



APOLLO COMBO SET

40 mm Table Top Telescope &
900x Microscope Instruction Manual

40 mm Telescope Specifications

Optical design	Achromatic refractor
Magnification	50 - 15x
Front lens (clear aperture)	40 mm
Focal length	300 mm
Standard eyepieces	6 mm and 20 mm
Finish	Blue
Tripod	Table Top

900x Microscope Specifications

Lenses	5x, 20x, 45x
Magnification	100x, 400x, 900x
Accessories	Slides, Pipette, Scalpel Tweezers, SlideTray, Extra Slides, Specimen Vials, Petri Dish, Experimental Instructions



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

WARNING:

Never attempt to observe the sun with this telescope. Make sure children do not attempt to observe the sun with the telescope. Observing the sun directly, even for a short time, may cause blindness. Packing materials, like plastic bags, should be kept out of the reach of children.

Risk to your child!

Never look through this device directly at or near the sun. There is a risk of **BLINDING YOURSELF!**



Children should only use this device under supervision. Keep packaging materials, like plastic bags and rubber bands, out of the reach of children, as they pose a choking hazard.

Fire and burn risk!

Never subject the device, especially the lenses, to direct sunlight. Light ray concentration can cause fires and/or burns.

Risk of material damage!

Never take the device apart. Please consult Customer Service if there are any defects. The dealer will contact our service center and send the device in for repair if needed.

Do not subject the device to temperatures exceeding 140° F.

Tips on cleaning

Clean the lens (objective and eyepiece) only with a soft, lint-free cloth, like a microfiber cloth. Do not use excessive pressure - this may scratch the lens.

To clean a very dirty lens, dampen the cleaning cloth with eyeglass cleaning solution, and wipe the lens gently.

Protect the device against dirt and dust. Leave it to dry properly after use at room temperature. Then put the dust caps on and store the device in a suitable location.

Respect privacy!

This device is meant for private use. Respect others' privacy. Do not use the device to look into other people's homes, or otherwise infringe on their privacy.

Disposal

Dispose of the packaging material/s as legally required. Consult the local authority on the matter if necessary.



Product Manual, Planisphere & Astro Software Visit:

www.exploreone.com/pages/product-manuals



DISPOSAL

Dispose of the packaging materials properly, according to their type, such as paper or cardboard. Contact your local waste-disposal service or environmental authority for information on the proper disposal.

Please take the current legal regulations into account when disposing of your device.



List of parts:

Please check this list while unpacking your telescope to ensure all parts are present:

1. Focus Wheel
2. Diagonal Mirror
3. Eyepieces (6 mm, 20 mm)
4. Telescope Tube
5. Dew Shield
6. Objective Lens
7. Locating Screw For The Vertical Adjustment
8. Locating Screw For The Vertical Axis
9. Tripod Legs

Your Telescope

Please look for a suitable location for your telescope before you begin. Use a stable surface, e.g. a table.

Mount the telescope to the tripod with the locating screw for the vertical adjustment (7). Insert the eye piece into the diagonal mirror (6 mm or 20 mm).

Azimuthal Mounting

Azimuthal mounting just means that you can move your telescope up and down, left and right, without having to adjust the tripod.

Use the locating screw for the vertical fine adjustment (7) and the locating screw for the vertical axis

(8) to locate and lock the position of an object (to focus an object).

Which eyepiece is right?

First of all, it is important that you always choose an eyepiece with the highest focal width for the beginning of you observation. Afterwards, you can gradually move to eyepieces with smaller focal widths. The focal length is indicated in millimeters, and is written on each eyepiece. In general, the following is true: The larger the focal width of an eyepiece, the smaller the magnification! There is a simple formula for calculating the magnification:

Focal length of the telescope tube: Focal length of the eyepiece = magnification.

You see: The magnification is also depends on the focal length of the telescope tube. This telescope contains a telescope tube with focal length of 300 mm. From this formula, we see that if you use an eyepiece with a focal width of 20 mm, you will get the following magnification:

$$300 \text{ mm} / 20 \text{ mm} = 15 \text{ x magnification}$$

To make things simpler, I've put together a table with some magnifications:

Telescope Focal Width	Eyepiece Focal Width	Magnification
300 mm	20 mm	15x
300 mm	6 mm	50x

Technical Data:

- Design: Achromatic
- Focal Length: 300 mm
- Objective Diameter: 40 mm

Possible objects for observation:

The following section details several interesting and easy-to-find celestial objects you may want to observe through your telescope. The pictures at the end of the manual show what the objects will look like through your telescope's eyepiece.

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 6 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

The moon is the Earth's only natural satellite.
 Diameter: 3,476km
 Distance from Earth: approx. 384,400 km (average)

The moon has been known to humans since prehistoric times. It is the second brightest object in the sky (after the sun). Because the moon circles the Earth once per month, the angle between the Earth, the moon and the sun is constantly changing; one sees this change in the phases of the moon. The time between two consecutive new moon phases is about 29.5 days (709 hours).

Orion Nebula (M 42)

M 42 in the Orion constellation
 Right ascension: 05:35 [Hours: Minutes]
 Declination: -5:22 [Degrees: Minutes]
 Distance from Earth: 1,500 light years

Located about 1,500 light years from Earth, the Orion Nebula [Messier 42, abbreviation: M 42] is the brightest diffuse nebula in the sky – visible with the naked eye, and a worthwhile object for telescopes of all types and sizes, from the smallest field glass to the largest earthbound observatories and the Hubble Space Telescope.

When talking about Orion, we're actually referring to the main part of a much larger cloud of hydrogen gas and dust, which spreads out over half of the Orion constellation. The expanse of this enormous cloud stretches several hundred light years.

