

Structure of the microscope



Biology

Microscopy / Cell Biology

Basics of Microscopy & Work Technology



Difficulty level

easy



Group size

1



Preparation time

10 minutes



Execution time

10 minutes

PHYWE
excellence in science

Teacher information

Application

PHYWE
excellence in science

Modern microscope

Hundreds of years ago, scientists already tried to explore the structure of organisms with lenses that allowed magnification. Around the 16th and 17th centuries, the first microscopes were thus created, which, through continuous further development, resulted in the instruments available to us today. In the meantime, microscopes have become indispensable, especially in teaching and research, but also in the crafts. A basic understanding of the operation and functionality should therefore be available to every student.

Other teacher information (1/3)

PHYWE
excellence in science

Prior knowledge



Before the microscope is used in class, students should learn how to use a magnifying glass. Objects from the students' immediate environment, e.g. the fabric or leather of the pencil case, articles of clothing, their own skin and the outside of their eyes, are suitable objects for examination. A new dimension is opened up to the students and they learn to vary the distance between the lens and the object in order to obtain a sharp, magnified image.

Scientific principle



The students should handle the microscope carefully from the beginning. Thorough familiarization with the components is therefore essential. The various microscopy techniques should be acquired gradually through repeated microscopy in different subject areas.

Other teacher information (2/3)

PHYWE
excellence in science

Learning objective



The students get to know the components of the microscope. Afterwards the microscope should be prepared and used in a playful way (moving the object stage up and down to get a feeling for focusing the preparations).

Tasks



1. Naming microscope components
2. Preparing the microscope for use
3. Moving the preparation

Other teacher information (3/3)

Microscopes should be provided on trolleys if possible. This allows quick access for the students. It has proven to be advantageous to mark (number) the microscopes and to assign accompanying booklets to them, in which the users confirm that they have been taken over properly. This gives the teacher the possibility of checking in case of damage.



Safety instructions

PHYWE
excellence in science



- Working with microscopes and magnifying glasses for too long can lead to physical discomfort (fatigue, headaches, nausea), especially if the students are untrained.
- Microscopes and magnifying glasses are sensitive. During transport and handling, care should be taken to ensure that everything is done carefully and without rushing.
- The general instructions for safe experimentation in science lessons apply to this experiment.

PHYWE
excellence in science

Student Information

Motivation

PHYWE
excellence in science

Antique microscope

Before you can properly start working with this valuable optical instrument, you should get to know the components of the microscope and their meaning.

You can see small, interesting objects and creatures enlarged with a magnifying glass. The glass lens of a magnifying glass shows an object magnified up to 15 times.

You can achieve a higher magnification with a light microscope (40x to 400x), because there is a whole system of lenses. However, only very thin objects can be viewed, through which light can shine through from below.

Tasks

PHYWE
excellence in science



Working with the microscope

1. Naming microscope components
2. Preparing the microscope
3. Moving the preparation

Equipment

Position	Material	Item No.	Quantity
1	PHYWE Binocular student microscope, 1000x, mechanical stage	MIC-129A	1
2	Microscopic slides, 50 pcs	64691-00	1

Procedure (1/3)

PHYWE
excellence in science

Name the individual components

(1) Name the components of the microscope

Transporting the microscope could already damage this sensitive device. Therefore, first look at the illustration and show your table partner the tripod and the tube. There are sensitive lenses (eyepieces) in the tube that could fall out. The microscope must therefore always be held vertically. It is carried on the stand.

In the task, name the individual components of the microscope by moving the labels to the correct position.

Procedure (2/3)

PHYWE
excellence in science

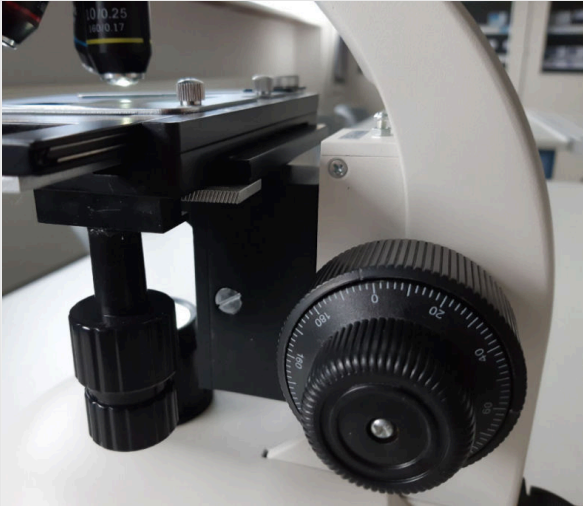
Follow the path of the light

(2) Prepare the microscope

Now you have to memorize the technical terms so that the work can start soon. Everything goes better when you are two. Follow the path of the light: The lamp or mirror shines through an object from below. This object lies on an elongated glass plate (microscope slide) on the object table. The lenses near the object are called objectives. The rotating disk contains several objectives and is called revolving nosepiece. The light continues through an optical system with different lenses and mirrors to the eyepiece. The eyepiece therefore contains the lenses close to the eye (lat. oculus = eye).

Procedure (3/3)

PHYWE
excellence in science



Coarse and fine drive

(3) Move the preparation

For a first exercise you need some recycled paper (torn off, fibrous). Put it on the slide and choose the shortest objective with the smallest number (4x). This one has the lowest magnification. Now look through the eyepiece and move the specimen stage up and down using the coarse adjustment knob. With the fine drive you can fine-tune the distance between objective and object. Make sure that the objective never touches the specimen stage.

PHYWE
excellence in science



Report

Task 1



Components of the microscope



- Revolving Nosepiece
- Coarse and fine drive
- Objective
- Lighting
- Iris diaphragm
- Object stage
- Eyepiece
- Tube
- Foot
- Tripod

Check

Slide

Score/Total

Slide 15: Components of the microscope

0/10

Total amount



Solutions

Repeat