Better Equipped®

Microscope Buying Guide

An essential guide to help you be better informed when purchasing Microscopes.

Microscopes are essential tools in education, research, clinical diagnostics, and industrial inspection. Although many models look similar, choosing the right one means understanding optical systems, magnification needs, illumination, ergonomics, camera options, and durability. This guide breaks down everything you should know before purchasing.

Our advice in a nutshell: See beyond magnification.

When its comes to magnification a bigger number isn't necessarily better. Choose your microscope based on how you will use it and what you want to examine. Prioritise optical quality over magnification claims; as clear, sharp images matter far more than how "powerful" the microscope appears.

MICROSCOPE ANATOMY

Understand the parts, their functions and how magnification & light work

- Focusing Controls
- Magnification Components
- Specimen Handling Parts
- Illumination Components

1 Eyepiece (Ocular Lens)
Magnifies the image (e.g. 10×).

2 Head/Body Tube
Holds the eyepiece and keeps the correct distance to objectives.

3 Revolving Nosepiece
Holds the objective lenses; rotates to change magnification.

4 Objective Lenses
Provide the main magnification.

- 4x Scanning (low power)
- 10x Low power
- 40x High power
- 100x Oil immersion (highest power)

5 Arm
Supports the upper parts; used for carrying.

6 Stage Clips
Hold the slide in place.

7 Stage
Platform that supports the slide.

10 Condenser
Focuses light onto the specimen.

11 Iris Diaphragm
Controls the amount of light and contrast.

12 Illuminator (Light Source)
Provides light that passes up through the specimen.

Coarse Focus
Moves the stage up and down quickly for rough focusing.

9 Fine Focus
Moves the stage slowly for sharp, precise focusing.

13 Base
Supports the microscope; provides stability.

MAGNIFICATION PATHWAY

How the image is magnified

Your Eye → Eyepiece (e.g. 10×) → Objective Lens (e.g. 40×) → Specimen (on slide)

Total Magnification = Eyepiece Magnification × Objective Magnification

Example: 10× (eyepiece) × 40× (objective) = 400× total magnification

LIGHT PATHWAY

How light travels through the microscope

Light from illuminator → Up through condenser → Through specimen → Through objective lens → Through eyepiece → To your eye

SPECIMEN HANDLING PARTS

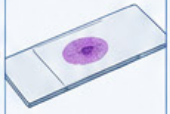
Stage Clips

Gently hold the slide in place.

Stage

Supports the slide during viewing.

Slide



Specimen mounted on a slide with coverslip.

FOCUSING CONTROLS

Coarse Focus
Use on low power only to bring the specimen into focus quickly.

⚠ Do NOT use on high power – may damage the slide.

Fine Focus
Use on any power to sharpen the image and see fine detail.

⚠ Always use fine focus on high power.

MAGNIFICATION COMPONENTS

Eyepiece (Ocular Lens)
Usually 10× or 15×.

Objective Lenses
4×, 10×, 40×, 100×
Each provides a different level of magnification.

Revolving Nosepiece
Rotates to change the objective lens.

QUICK TIPS

- Start on the lowest power (4×) to find your specimen.
- Use coarse focus on low power, fine focus on all powers.
- Increase power for more detail, not for brightness.
- Keep lenses clean using lens paper only.
- Always carry the microscope with two hands.

SAFETY REMINDERS

- ⚠ Keep microscope away from the edge of benches.
- ⚠ Do not force the focusing knobs.
- ⚠ Report any damage or faults.
- ⚠ Handle slides and coverslips carefully.

COMMON MAGNIFICATIONS

Eyepiece	Objective	Total Magnification
10×	4×	40×
10×	10×	100×
10×	40×	400×
10×	100×	1000× (oil)

1. Identify Your Primary Use Case

Start by deciding where the microscope will be used and what types of specimens you need to observe.

Environment	Requirements
School/Teaching Labs	Durable construction; easy focusing; fixed or semi plan lenses; LED or Tungsten lighting; low maintenance; limited set of objectives.
College/ Further Education	Plan objectives; coaxial focus; brighter illumination; mechanical stage for slide control.
Research/Professional Labs	High precision plan or plan apochromat lenses; coaxial coarse/fine focus; trinocular head for cameras; modular upgrades.
Clinical/Diagnostics	Reliable Köhler illumination; ergonomic design; high quality 100× oil objective; smooth mechanical stage; certified optical quality.
Industrial / Quality Testing	Stereo microscopes; large working distances; adjustable zoom; ESD safe options; built in camera compatibility.

Click to view our range

2. Choose the Microscope Type

Your application determines the type of microscope you need.

Common Microscope Types

Compound Microscope

Best for: Cells, bacteria, slides, thin sections.
High magnification (40×–1000×+)

Used in schools, labs, hospitals, universities.

Stereo (Dissecting) Microscope

Best for: Larger, 3D samples: insects, rocks, circuit boards, school dissections.
Lower magnification (typically 10×–45× or more with zoom)

Provides wide working distance and depth perception.

Digital Microscope

Best for: Demonstrations, classrooms, inspection tasks.
Built in camera; no eyepieces required; connects to screen/PC.

Inverted Microscope

Best for: Cell culture, observing samples in flasks or petri dishes.
Objectives below the stage; ideal for liquid samples.

Specialist Microscopes

Polarising microscopes: geology, minerals.
Fluorescence microscopes: research & diagnostics requiring labelled samples.
Metallurgical microscopes: opaque or polished surfaces.

