



Microscopes

Name:

Date:

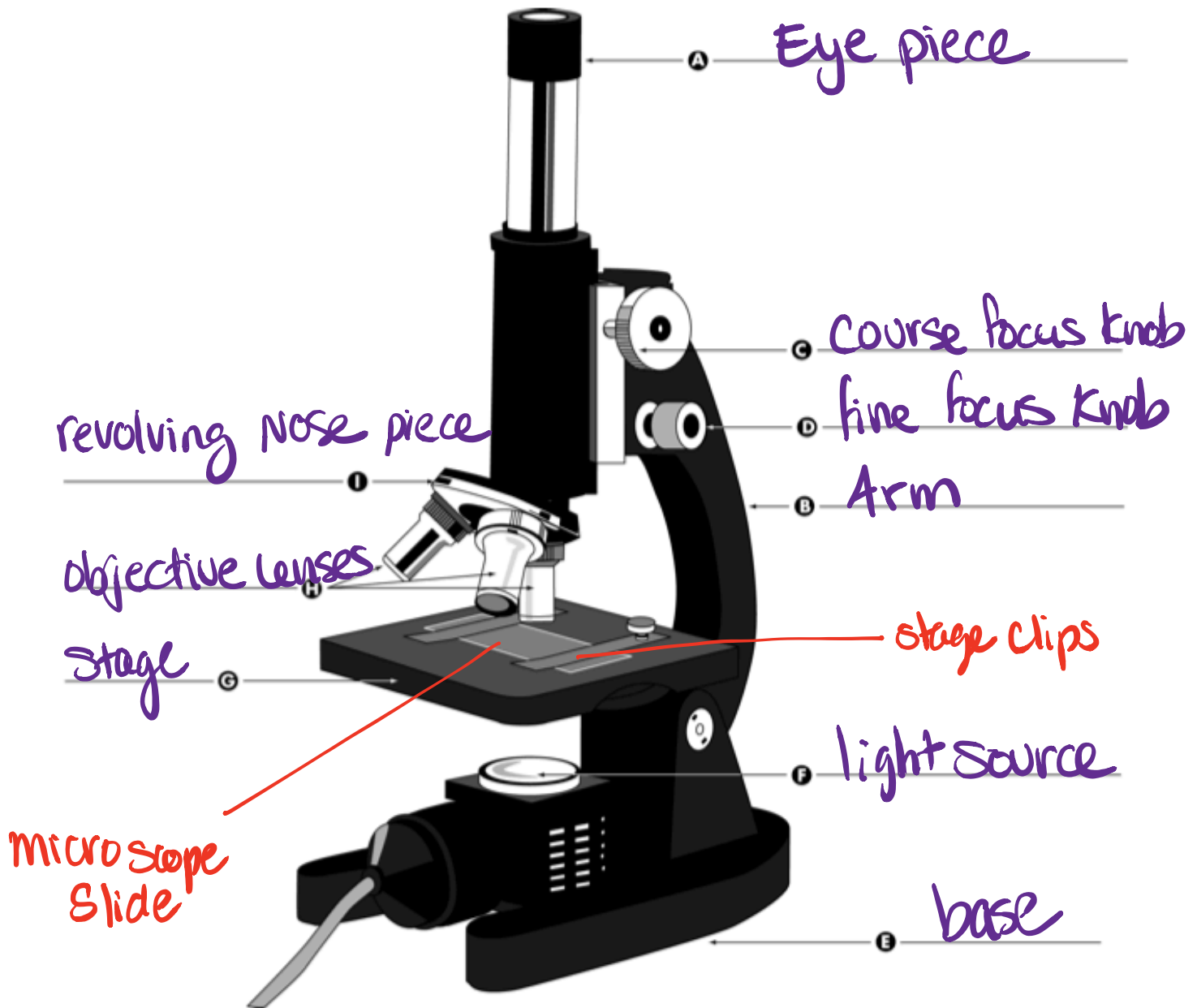
Block:

Early Microscopes:

- Built in the late 1600s and early 1700s
- One of the first people to build a microscope was named Antony Van Leeuwenhoek

THE COMPOUND LIGHT MICROSCOPE:

- Usually used in science classes and medical laboratories.
- Using your textbook, label the parts of the microscope!



Parts of the Microscope

<u>Part</u>	<u>Function</u>
Eyepiece	Contains a magnifying lens you look through.
Arm	Supports the eyepiece.
Coarse focus knob	Focus image under low power.
Fine focus knob	Brings an object into focus at high power.
Objective lenses	each contains a lens with different power of magnification (4x, 10x, 40x)
Revolving nose piece	Holds the three objective lenses.
Stage	platform that supports microscope slide.
light source	Supplies the light needed to view the slide.
Base	provides support for the microscope.

Magnification:

- Contains two sets of lenses
- Eyepiece lens 10x
- Objective lenses:
 - Low-power objective lens 4x
 - Medium-power objective lens 10x
 - High-power objective lens 40x

Eyepiece lens x Objective lens = Total magnification of microscope

Example:

Total magnification of medium-power lens = eye piece x med. objective lens

$$= 10 \times 10$$
$$= 100x$$

An eyepiece on a microscope has a magnification of $10\times$. The objective lenses on the microscope have magnifications of $4\times$ at low power, $10\times$ at medium power, and $40\times$ at high power.

