Microscopy

Course Description

In this captivating, hands-on course, 7th-12th grade students will explore the fascinating realm of microscopy, uncovering hidden worlds invisible to the naked eye. Through practical exercises, they will master the operation of compound microscopes, learn various microscopy techniques, examine prepared specimens, and gain proficiency in specimen preparation. Whether observing plant cells, animal tissues, bacteria, or textiles, students will cultivate a keen eye for detail and an appreciation of the unseen wonders around them.

Prerequisites

No extensive prior knowledge is required. Curiosity and a willingness to explore the microscopic world are essential!

Course Objective

By the end of this course, students will be equipped with fundamental knowledge and practical skills in microscopy, enabling them to explore and understand the intricate details of the microscopic world, thereby fostering a deeper appreciation for science and promoting critical thinking in biological and physical sciences.

Learning Outcomes

By the end of this course students should be able to:

- Outline the structure of a microscope.
- Operate a compound microscope and a stereoscope.
- Discuss various microscopy techniques such as bright field, dark field, and phase-contrast microscopy.
- Describe the role of stains and dyes in improving images produced.
- Prepare different types of microscope slides including whole-mounts, wet-mounts, live-mounts, and permanent mounts.
- Apply microscopy to the study of various organisms and objects.
- Keep a detailed laboratory notebook as a record of observations, procedures, results, and skills developed.

Modules:

- The Microscope
- Textiles
- Crystals
- Microbes
- Plants
- Animals

NGSS Standards Alignment

Next Generation Science Standards

Science and Engineering Practices	
Asking questions and defining problems	X
Developing and using models	
Planning and carrying out investigations	X
Analyzing and interpreting data	
Using mathematics and computational thinking	
Constructing explanations and designing solutions	
Engaging in argument from evidence	X
Obtaining, evaluating, and communicating information	X

Crosscutting Concepts	
Patterns	X
Cause and effect	
Scale, proportion, and quantity	X
Systems and system models	
Energy and matter	
Structure and function	X
Stability and change	