-Learning guide/Checklist:



Rate the performance of each step or task observed using the following rating scale:

1. Needs Improvement: Step or task not performed correctly, out of sequence (if necessary), or is omitted

2. Competently Performed: Step or task performed correctly in proper sequence (if necessary) but participant/student does not progress from step to step efficiently

3. Proficiently Performed: Step or task performed efficiently and precisely in the proper sequence (if necessary)

Ser.No	Steps/Tasks	Needs improvement	Competently performed	Proficiently Performed	Remark
Get ready					
1	Wearing gown				
2	Washing your hand with soap and water				
3	Wearing glove				
4	Cleaning the working area				
5	Confirming the working area fit for purpose(i.e. safe to work)				
5	Arrange necessary materials& microscopy in appropriate place				
6	Operate Support component of Microscope				
7	Operate Magnification part of Microscope				
8	Operate Illumination part of Microscope				
9	Operate Adjustment part of Microscope				
10	Practice switching on/ of Microscope				

11	Practice focusing Object under Microscopy				
12	Practice placing Microscope At safe protected place at the end of day work				
13	Review SOP for operating Microscope				
14	Operates all parts, set up, a adjustment or focus maintainance, with form				

Quality criteria :

During accomplishment Operating parts of Microscope the trainees should be :

- Able to Operate support parts of Microscope
- Able to Operate magnification part Microscope
- Able to Operate Illumination part of microscope
- Able to Operate Adjustment part of microscope
- Able to Focus Objects under Microscopy



Operation Sheet 3	Focus Objects under Microscope
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Purpose

The purpose of this activity is to enable you to practice those skills necessary to Focus Objects under Microscope , and to achieve competency in these skills.

INSTRUCTIONS: - This activity should be conducted in a training institution skills laboratory. Trainee's should review Learning Guide/check list for focus Objects Under Microscope before beginning the activity,the trainer should demonstrate the steps/tasks in each learning guide one at a time. Under the guidance of the trainer, trainee's should then practice the steps/tasks in the Learning Guide/check for Focusing Objects Under Microscope.

Trainee’s should be able to perform the steps/tasks before skills competency is assessed using the Checklist for.

Focusing Objects under Microscope.

Conditions or situation for the operations:

This task should be performed in a well organized skills laboratory which has an electric light source and water supply for accomplishment of the tasks at allowable period of time.

Teaching/learning materials

Resource/ materials

Tools and materials	
<ul style="list-style-type: none"> ○ TTLM(Laboratory Log Book Learning module ,Laboratory Manual Checklists ○ Reporting format ○ Sample 	<ul style="list-style-type: none"> ○ Cleaning materials ○ Microscope
<ul style="list-style-type: none"> ○ SOP, ○ Stationary (pen, pencil, marker, paper ...) ○ Applicator sticks 	<ul style="list-style-type: none"> ○ Slide ○ Cover slides ○ Sample container

Precaution: Operating with Microscope requires special care, because microscopy is Expensive material, and all universal precaution-in the medical laboratory should be followed. all specimen should be considered as potential source of pathogens ,hence wearing PPE, and care handling of specimen should be considered.



Rate the performance of each step or task observed using the following rating scale:

1. Needs Improvement: Step or task not performed correctly, out of sequence (if necessary), or is omitted

2. Competently Performed: Step or task performed correctly in proper sequence (if necessary) but participant/student does not progress from step to step efficiently

3. Proficiently Performed: Step or task performed efficiently and precisely in the proper sequence (if necessary)

Ser.No	Steps/Tasks	Needs improvement	Competently performed	. Proficiently Performed	Remark
Get ready					
1	Wearing gown				
2	Washing your hand with soap and water				
3	Wearing glove				
4	Cleaning the working area				
5	Confirming the working area fit for purpose(i.e. safe to work)				
5	Arrange necessary materials& microscopy in appropriate place				
6	Turn the rotary lamp brightness control anti-clockwise to its lowest setting and then switch on the microscope.				

