

STAR HOPPING - HOW DO YOU STAR HOP?

What is star hopping? What does that mean? It is a convenient way to orient yourself in the sky. You look for a pattern of stars you recognise and then extend the pattern to the area you are looking for. Today we live in an age of GO-TO telescopes.

With only a push of a button your telescope takes you anywhere to the far reaches of deep space in just a few seconds. But despite all of this easily available technology, many amateur astronomers do their observing without it, and some say that here resides the true joy of observing.

But how is it possible to find a dim galaxy or nebula lost among all those thousands of stars?

Star hopping is the answer.

Star hopping is often used when one intends to find a celestial object spreading a dim light, invisible with the naked eye. It consists of successive leaps from a star that is visible either with the naked eye or with a finder-scope, to another star and so forth until the aimed target is reached.

Before you go under the stars with a telescope, make sure you know some prominent bright stars and constellations. You will use them as a stepping-off point to help you find those constellations and stars that you don't know yet.

Astronomers use star hopping to go from stars and constellations they know ... to ones they don't know yet. First, look for noticeable patterns on the sky's dome. For instance one very easy pattern to find at this time of year is the constellation **Orion, the Hunter**. This time of the year you'll find it descending in the west after sunset. If you can find Orion, you can use it to star-hop to Sirius, the sky's brightest star, in the constellation Canis Major. This will guide you to the Ecliptic and the constellations of the Zodiac, when everything in the sky will fall into place. Note that Orion and Sirius are dropping into the Sun's glare at this time of year, so be sure to look for them soon after the Sun goes down.

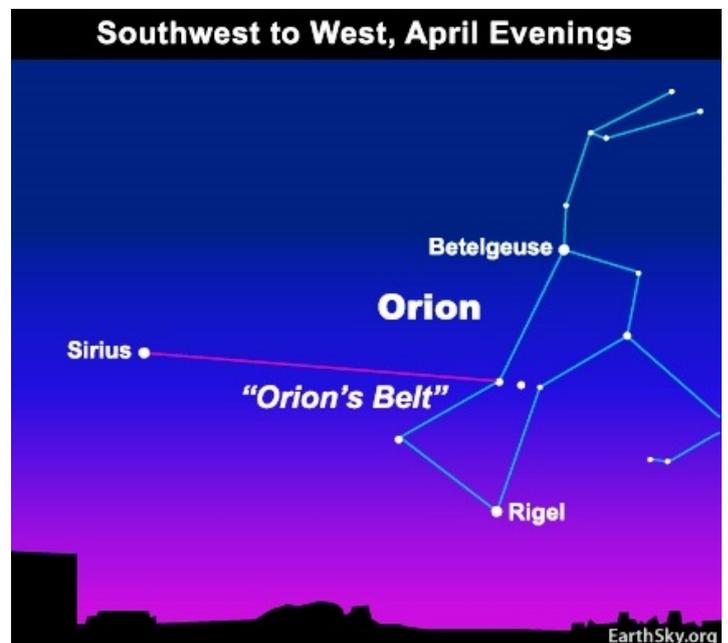
Many celestial objects of interest are too faint to be visible to the unaided eye. Telescopes or binoculars collect much more light, making faint objects visible, but have a smaller field of view, thus complicating orientation on the sky.

The field of view of binoculars is rarely more than eight degrees, while that of typical amateur telescopes may be substantially less than one degree, depending on the magnification used. Many objects are best observed using higher magnifications, which inevitably go along with narrow fields of view.

Using a telescope equipped with a properly aligned equatorial mount, the observer may also follow the equatorial coordinate system on a star map to "hop" or "slide" along the lines of right ascension or declination from a well known object to find a target. This can be assisted using setting circles. Once an instrument is centred on the target object, higher magnifications may be used for observation

Star hopping uses bright stars as a guide to finding fainter objects. A knowledge of the relative positions of bright stars and target objects is essential. After planning the star hop with the aid of a star chart, the observer first locates one or more bright stars in a finderscope, reflex sight, or, at a low magnification, with the instrument to be used for observation. The instrument is then moved by one or more increments, possibly using a reticle to identify specific angular distances, to follow identified patterns of stars in the sky, until the target object is reached.

The more difficult part is to memorize the shape of the pattern formed by the group of stars, in some cases you may need to return to the group after having passed by it. Confusions may occur in case you mistake a group for another, only to finally find yourself a few degrees away from the targeted object. The solution is to associate a familiar shape to a group of stars (line, triangle, circle or square), thus you will succeed in memorizing them more easily.



Orion is easy to find because it contains a very noticeable pattern of three medium-bright stars in a short straight row. These stars represent Orion's Belt.

A simple example of star hopping would be trying to find Messier 13, a globular cluster in the constellation Hercules, which is too faint to be seen by the unaided eye under most conditions. As shown on the map, M13 lies on a line connecting the stars η Eta and ζ Zeta Herculis. Using star hopping techniques an observer would first identify these two by the naked eye and then point an instrument (binocular or telescope) two thirds of the way up from ζ , one third down from η to site M13. An observer using a telescope equipped with an equatorial mount would pan down from η in declination to site M13.

TYPICAL EQUIPMENT

The equipment you need is pretty basic: a star atlas and a decent finder-scope attached to your telescope. The atlas of choice for beginners is Sky Atlas 2000, it indicates stars up to magnitude 8.5 and about 2500 deep sky objects. The scale of the maps is about 8-mm per degree. Knowing the scale will prove useful a little later when we determine the visual field of the eyepieces.

I recommend having every page of your atlas wrapped in a protective plastic sheet. Thus you will be able to draw lines joining the stars in a constellation, which will help you get orientated more easily. Besides, your atlas will be safe from moisture.

DETERMINING VISUAL FIELDS

Once you have the atlas, the next step is to determine the visual field of the eyepiece you are using. In order to determine the power given by the eyepiece, you should divide the focal length of the instrument by that of the eyepiece. If for example we have an eyepiece with an apparent field of 50 degrees, which assembled to the telescope gives a power of 30x, then the visual field of the eyepiece will be equal to the apparent field divided by the magnifying power of the eyepiece, that is $50/30$, which is about 1.7 degrees.

M92, A GOOD STAR HOPPING EXERCISE

M92 is a beautiful globular cluster in Hercules. It is an easy target even for small telescopes, and on clear nights it can be spotted with binoculars. For this star hopping example let's say that your finder-scope's field is five degrees and the eyepiece field is one degree. Then the large circle represents the field of the finder-scope and the small circle is the field of the eyepiece. First locate the bright star Pi Herculis, shining at 3rd magnitude. Centre it in the field of your finder-scope and sweep one more field towards Iota Herculis. At the edge of that field look for four stars arranged in a line, and centre them in your eyepiece. Move one degree in the direction of Iota Herculis and M92 will be right in the center of your eyepiece. AK, with Wikipedia Notes

