CELESTRON®

Travel Scope

Instruction Manual

Model # 21035 Travel Scope 70
Model # 21038 Travel Scope 50

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Introduction

Congratulations on your purchase of a Celestron Travel Scope. The Travel Scope is made of the highest quality materials to ensure stability and durability. All this adds up to a telescope that gives you a lifetime of pleasure with a minimal amount of maintenance.

This telescope was designed with traveling in mind offering exceptional value. The Travel Scope features a compact and portable design with ample optical performance. Your Travel Scope is ideal for terrestrial as well as very casual astronomical observation.

The Travel Scope carries a **two year limited warranty.** For details see our website at www.celestron.com

Some of the standard features of the Travel Scope include:

- All coated glass optical elements for clear, crisp images.
- Erect image diagonal so that your views are correctly oriented.
- Smooth functioning altazimuth mount with easy pointing to located objects.
- Preassembled aluminum full size photographic tripod ensures a stable platform.
- Quick and easy no-tool set up.
- The telescope and tripod fit inside the standard backpack for easy traveling.

Take time to read through this manual before embarking on your journey through the Universe. It may take a few observing sessions to become familiar with your telescope, so you should keep this manual handy until you have fully mastered your telescope's operation. The manual gives detailed information regarding each step as well as needed reference material and helpful hints to make your observing experience simple and pleasurable as possible.

Your telescope is designed to give you years of fun and rewarding observations. However, there are a few things to consider before using your telescope that will ensure your safety and protect your equipment.

Warning

- **Never look directly at the sun with the naked eye or with a telescope (unless you have the proper solar filter). Permanent and irreversible eye damage may result.**
- **Never use your telescope to project an image of the sun onto any surface. Internal heat build-up can damage the telescope and any accessories attached to it.**
- **Never use an eyepiece solar filter or a Herschel wedge. Internal heat build-up inside the telescope can cause these devices to crack or break, allowing unfiltered sunlight to pass through to the eye.**
- **Do not leave the telescope unsupervised, either when children are present or adults who may not be familiar with the correct operating procedures of your telescope.**

