



Microscopes

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INTRODUCTION

The word "microscope" comes from the Latin "microscopium," which is derived from the Greek words "mikros," meaning "small," and "skopein," meaning "to look at." Microscopes are instruments designed to produce magnified visual or photographic images of objects too small to be seen with the naked eye.

The microscope must accomplish three tasks: produce a magnified image of the specimen, separate the details in the image, and render the details visible to the human eye or camera.



History

During the 1st century AD (year 100), glass had been invented and the Romans were looking through the glass and testing it. They discovered that if you held one of these “lenses” over an object, the object would look larger.

Someone also discovered that you can focus the rays of the sun with one of these special “glasses” and start a fire. These early lenses were called magnifiers or burning glasses.

Anthony Leeuwenhoek of Holland became very interested in lenses while working with magnifying glasses in a dry goods store. He used the magnifying glass to count threads in woven cloth. He became so interested that he learned how to make lenses. By grinding and polishing, These rounder lenses produced greater magnification Anthony Leeuwenhoek became more involved in science and with his new improved microscope was able to see things that no man had ever seen before. Today, there are no microscope manufacturers in the US and most of the microscopes come from Germany, Japan and China.



Types of Microscopes

We have 5 types of microscopes, which are:

1. Stereo Microscopes
2. Compound Microscopes
3. Inverted Microscopes
4. Metallurgical Microscopes
5. Polarizing Microscopes



TYPE 1: Stereo Microscopes



Stereo microscopes are used to look at a variety of samples that you would be able to hold in your hand. A stereo microscope provides a 3D image or "stereo" image and typically will provide magnification between 10x - 40x. The stereo microscope is used in manufacturing, science projects for high school students, and botany.

A stereo microscope typically provides both transmitted and reflected illumination and can be used to view a sample that will not allow light to pass through it.





This image of a penny that was captured under the stereo zoom microscope at 20x magnification.

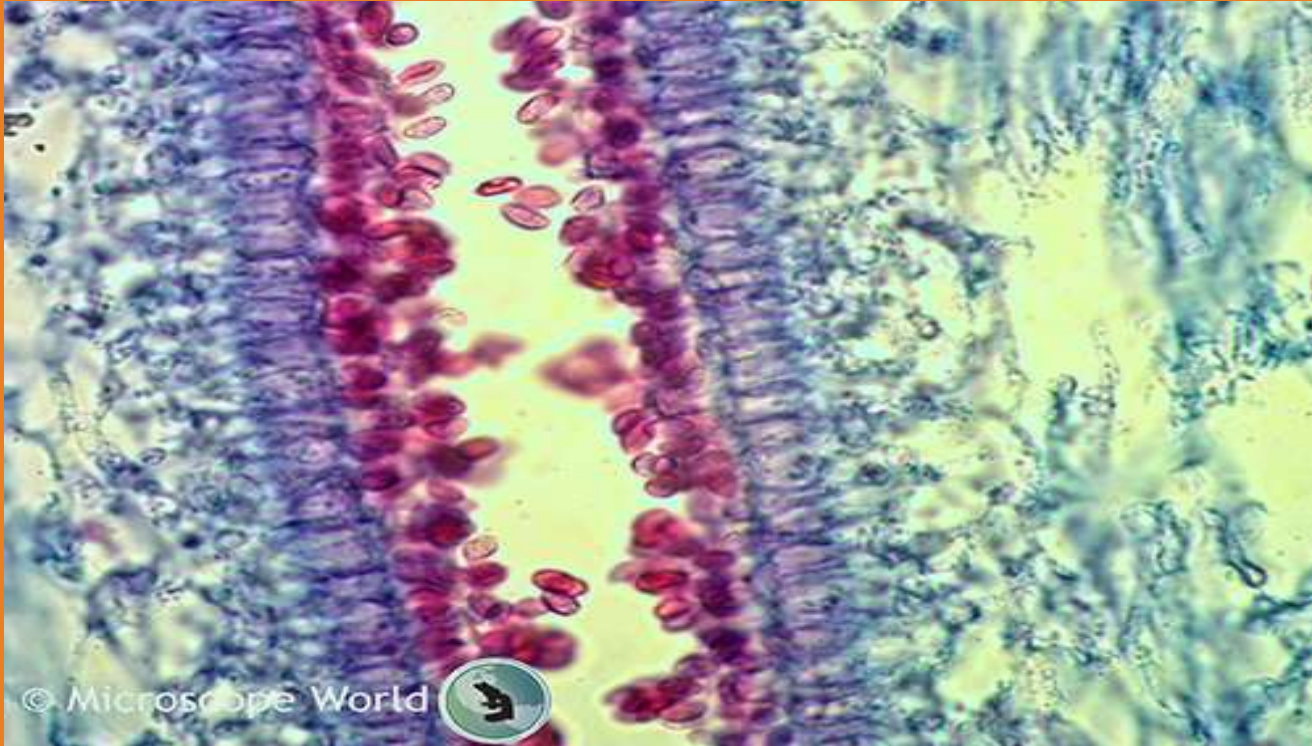
Type 2: Compound Microscopes



A compound microscope may also be referred to as a biological microscope. Compound microscopes are used in laboratories, schools, treatment plants, veterinary offices, and for histology and pathology.

The compound microscope can be used to view a variety of samples, some of which include: blood cell, cheek cells, parasites, bacteria, algae, tissue, and thin sections of organs. Compound microscopes are used to view samples that can not be seen with the naked eye. The magnification of a compound microscope is most commonly 40x, 100x, 400x, and sometimes 1000x.





