DATE: NAME: CLASS:

CHAPTER 1

Calculate Magnification

BLM 1-8

Goal • Use this page to practise calculating magnifications.

Think About It

A magnifying lens that magnifies the size of an image by 10 times has a magnification of 10×. A **compound microscope** uses two lenses to create higher magnifications.

What to Do

To calculate the total magnification of a compound microscope, multiply the magnification of the eyepiece by the magnification of the objective lens.

1. What is the magnification of a microscope with two lenses that each enlarges an image by 10×?

_____

2. An eyepiece on a microscope has a magnification of 10×. The objective lenses on the microscope have magnifications of 4× at low power, 10× at medium power, and 40× at high power.
   (a) Using the information how would you combine lenses on a microscope if you wanted to magnify an object 40×?

   _____

   _____

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

   _____

   _____

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

   _____

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

_____

4. Fill in the blanks within the brackets to express total magnification as a word equation. Total magnification = (_____) × (_____)

DATE: NAME: CLASS:

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

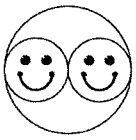
Read the information below and answer the questions.

Part A: Estimating Object Size

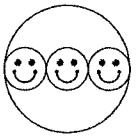
1. Look at the four circles below. Assume that each circle below has a diameter of 2.5 cm. (Diameter is the distance across a circle.) Use the following formula to calculate the exact size of one happy face in each of the circles:

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

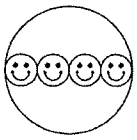
_____ cm



_____ cm



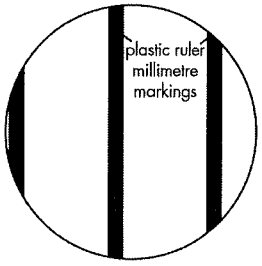
_____ cm



_____ 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.



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 _____ μm.

DATE: NAME: CLASS:

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.

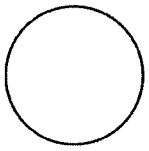
1. As scientists, we must determine how small cells really are. To do this, we need to measure the diameter of the field of view.
   (a) What is a field of view?

   _____

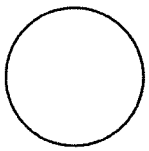
   (b) What is a diameter?

   _____

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 _____
   in millimetres _____



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



   _____

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

   _____