Elementary & High School Glossary

Abbe Condenser: A lens that is mounted under the stage of a microscope and contains an iris diaphragm which controls the width of the beam of light before it enters the lens. This is achieved by changing the size of the iris and moving the lens toward or away from the stage.

Alignment: When optical and mechanical parts are aligned along a common axis.

Binocular Head: A microscope head with an eyepiece lens for each eye. This term is typically used to describe a compound microscope (high power). This type of binocular head does not deliver a stereoscopic Parco(3D) as there is only one objective lens. Stereo microscopes have separate objective lenses for each eyepiece which produce two individual paths of light, one for each eye.

Bright Field Illumination: In ordinary microscopy, this is the most common type of illumination used. Against a brighter background, specimen images appear darker.

Calibrate: To determine the errors of a scale and their proper intervals

Centration: The precise overlapping of the optical and mechanical axes of the mounting.

Coaxial Focus: This focus control combines the coarse and fine focus mechanisms into one control, mounting both on the same axis.

Compound Microscope: A microscope having at least two lenses (an objective and an eyepiece), used to view and observe fine detail within a small, translucent specimen, presenting it in a two-dimensional view.

Coverslips: A thin square, rectangular or circular piece of glass, or plastic, placed over the specimen on a microscope slide to hold the specimen in place.

Dark Field Condenser: Dark field condensers illuminate the object, making it appear bright against a background of little or no light. They do not admit direct light to the microscope.

Diaphragm: Part of the condenser. A rotating disk, generally with 5 holes, and positioned under the stage of a low power microscope. It controls the amount of light entering the objective. Resolution, contrast and clarity of the specimen greatly depend on the diaphragm.

DIN optics: A German standard for the manufacturing of optical systems. All DIN standard objectives are interchangeable and have a tube length standardized to 160 mm as well as a uniform thread standard. (Deutsche Industrial Normen)

Diopter Adjustment: In a binocular or trinocular microscope, the diopter adjustment allows you to change the focus on one eyepiece to compensate for the difference in Parco between your two eyes.

Dual Head: A microscope head with two separate eyepieces. Dual heads are useful for a number of different applications and are proven to be quite versatile. The 45° dual view design is beneficial for classroom applications, enabling two students to comfortably view the same object simultaneously. The 90° dual viewing head is intended for incorporating or attaching a camera.

Eyepiece: Also referred to as the ocular. The eyepiece contains the group of magnifying lenses nearest to the eye .The eyepiece is the lens into which a person looks when observing. Magnification of eyepieces can range anywhere from 10x – 25x. This number, multiplied with the magnification power of the objective, totals the resultant magnification.

Eye-point: Point on the axis above the eyepiece where all the principal rays of light intersect and the eye is placed when observing an image.

Field of View (FOV): When looking into a microscope, FOV is the diameter of the visible image. The larger the field of view (FOV), the more of the specimen is visible. FOV decreases with higher magnification.

Fine Focus: This focus control is used to fine tune the focus at different layers of the specimen by moving the stage up and down in small steps.

Interpupiliary Adjustment: The adjustment of interpupiliary distance. Interpupiliary distance is the distance between the centers of your two pupils. Interpupiliary distance varies from one person to the next. This is why the interpupiliary distance between the two eyepieces of the stereo or binocular microscope must be adjusted.

Iris Diaphragm: A device mounted underneath the stage and used to regulate the amount of light admitted to a lens or optical system.

LED Illumination (Light Emitting Diodes): This illumination system generates far less heat than traditional bulbs and promises a lifespan that lasts anywhere from 10 000 to 60 000 hours, nearly 60X longer than traditional illumination systems. These features, coupled with its clear and crisp, bright white light, make LED the leading choice in microscope illumination.

Mechanical Stage: Permits mechanical mobility of slide on the stage. It consists of a slide holder and two knobs. One knob moves the stage backward and forward, the other one moves the slide sideways.

Monocular Head: A microscope head with a single eyepiece lens

Nosepiece: Also referred to as the revolving nosepiece or objective turret. This is the rotating part of the microscope that holds the objective lenses.

Numerical Aperture (N.A.): The numerical aperture of a microscope objective is a measure of its light gathering capabilities and its ability to resolve fine detail of a specimen at a fixed object distance. The higher the numerical aperture of an objective, the greater the potential resolution of that objective is. Usually, the numerical aperture is found on the objective itself, along with the objective specifications, such as power of the objective, measurement of tube length, and thickness (in mm) of the coverslip that should be used.

Objective: On compound microscopes, this is the closest lens to the object. Objectives usually have a magnification of 4x- 100x. Objectives are also the most important part of a microscope.

Oil Immersion Lens: The quality of an image depends on the numerical aperture (N.A.) and resolution. Immersion oil is transparent oil with a high refractive index. An oil immersion lens coupled with immersion oil increases the resolution and N.A. of a microscope. The oil is placed on the slide and the objective lens is lowered until it touches the oil. Immersion oil is essential to achieve the potential resolution of the oil immersion objective.

Parcentered: This refers to the centered alignment of an object when the nosepiece, or objective turret, is rotated and another objective is positioned. Most microscopes are parcentered.

Parfocal: This refers to the focus of an object which will remain in focus when the nosepiece, or objective turret is rotated, and another objective is used. A small fine focus adjustment is required when another objective is used.

Polarized Light: Used to enhance contrast of an image. A regular light microscope uses unpolarised white light. This is the type of light that we see, and its waves vibrate in random directions. The opposite of unpolarised light, polarised light, is not able to be seen normally and has light waves that vibrate only in one direction.

Rack and Pinion: Important component of the focusing mechanism. It offers smooth motion throughout the focusing range. The rack acts as a sort of track, while the pinion is a gear that rides on the track.

Rack Stop (Safety Rack Stop): A small bar and screw between the stage and the arm of a microscope. This feature prevents damage to the objective lens and slide, by keeping the stage from being elevated to high.

Resolution (Resolving Power): The ability of a lens system to show fine detail of the specimen being observed. Resolution is the quality, or clarity, of the magnified image.

Reticle: A reticle is a clear circular glass insert with a visible scale marked on it. It allows for an accurate measurement to be taken of the specimen being viewed, when seen through the microscope.

Slip Clutch: When the focus is brought all the way to the top and bottom of the focus range, the slip clutch allows the focus knob to ‘slip’. This prevents damage to the microscopes’ focus gear system.

Stage Clips: Found on the stage of a microscope and used to securely hold the slide in position.

Stereo: Refers to a microscope with two separate eyepieces and objective lenses, allowing three dimensional viewing.

Tension Adjustment: A factory set adjustment that ensures the stage does not drift during focus.

Trinocular Head: A binocular microscope equipped with two viewing heads (binocular vision) and an additional exit used to connect a camera.

Widefield Eyepiece Lenses: Corrected, coated lenses that reduce glare and provide a wider field of view.