Use with textbook pages 11-14.

Microscopes

Vocabulary	
coarse focus knob	magnification power
compound light microscope	objective lenses
electron micrograph	resolving power
eyepiece	reversed
light source	right side up
	upside down

Use the terms in the vocabulary box to fill in the blanks. Use each term only once. You will not need to use all the terms.

1. The _compound light microscope_ is the microscope usually used in science classes and medical laboratories.

2. The _eyepiece_ is used for viewing and contains a _____ lens that magnifies.

3. The _coarse adjustment_ brings an object into focus at low or medium power.

4. The _fine adjustment_ brings an object into focus at high power.

5. The _objective_ have different magnification power to magnify the object.

6. The _light source_ supplies the light needed to view the slide.

7. The ability to distinguish between objects that are very close together is called _resolving power_.

8. When you look through a microscope, you will observe an image that is magnified, _reversed_, and _upside down_.

9. A(n) _electron micrograph_ is a picture taken by a camera hooked up to an electron microscope.

Use with textbook pages 8-21.

Observing living things

Match each Term on the left with the best Descriptor on the right. Each Descriptor may be used only once.

Term	Descriptor
1. compound light microscope	A. power of the objective lens multiplied by the power of the eyepiece
2. objective lenses	B. has two sets of lenses
3. eyepiece	C. used for viewing and magnifying the image
4. stage	D. ability to distinguish between two objects that are very close to each other
5. arm	E. supports the eyepiece
6. total magnification	F. have different magnification powers to magnify the object
7. resolving power	G. supports the slide

Circle the letter of the best answer.

8. Which of the following is not a characteristic of living things?
A. needs energy
B. hunts for food
C. grows
D. reproduces

9. What is the difference between a unicellular and a multicellular organism?
A. size of cells
B. structure of cells
C. shape of cells
D. number of cells

10. Which of the following is not a use of a microscope?
A. magnifies distant objects
B. magnifies objects that are close together
C. magnifies unicellular organisms
D. magnifies cells

11. Which of the following best describes an electron micrograph?
A. a type of electron microscope
B. a camera hooked up to an electron microscope
C. a picture shown on a screen hooked up to an electron microscope
D. a scanning electron microscope

12. If the objective lens is 40× and the eyepiece lens is 10×, what is the total magnification?
A. 400×
B. 40×
C. 10×
D. 4×

13. If the objective lens is 10× and the eyepiece lens is 10×, what is the total magnification?
A. 10×
B. 100×
C. 1000×
D. 20×

CHAPTER 1 | **Parts of a Compound Light Microscope** | **BLM 1-5**

Goal • Use this page to review the function of each part of the compound light microscope.

What to Do

Each part of the compound light microscope is listed in the left column of the table below. In the right column, describe the function of each microscope part. For assistance, refer to pages 12–13 of *BC Science 8*.

Microscope Part	Function
Eyepiece	used for viewing, (contains a lens that magnifies)
Arm	supports eye piece
Revolving nosepiece	holds 3 objective
Objective lenses	magnify image
Fine focus knob	brings object into focus under high power
Coarse focus knob	" low med.
Stage	supports slide
Base	supports entire microscope
Light source	supplies light

Use with textbook page 12.

The compound light microscope

Identify the following parts of a compound light microscope.