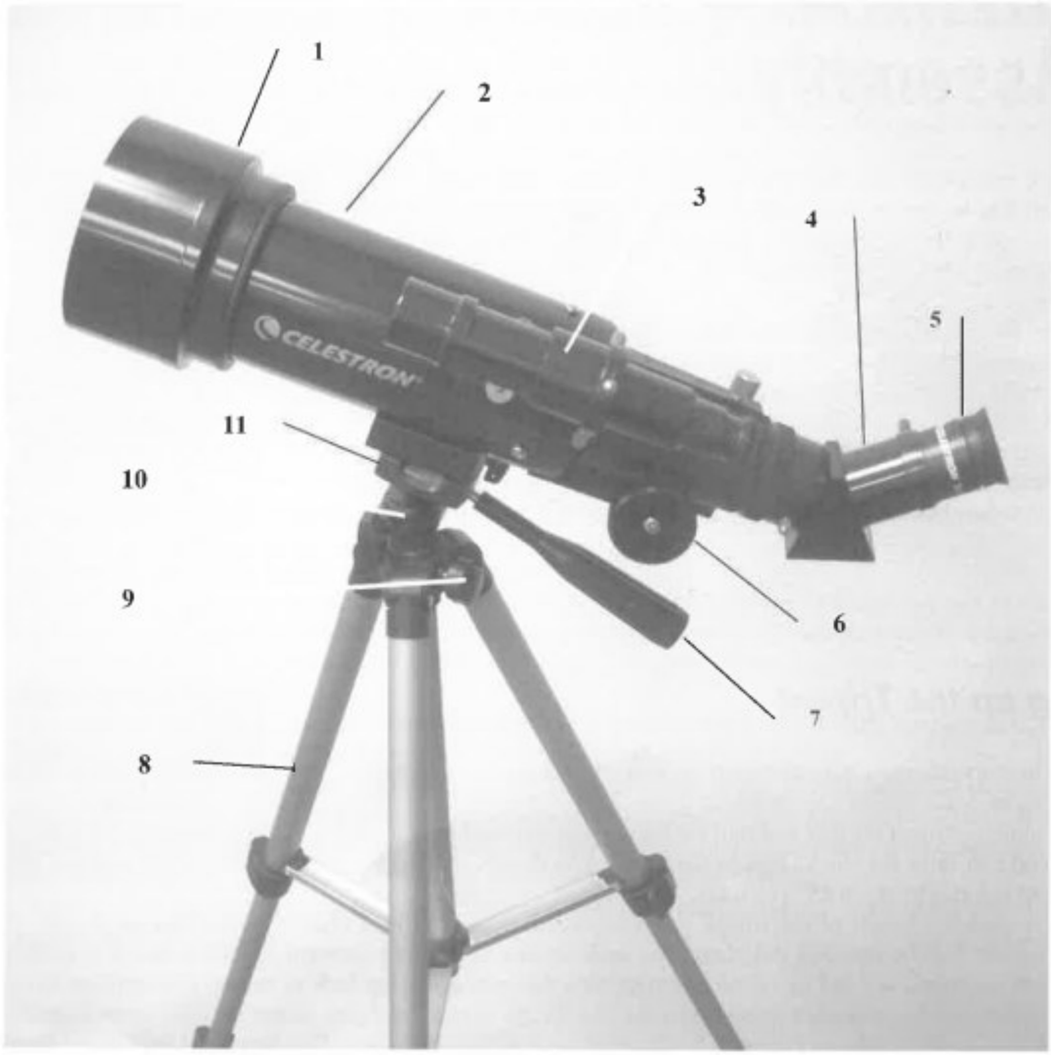

Figure 1-1 Travel Scope 70 (Travel Scope 50 similar)

1.	Objective Lens	7.	Pan Handle – Altitude Motion
2.	Telescope Optical Tube	8.	Tripod
3.	Finderscope Bracket	9.	Central Column Locking Knob
4.	Erect Image Diagonal	10.	Azimuth Locking Knob
5.	Eyepiece	11.	Tripod Head Platform
6.	Focus Knob		

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Assembly

This section covers the assembly instructions for your Travel Scope. Your telescope should be set up indoor the first time so that it is easy to identify the various parts and familiarize yourself with the correct assembly procedure before attempting it outdoor.


Figure 2-1

The Travel Scope 70 comes in one box. The pieces in the box are – telescope optical tube, tripod, erect image diagonal, 20mm eyepiece, 10mm eyepiece, 5x24 Finderscope with bracket, CD-ROM ----- all packed in the travel backpack.

The Travel Scope 50 comes in one box. All items the same as above except it has a 2x20 Finderscope and 8mm eyepiece (instead of 10mm). In addition, the Travel Scope 50 includes a 3x Barlow Lens – 1.25".

Setting up the Tripod

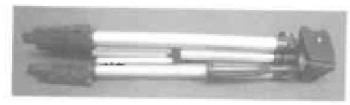


Figure 2-2

1. The tripod comes preassembled so that the set up is very easy – see Figure 2-2.
2. Stand the tripod upright and pull the tripod legs outward until each leg is fully extended – Figure 2-3.
3. You can raise the tripod legs to the height you desire. At the lowest level the height is about 16" (41cm) and extends to about 49" (125cm).
4. To raise the height of the tripod, you unlock the tripod leg lock clamps at the bottom of each tripod leg (Figure 2-4) by opening the clamp for each section by pulling outward. Once a clamp is unlocked, then pull the tripod leg out as far as it will go and then close the leg lock to secure it. Continue doing this for each tripod leg and each section to raise the height to the level you desire. A fully extended tripod looks similar to the image in Figure 2-5. With all the legs raised up on all sections, the height will be about 42" (107cm).
5. If you want to raise the tripod height up further you must use the central column locking knob which is the knob located at the bottom left in Figure 2-6. Turn the locking knob counterclockwise until loose. Then, pull up on the head of the tripod and the central column will move up. Continue pulling to the height you desire and then tighten the locking knob. When the central column is raised up as far as it will go, then the maximum height possible is achieved – 49" (125cm).


Figure 2-3


Figure 2-4


Figure 2-5


Figure 2-6

Attaching the Telescope Optical Tube to the Tripod

The telescope optical tube attaches to the tripod by using the mounting bracket on the bottom of the optical tube (Figure 2-7 shows the Travel Scope 70; and the Travel Scope 50 is similar) and the mounting platform of the tripod (Figure 2-8). Before starting make sure all of the knobs on the tripod are locked.

Figure 2-7

Figure 2-8

1. Remove the protective paper covering the optical tube.
2. Loosen the top right knob (see Figure 2-8) by turning it counterclockwise. This allows you to tilt the tripod platform up 90° as shown in Figure 2-9. After tilting the platform up, tighten the knob to secure it in place.
3. Figure 2-10 shows the bottom of the optical tube and the tripod platform and where they will attach to each other.
4. Under the center of the tripod platform you will see (Figure 2-10) a knob which contains a ¼ x 20 screw that will attach securely the platform to the telescope optical tube.
5. You can put the ¼ x 20 screw into either of the threaded holes of the Travel Scope 70 (it doesn't matter which one you use) in the mounting bracket of the telescope optical tube whereas the Travel Scope 50 has only one threaded hole. Hold the optical tube with one hand while threading the screw clockwise until tight with the other hand. Now the assembly will look like Figure 2-11.
6. Lastly, loosen the knob for the tripod platform and lower the platform down to the level position and then tighten the knob securely.

