Microscopes and Magnification: Year 8 Science Activity Pack

Learning Objectives

- Identify and understand the functions of key microscope parts
- Calculate total magnification using eyepiece and objective lens values
- Develop practical microscope skills and proper handling techniques
- Apply microscopy knowledge to real-world scenarios

Section 1: Basic Microscope Knowledge (10 points)

Study the microscope diagram below and complete the following activities.

Label the microscope parts (1-7):

[Microscope Diagram Placeholder]

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Match each microscope part with its correct function by drawing lines:

Parts:

a) Eyepiece

b) Stage

c) Diaphragm

d) Base

Functions:

____ Controls amount of light

____ Where you look through to see the specimen

____ Provides stability for the microscope

____ Platform where slides are placed

True or False Questions

Circle your answer and correct any false statements in the space provided.

1. The coarse focus should be used with high power objectives

○ True ○ False

Correction: _____

2. You should always start with the highest magnification first

○ True ○ False

Correction: _____

3. The total magnification is found by multiplying the eyepiece and objective lens powers

○ True ○ False

Correction: _____

Section 2: Calculations and Problem Solving (15 points)

Show all your working out in the spaces provided.

Calculate the total magnification:

1. Eyepiece: 10x, Objective: 4x

Working: _____
Answer: _____

2. Eyepiece: 10x, Objective: 40x

Working: _____
Answer: _____

3. Eyepiece: 15x, Objective: 10x

Working: _____
Answer: _____

Challenge Question:

A cell appears to be 5mm when viewed through a microscope at 400x magnification. Calculate its actual size.

Formula: _____

Working: _____

Answer: _____

Section 3: Practical Skills Assessment (20 points)

Number these steps for focusing a microscope in the correct order (1-6):

__ Use fine focus to sharpen image

__ Place slide on stage

__ Start with lowest power objective

__ Secure slide with stage clips

__ Look through eyepiece

__ Use coarse focus to find specimen

Draw what you would expect to see when looking at an onion cell under different magnifications. Label all visible structures.

40x Magnification

Label: Cell wall, Nucleus, Cytoplasm

100x Magnification

Label: Cell wall, Nucleus, Cytoplasm

Section 4: Advanced Microscopy Techniques (25 points)

Staining Techniques

Methylene Blue

Iodine Solution

Used for:
_____

Color result:
_____

Best for viewing:
_____

Used for:
_____

Color result:
_____

Best for viewing:
_____

Complete the following table about common microscopy problems and solutions:

Problem	Possible Cause	Solution
Image too dark	_____	_____
Blurry image	_____	_____
Bubbles in view	_____	_____

Section 5: Cell Structure Investigation (20 points)

Materials Needed:

□ Microscope
□ Glass slides
□ Cover slips
□ Dropper
□ Methylene blue
□ Cheek cells sample

Procedure:

1. _____
2. _____
3. _____
4. _____
5. _____

Record Your Observations:

Magnification	Cell Shape	Visible Structures	Drawing
100x			
400x			

Section 6: Comparative Analysis (15 points)

Compare and Contrast Different Cell Types

Complete the Venn diagram comparing plant and animal cells:

[Venn Diagram Template]

Answer the following questions:

1. Why do plant cells have cell walls while animal cells don't?

2. How does the presence of chloroplasts affect cell observation under the microscope?

3. Explain why different magnifications might be needed for different cell types:

Section 7: Real-World Applications (15 points)

Case Study 1: Medical Laboratory

A medical laboratory technician needs to examine a blood sample for possible infections.

1. What type of microscope would be most appropriate? Why?

2. What magnification would you recommend? Explain your reasoning.

3. What special preparation techniques might be needed?

Forensic Science

Describe how microscopes are used in forensic investigation:

Environmental Science

Explain how microscopes help in water quality testing:

Assessment Criteria

Section 1: Basic Microscope Knowledge (10 points)

Section 2: Calculations and Problem Solving (15 points)

Section 3: Practical Skills Assessment (20 points)

Total: 45 points

Teacher Comments:

Teacher Signature: _____ Date: _____