This image of mushroom spores that was captured under a compound biological microscope at 400x magnification.

Type 3: Inverted Microscopes



Inverted microscopes are available as biological inverted microscopes or metallurgical inverted microscopes. Biological inverted microscopes provide magnification of 40x, 100x and sometimes 200x and 400x. Inverted microscopes are used for in-vitro fertilization, live cell imaging, developmental biology, cell biology, neuroscience, and microbiology. Inverted microscopes are often used in research to analyze and study tissues and cells, and in particular living cells. They are similar to biological inverted microscope in the magnification provided, but one primary difference is that the samples are not placed in a petri dish, but rather a smooth side of the sample must be prepared so it can lay flat on the stage.



Type 4: Metallurgical Microscopes



Metallurgical Microscopes are high power microscopes designed to view samples that do not allow light to pass through them. It provides a magnification of 50x, 100x, 200x, and sometimes 500x. Metallurgical microscopes are utilized to examine micron level cracks in metals, very thin layers of coatings such as paint, and grain sizing. Metallurgical microscopes are utilized in the aerospace industry, the automobile manufacturing industry, and by companies analyzing metallic structures, composites, glass, wood, ceramics, polymers, and liquid crystals.





This image of a piece of metal with scratches on it was captured under a metallurgical microscope at 100x magnification.

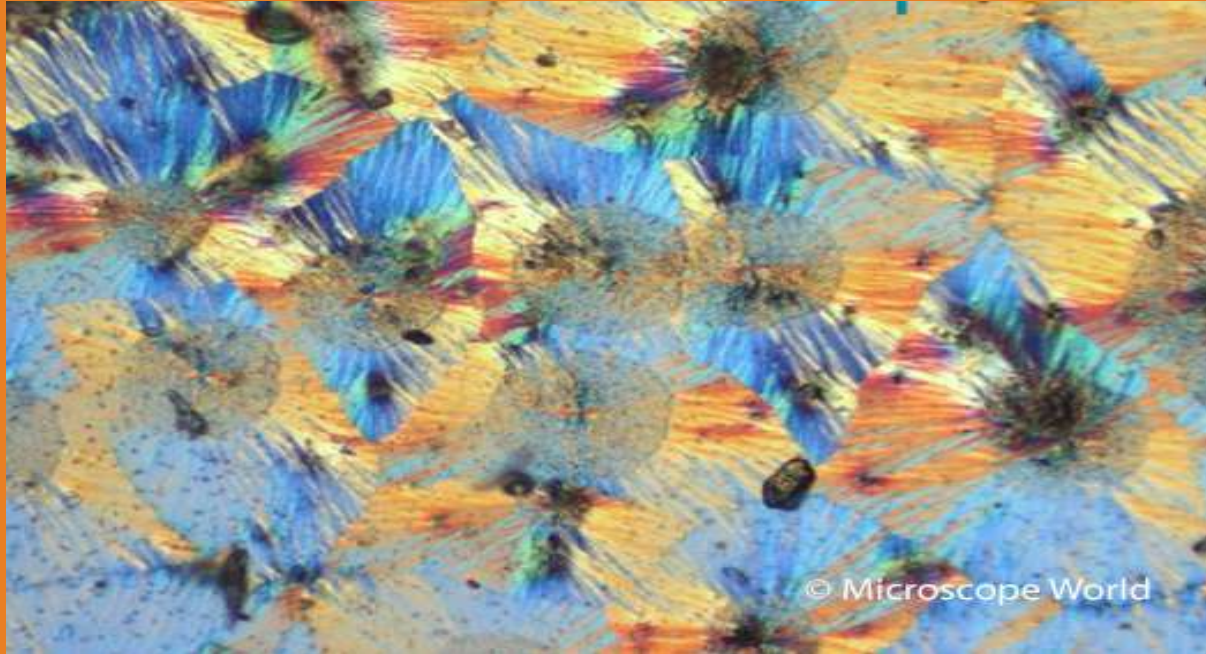
Type 5: Polarizing Microscopes



Polarizing Microscopes use polarized light along with transmitted and reflected illumination to examine chemicals, rocks, and minerals. Polarizing microscopes are utilized by geologists, petrologists, chemists, and the pharmaceutical industry on a daily basis.

All polarizing microscopes have both a polarizer and an analyzer. The polarizer will only allow certain light waves to pass through it. The analyzer determines the amount of light and direction of light that will illuminate the sample.





This is Vitamin C captured under a polarizing microscope at 200x magnification.

Summary

A microscope is a laboratory instrument used to examine objects that are too small to be seen by the naked eye.

There are a number of different types of microscopes and each of them solves unique problems.

Compound microscope is the most accurate microscope out of all types of microscopes.

It's the oldest microscope out of the all mentioned types. It gives a black and white image of a magnification above 500x.

The inverted microscope isn't like any other microscope, it's only used for fertilization , live cell imaging, developmental biology, cell biology, neuroscience, and microbiology.

Polarizing microscope examine chemicals, rocks, and minerals. Polarizing microscopes are utilized by geologists, petrologists, chemists, and the pharmaceutical industry on a daily basis.

Metallurgical microscopes are utilized to examine micron level cracks in metals, very thin layers of coatings such as paint, and grain sizing.



REFERENCES

-<https://www.britannica.com/technology/microscope>

-<https://www.microscopeworld.com/p-3658-types-of-microscopes.aspx>

-<https://en.wikipedia.org/wiki/Microscope>





THANK YOU!