

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 \div Number of happy faces



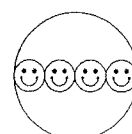
_____ cm



_____ cm



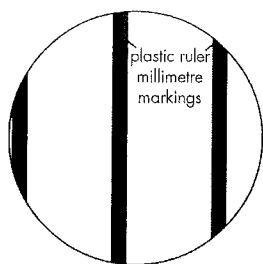
_____ cm



_____ 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 .

Calculating the Size of Objects Under the Microscope

Step 1: Determining the diameter of the field at each power.

1. LOW POWER (X40) - Measure the field diameter with a millimeter ruler.

Diagram of what you see:

Field diameter at low magnification:

_____ millimeters
_____ microns (micrometers)
1

2. MEDIUM POWER (X100) - Low magnification divided by medium magnification times the diameter of field at low power (in microns)

Calculated field diameter at medium magnification:

$\frac{\text{low}}{\text{high}}$ X diameter (in microns) of field at low power = medium field diameter
_____ X _____ = 2

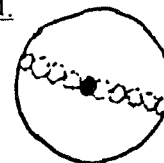
3. HIGH POWER (X400) - Low magnification divided by high magnification times the diameter of field at low power (in microns)

Calculated field diameter at high magnification:

$\frac{\text{low}}{\text{high}}$ X diameter (in microns) of field at low power = high field diameter
_____ X _____ = 3

Step 2: Estimating how many specimens fit across the field.

Estimate the number of objects which fit across the field.



Number of objects which fit across field _____

Step 3: Calculating the size of the object

Divide the field diameter by the number of objects which would fit across the field diameter.

$\frac{\text{Diameter (microns)}}{\text{Number of objects}} = \text{size of object}$

Use the space below to calculate the size of one of the objects below if it was viewed under low, medium and high powers.