

Science 8
Unit 4: Cells, Tissues, Organs and Systems
Topic 1: Introduction To The Microscope



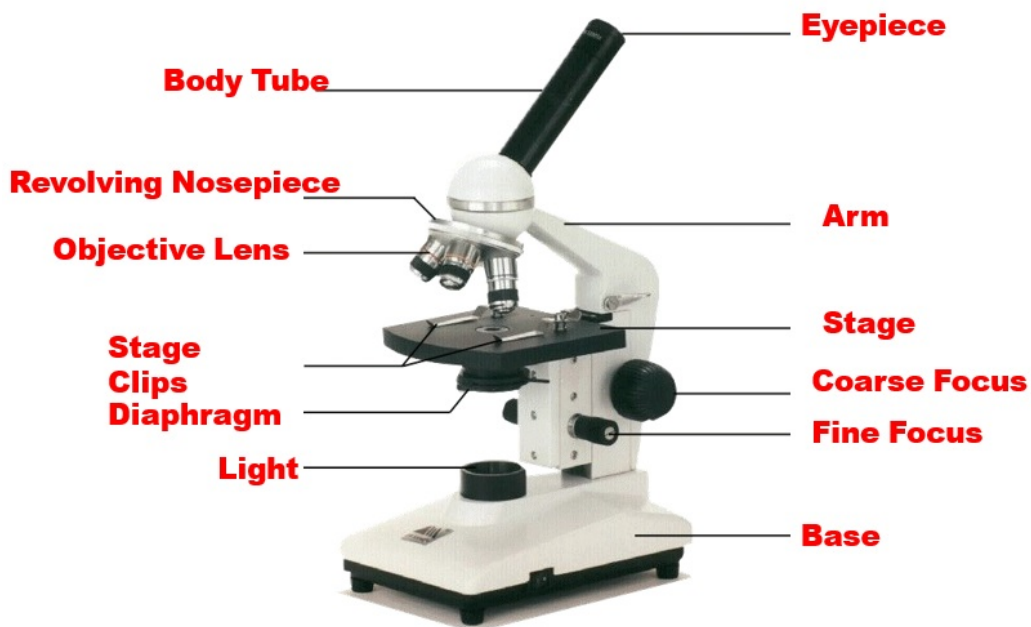
Student Name: _____

Care Of A Microscope:

- Always carry with 2 hands
- Do not force knobs
- Always store covered
- Only use lens paper for cleaning
- Keep objects clear of desk and cords
- Tell your teacher if your microscope is dirty or if the parts do not move freely. Do not try to force any parts of the microscope to move.



Parts Of An Compound light Microscope:



PARTS	FUNCTION
Eyepiece	Is used for viewing and contains a lens that magnifies
Tube	Holds the eyepiece and objective lenses at proper distance from each other
Arm	Supports the eyepiece
Coarse adjustment knob	Brings an object into focus at low or medium power
Fine adjustment knob	Brings an object into focus at high power
Objective lenses	Magnify the image. Most microscopes have three or four lenses.
Revolving nosepiece	Holds the three objective lenses
Stage	Supports the slide. Some microscopes have stage clips to hold the slide in place.
Iris diaphragm	Controls the amount of light reaching the specimen
Light source	Supplies the light needed to view the slide
Base	Supports the entire microscope

How A Compound Microscope Works:



This is how the letter e will appear in a microscope

Two sets of lenses work together to magnify and focus an image. When you look through this microscope, you see an image that is magnified (made larger), inverted (upside down), and reversed (backwards).

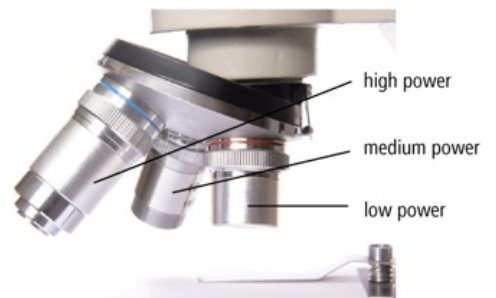
Magnification Of A Compound Microscope:

The magnification power of a lens is the number of times larger an image looks under the lens.

