

Digital Microscopes



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Digital Microscopes

The Digital Microscopes Kit gives students the opportunity to explore the microscopic world through hands-on scientific investigation. With portable digital microscopes capable of up to 1000× magnification, students can examine plants, insects, rocks, fabrics, prepared slides, and everyday objects in remarkable detail. As students collect observations and compare specimens, they develop skills in scientific inquiry, observation, and evidence-based reasoning while learning techniques used by biologists, forensic scientists, materials scientists, and engineers. Designed for collaborative investigations, this kit supports life science, Earth science, and engineering concepts for k-12 learners.



Grade Level

K - 12th

Group Size

2 students per microscope

Time Duration

20 - 90 minutes

Content of Kits

Components

- 15 Digital Microscopes
- Slides



Usage

Getting Started

1. Inventory and Charge the Microscopes

Begin by unpacking the microscopes and confirming that all devices, charging cables, prepared slides, neck straps, and carrying cases are present. Charge the microscopes before classroom use to ensure they are ready for extended investigations.

2. Familiarize Yourself with the Controls

Turn on a microscope and practice adjusting the magnification, focus, and lighting. Becoming familiar with the controls before students begin will help investigations run more smoothly and produce clearer images.

3. Explore Prepared Slides First

Introduce students to microscope operation by observing the included prepared slides. Encourage them to practice focusing, adjusting magnification, and describing what they observe before investigating classroom or outdoor specimens.

4. Prepare Specimens and Data Collection

Gather additional specimens such as leaves, flowers, fabrics, rocks, feathers, or insects for investigation. Provide students with science journals or data sheets to record observations, sketches, measurements, and questions throughout their exploration.

Storage

- **Recharge and Store Microscopes Properly**

After use, power off each microscope and recharge the batteries if needed. Store each microscope, charging cable, neck strap, and prepared slides in its protective carrying case to prevent damage and ensure the kit is ready for the next class.

- **Keep Lenses and Slides Clean**

Wipe microscope lenses gently with a soft lens cloth before storing. Return all prepared slides to their designated storage slots and avoid placing heavy objects on the carrying cases.

Troubleshooting

- **The Image Is Blurry**

If the image is out of focus, slowly adjust the focus wheel while changing the distance between the microscope and the specimen. Using additional lighting or selecting a flatter specimen can also improve image quality.

- **The Microscope Will Not Turn On**

If the microscope does not power on, check that the battery is charged and the power button has been held long enough to activate the device. If needed, recharge the microscope using the included charging cable before continuing the investigation.



Activity Guide

Beginner

A Closer Look at Nature

Students use the digital microscopes to observe natural objects such as leaves, flower petals, bark, feathers, seeds, or rocks. They compare structures that are difficult to see with the naked eye and record detailed observations.

Oregon Science Standards Alignment

MS-LS1-1 & Science and Engineering Practice

Procedure

1. Introduce students to microscope operation using the prepared slides.
2. Collect several natural specimens from the classroom or outdoors.
3. Observe each specimen under different magnifications.
4. Record sketches, observations, and questions in a science journal.
5. Compare similarities and differences among specimens.

Intermediate

Mystery Materials Investigation

Students investigate everyday materials by examining fabrics, paper, coins, plastics, wood, or other classroom objects under magnification. Students compare material properties and identify characteristics that are not visible without magnification.

Oregon Science Standards Alignment

MS-PS1-3 & Science and Engineering Practice

Procedure

1. Provide each team with several unknown materials.
2. Observe each sample using multiple magnification levels.
3. Record textures, patterns, colors, and other microscopic features.
4. Attempt to identify each material based on observations.
5. Discuss how microscopic structures influence material properties.

Advanced

Designing a Scientific Investigation

Student teams develop and conduct their own microscope investigation by selecting a question, collecting specimens, documenting observations, and presenting evidence-based conclusions.

Oregon Science Standards Alignment

- MS-ETS1-3 & Science and Engineering Practice

Procedure

1. Develop an investigable question about a specimen or material.
2. Collect observations using the digital microscopes.
3. Record images, sketches, measurements, and notes.
4. Analyze observations and identify patterns.
5. Present findings and explain conclusions using scientific evidence.



Learning Extensions

STEAM Connections: Engineering - Technology - Science

Learning Objectives:

- Use digital microscopes to observe and investigate specimens at varying levels of magnification.
- Compare the microscopic structures of living organisms, natural materials, and manufactured objects.
- Collect, record, and communicate scientific observations using drawings, photographs, and written descriptions.
- Analyze evidence of patterns, structures, and relationships not visible to the naked eye.
- Develop and conduct scientific investigations by asking questions, collecting data, and drawing evidence-based conclusions.

Career Connections:

- **Microbiologist** – Investigates microscopic microorganisms such as bacteria and fungi.
- **Forensic Scientist** – Uses microscopes to examine evidence and solve crimes.
- **Materials Scientist** – Studies the properties of natural and manufactured materials to develop new technologies.
- **Environmental Scientist** – Examines environmental samples to monitor ecosystem health and identify pollutants.
- **Medical Laboratory Scientist** – Analyzes biological samples to support medical diagnosis and research.
- **Quality Control Technician** – Inspects products and materials for defects using precision instruments.

Essential Employability Skills:

- Critical Thinking
- Communication
- Collaboration
- Problem Solving
- Data Literacy
- Curiosity and Initiative





Resources and Accessibility

Safety Guidelines

- **Handle Microscopes and Slides with Care**

Carry digital microscopes using the neck strap or with both hands, and place them on stable surfaces when not in use. Handle prepared slides gently to avoid breakage and return them to their storage case after use.

- **Use Equipment Responsibly**

Keep microscopes and charging cables away from water and other liquids. Avoid looking directly at bright light sources with the microscope, and ensure students use the equipment only as instructed.

Accessibility

- **Provide Multiple Ways to Participate**

Students can take turns operating the microscope, preparing specimens, recording observations, photographing images, sketching specimens, or presenting findings. Offering a variety of roles allows all learners to contribute based on their strengths and abilities.

- **Support Learning with Multiple Representations**

Encourage students to combine microscope observations with sketches, digital images, verbal discussions, and written descriptions. Enlarged images, collaborative observations, and guided questioning help make microscopic investigations accessible to a wide range of learners.

Library Catalog



Library Resources



Feedback

QR to feedback survey

