Classroom Activity: Microscopy and Magnification

Learning Objectives

- Understand the basic parts and functions of a microscope
- Calculate total magnification using different lens combinations
- Develop proper microscope handling and slide preparation techniques
- Apply microscopy skills to environmental sample analysis

Part 1: Understanding Your Microscope (15 minutes)

Label the parts of the microscope in the diagram below:

1. Eyepiece (Ocular lens)	
2. Revolving nosepiece	
3. Objective lenses	
4. Stage and stage clips	
5. Coarse focus knob	
6. Fine focus knob	

Magnification Calculations (20 minutes)

Complete the following calculations and show your work:

Formula: Total Magnification = Eyepiece Lens × Objective Lens

Eyepiece	Objective	Your Calculation	Total Magnification
10×	4×		
10×	10×		
10×	40×		

Part 2: Slide Preparation (25 minutes)

Follow these steps to prepare your microscope slides:

Materials Needed:

- Clean microscope slides
- Cover slips
- Dropper
- Water
- Plant leaf sample
- Paper towels

Procedure:

1. Clean your slide and cover slip with lens paper
2. Place your specimen in the center of the slide
3. Add one drop of water using the dropper
4. Hold the cover slip at a 45° angle and lower it slowly

Record your observations:

1. What challenges did you face while preparing the slide?

2. How did you overcome these challenges?

3. What would you do differently next time?

Observation Drawing Activity

Draw what you observe at each magnification level:

40× Magnification

Description:

100× Magnification

Description:

400× Magnification

Description:

Part 3: Advanced Microscopy Techniques

Practice these essential microscopy skills:

1. Köhler Illumination

Follow these steps to achieve optimal illumination:

1. Center the light source
2. Focus the condenser
3. Adjust the diaphragm
4. Fine-tune the light intensity

Record your illumination settings:

Light Intensity:	
Diaphragm Setting:	

2. Phase Contrast

Observe these specimens using phase contrast:

- Living bacteria
- Cell membranes
- Unstained tissue samples

Specimen	Visible Features	Advantages of Phase Contrast
Bacteria		
Cell Membrane		

Part 4: Environmental Sample Analysis

Collect and analyze environmental samples:

Sample Collection Guidelines:

- Pond water sample
- Soil suspension
- Plant tissue sample
- Cheek cell sample (with proper safety protocols)

Sample Type	Organisms/Structures Identified	Magnification Used	Sketch Reference
Pond Water			
Soil Suspension			
Plant Tissue			

Part 5: Microscope Maintenance and Care

Daily Maintenance Checklist:

Task	Completed	Notes
Clean objective lenses	□	
Clean stage	□	
Check light function	□	
Cover microscope	□	

Common Issues and Solutions:

Problem	Possible Cause	Solution
Blurry Image	• Dirty lenses • Incorrect focus	• Clean lenses with lens paper • Refocus using coarse then fine adjustment
Poor Illumination	• Misaligned light • Incorrect diaphragm	• Adjust light source • Adjust diaphragm opening

Part 6: Assessment and Reflection

Skills Assessment Checklist:

Skill	Beginner	Intermediate	Advanced
Microscope Setup	□	□	□
Slide Preparation	□	□	□
Focus Adjustment	□	□	□
Drawing Specimens	□	□	□

Final Reflection:

1. What was the most challenging aspect of using the microscope?

2. How has your understanding of microscopic organisms changed?

3. What additional skills would you like to develop?

Assessment and Reflection

Self-Assessment Checklist

Skill	Confident	Need Practice
I can identify microscope parts	□	□
I can calculate magnification	□	□
I can prepare slides correctly	□	□

Final Thoughts

What was the most interesting thing you observed today?

What would you like to examine under the microscope next time?