Each objective lens has a number that states its magnification power

Most school microscopes have these magnification powers:

- low-power objective lens (4×)
- medium-power objective lens (10×)
- high-power objective lens (40×)



Calculate Total Magnification Power:

Usually the eyepiece lens has a magnification power of 10X.


To find the total magnification of the microscope for each objective lens, you multiply the power of the objective lens by the power of the eyepiece.

For example:

$$\begin{aligned} \text{Total Magnification} &= \text{low-power objective lens} \times \text{eyepiece lens} \\ &= 4 \times 10 \\ &= 40 \end{aligned}$$


Examples: What is the total magnification power for the medium and high power lens?

Medium power objective



Total magnification =

High power or high dry objective



Total magnification =

Setting Up And Using A Microscope:

A microscope is a valuable and delicate instrument. Review the parts of the microscope shown in the diagram and read the following hints so that you can use a microscope properly.

1. Use both hands to carry a microscope. Use one hand to hold it vertically by the metal arm, and use the other hand for extra support under the base.
2. Place the microscope on the surface of a cleared lab bench or a clean desk.
3. Keep the microscope in an upright position at all times. Tell your teacher if your microscope is dirty or if the parts do not move freely. Do not try to force any parts of the microscope to move. If you are examining a liquid, use only a small drop. Keep the stage clean and dry.
4. Start focussing by using the low-power objective lens. (To focus means to make something sharp or clear.) Observe the microscope from the side as you use the coarse adjustment knobs. Lower the lens as close as possible to the stage without touching it.
5. When you focus, look through the eyepiece and slowly turn the coarse adjustment knobs so that the lens moves upwards from the stage. The fine adjustment knobs may then be used to sharpen your view of the object.
6. When you have finished using the microscope, remove the glass slide, place both stage clips so that they point forwards, and ensure the low-power lens clicks into place below the eyepiece.
7. Cover your microscope when it is not in use.

How To Create A Wet Slide:

Step 1: You will need the following materials

- Glass Slides - Slip Covers - Pipet - Water - Specimen

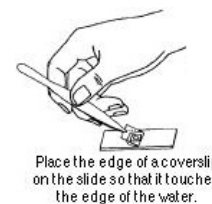
Step 2: Fill the pipet with water and drop 1-2 droplets onto the slide



Step 3: Place the specimen in the water



Step 4: Place the edge of the cover slip on the slide so that it touches the edge of the water.



Step 5: Slowly lower the slipcover to prevent forming and trapping bubbles.



What To Do When You Are Finished With The Compound Microscope:

- remove the glass slide
- place both stage clips so that they point forward
- ensure the low-power lens clicks into place below the eyepiece
- turn off light
- unplug microscope
- coil electrical cord
- return to appropriate space on shelf
- Cover your microscope when it is not in use.

PART A: MULTIPLE CHOICE

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided.

1. What part of a microscope controls the amount of light passing through to the slide?

(A) Diaphragm
(B) Objective Lenses
(C) Ocular lens
(D) Stage
2. What parts should you hold on to when carrying a microscope?

(A) Arm and base
(B) Body Tube
(C) Coarse Adjustment Knob
(D) Stage
3. Which of the following is the part that you look through?

(A) Diaphragm
(B) Eyepiece
(C) Objective Lenses
(D) Light Source
4. Which of the following is used to focus the image?

(A) Eyepiece
(B) Diaphragm
(C) Coarse Adjustment Knob
(D) Fine Adjustment Knob
5. Which of the following is used to bring the specimen into view, but never used on high magnification.

(A) Eyepiece
(B) Diaphragm
(C) Coarse Adjustment Knob
(D) Fine Adjustment Knob
6. What part of the microscope has different powers of magnification?

(A) Eyepiece
(B) Diaphragm
(C) Light Source
(D) Objective Lenses

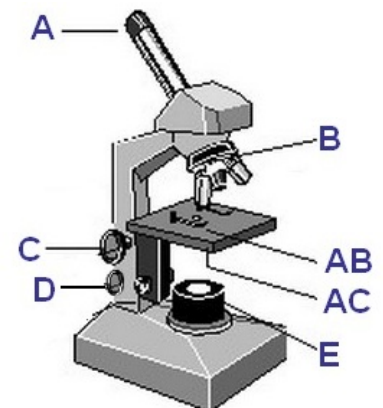
7. Where you place the slide?
- (A) Arm
(B) Base
(C) Eyepiece
(D) Stage
8. Which part turns and holds the objective lenses?
- (A) Arm
(B) Body Tube
(C) Coarse Adjustment Knob
(D) Nose Piece