7	Turn up the brightness control to about three quarters of its full power(final adjustment will be made at a later stage).				
8	Carefully revolve the nosepiece until the 10objectiveislocatedverticallyabove the stage. <i>Make suret here is no danger of the objective</i>				
9	Prepare a specimen slide such as amounted stained thin blood film .A temporary mounted preparation can be made by adding a drop of oil to the lower third of the blood film and covering it with a cover glass. Make sure the underside				



	of the slide is dry ,clean ,and free of stain marks.				
10	Place the specimen slide, cover glass uppermost, on the front of the stage .Gently holding back the spring arm of the mechanical stage, push the slide back into the slide holder and release the arm slowly. The specimen will be held firmly.				
11	While looking from the side(not downtheeye-pieces), turn the coarse focusing control to bring the specimen close to the objective i.e. about 5mm from the objective.				
12	Looking down through the eyepieces, bring the specimen into focus by slowly turning the coarse focusing control in the opposite direction to increase the distance between specimen and objective. The specimen will come into focus ,first as a blurred image and then a sa clear image.				
13	Use the fine focusing control to obtain a sharp image (this will not be the best image				
14	Using the iris lever, open the iris fully.				
15	Focus the condenser as follows: <ul style="list-style-type: none"> ● Using the condenser focusing knob located on the left, raise the condenser to it stop- most position. ● Using the iris lever, open the iris fully. ● Check that the filter holder is located against its stop and not out of position and blocking the light. ● Looking down the eye pieces and with the specimen in focus, slowly lower the condenser until the mottled image of the ground glass light diffusing screen(located below the lens of the illuminator) is seen in the background. ● Slowly raise the condenser until the mottled image of the diffusing screen just disappears(thisisusuallyabout1mmbelow the condenser's topmost position).The condenser is no in focus and should be left in 				



	this position.				
16	Check the centering of the condenser unless the microscopes fitted with precentred condenser (if precentred there will be no countering screws, only a single screw holding the condenser in its mount). To check the centering of a condenser that is not precentred:				
17	Looking down the eye pieces with the specimen in focus, obtain the best possible image by adjusting the condenser aperture and lamp brightness control. For the 10 objective, the condenser will need to be closed about two thirds to provide a good image. Adjust the lamp brightness control to a level which provides good illumination without glare.				
18	Examine the specimen with the x40 objective. Carefully revolve the nosepiece to bring the 40 objective into place. It will locate very close to the specimen. Providing the objectives are parfocal (in focus one with another), only slight focusing with the fine focusing control should be necessary to bring the specimen into sharp focus.				
19	Examine the specimen with the 100 oil immersion objective. Revolve the nosepiece to move 40x objective one side before bringing 100x in position place one drop of immersion oil on the specimen. Carefully locate the 100 objective. The lens of this objective should just dip into the drop of oil (providing the objectives are parfocal). Use the fine focusing control to focus the specimen. Open the condenser iris fully and increase the illumination to give a bright clear image.				



20	Before removing the specimen from under the oil immersion objective, revolve the nosepiece so that the objective moves to one side. Only then remove the slide from the slide holder.				
21	Clean microscope, and place in appropriate way of caring				

Quality criteria :

During accomplishment Operating parts of Microscope the trainees should be :

- Able to Focus Object under Microscope under diff objectives



LAP Test	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary materials, reagents and color plates you are required to perform the following tasks within --- hours.

Task 1: Identify parts of a microscope

Task 2: Operate Parts of Microscope

Task 3: performing Focusing objects under Microscope.



List of Reference Materials

- Cheesbrough M, 1998. District Laboratory Practice In tropical countries.
- Jeffrey H.C and Leach R.M. 1975. Atlas of Medical Helminthology and Protozoology
- Parasitology Handbook, 1998. London School of Hygiene and Tropical Medicine.
- Smith JW, et al. Diagnostic Medical Parasitology. Chicago: American Society of Clinical Pathology, 1976.
- Strickland GT. Hunter's tropical medicine. 7th ed. Philadelphia: WB Saunders, 1991.
- Sullivan J.T, 1997. A color Atlas of Parasitology. Taticheeff, Seyoum, Yahya A,

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