

WARNING!

Not suitable for children under 3 years of age due to small parts.

WARNING!

Do not view the sun through the telescope as serious injury to the eye may occur.

Telescopes should always be used under adult supervision.



National Geographic's net proceeds support vital exploration, conservation, research, and education programs.

Parents: Experience the National Geographic Channel. Call your cable or satellite provider for availability. Visit ngceurope.com

Visit our website: kids.nationalgeographic.com

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 NATIONAL GEOGRAPHIC™

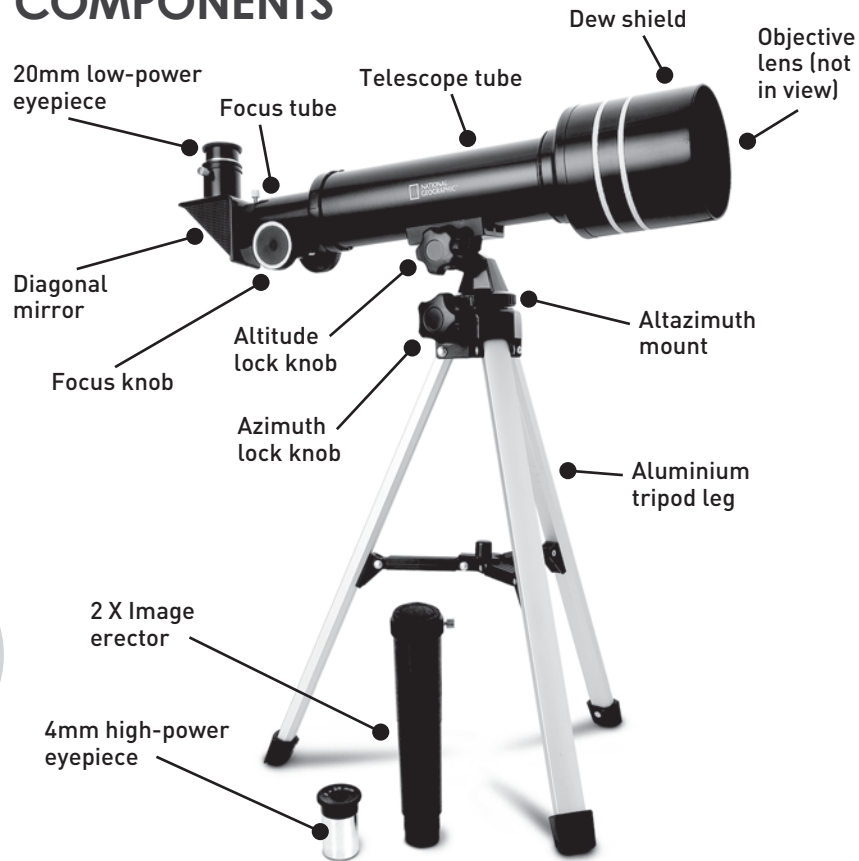
50mm ASTRONOMICAL TELESCOPE



INSTRUCTION MANUAL

AGES 8 AND UP

COMPONENTS



INTRODUCTION

Congratulations! You are now the owner of a National Geographic telescope. With proper care and handling of your telescope, you will enjoy looking at nature's wondrous sights for many years.

This telescope has been designed to show you the Moon's craters, Jupiter's major moons and even glimpses of Saturn's rings. It also delivers great views of mountains, valleys and many other subjects, near and far, in the world around us.

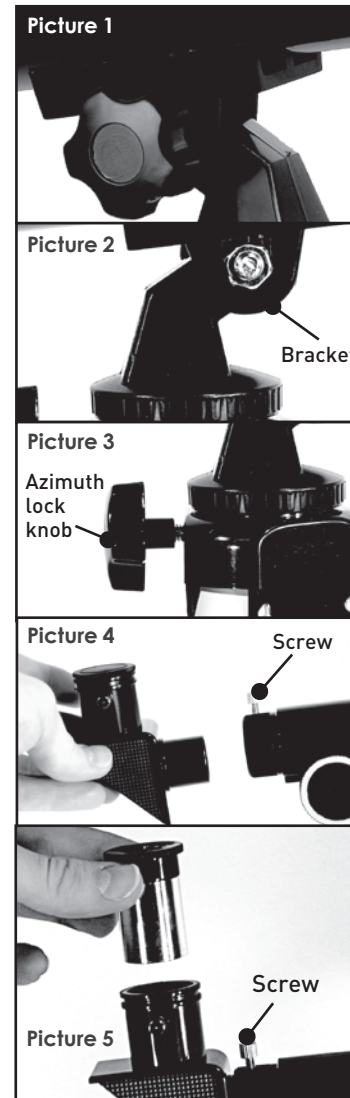
You can use your telescope as a terrestrial (land) telescope to study birds, animals and landscapes at a distance. To obtain the best performance from your new telescope, please read this manual carefully and completely.