3. Optical Quality and Objectives

Optics determine brightness, clarity, and accuracy of what you see. Common Objective types are:

Achromatic:

Standard teaching level
Corrects basic colour distortion

Plan Achromatic (Plan):

Flat field; edges are sharp; ideal for teaching, clinical, general research

Plan Fluor / Semi Apochromatic

Brighter images; better colour correction; widely used in research

Apochromatic (APO):

Highest correction; best colour accuracy and resolution; for advanced imaging and research

Common Objective Sets: 4×, 10×, 40× (dry), 100× oil

For stereo microscopes, zoom ranges like 0.7×–4.5× are typical.

Tip: If the microscope will be used for photography, choose plan or better lenses for edge to edge clarity.

4. Magnification and Eyepieces

Magnification = eyepiece × objective

(e.g., 10× eyepiece × 40× objective = 400× total magnification)

Eyepiece Options

10× - standard

15× or 20× - boosts total magnification

Widefield (WF) - larger view, easier for beginners

High eye relief eyepieces - comfortable for glasses wearers

More magnification is not always better- clarity and resolution matter more than extreme power.

5. Illumination system

Good lighting is critical for quality viewing.

LED Illumination

Long life, cool operation, low maintenance
Stable brightness
Ideal for teaching and research environments
Also available in 'Tungsten' coloured LED

Tungsten Halogen

Traditional filament bulb producing warm yellow light. Particularly good in brightfield, polarized light, and photomicrography due to its ability to render colors naturally and provide a stable, continuous spectrum

Köhler Illumination

Provides optimal contrast and even lighting
Essential for high precision and clinical applications
Typically found on mid range and advanced microscopes

For Stereo Microscopes:

Top (incident) lighting for opaque samples
Bottom (transmitted) lighting for translucent samples
Ring lights for shadow free illumination

6. Mechanical Stage and Focus Controls

Mechanical Stage

Allows smooth slide movement

Essential for scanning samples, especially at higher magnifications

Look for ball bearing stages for smoothness and durability

Focus System

Coaxial coarse & fine focus (combined knobs)

Tension adjustment for user comfort

Stage stop to prevent crashing the objective into the slide (good for students)

7. Build Quality and Ergonomics

Desirable Features:

- All metal frame for stability and durability
- Rubber coated grips and adjustable eyepiece spacing for comfort
- Inclined head (30°–45°) for ergonomic viewing
- Trinocular head if camera integration is needed
- Reverse facing objectives to protect lenses during slide changes
- Wide focusing knobs for precise control

8. Digital Cameras & Imaging

If you plan to record images or display them for teaching:

Options:

- USB cameras for PC imaging
- HDMI cameras for screens/TVs
- WiFi-enabled cameras for tablets and classroom sharing

Consider:

- Sensor size (larger generally = better image quality)
- Software included (measurement tools, live preview, capture options)
- Frame rate for live demonstrations

Choose a trinocular microscope if you want to attach a camera without blocking an eyepiece.

9. Accessories and Add Ons

Look for:

- Prepared slide kits (schools & demonstrations)
- Additional objectives
- Phase contrast kits
- Darkfield condensers
- Polarising filters
- Mechanical stage upgrades
- Dust covers & storage cases
- Calibration slides (stage micrometers) for measurements
- Graticule Eye Pieces

10. Maintenance and Longevity

Look for:

- Easy clean optical surfaces
- Sealed body construction (protects internal gears from dust)
- LED modules with long service life
- Replaceable fuse, bulbs (if halogen), and stage clips

Routine Care Includes:

- Keeping lenses dust-free
- Storing with a dust cover
- Avoiding touching optics with fingers
- Annual servicing for high use microscopes

11. Buying Checklist

Before purchasing, make sure you confirm:

☐Purpose & Use

- What will I mainly observe? (pond water, cells, bacteria, insects, minerals, electronics, fabrics, etc.)
- Is this for education, hobby, or professional work?
- Will children or beginners be using it?

☐Type of Microscope

- Do I need a compound or stereo (dissecting) microscope?
- Compound: cells, bacteria, thin specimens
- Stereo: insects, plants, coins, circuit boards
- Is digital imaging important, or is eyepiece-only fine?

☐Magnification & Optics

- What is the useful magnification range? (not just "maximum magnification")
- What objective lenses are included? (e.g., 4×, 10×, 40×, 100×)
- Are the lenses achromatic, plan, or plan-apochromatic?
- Is the image sharp across the whole field of view?

11. Buying Checklist (contd.)

☐Illumination & Contrast

- What type of light source does it use? (LED preferred for longevity)
- Is the brightness adjustable?
- Does it have a condenser and diaphragm for contrast control?
- Can it support darkfield or phase contrast later if needed?

☐Build Quality & Ease of Use

- Is the focus mechanism smooth and precise (coarse & fine focus)?
- Does it feel sturdy and stable at higher magnifications?
- Is it comfortable for long viewing sessions?
- Is the stage mechanical and easy to control?

☐Expandability & Compatibility

- Can I upgrade lenses or add accessories later?
- Can I attach a camera or phone adapter?

11. Buying Checklist (Contd.)

☐Maintenance & Support

- What warranty is included?
- Are replacement bulbs, lenses, and parts easy to get?
- Is there local or reliable customer support?

☐Budget & Value

- What am I paying for optics vs features?

☐Red Flags to Watch For

- Claims of extremely high magnification (e.g. “2000×”) with low-quality optics
- Plastic focus mechanisms
- No condenser on compound microscopes
- Vague descriptions of lenses or illumination