

 **Discovery**™/SMC

AGES
8+

INSTRUCTION MANUAL

AA
x2
NOT INCLUDED
1.5V



WARNING:

SUN HAZARD – Never look directly at the sun with this device.



WARNING:

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

Telescope and Microscope Combo Set

40 mm Tabletop Telescope and
900x Magnification Microscope

Do not mix old and new batteries. Do not mix alkaline, standard (carbon-zinc), or rechargeable (ni-cad, ni-mh, etc.) batteries. Non-rechargeable batteries are not to be recharged. Rechargeable batteries are to be removed from the toy before being charged. Rechargeable batteries are only to be charged under adult supervision. Exhausted batteries are to be removed from toy.

Telescope Terms To Know:

Diagonal: A mirror that deflects the ray of light 90 degrees.

With a horizontal telescope tube, this device deflects the light upwards so that you can comfortably observe by looking downwards into the eyepiece. The image in a diagonal mirror appears upright, but rotated around its vertical axis (mirror image).

Focal length: Everything that magnifies an object via an optic lens has a certain focal length. The focal length is the length of the path the light travels from the surface of the lens to its focal point. The focal point is also referred to as the focus. In focus, the image is clear. In the case of a telescope, the focal length of the telescope tube and the eyepieces are used to determine magnification.

Lens: The lens turns the light that falls on it around in such a way so that the light gives a clear image in the focal point after it has traveled a certain distance (focal length).

Eyepiece: An eyepiece is a system made for your eye and comprised of one or more lenses. In an eyepiece, the clear image that is generated in the focal point of a lens is captured and magnified still more.

Magnification: The magnification corresponds to the difference between observation with the naked eye and observation through a magnifying device like a telescope. If a telescope configuration has a magnification of 30x, then an object viewed through the telescope will appear 30 times larger than it would with the naked eye. To calculate the magnification of your telescope setup, divide the focal length of the telescope tube by the focal length of the eyepiece.



**For Instruction Manual, and
Downloadable Planisphere Visit:**

www.exploreone.com/pages/product-manuals

CONTENTS

Telescope Parts

1. 40 mm Objective Lens
2. Tabletop Tripod
3. Optical Tube Assembly (OTA) with Dew Shield
4. Tripod Head
5. Focus Wheel
6. Diagonal
7. Eyepieces (6 mm and 20 mm)
8. Compass



Observe, Investigate, Discover!

With the Discovery Telescope/Microscope Set, you are ready to explore everything from the soil to the stars.

The set's 40 mm telescope is a great starter instrument for both daytime nature watching and nighttime moon gazing. With this easy-to-use refractor you can spend an afternoon visually exploring distant landscape features or getting a closer view of wildlife without disturbing it. Once the stars come out, you can visit the chiseled ridges and craters of the lunar surface or tour some of the night sky's brightest objects. It also offers two interchangeable eyepieces so you can experiment with different magnifications and fields of view.

When you want to take your investigations to the cellular level, the 900x Microscope is ready to reveal the hidden details of the world around you. Everyday things like sand, onion skin, hair and pollen will show their extraordinary sides when viewed at magnifications ranging from 100x to 900x. To jumpstart your observations, the set comes with prepared specimens, collection tools and an experiment guide.

As an added bonus, both elements in the set are well secured in a durable case for quick portability so you can follow your investigations wherever they may take you.

For added versatility, the telescope comes with two interchangeable eyepieces, so you can experiment with different magnifications and fields of view.

Did You Know?

The magnifying power of a telescope is determined by dividing the focal length of the telescope by the focal length of the eyepiece. This means that as the focal length of your eyepiece increases, the magnifying power decreases.

Microscope Parts:

1. Eyepiece
2. Focus Knob
3. Stage
4. Metal Stage Clips
5. Colour Filter Wheel
6. Objective
7. Objective Turret (5x, 20x, 45x)
8. Illumination On/Off Switch and Mirror
9. Rubber Base and Battery Case
10. Microscope Arm

Additional Contents:

11. (5) Prepared Slides and (7) Blank Slides with Slide Case
12. (8) Slide Covers/Labels
13. (3) Collection Vials
14. Test Tube
15. Petri Dish
16. Tweezers / Scalpel / Pipette / Stirring Rod / Spatula*



Assembly:

Note: We recommend assembling your telescope for the first time in the daylight or in a lit room so that you can familiarize yourself with assembly steps and all components.

- Find a stable surface, like a table. Set the tripod on the table and open it until the tripod spreaders are fully extended.
- Snap the telescope tube into the U-shaped clamp on the top of the tripod head.
- Insert the diagonal into the focuser and secure it by tightening the thumbscrews.
- Place your chosen eyepiece into the diagonal. We recommend starting with the 20 mm because it will provide the widest field of view.

Using Your Telescope:

Now you are ready to start observing! Put the 20 mm eyepiece into the diagonal to get the widest field of view. This wider field of view will make it easier to locate and track objects. To move the scope up, down and side to side, grip the telescope near where the tube meets the focuser and steadily move the tube until your target comes into view in the eyepiece. It is important to remember that the rotation of the Earth means objects will move out of your eyepiece fairly quickly. Once you have found and focused on your desired target, you will have to track the object as it journeys across the night sky. For a closer look at an object, you can insert the 6mm eyepiece. The magnification will increase from 20x to 67x.