THE ALTAZIMUTH MOUNT

This telescope is fitted with an easy-to-aim altazimuth mount. This user-friendly mounting system allows fast, simple and accurate vertical and horizontal movement of the telescope.

Assembly

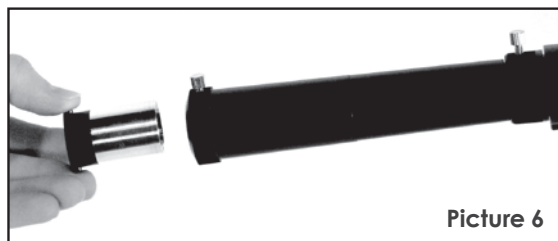
1. Carefully remove all parts from the cardboard boxes and lay them on a table or on the floor in order to take an inventory of all the pieces. Keep your box for storage or in case you ever need to ship your telescope.



2. Spread the three legs of the table-top tripod apart and gently press down on the centre of the tripod supports until they lock into place.
3. Place the telescope tube over the altazimuth mount. Lower the telescope tube onto the mount so that the plastic tongue on the mount slips into the bracket underneath the telescope tube (Picture 1).
4. One of the short bracket arms has a hexagon-shaped cutout around its opening. Insert the nut from the altitude lock knob into this cutout. Insert the altitude lock knob through the bracket and tongue (Picture 2). Turn the altitude lock knob clockwise into this nut until it stops.
5. Turn the azimuth lock knob (Picture 3) on the tripod mount clockwise until it stops. The telescope is now securely attached to the tripod.
6. Loosen the small chrome screw on the side of the focus tube by turning it anti-clockwise. Insert the shiny chrome end of the diagonal mirror into the focus tube so that the opposite open end is facing upward. Tighten the small chrome screw on the side of the focus tube to hold the diagonal mirror securely in position (Picture 4).
7. Loosen the small chrome screw located on the side of the diagonal mirror by turning it anti-clockwise (Picture 5).
8. Insert the low-power eyepiece marked 'H20mm' into the diagonal mirror. Tighten the small chrome set screw by turning it clockwise to hold the eyepiece securely in place (Picture 5).

THE 2 X IMAGE ERECTOR

When using your telescope with the diagonal mirror in place, everything you see will be right-side up, but will be laterally reversed. That means that right and left are reversed – like looking in a mirror. This is normal and is of no consequence unless you are trying to follow motion or read signs, license plates and similar items. To fix this, you can use the supplied 2 X Image Erector. It is positioned as shown in Picture 6. You must first remove the diagonal mirror, then insert the 2 X Image Erector. Finally, insert an eyepiece. We recommend the H20mm eyepiece.



Picture 6

ABOUT MAGNIFICATION

The magnification power of a telescope indicates how much an image is enlarged or how big and close it appears to the viewer. The focal length of the eyepiece, combined with the focal length of the telescope, determine the magnification power. To calculate the power of your telescope with any particular eyepiece, simply divide the focal length of the telescope (360mm) by the focal length of the eyepiece (indicated in 'mm' on the eyepiece collar).

EXAMPLE $\frac{360\text{mm focal length (tube)}}{20\text{mm focal length (eyepiece)}} = 18 \text{ X magnification power}$

The two interchangeable eyepieces included provide the following magnification powers:

Eyepiece	Power
20mm	18 X
4mm	90 X

The level of magnification required depends on the object being observed.

A lower magnification power with a wider field of view is good for observing galaxies and nebulae. Higher magnification powers should only be used for highly detailed observations of the Moon, Jupiter, and Saturn, or any object that is extremely bright.

For terrestrial applications, it is always recommended to begin viewing with the 20mm low power eyepiece and switch to higher power only under bright lighting conditions. This will help ensure that the best possible image quality and detail are maintained.

When you use the 2 X Image Erector it will double the effective magnification of the eyepiece being used. Thus, the 20mm eyepiece with the 2 X Image Erector will yield 36 X. With the 4mm eyepiece, it will yield 180 X.

USING YOUR TELESCOPE

1. Take your telescope outside. Viewing objects through closed or open windows is not recommended. Your view can be distorted by reflections in the glass of a closed window or by air currents of differing temperatures passing through an open window.
2. Let your telescope adjust to the outside temperature. Your telescope will perform much better if the lenses and the air inside the tube are the same temperature as outside. It may take as long as 30 minutes to equalise the temperatures when the difference in temperatures is extreme.
3. Find a location far from glaring light. If you live in an urban area, your viewing will probably improve the farther you move away from the city lights. The sky glow of a town or city can dramatically reduce the telescope's performance and viewing capabilities.

When possible, avoid sudden temperature changes, as the moisture in the air will condense on the objective lens. Should this occur after bringing your telescope inside, leave the lens cap off the objective lens, tilt the objective (front) lens face down, and wait until the telescope reaches room temperature.