4. eye piece
5. arm
3. objective
6. coarse adjustment
2. stage
7. fine adjust
1. light
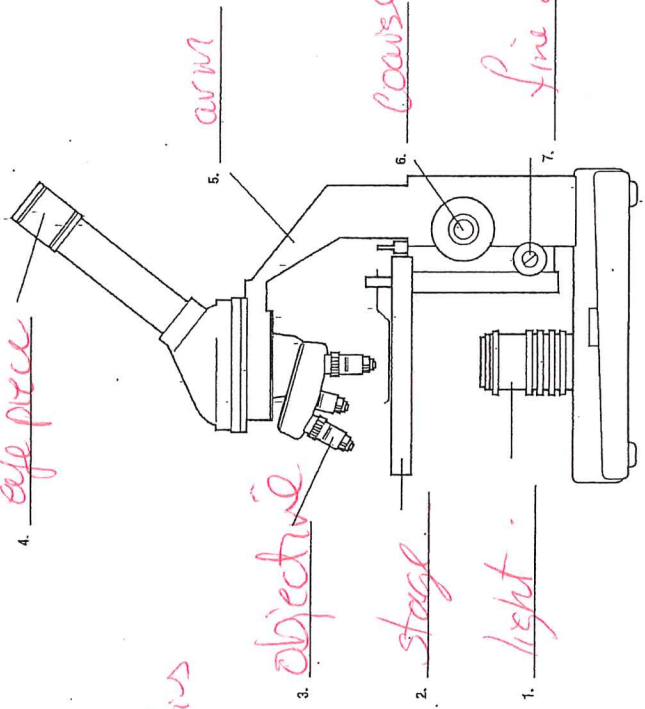
CHAPTER 1   **Estimating the Size of Microscopic Objects**   **BLM 1-9**

> **Goal** • Use this page to help you develop your skill of estimating the size of objects under the microscope.

Think About It

How do you estimate the size of the object you are viewing?

What to Do

Read the information below and answer the questions.

Part A: Estimating Object Size

1. Look at the four circles below. Assume that each circle below has a diameter of 2.5 cm. (Diameter is the distance across a circle.) Use the following formula to calculate the exact size of one happy face in each of the circles:

   Size of one happy face = Diameter of circle ÷ Number of happy faces

   2.5 cm   1.25 cm   0.83 cm   0.625 cm

Part B: Estimating Size Under the Microscope

- Once you know the diameter of the field of view of a microscope, you can estimate the size of the object you are viewing. The **field of view** is what you see when you look through the microscope. To find the **diameter of the field of view,** use a ruler to measure the distance across its centre. The diagram below represents a field of view when looking at millimetre markings on a ruler.

   plastic ruler millimetre markings
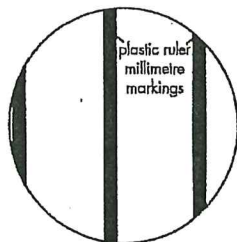
   The diameter of the field of view represented on the left is 2.5 mm.

- Most objects under the microscope are much smaller than a millimetre. Try using a smaller unit, the **micrometre** (μm). Multiply the field diameter by 1000 to convert it from millimetres (mm) to **micrometres** (μm).

   Convert the field of view represented above (2.5 mm) to micrometres:
   The diameter of the field of view is __2500__ μm.

   1 mm = 1000 μm

Key

CHAPTER 1   **Cell Size**   **BLM 1-10**

Goal • Use this page to practise estimating the size of cells in a field of view.

What to Do

Read the information given for each question. Answer the questions in the space provided.

1. As scientists, we must determine how small cells really are. To do this, we need to measure the diameter of the field of view.
   (a) What is a field of view?

   The area you see when looking through microscope

   (b) What is a diameter?

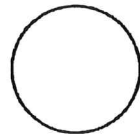   _The line directly through center of circle_

2. When Molly looks under a microscope, before placing her specimen on the stage, she observes an empty field of view.
   (a) Use your ruler to draw in the diameter of the field of view; that is, draw a line that cuts the circle exactly in half.
   (b) What is the measurement of the circle's diameter?
   in centimetres _1.7 cm_
   in millimetres _17 mm_

3. Imagine that 10 cells of equal size fit across the diameter of the circle below.
   (a) Measure the diameter of the circle. _17 mm_
   (b) What is the span of the 10 cells? _17 mm_
   (c) What is the span of one cell? _1.7 mm_
   (d) Explain how you arrived at your answer for question (c).

   $$\text{Size of cell} = \frac{\text{Diameter}}{\#\text{Cells}} = \frac{17\,mm}{10\,cells} = 1.7\,mm$$

4. If 10 equally sized cells fit across a field diameter of 40 mm, what is the length of one cell? Show your work.

   $$\text{Size} = \frac{\text{Diameter}}{\#\text{Cells across}} = \frac{40\,mm}{10\,cells} = 4\,mm$$

   _40 mm_