

 **Discovery™**

AGES  
**10+**

# INSTRUCTION MANUAL



**450x Power  
Student Microscope**  
Biological Experiments Gear

 **x2**  
**NOT INCLUDED**



**WARNING:**  
CHOKING HAZARD – Small parts.  
Not for children under 3 years.

# CONTENTS

## **Microscope Parts:**

- 01** Eyepiece
- 02** Focus Knob
- 03** Stage
- 04** Metal Stage Clips
- 05** Color Filter Wheel
- 06** Objective
- 07** Objective Turret (5x, 15x, 45x)
- 08** Illumination On/Off Switch and Mirror
- 09** Base and Battery Case
- 10** Microscope Arm

## **Additional Contents:**

- 11** (3) Prepared Slides and (5) Blank Slides
- 12** Slide Covers
- 13** Tweezers\*
- 14** Spatula
- 15** Scalpel\*
- 16** (3) Empty Vials
- 17** Magnifying Glass
- 18** Pipette
- 19** Graduated Cylinder
- 20** Shrimp Hatchery
- 21** Drawstring Carry Bag
- 22** Experiment Booklet

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## **Welcome To The World Of Microscopy!**

You don't always have to think big to make amazing discoveries. In fact, sometimes you have to think very, very small and take your quest for the unknown to a cellular level. With the Discovery 450x Advanced Microscope Set, you can see the ordinary become extraordinary! Everyday things like sand, salt, onion peel, hair and pollen will show unexpected dimension when viewed at magnifications ranging from 50x to 450x. This set will let you dive right into the world of microscopy with prepared slides and included samples or launch your own investigations using the extensive lab supplies and experiment guide!

## **How Do I Use My Microscope?**

Before you use your microscope, make sure that the table, desk or surface that you place it on is stable and is not subject to vibration. If the microscope needs to be moved, hold it by the arm and base while carefully transferring it. Once the microscope is in a suitable location and the batteries are installed, check the light source to make sure that it illuminates. Use a microfibre cleaning cloth to gently wipe the lenses off. If the stage is dirty with dust or oil, carefully clean it off. Make sure that you only raise and lower the stage using the focus adjustment knob.

## **How Do I Operate The Illumination?**

Locate the mirror/light on the base of the microscope. Flip the mirror/light to the "on" position (with the light facing up) and the light will illuminate. This microscope is equipped with an incandescent light that illuminates the specimen from below. The color filter wheel is located in the middle of the microscope stage. The filters help you when you observing very bright or clear specimens. Using these filters, you can choose various brightness levels and colors. This helps you better recognize the components of colorless or transparent objects (e.g. sea salt).

## **How Do I Adjust My Microscope Correctly?**

Place the microscope in a suitable location as described above, and sit in a comfortable viewing position. Always start each observation with the lowest magnification. Adjust the distance of the microscope stage so that the stage is in the lowest position — farthest away from the turret head. Turn the objective turret until it clicks into place at the lowest magnification (Objective: 5x/Magnification: 50x). Note: Before you change the objective

setting, always make sure the microscope stage is farthest away from the turret by rotating the focus knob. Separating the stage and turret by rotating the focus knob will avoid causing damage to the specimen slide or microscope. When starting an observation, always start with the 5x objective in the rotating head.

### Did You Know?

The highest magnification is not always the best for every specimen!

### How Do I Observe The Specimen?

Sitting in your location with adequate illumination chosen from the color filter wheel, the following basic rules should be observed. Start with a simple observation at the lowest magnification. Position the object or specimen in the middle of the stage under the stage clips, centered over the lower light. Focus the image by rotating the focus knob until a clear image appears in the eyepiece.


Place the prepared slide directly under the objective on the microscope stage and secure it with the stage clips. The prepared slide should be located directly over the lower illumination. Look through the eyepiece and carefully turn the focus knob until the image appears clear and sharp. Now you can select a higher magnification by rotating to the 15x objective turret, which will give you a 150x magnification. Following this procedure creates a steady increase of magnification without overpowering the view of the object. The following magnification order should be used: 50x, 150x and then 450x. Each time the magnification changes (due to the objective change), the image sharpness must be readjusted with the focus knob. When doing this, be careful because if you move the microscope stage too quickly, the objective and the slide could come into contact and cause damage to the slide or microscope.