Figure 2-9

Figure 2-10

Figure 2-11

Moving the Travel Scope Manually

The Travel Scope is easy to move wherever you want to point it. The up and down (altitude) is controlled by the Pan Handle (Figure 1-1) Control Knob. The side-to-side (azimuth) is controlled by the Azimuth Locking Knob (top left knob in Figure 2-8). Both knobs are loosened when turned counterclockwise and tightened when turned clockwise. When both knobs are loose you can find your objects easily (through the Finderscope which is discussed shortly) and then lock the controls.

Installing the Diagonal & Eyepiece

The diagonal is a prism that diverts the light at a right angle to the light path of the telescope. This allows you to observe in a position that is more comfortable than if you had to look straight through. The Travel Scope diagonal is an erect image model that corrects the image to be right side up and oriented correctly left-to-right which is much easier to use for terrestrial observing. Also, the diagonal can be rotated to any position which is most favorable for you. To install the diagonal and eyepiece:

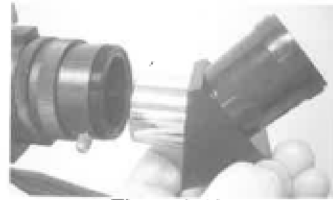


Figure 2-12

1. Make sure the two thumbscrews on the rear of the telescope tube do not protrude into the opening before installation, the plug up cap is removed from the opening at the rear of the telescope tube, and the caps are removed from the barrels on the diagonal. Insert the small barrel of the diagonal all the way into the rear opening of the telescope tube (Figure 2-12). Then tighten the two thumbscrews.
2. Put the chrome barrel end of one of the eyepieces into the diagonal (Figure 2-13) and tighten the thumb screw. When doing this make sure the thumbscrew is not protruding into the diagonal before inserting the eyepiece.
3. The eyepieces can be changed to other focal lengths by reversing the procedure in step 2 above.

Figure 2-13

Installing the Finderscope – Travel Scope 70 only

To install the Finderscope:
1. Locate the Finderscope (it will be mounted in the Finderscope bracket) – see Figure 1-1.
2. Remove the knurled nuts on the threaded posts on the telescope tube – see Figure 2-14.
3. Mount the Finderscope bracket by placing it over the posts protruding from the optical tube and then holding it in place thread on the knurled nuts and tightening them down – see Figure 2-15.
4. Note that the Finderscope should be oriented so that the larger diameter lens is facing toward the front of the telescope tube.
5. Remove the lens caps from both ends of the Finderscope.

Figure 2-14

Figure 2-15

Aligning the Finderscope

Use the following steps to align the Finderscope:

1. Locate a distant daytime object and center it in the low power (20mm) eyepiece in the main telescope.
2. Look through the Finderscope (the eyepiece end of the Finderscope) and take notice of the position of the same object.
3. Without moving the main telescope, turn the adjustment thumbscrews located around the Finderscope bracket until the crosshairs of the Finderscope are centered on the object chosen with the main telescope.
4. If the image through the Finderscope is out of focus, rotate the eyepiece of the Finderscope for a clear view.

Note: Objects viewed through a Finderscope are upside down and backwards which is normal.

Figure 2-16

Focusing

To focus your Travel Scope turn the focus knob located near the rear of the telescope (see Figure 1-1). Turning the knob counterclockwise allows you to focus on an object that is farther than the one you are currently observing. Turning the knob clockwise from you allows you to focus on an object closer than the one you are currently observing.

Note: Remove the front lens cap of the Travel Scope optical tube prior to attempting your observation.

Note: If you wear corrective lenses (specifically glasses), you may want to remove them when observing with an eyepiece attached to the telescope. If you have astigmatism, corrective lenses should be worn at all times.

Calculating Magnification

You can change the power of your telescope just by changing the eyepiece (ocular). To determine the magnification of your telescope, simply divide the focal length of the telescope by the focal length of the eyepiece used. In equation format, the formula looks like this:

$$\text{Magnification} = \frac{\text{Focal Length of Telescope (mm)}}{\text{Focal Length of Eyepiece (mm)}}$$

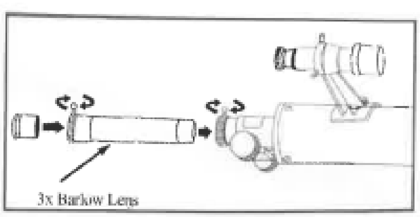
Let's say, for example, you are using the 20mm eyepiece that came with your Travel Scope 70 telescope. To determine the magnification you divide the focal length of your telescope (the Travel Scope for this example has a focal length of 400mm) by the focal length of the eyepiece, 20mm. Dividing 400 by 20 yields a magnification of 20x.

Although the power is variable, every telescope under average skies has a limit to the highest useful magnification. The general rule is that 60 power can be used for every inch of aperture. For example, the Travel Scope 70 is 2.8" inches in diameter. Multiplying 2.8 by 60 gives a maximum useful magnification of 168 power. Although this is the maximum useful magnification, most of your observing will be done at low powers which generate brighter and sharper images.