With the diagonal mirror already attached and in place, we recommend starting your viewing with the low-power 20mm eyepiece because it gives you the widest angle with the brightest and sharpest views. To adjust the angle of the telescope, loosen the azimuth lock knob by turning it anti-clockwise. Adjust the telescope to the desired angle, then tighten the azimuth lock knob.

NOTE: When using the diagonal mirror, objects will appear right-side up in your telescope, but reversed, like a reflection in a mirror. This is normal and does not indicate a defect.

Care and Cleaning of Optics

Optical components of a telescope get dirty over time. Dirt or dust on a lens should be removed only with the utmost care. A considerable amount of dirt or dust would have to accumulate on the optical surface before your view would be compromised.

1. Keeping any dust caps on during storage and transport will reduce dust collection.
2. Condensation may collect on the optical surfaces when the telescope is not in use. Remove the dust caps and allow the moisture to evaporate naturally. Point the telescope downwards to minimise the accumulation of airborne dust.
3. Once all moisture has evaporated, replace the dust caps.

If you keep the dust caps on your telescope when it is not in use and avoid handling the lenses or mirrors, only minimal optical maintenance of your telescope should be required. Extensive cleaning is usually only necessary every few years.

WHAT TO LOOK FOR IN THE SKY

There is a whole universe of objects you could view at night, so where do you start? We recommend starting with the most prominent objects first.

The Moon

The Moon is the easiest target to find at night. When the Moon is in full position, it bathes the night with a silvery light that washes the sky of all but the brightest objects. The best time to view the Moon is not when it is full, but rather when it is less than half full. The dividing line between dark and light on the moon, called the terminator, shows the best detail in the craters and mountains.

The Planets

To find the planets, you will need information about their times of

The planets, our solar system companions, range in size from moon-size rocky bodies to giant gas balls, which could hold the Earth 1,000 times over.

visibility. An astronomy magazine will give you the locations of the planets, as they change position from month to month. The Internet is also an excellent source of information, star charts, maps and more! The popular and more familiar constellations often provide the easiest landmarks to help find the planets locations and paths of orbit. Most people have looked up at night and seen some of the planets without even realising it. A planet appears like a bright star but does not twinkle like a star; it will look like a tiny ball. Venus, Mars, Jupiter and Saturn are the easiest planets to view. Mercury is dimmer, usually below the horizon and is more challenging to find.

Each of the planets provides interesting views. **Venus** is covered with clouds so all that is visible is an extremely bright light, the brightest next to the Moon. Venus, like the Moon, goes through phases. As it travels around the sun, different areas of the planet's surface are illuminated, producing crescent shapes of varying size. **Mars** is the red planet. When it is above the horizon, it is noticeably red and stands out like a beacon in the night sky. The apparent brightness of Mars varies as the planet orbits around the sun and throughout its period of visibility, it will brighten and dim depending on how near or far it is from Earth.

Jupiter is the largest planet in our solar system and the second brightest next to Venus.

Jupiter has many moons, four of which are often visible through your telescope, when viewing conditions permit. As you watch them throughout the evening, you

will see that they change position relative to each other and to Jupiter. It is possible with careful planning to actually see one of the moons disappear either in front of or behind Jupiter as it orbits around the planet. **Saturn**, the second largest planet, is not as bright as Jupiter and so its moons are not as visible through small telescopes. The large rings that encircle Saturn are spectacular to observe, however. The planet and its rings appear pale yellow.

FREQUENTLY ASKED QUESTIONS

1. How far can I see?

If you stand outside and look up at the night sky on a clear evening, you can see hundreds of stars with the unaided eye. The telescope is a light-gathering instrument that magnifies the view – providing significantly more detail and unveiling more stars, nebulae and celestial objects. With the aid of a telescope, you will be able to enjoy exciting views of Saturn's rings, Jupiter's major moons, the Orion Nebula and much more.

2. Why can't I see anything?

If you see only gray or black when looking through your telescope, even after searching for an object to view, it is very likely that you are using an eyepiece that is too powerful. To solve this problem, always start with the lowest power eyepiece first and only insert the higher power eyepiece after you have found an object. Also, be sure to remove the dust cap from the lens.

3. When I use my high-power eyepiece, everything looks much darker. Why?

As magnification in a telescope increases, brightness diminishes. Conversely, brightness increases when magnification is reduced. If an image appears too dark or unclear, use a lower-powered eyepiece. Views of small, bright objects are better than those of large, dark, or blurry ones! Atmospheric conditions, air currents, as well as light and air pollution also affect viewing quality.

4. As I look through my telescope, objects in the sky appear to move. Why is that?

The constant rotation of the Earth makes things appear to move. Lower-power eyepieces will reduce this effect of movement considerably and allow you to observe an object for a longer duration before you have to readjust your telescope.