**Magnification Guide**

Eyeiece	Objective	Power
10x	5x	50x
10x	15x	150x
10x	45x	450x

**Troubleshooting Table**

Problem	Solution
No recognizable image	<ul style="list-style-type: none"><li>• Turn on light</li><li>• Readjust focus</li><li>• Start with the lowest power objective (5x)</li></ul>
No image	<ul style="list-style-type: none"><li>• Center object on slide under lowest power objective</li></ul>
No light	<ul style="list-style-type: none"><li>• Replace batteries</li><li>• Check on/off position</li></ul>



For transparent objects (e.g. sea salt), light is projected by the lower light traveling from below the stage, through the objective and eyepiece, and finally into your eye. This process of light transmission is known as microscopy. Many micro-organisms found in water, plant components and the smallest animal parts are transparent in nature. Opaque specimens, on the other hand, will need to be prepared for viewing. Opaque specimens can be made transparent by a process of treatment and penetration with the correct materials (media), or by slicing. You can read more about creating specimens in the enclosed microscope experiments booklet.

### **Cleaning Tips**

To ensure your microscope has a long service life, clean the lenses (objective and eyepiece) with only a soft, lint-free cloth, like a microfiber cloth. Do not press down too hard while cleaning, as this might scratch the lens. Ask your parents to help if your microscope is really dirty. To avoid causing damage to electrical components, do not apply cleaning fluids directly to the device. If necessary, the cleaning cloth can be moistened with cleaning fluid and the lens wiped clean using very little pressure. Make sure your microscope is always protected against dust and dirt. After use, leave it in a warm room to dry off before storing. Batteries should be removed from the device if it will not be used for a long period of time.

## SAFETY WARNINGS

### Read and follow the instructions, safety rules, and first aid information.

- This microscope set is intended for children older than age 8. Children should only use this device under adult supervision. Never leave a child unsupervised with this device. Accessories in the experiment kit may have sharp edges and tips. Please store the device and all of its accessories and aids out of the reach of young children when not being used due to a risk of injury.
  - Chemicals: Any chemicals and liquids used in conjunction with the device should be kept out of reach of children. Do not drink any of the chemicals contained in this set. Hands should be washed thoroughly under running water after working with these chemicals. In case of accidental contact with eyes or mouth, rinse the affected area with water. Seek medical treatment for ailments arising from contact with the chemical substance, and take the chemicals with you to the doctor.
  - Choking hazard: Children should only use device under adult supervision. Keep packaging materials like plastic bags and rubber bands out of the reach of children as these materials pose a choking hazard.
  - Battery guidelines: This device contains electronic components that are powered by batteries. Batteries should be kept out of children's reach. When inserting batteries, please ensure the polarity is correct. Insert the batteries according to the displayed +/- information. Never mix old and new batteries. Replace all batteries at the same time. Never mix alkaline, standard carbon-zinc and rechargeable nickel-cadmium batteries. Never short circuit the device or batteries or throw either into a fire. Leaking or damaged batteries can cause injury if they come into contact with the skin. If you need to handle such batteries, please wear suitable safety gloves. Remove batteries from the product before extended storage to prevent leaking.
- Do not immerse the battery compartment in water.
- Risk of fire: Do not place device, particularly the lenses, in direct sunlight. The concentration of light rays could cause a fire.
  - Do not disassemble this device. In the event of a defect, please contact your dealer. The dealer will contact the Customer Service Department and can send the device in to be repaired if necessary.
  - Do not subject the device to temperatures exceeding 60° C (140° F).



- Disposal: Keep packaging materials, like plastic bags and rubber bands, away from children as they pose a risk of suffocation. Dispose of packaging materials as legally required. Consult the local authority on the matter if necessary and recycle materials when possible.



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