Note on Using High Powers – Higher powers are used mainly for lunar and sometimes planetary observing where you can greatly enlarge the image, but remember that the contrast and brightness will be very low due to the high magnification. When using the 8mm eyepiece together with the 3x Barlow lens with the Travel Scope 50 gives extremely high power and can be used on rare occasions – you will achieve the power but the image will be dark with low contrast because you have magnified it to the maximum possible. For the brightest images with the highest contrast levels, use lower powers.

You can purchase optional eyepieces to give you a range of powers you can observe with. Visit the Celestron website to see what is available.

Installing & Using the Barlow Lens - Travel Scope 50 only



Your telescope also comes with a 3x Barlow Lens which triples the magnifying power of each eyepiece. However, the greatly magnified images should only be used under ideal conditions – see the Calculating Magnification section of this manual. To use the Barlow lens remove the diagonal and insert the Barlow directly into the focuser tube. You then insert an eyepiece into the Barlow lens for viewing.

Note: Start by using a low power eyepiece as it will be easier to focus.

Determining Field of View

Determining the field of view is important if you want to get an idea of the angular size of the object you are observing. To calculate the actual field of view, divide the apparent field of the eyepiece (supplied by the eyepiece manufacturer) by the magnification. In equation format, the formula looks like this:

$$\text{True Angular Field} = \frac{\text{Apparent Field of Eyepiece}}{\text{Magnification}}$$

As you can see, before determining the field of view, you must calculate the magnification. Using the example in the previous section, we can determine the field of view using the same 20 mm eyepiece that is supplied standard with the Travel Scope 70. The 20 mm eyepiece has an apparent field of view of 50°. Divide the 50° by the magnification, which is 20 power. This yields an actual (true) field of 2.5°.

To convert degrees to feet at 1,000 yards (which is more useful for terrestrial observing) multiply by 52.5. Multiply the angular field of 2.5° by 52.5. This produces a linear field width of 131 feet at a distance of one thousand yards.

General Observing Hints

When using any optical instrument, there are a few things to remember to ensure you get the best possible image.

- Never look through window glass. Glass found in household windows is optically imperfect, and as a result, may vary in thickness from one part of a window to the next. This inconsistency can and will affect the ability to focus your telescope. In most cases you will not be able to achieve a truly sharp image, while in some cases you may actually see a double image.

- Never look across or over objects that are producing heat waves. This includes asphalt parking lots on hot summer days or building rooftops.

- Hazy skies, fog, and mist can also make it difficult to focus when viewing terrestrially. The amount of detail seen under these conditions is greatly reduced.

Note: Your telescope was designed for terrestrial observation. Knowing how to use it for this purpose has been described already as it is quite simple and straightforward. Your telescope can also be used for casual astronomical observing which will be discussed in the next sections.

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Astronomy Basics

Up to this point, this manual covered the assembly and basic operation of your telescope. However, to understand your telescope more thoroughly, you need to know a little about the night sky. This section deals with observational astronomy in general and includes information on the night sky.

The Celestial Coordinate System

To help find objects in the sky, astronomers use a celestial coordinate system that is similar to our geographical co-ordinate system here on Earth. The celestial coordinate system has poles, lines of longitude and latitude, and an equator. For the most part, these remain fixed against the background stars.

The celestial equator runs 360 degrees around the Earth and separates the northern celestial hemisphere from the southern. Like the Earth's equator, it bears a reading of zero degrees. On Earth this would be latitude. However, in the sky this is referred to as declination, or DEC for short. Lines of declination are named for their angular distance above and below the celestial equator. The lines are broken down into degrees, minutes of arc, and seconds of arc. Declination readings south of the equator carry a minus sign (-) in front of the coordinate and those north of the celestial equator are either blank (i.e., no designation) or preceded by a plus sign (+).

The celestial equivalent of longitude is called Right Ascension or R.A. for short. Like the Earth's lines of longitude, they run from pole to pole and are evenly spaced 15 degrees apart. Although the longitude lines are separated by an angular distance, they are also a measure of time. Each line of longitude is one hour apart from the next. Since the Earth rotates once every 24 hours, there are 24 lines total. As a result, the R.A. coordinates are marked off in units of time. It begins with an arbitrary point in the constellation of Pisces designated as 0 hours, 0 minutes, 0 seconds. All other points are designated by how far (i.e., how long) they lag behind this coordinate after it passes overhead moving toward the west.

