

Can't See Anything

Question:

Help! I have just bought a Celestron 5 but am unable to see anything. Everything is fine in the daylight, but I can't see anything at night!

Reply:

I understand that you can get your telescope to work during the day, but can't see anything through it at night. This is a more common experience than you might think and it's likely to be quite easy to sort out. Here are some essential starting points; they may well be all you need.

Establish Focus

Focus is absolutely critical when looking at the night sky. You only need to be a little bit off for stars to appear as pale, diffuse blobs or even vanish entirely. If the focus isn't accurate, you could certainly look through the eyepiece and see what appears to be featureless, dark sky.

It can be a little tricky to focus on the stars at night without some kind of starting point. Here's how to find one. During daylight, focus the telescope sharply on a distant object: a tree, church spire, edge of a building, etc. It must be something clearly defined and far away, as close to infinity as you can get. Use a modest magnification for now. Once you've established a nice crisp focus and the object is sharp in the eyepiece, keep the focuser in the same position. If the focuser has a numeric scale, note the position where the focus is sharp. Lock it if you can or you might put a bit of tape on the focuser so that it can't shift.

At night, *making sure you haven't lost the focus setting you established earlier* and using the same low power eyepiece, point the telescope at something you can't miss when it appears in the field of view - the Moon is ideal. If your finder scope is well adjusted (see below) you could use a bright star.

Use the buttons on the hand-set to steer the scope. Discover from the handbook how to access the different speeds available. Use a fast speed (slew) to make big movements and a slow one (guide) to refine your aim. Don't bother for now about the various other functions of the hand-set.

If you've successfully retained the focus setting you achieved on your distant daylight target, your night-time target will be close to focus as well. Trust me – it will.

What else can go wrong? There are several possibilities. If you chose something bright and still can't see anything, it's likely that the telescope simply isn't pointing at it. If you chose something faint (not the best place to start) and can't see anything, it could be because you expect to see something bright in the telescope when, in fact, it is truly difficult to see. If, since setting the focus, you've somehow jogged it, the stars may have bloated into pale discs and, again, be difficult to detect - and it's back to square one.

You might also find it takes a bit of practice getting your eye in the right place to look through the eyepiece. Eyepieces with short 'eye-relief' (the distance you have to place your eye from the eye lens) can be somewhat awkward to use, especially if you wear glasses; easier to use, long eye-relief options are readily available.

Once you have the target in your telescope's field of view, you might decide to tweak the focus a little bit to refine the sharpness further; incidentally, you'll probably find that you need to do this whenever you change eyepieces. But move in tiny steps so as not to risk losing focus again.

Adjust your Finder

Make sure that your small finder scope or red-dot finder is accurately aligned with the main telescope. You can then use it to aim the scope. Your Celestron has a fairly narrow field of view on account of its design, so you'll find this easier to do using a low power eyepiece in the main scope. It shouldn't be too difficult to catch the Moon in the eyepiece because it is big and bright, but catching a specific star by just scanning around could take half the night. Having your finder scope accurately aligned makes life a lot easier.

Again, carry out the adjustment in daylight, using a distant object and a low power eyepiece to start with. You need to adjust the finder until the object centred in it is also exactly central in the main telescope. You can refine the centring by moving up to a higher power eyepiece and tweaking the finder scope adjustments a little bit if required. Once you've made the adjustment, it's a simple matter to aim with the finder and the target will be in or close to the field of view of your telescope.

When you're searching for something in the night sky, it's a lot easier to start with the wider field typically associated with a lower power eyepiece (an eyepiece of relatively long focal length) - a 20mm focal length

eyepiece, say, rather than a 10mm one. A narrow field greatly reduces your chances of finding what you're looking for. Only increase the magnification once you have your target nicely centred in a low power eyepiece and, again, do so progressively, making gradual shifts in focus until you have the sharpest possible image.

The same principle applies to steering adjustments. When you're close to an object that you want to observe, use the guide setting on the handset to produce gradual, delicate movements. If you use a fast slewing speed, there's a good chance that you'll lose sight of your target and have to start again.

Other Considerations

Observing the night sky through any kind of telescope is very different from terrestrial viewing and takes some practice. You also need to set aside expectations raised by spectacular, published images - including those that may adorn the box in which the telescope arrived! Observing solar system and deep sky objects directly through an astronomical telescope has a magic all its own, but, for reasons beyond the scope of this answer, the view, even in a big telescope, usually won't look anything like as dramatic as the pictures. With few exceptions, galaxies and nebulae appear faint and elusive in most amateur telescopes, especially under less than dark skies.

In urban and suburban areas, light pollution brightens the sky back-ground and makes it difficult or impossible to detect faint objects that theoretically would fall within the grasp of your telescope. Many of the objects listed in your scope's database will be affected, so use a sky guide to identify some of the brighter ones and start with these. Some useful guides are listed in my *Starting Astronomy* answer in the Ask an Astronomer archive on the GAS website. If possible, take your scope to darker skies!

You'll see more once your eyes become dark adapted. Keep away from nearby lights. Don't expect to see faint objects in the eyepiece if you've just come from a brightly lit room or looked into car headlights. Try not to interrupt the process of dark adaptation by flashing torches about or staring at screens. Red light is much less of a problem, so amateur astronomers generally use red torches; most planetarium programs and astronomy apps have a red light mode. If it's difficult to escape intrusive street-lights, bright windows, etc, try covering your head and the eyepiece with a dark cloth, as old-time photographers used to do. While this may look a little strange, it helps.

Do let me know how you get on and whether or not this solves your problem.

I hope this helps.

John Evans FRAS
GAS Ask an Astronomer