Ring Nebula (M 57)

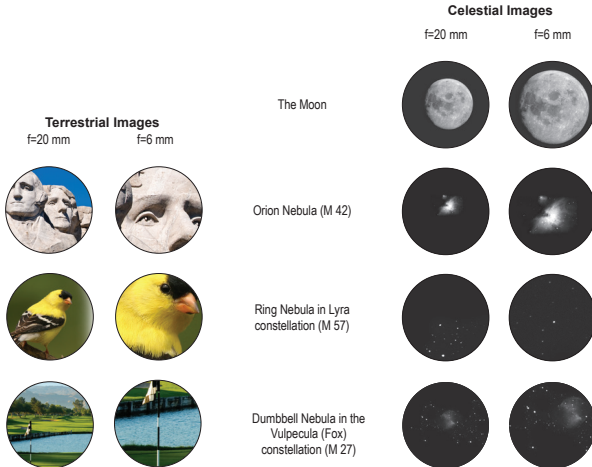
M 57 in the Lyra constellation
 Right ascension: 18:53 [Hours: Minutes]
 Declination: -33:02 [Degrees: Minutes]
 Distance from Earth: 2,400 light years

The famous Ring Nebula M 57 in the constellation of Lyra is often viewed as the prototype of a planetary nebula; it is one of the magnificent features of the Northern Hemisphere's summer sky. Recent studies have shown that it is probably comprised of a ring (torus) of brightly shining material that surrounds the central star (only visible with larger telescopes), and not of a gas structure in the form of a sphere or an ellipsoid. If you were to look at the Ring Nebula from the side, it would look like the Dumbbell Nebula [M27]. When viewed from Earth, we are looking directly at the pole of the nebula.

Dumbbell Nebula (M 27)

M 27 in the Fox constellation
 Right ascension: 19:59.6 [Hours: Minutes]
 Declination: -+2:43 [Degrees: Minutes]
 Distance from Earth: 1,360 light years

The Dumbbell Nebula [M 27] in Fox was the first planetary nebula ever discovered. On July 12, 1764, Charles Messier discovered this new and fascinating class of objects. We see this nebula almost directly from its equatorial plane. If we could see the Dumbbell Nebula from one of its poles, we would see the shape of a ring, and we would see something very similar to what we know as the Ring Nebula [M 57]. In reasonably good weather, we can see this object well even with low magnifications.



Telescope ABC's

What do the following terms mean?

Diagonal:

A mirror that deflects rays 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 (FL). The FL 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 a telescope, the FL of the telescope tube and the eyepieces are combined.

Lens:

The lens turns the light which 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 even more.

There is a simple formula for calculating the magnification:
 focal length of the telescope tube / focal length of the eyepiece = magnification

In a telescope, the magnification depends on both the focal length of the telescope tube and the focal length of the eyepiece.

Magnification:

The magnification corresponds to the difference between observation with the naked eye and observation through a magnification apparatus such as a telescope. In this formula, observation with the eye is considered "single," or 1x magnification. Accordingly, if a telescope has a magnification of 30x, then an object viewed through the telescope will appear 30 times larger than it would with the naked eye.

Troubleshooting:

Problem:	Solution:
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
Despite using star diagonal prism the picture is "crooked"	The star diagonal prism should be vertical in the eyepiece connection.



DISPOSAL

Dispose of the packaging materials properly, according to their type (paper, cardboard, etc). Contact your local waste disposal service or environmental authority for information on the proper disposal.

List of parts:

Please check this list while unpacking your telescope to ensure all parts are present:

1. 900x Microscope
2. 5 Prepared & 7 Blank Slides
3. 8 Slide Covers, 8 Slide Labels. 8 Slide Slips
4. Test Tube
5. 3 Specimen Vials
6. Pipette
7. Petri Dish
8. Tweezers
9. Scalpel
10. Blade
11. Stirring Rod



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

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 color filter wheel is located in the middle of the microscope stage. The filters help you when you are 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/100x]. Note: Before you change the objective setting, always make sure the microscope stage is farthest away from 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/100x objective in the rotating head.

Did you know?

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

Magnification Guide		
Eyeiece	Objective	Power
20x	5x	100x
20x	20x	400x
20x	45x	900x

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 20x/400x objective turret. Higher levels of magnification can be achieved by turning the objective turret to a higher setting (45x/900x). Following this procedure creates a steady increase of magnification without overpowering the view of the object. The following magnifications should be

considered: 100x, 400x, 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 following Microscope Experiments booklet.

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

Cleaning Tips

To ensure your microscope has a long service life, clean the lens (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. The cleaning cloth should 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.

WARNINGS AND SAFETY

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 this experimental 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.

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.

DANGER OF FIRES AND EXPLOSIONS!

Do not expose the device to high temperatures. Use only battery types recommended. 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. Exposure to high temperatures or misuse of the device can lead to short circuits, fires, or even explosions. 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.

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 substances, and take the chemicals with you to the doctor.

RISK OF MATERIAL DAMAGE

Never take the device apart. Please consult our customer service department and send the device in for repair if needed.

Do not subject the device to temperatures exceeding 60 °C (140 °F).

TIPS ON CLEANING

Remove batteries from device before cleaning.

MICROSCOPE CARE

Clean the exterior of the device with a dry cloth. To avoid causing damage to electrical components, do not use cleaning fluids. Clean the lenses (objective and eyepiece) with only a soft, lint-free cloth, like a microfiber cloth. Do not use excessive pressure—this may scratch the lens. Protect the device from dust and moisture. Store the device in its original packaging. Batteries should be removed from the device if it will not be used for a long period of time.

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.



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CONFORMS TO THE SAFETY
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