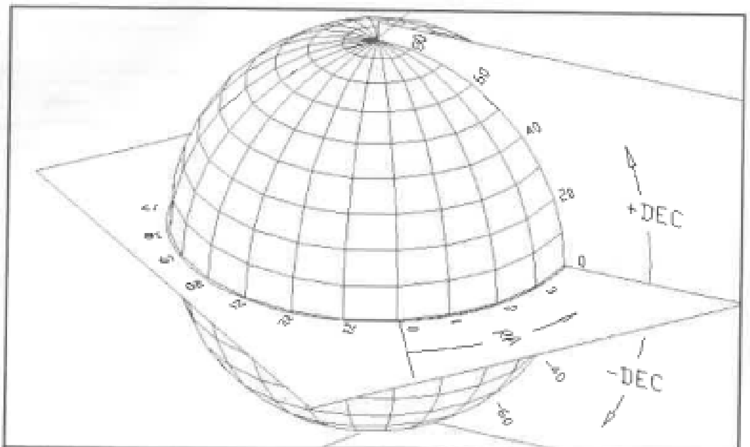
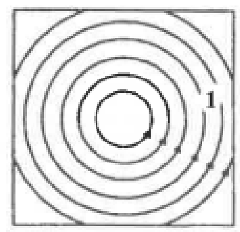


Figure 4-1
The celestial sphere seen from the outside showing R.A. and DEC.

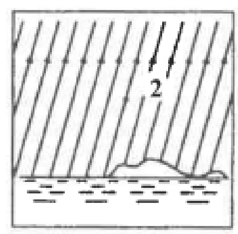
Motion of the Stars

The daily motion of the Sun across the sky is familiar to even the most casual observer. This daily trek is not the Sun moving as early astronomers thought, but the result of the Earth's rotation. The Earth's rotation also causes the stars to do the same, scribing out a large circle as the Earth completes one rotation. The size of the circular path a star follows depends on where it is in the sky. Stars near the celestial equator form the largest circles rising in the east and setting in the west. Moving toward the north celestial pole, the point around which the stars in the northern hemisphere appear to rotate, these circles become smaller. Stars in the mid-celestial latitudes rise in the northeast and set in the northwest. Stars at high celestial latitudes are always above the horizon, and are said to be circumpolar because they never rise and never set. You will never see the stars complete one circle because the sunlight during the day washes out the starlight. However, part of this circular motion of stars in this region of the sky can be seen by setting up a camera on a tripod and opening the shutter for a couple hours. The timed exposure will reveal semicircles that revolve around the pole. (This description of stellar motions also applies to the southern hemisphere except all stars south of the celestial equator move around the south celestial pole.)

Starts seen near the north celestial pole



Starts seen near the celestial equator



Starts seen looking in the opposite direction of the north celestial pole

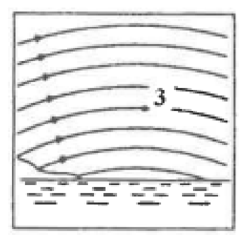


Figure 4-2
All stars appear to rotate around the celestial poles. However, the appearance of this motion varies depending on where you are looking in the sky. Near the north celestial pole the stars scribe out recognizable circles centered on the pole (1). Stars near the celestial equator also follow circular paths around the pole. But, the complete path is interrupted by the horizon. These appear to rise in the east and set in the west (2). Looking toward the opposite pole, stars curve or arc in the opposite direction scribing a circle around the opposite pole (3).

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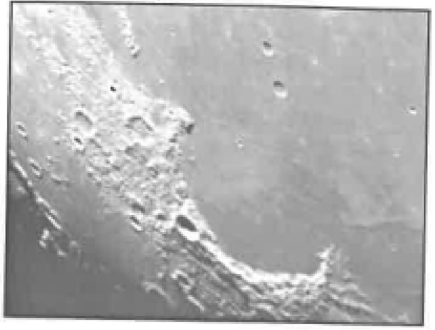
Celestial Observing

With your telescope set up, you are ready to use it for observing. This section covers visual observing hints for solar system and deep sky objects as well as general observing conditions which will affect your ability to observe.

Observing the Moon



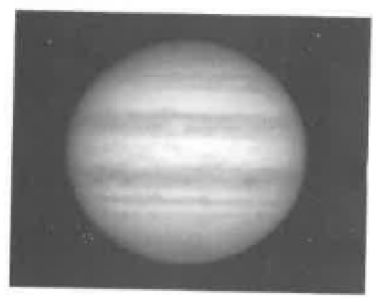
Often, it is tempting to look at the Moon when it is full. At this time, the face we see is fully illuminated and its light can be overpowering. In addition, little or no contrast can be seen during this phase.

One of the best times to observe the Moon is during its partial phases (around the time of first or third quarter). Long shadows reveal a great amount of detail on the lunar surface. At low power you will be able to see most of the lunar disk at one time. Change to optional eyepieces for higher power (magnification) to focus in on a smaller area.

Lunar Observing Hints

To increase contrast and bring out detail on the lunar surface, use optional filters. A yellow filter works well at improving contrast while a neutral density or polarizing filter will reduce overall surface brightness and glare.

Observing the Planets



Other fascinating targets include the five naked eye planets. You can see Venus go through its lunar-like phases. Mars can reveal a host of surface detail and one, if not both, of its polar caps. You may be able to see the cloud belts of Jupiter and the great Red Spot (if it is visible at the time you are observing). In addition, you will also be able to see the moons of Jupiter as they orbit the giant planet. Saturn, with its beautiful rings, is e visible at moderate power.