Telescope Cleaning Guide:

Your telescope is a precision optical device and keeping the optics free of dust and dirt is crucial for optimal performance. To clean the lenses (objective and eyepiece) use only a photo-grade soft brush or a 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 telescope is really dirty. If necessary, the cleaning cloth can be moistened with an optical glass cleaning fluid and the lens wiped clean using very little pressure. Do not use harsh detergents! Make sure your telescope is always protected against dust and dirt. After use, leave it in a warm room to dry off before storing.

Telescope Parts Overview:

1. 40 mm Objective Lens
2. Tabletop Tripod
3. Optical Tube Assembly (OTA) with Dew Shield
4. Tripod Head
5. Focus Wheel
6. Diagonal
7. Eyepiece (6 mm and 20 mm)
8. Compass



Troubleshooting Guide:

No picture	Remove dust protection cap and sun-shield from the objective opening.
Blurred picture	Adjust focus using focus ring.
No focus possible	Wait for temperature to balance out.
Bad quality	Never observe through a glass surface such as a window.
Viewing object visible in the finder, but not through the telescope	Align finder to telescope (see instructions)
Despite using star diagonal prism the picture is "crooked"	The star diagonal prism should be vertical in the eyepiece connection.

Possible Objects For Observation:

Terrestrial Objects

Take note of the examples below, including Mount Rushmore and the golf course. Start with the 20 mm eyepiece and focus until the image is clear. After mastering the 20 mm eyepiece, switch to the 12.5 mm eyepiece and practice scanning and focusing until the image is clear. Choose several terrestrial objects to practice focusing on, but never point your telescope at or near the sun, or you risk blindness.

The Moon

Diameter: 3,476 km

Distance: Approximately 384,401 km

The Moon is the Earth's only natural satellite, and it is the second brightest object in the sky (after the Sun). Although it is our closest neighbor, a lot of people have never really taken a good long look at the Moon. With your telescope, you should be able to see several interesting lunar features. These include lunar maria, which appear as vast plains, and some of the larger craters. The best views will be found along the terminator, which is the edge where the visible and cloaked portions of the Moon meet.

Terrestrial Images

f=20 mm

f=12.5 mm



The Moon

f=20 mm

f=12.5 mm



SAFETY WARNINGS

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

- **Respect privacy:** When using this device, respect the privacy of other people. For example, do not use them to look into people's homes.
- **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.
- **Risk of blindness:** Never use this device to look directly at the Sun or in the direct proximity of the Sun. Doing so may result in a permanent loss of vision.
- **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.

How Do I Use My Microscope

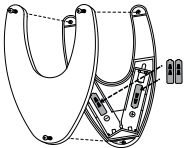
Before you use your microscope, make sure that the table, desk or surface that you place it on is stable and is not subject to vibration. If the microscope needs to be moved, hold it by the arm and base while carefully transferring it. Once the microscope is in a suitable location and the batteries are installed, check the light source to make sure that it illuminates. Use a microfiber 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 colour 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 colours. This helps you better recognize the components of colourless or transparent objects (e.g. sea salt).



How Do I Adjust My Microscope Correctly?

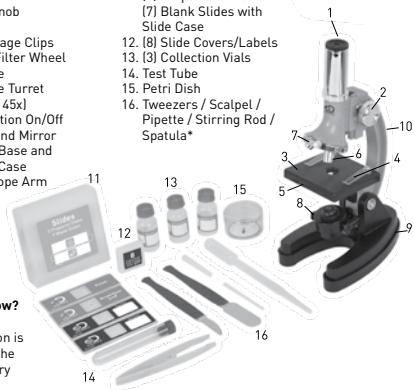
Place the microscope in a suitable location as described above, and sit in a comfortable viewing position. Always start each observation with the lowest magnification. Adjust the distance of the microscope stage so that the stage is in the lowest position — farthest away from the turret head. Turn the objective turret until it clicks into place at the lowest magnification (Objective: 5x/ Magnification: 100x). 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.

Microscope Parts:

1. Eyepiece
2. Focus Knob
3. Stage
4. Metal Stage Clips
5. Colour Filter Wheel
6. Objective
7. Objective Turret
8. Illumination On/Off Switch and Mirror
9. Rubber Base and Battery Case
10. Microscope Arm

Additional Contents:

11. (5) Prepared Slides and (7) Blank Slides with Slide Case
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16. Tweezers / Scalpel / Pipette / Stirring Rod / Spatula*



Did You Know?

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

* Not suitable for children under 3 years of age.
Contains functional sharp points.

Troubleshooting Guide:

No recognizable image	Turn on light, Readjust focus, Start with the lowest power objective (5x)
No image	Centre object on slide under lowest power objective
No light	Replace batteries, Check on/off position

How Do I Observe The Specimen?

Sitting in your location with adequate illumination chosen from the colour 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, centred over the lower light. Focus the image by rotating the focus knob until a clear image appears in the eyepiece.

Magnification Guide:

20x	5x	100x
20x	20x	400x
20x	45x	900x

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/300x objective turret. Higher levels of magnification can be achieved by turning the objective turret to a higher setting (300x or 900x). Following this procedure creates a steady increase of magnification without overpowering the view of the object. The following magnification order should be used: 100x, 300x then 900x. 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.

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.

SAFETY WARNINGS

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

- This microscope set is intended for children older than age 7. 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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