Optical Magnification Investigation Worksheet

Part 1: Understanding Light and Lenses

Before we begin working with microscopes, let's explore how light and lenses work together.

Activity 1.1: Light Behavior Investigation

Using the laser pointer provided by your teacher (under supervision), observe and record:

1. What happens when light hits the following surfaces?

Surface	Observation	Type of Reflection
Mirror		
White Paper		
Glass Surface		

Activity 1.2: Lens Investigation

Examine the provided convex and concave lenses:

1. Draw ray diagrams showing how light passes through each lens type:

   [Space for ray diagrams]

2. Calculate the magnification using the formula: M = hi/ho

   Working space for calculations:

Part 2: Microscope Components Quiz

Label the following microscope diagram and explain the function of each component:

[Microscope diagram for labeling]

Component	Function
1. Eyepiece	
2. Objective Lenses	
3. Stage	
4. Condenser	
5. Light Source	

Part 3: Practical Microscope Skills

Complete these practical exercises with your microscope:

Exercise 1: Microscope Setup and Focus

1. Document your microscope preparation steps:

2. What problems did you encounter and how did you solve them?

3. Calculate the total magnification for each objective lens combination:

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

Final Reflection Questions:

1. How does understanding light behavior help you use a microscope more effectively?

2. What is the relationship between objective lens power and working distance?

3. How would you explain the importance of proper microscope focus to a new student?

Part 4: Specimen Observation and Documentation

Practice observing and recording microscopic specimens:

Activity 4.1: Prepared Slide Observation

Using the provided prepared slides, complete the following:

Specimen Name	Magnification Used	Sketch	Key Features Observed
Onion Cells			
Cheek Cells			

Activity 4.2: Field of View Measurements

1. Calculate the actual field of view diameter:

   Field of View (mm) = Field Number / Magnification
   Working space:

2. Estimate the size of observed specimens:

Specimen	Estimated Size (µm)	Calculation Method
Onion Cell		
Cheek Cell		

Part 5: Advanced Microscopy Techniques

Explore additional microscopy skills and concepts:

Exercise 5.1: Köhler Illumination Setup

1. List the steps to achieve proper Köhler illumination:

2. Why is Köhler illumination important?

Exercise 5.2: Common Problems and Solutions

Complete the troubleshooting table:

Problem	Possible Causes	Solution
Blurry Image		
Poor Contrast		
Uneven Illumination		