Planetary Observing Hints

- Remember that atmospheric conditions are usually the limiting factor on how much planetary detail will be visible. So, avoid observing the planets when they are low on the horizon or when they are directly over a source of radiating heat, such as a rooftop or chimney. See the "Seeing Conditions" section later in this section.
- To increase contrast and bring out detail on the planetary surface, try using Celestron eyepiece filters.

Observing the Sun

Although overlooked by many amateur astronomers, solar observation is both rewarding and fun. However, because the Sun is so bright, special precautions must be taken when observing our star so as not to damage your eyes or your telescope.

For safe solar viewing, use a proper solar filter that reduces the intensity of the Sun's light, making it safe to view. With a filter you can see sunspots as they move across the solar disk and faculae, which are bright patches seen near the Sun's edge.

- The best time to observe the Sun is in the early morning or late afternoon when the air is cooler.
- To center the Sun without looking into the eyepiece, watch the shadow of the telescope tube until it forms a circular shadow.

Observing Deep-Sky Objects

Deep-sky objects are simply those objects outside the boundaries of our solar system. They include star clusters, planetary nebulae, diffuse nebulae, double stars and other galaxies outside our own Milky Way. Most deep-sky objects have a large angular size. Therefore, low-to-moderate power is all you need to see them. Visually, they are too faint to reveal any of the color seen in long exposure photographs. Instead, they appear black and white. And, because of their low surface brightness, they should be observed from a dark-sky location. Light pollution around large urban areas washes out most nebulae making them difficult, if not impossible, to observe. Light Pollution Reduction filters help reduce the background sky brightness, thus increasing contrast.

Star Hopping

One convenient way to find deep-sky objects is by star hopping. Star hopping is done by using bright stars to "guide" you to an object. For successful star hopping, it is helpful to know the field of view of you telescope. If you're using the standard 20mm eyepiece with the Travel Scope 70, your field of view is approximately 2.5° or so. If you know an object is 3° away from your present location, then you just need to move a little more than one field of view. If you're using another eyepiece, then consult the section on determining field of view. Listed below are directions for locating two popular objects.

The Andromeda Galaxy (Figure 5-1), also known as M31, is an easy target. To find M31:

1. Locate the constellation of Pegasus, a large square visible in the fall (in the eastern sky, moving toward the point overhead) and winter months (overhead, moving toward the west).
2. Start at the star in the northeast corner—Alpha (α) Andromedae.
3. Move northeast approximately 7°. There you will find two stars of equal brightness—Delta (δ) and Pi (π) Andromeda—about 3° apart.
4. Continue in the same direction another 8°. There you will find two stars—Beta (β) and Mu (μ) Andromedae — also about 3° apart.
5. Move 3° northwest—the same distance between the two stars—to the Andromeda galaxy.

Star hopping to the Andromeda Galaxy (M31) is a snap, since all the stars needed to do so are visible to the naked eye.

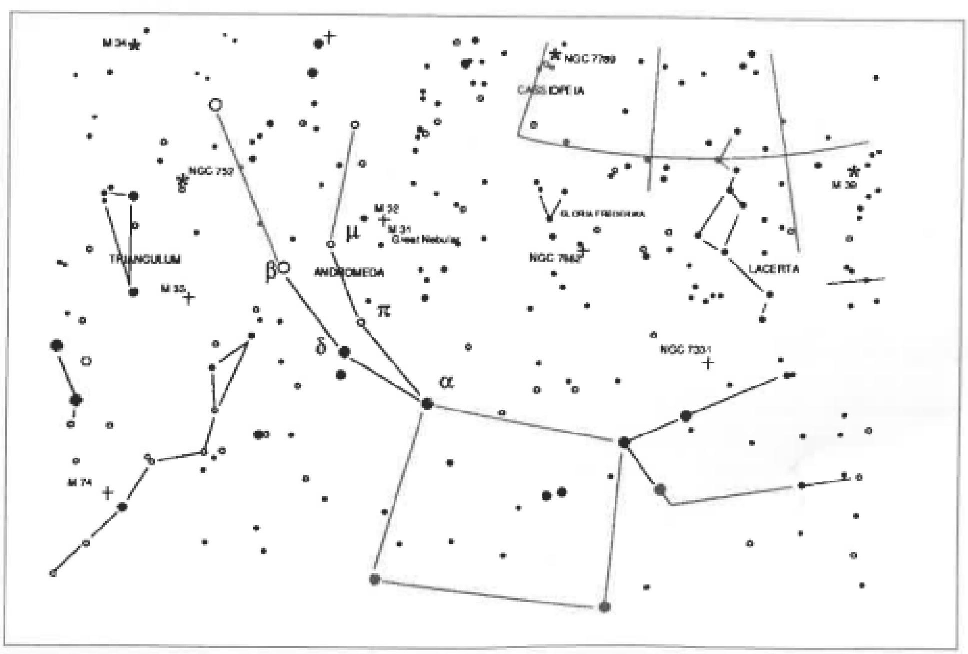


Figure 5-1

Star hopping will take some getting used to and objects that don't have stars near them that are visible to the naked eye are challenging. One such object is M57 (Figure 5-2), the famed Ring Nebula. Here's how to find it:

1. Find the constellation of Lyra, a small parallelogram visible in the summer and fall months. Lyra is easy to pick out because it contains the bright star Vega.