9. What is the magnification power of the eyepiece?
- (A) 2x
(B) 4x
(C) 10x
(D) 40x

10. What is the total magnification of the eyepiece and the lowest power objective lens?
- (A) 4x
(B) 10x
(C) 40x
(D) 100x

Use the image below to answer questions 11 to 14

11. On the image, which letter represents the objective lens?
- (A) A
(B) B
(C) C
(D) E
12. On the image, which letter represents the coarse adjustment knob?
- (A) B
(B) C
(C) D
(D) E
13. On the image, which letter represents the stage?
- (A) A
(B) AB
(C) B
(D) E
14. On the image, which letter indicates the location of the diaphragm?
- (A) AC
(B) C
(C) D
(D) E



15. If the objective lens is 40x and the eyepiece is 10x, what is the total magnification?
- (A) 4x
 - (B) 10x
 - (C) 40x
 - (D) 400x

PART C: MATCHING

Fill in the blanks on the left with the terms on the right. Please, place your answers on the scantron

16. _____ compound microscope	A. Power of the objective lens multiplied by the power of the eye piece.
17. _____ eyepiece	B. Has two set of lenses.
18. _____ arm	C. Used for viewing and magnifying the image.
19. _____ stage	D. Supports the eyepiece.
20. _____ total magnification	E. Supports the slide.

PART D: FILL IN THE BLANKS

Use the terms below to fill in the blanks. Use each term only once.

- Coarse Focus Knob
- Compound Microscope
- Upside Down
- Objective Lens
- Eyepiece
- Fine Focus Knob
- Reversed
- Light source

1. The _____ is a microscope usually used in science classes and medical laboratories
2. The _____ is used for viewing and contains a lens that magnifies.
3. The _____ brings an object into focus at low or medium power.
4. The _____ brings an object into focus at high power.
6. The _____ have different magnification powers to magnify the object
6. When you look through a microscope, you will observe an image that is magnified, _____ and _____.
7. The _____ supplies the light needed to view the slide.

PART E: WRITTEN RESPONSE

1. How large does an object look when you combine the eyepiece lens with each objective lens? Use the table below to find out

Power of the objective lens	Power of eyepiece lens (10 X)	Calculation (Power of objective lens multiplied by power of eyepiece lens)	Total magnification of the lens combination
Low power			
Medium power			
High power			

2. Name all the parts of a compound light microscope that are directly responsible for making a magnified image of an object. (Hint: There are three.)

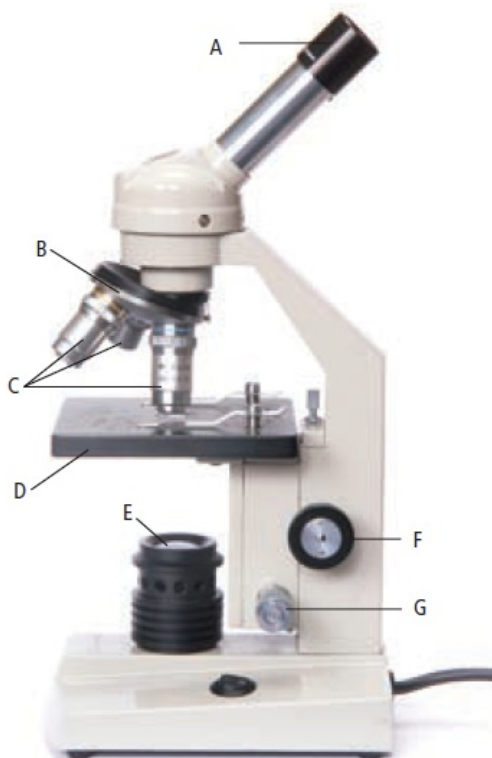
- 1) _____
- 2) _____
- 3) _____

3. Draw how the letter "G" would appear when viewed through a compound light microscope.

4. What is the total magnification for the medium-power objective lens?

5. Describe the proper way to carry a microscope.

6. Name each part identified with a letter in the photograph below.



- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____
- G. _____