(a) Using the information how would you combine lenses on a microscope if you wanted to magnify an object $40\times$?

$$\begin{aligned} & \text{eye piece} \times \boxed{\text{low power}} \\ & = 10 \times 4 \\ & = 40\times \end{aligned}$$

(b) How would you combine lenses if you wanted to magnify an object $100\times$?

$$\begin{aligned} & \text{eyepiece} \times \boxed{\text{med. power}} \\ & = 10 \times 10 \\ & = 100\times \end{aligned}$$


(c) How would you combine lenses if you wanted to magnify an object $400\times$?

$$\begin{aligned} & \text{eyepiece} \times \boxed{\text{high power}} \\ & 10 \times 40 \\ & = 400\times \end{aligned}$$

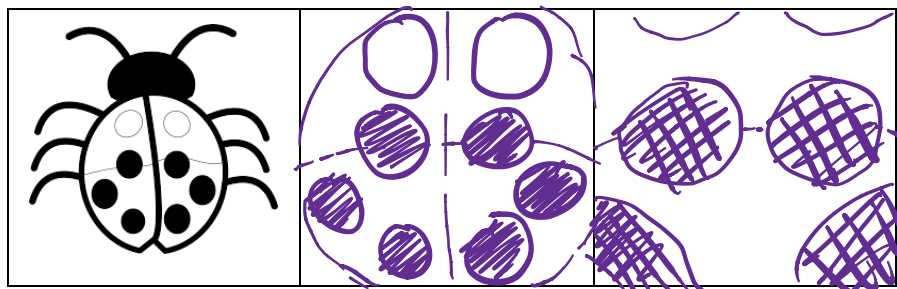
If a compound microscope has an eyepiece of $15\times$ magnification and you select an objective lens with a power of $40\times$, what is the total magnification of the object?

$$\begin{aligned} \text{total magnification} &= \text{eyepiece} \times \text{high. power} \\ &= 15 \times 40 \\ &= \boxed{600\times} \end{aligned}$$

Field of View (FOV):

- diameter of the field you are looking at
- how much of the specimen you will be able to see under  the microscope.

As the magnification gets greater, the FOV gets smaller



 more detailed!!

Questions:

1. Match the microscope part to the correct function.

Function	Microscope part
<u>e</u> 1. holds the slide in place	(a) objective lens
<u>b</u> 2. lens closest to the eye	(b) eyepiece
<u>g</u> 3. supplies the light needed to view the object	(c) revolving nosepiece
<u>c</u> 4. allows you to switch magnifications	(d) course focus knob
<u>a</u> 5. magnifies the object	(e) stage clips
<u>h</u> 6. supports the microscope slides	(f) fine focus knob
<u>d</u> 7. used for focusing at low power	(g) light source
<u>f</u> 8. used for focusing at high power	(h) stage

2. Name three parts of a compound light microscope that have names similar to the names of human body parts.

a) Arm

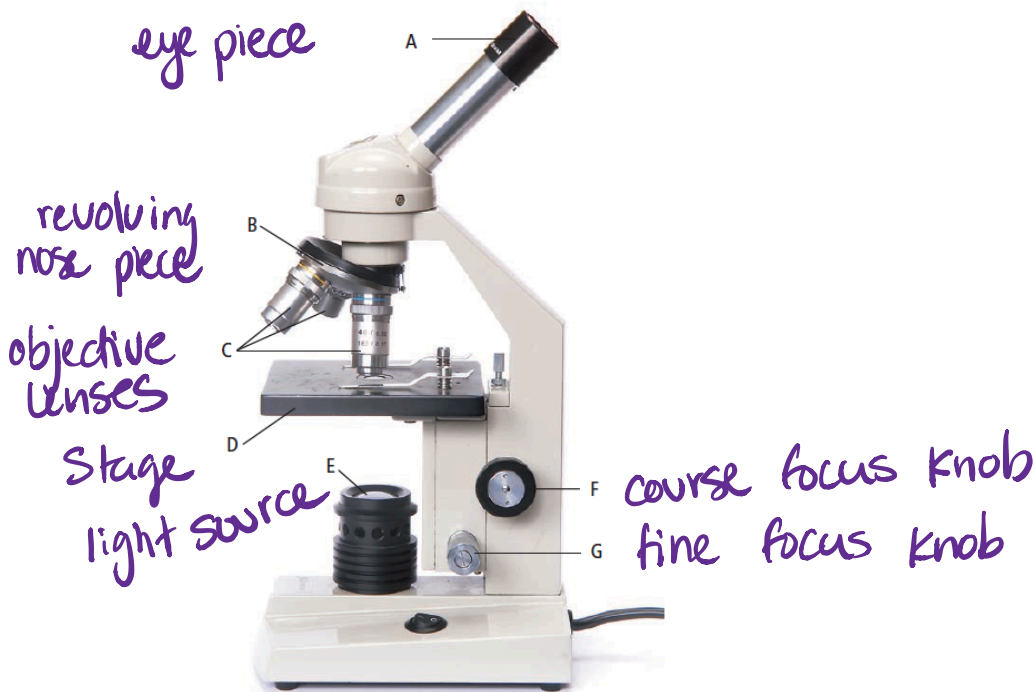
b) eye piece

c) revolving nose piece

3. What is the proper way to carry a microscope?

2 hands - 1 on the arm, other on the base

4. Name each part identified with a letter in the photograph of the compound light microscope below.



5. Why do you start with the low-power objective lens when focusing an image?

easier to focus when you know where the image is located.

6. If an objective lens of a compound light microscope has a magnification power of 40x, why is the image magnified 400x?

because the eye piece is 10x magnification
 $40x \times 10x = 400x$

7. You are exploring a remote region in the interior of British Columbia. You unexpectedly discover what may be a new microscope life form in a sample of pond water. How could you determine if this sample is living or non-living?

Does it meet the 7 characteristics of living things:

- ① made up of cells
- ② moves
- ③ Respond to environment
- ④ Needs energy
- ⑤ Grow
- ⑥ Reproduces
- ⑦ Eliminates waste