2. Start at the star Vega—Alpha (α) Lyrae—and move a few degrees southeast to find the parallelogram. The four stars that make up this geometric shape are all similar in brightness, making them easy to see.

3. Locate the two southernmost stars that make up the parallelogram—Beta (β) and Gamma (γ) Lyra.

4. Point about halfway between these two stars.

5. Move about ½° toward Beta (β) Lyra, while remaining on a line connecting the two stars.

6. Look through the telescope and the Ring Nebula should be in your field of view. The Ring Nebula's angular size is quite small and difficult to see.

7. Because the Ring Nebula is rather faint, you may need to use "averted vision" to see it. "Averted vision" is a technique of looking slightly away from the object you're observing. So, if you are observing the Ring Nebula, center it in your field of view and then look off toward the side. This causes light from the object viewed to fall on the black and white sensitive rods of your eyes, rather than your eyes color sensitive cones. (Remember that when observing faint objects, it's important to try to observe from a dark location, away from street and city lights. The average eye takes about 20 minutes to fully adapt to the darkness. So always use a red-filtered flashlight to preserve your dark-adapted night vision).

These two examples should give you an idea of how to star hop to deep-sky objects. To use this method on other objects, consult a star atlas, then star hop to the object of your choice using "naked eye" stars.

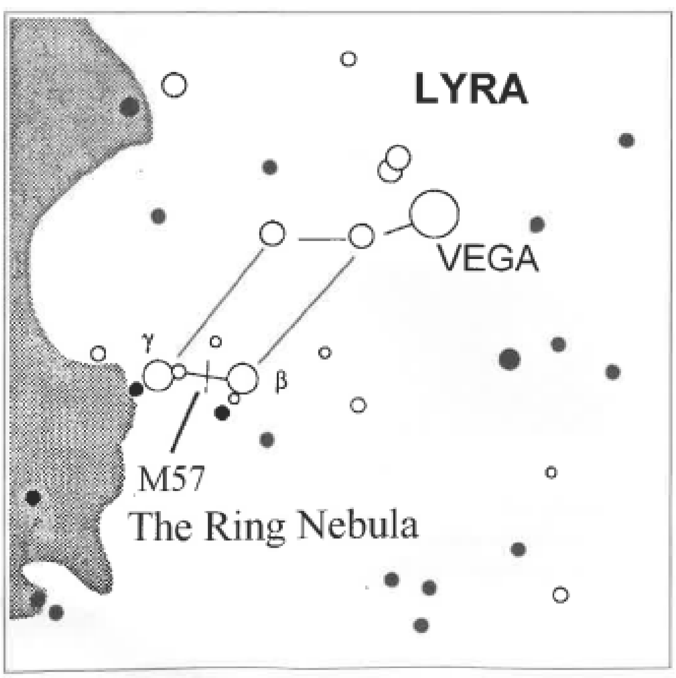


Figure 5-2

Seeing Conditions

Viewing conditions affect what you can see through your telescope during an observing session. Conditions include transparency, sky illumination, and seeing. Understanding viewing conditions and the effect they have on observing will help you get the most out of your telescope.

Transparency

Transparency is the clarity of the atmosphere which is affected by clouds, moisture, and other airborne particles. Thick cumulus clouds are completely opaque while cirrus can be thin, allowing the light from the brightest stars through. Hazy skies absorb more light than clear skies making fainter objects harder to see and reducing contrast on brighter objects. Aerosols ejected into the upper atmosphere from volcanic eruptions also affect transparency. Ideal conditions are when the night sky is inky black.

Sky Illumination

General sky brightening caused by the Moon, aurorae, natural airglow, and light pollution greatly affect transparency. While not a problem for the brighter stars and planets, bright skies reduce the contrast of extended nebulae making them difficult, if not impossible to see. To maximize your observing, limit deep sky viewing to moonless nights far from the light polluted skies found around major urban areas. LPR filters enhance deep sky viewing from light polluted areas by blocking unwanted light while transmitting light from certain deep sky objects. You can, on the other hand, observe planets and stars from light polluted areas or when the Moon is out.

Seeing

Seeing conditions refers to the stability of the atmosphere and directly affects the amount of fine detail seen in extended objects. The air in our atmosphere acts as a lens which bends and distorts incoming light rays. The amount of bending depends on air density. Varying temperature layers have different densities and, therefore, bend light differently. Light rays from the same object arrive slightly displaced creating an imperfect or smeared image. These atmospheric disturbances vary from time-to-time and place-to-place. The size of the air parcels compared to your aperture determines the "seeing" quality. Under good seeing conditions, fine detail is visible on the brighter planets like Jupiter and Mars, and stars are pinpoint images. Under poor seeing conditions, images are blurred and stars appear as blobs.

The conditions described here apply to both visual and photographic observations.

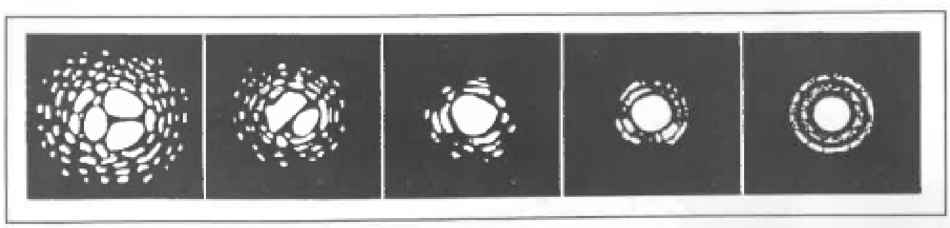


Figure 5-3

Seeing conditions directly affect image quality. These drawings represent a point source (i.e., star) under bad seeing conditions (left) to excellent conditions (right). Most often, seeing conditions produce images that lie somewhere between these two extremes.

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Telescope Maintenance

While your telescope requires little maintenance, there are a few things to remember that will ensure your telescope performs at its best.

Care and Cleaning of the Optics

Occasionally, dust and/or moisture may build up on the objective lens of your telescope. Special care should be taken when cleaning any instrument so as not to damage the optics.

If dust has built up on the optics, remove it with a brush (made of camel's hair) or a can of pressurized air. Spray at an angle to the glass surface for approximately two to four seconds. Then, use an optical cleaning solution and white tissue paper to remove any remaining debris. Apply the solution to the tissue and then apply the tissue paper to the optics. Low pressure strokes should go from the center of the lens (or mirror) to the outer portion. **Do NOT rub in circles!**

You can use a commercially made lens cleaner or mix your own. A good cleaning solution is isopropyl alcohol mixed with distilled water. The solution should be 60% isopropyl alcohol and 40% distilled water. Or, liquid dish soap diluted with water (a couple of drops per one quart of water) can be used.

Occasionally, you may experience dew build-up on the optics of your telescope during an observing session. If you want to continue observing, the dew must be removed, either with a hair dryer (on low setting) or by pointing the telescope at the ground until the dew has evaporated.

If moisture condenses on the inside of the optics, remove the accessories from the telescope. Place the telescope in a dust-free environment and point it down. This will remove the moisture from the telescope tube.

To minimize the need to clean your telescope, replace all lens covers once you have finished using it. Since the cells are NOT sealed, the covers should be placed over the openings when not in use. This will prevent contaminants from entering the optical tube.

Internal adjustments and cleaning should be done only by the Celestron repair department. If your telescope is in need of internal cleaning, please call the factory for a return authorization number and price quote.

Travel Scope Specifications	Model # 21035 Travel Scope 70	Model # 21038 Travel Scope 50
Optical Design	Refractor	Refractor
Aperture	70mm (2.8")	50mm (2.0")
Focal Length	400mm	360mm
Focal Ratio	f/5.7	f/7.2
Optical Coatings	Fully Coated	Fully Coated
Finderscope	5x24	2x20
Diagonal	Erect Image - 45° 1.25"	Erect Image .96" to 1.25" - 45°
Eyepieces	20mm 1.25" (20x)	20mm 1.25" (20x)
	10mm 1.25" (40x)	8mm 1.25" (45x)
Barlow Lens – 3x 1.25"	n/a	Yes (60x & 135x)
Apparent Field of View	20mm @ 50°	20mm @ 32°
	10mm @ 50°	8mm @ 30°
Angular Field of View	20mm @ 2.5°	20mm @ 1.6°
	10mm @ 1.3°	8mm @ 0.7°
Linear Field of View -- ft/1000yards /	20mm @ 131/44	20mm @ 84/28
m/1000meters	10mm @ 67/22	8mm @ 37/13
Near Focus w/20mm Eyepiece	19' (5.8m)	15' (4.5m)
Mount	Altazimuth (Photo Tripod)	Altazimuth (Photo Tripod)
Altitude Locking Knob	Yes	Yes
Azimuth Locking Knob	No	No
CD-ROM "The SkyX"	Yes	Yes
Highest Useful Magnification	168x	120x
Limiting Stellar Magnitude	11.7	11.1
Resolution -- Raleigh (arc seconds)	1.98	2.66
Resolution -- Dawes Limit " "	1.66	2.28
Light Gathering Power	100x	51x
Optical Tube Length	17" (43cm)	12" (30cm)
Telescope Weight	3.3# (1.5Kg)	2.2# (1.0Kg)

Note: Specifications are subject to change without notice or obligation.