

# NATURE DETECTIVES



## Star Light, Star Bright, Let's Find Some Stars Tonight!

Finding specific stars in the night sky might seem overwhelming. All those stars! At a glance stars look like a million twinkling points of light that are impossible to sort out. But with a little information, you may discover hunting **some** stars is not so difficult.

Turns out we don't see a million stars. Less than a couple thousand – and usually many fewer than that – are visible to most people's unaided eyes. The brightest and nearest stars are easily found without a telescope or binoculars.

### Stars Are Not Star-shaped

Stars are big balls of gas that give off heat and light. Sound familiar? Isn't that what our Sun does? Guess what, our Sun is a star. It seems confusing, but all stars are suns. Like our Sun, stars are also in the daytime sky. During the day, the Sun lights up the atmosphere so we can't see other suns... er... stars.

Our Sun isn't even the brightest star. In fact all the stars we see at night are bigger and brighter than the Sun. It wins the brightness contest during the day simply because it is incredibly closer than all the other stars. (At night we don't see the Sun because of Earth's rotation. Our Sun is shining on the opposite side of Earth and we are in darkness.)

### Suns or Stars Appear to Rise and Set

Our view of the stars changes through the night as Earth makes its daily rotation. Like the Sun, stars rise in the eastern sky and set in the west, day and night. The stars appear to rotate around Earth because Earth is rotating, making a complete turn approximately every 24 hours.



Pull Out and Save

## People Invented Constellations

Prehistoric humans saw lots of stars that our eyes cannot see in modern times. With no glare from electric lights reflecting on their atmosphere, dimmer stars were visible in the inky dark. Tall buildings never blocked their sky view. Lacking computers and TVs, the night sky was their fascination.

Ancient people imagined stars connected like dot-to-dot drawings. The dot-to-dot patterns formed animals, people and objects whose stories were dramatized in the dark sky. The tales explained the stars' existence and helped people remember patterns among the myriad of stars. In each culture, elders taught children the traditional star tales. Eventually many of the ancient star patterns came to be called constellations.

### Constellations are the Guideposts to the Night Sky

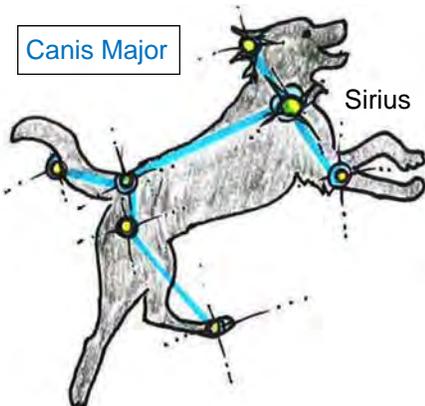
Early observers noticed that certain stars circled the sky nightly and other stars were visible only part of the year. For instance, prehistoric farmers planted their crops when they saw spring constellations overhead.

Constellations chart the location of individual stars and map directions. Long ago travelers relied on stars to guide them. Today astronauts still check star positions to make sure their modern navigational equipment is working.

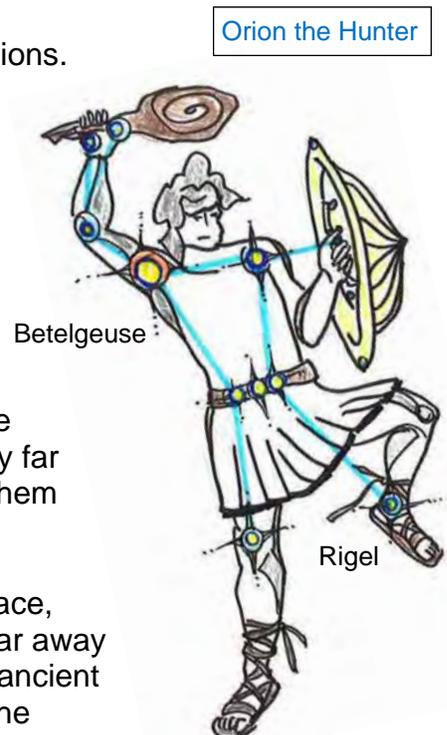
Scientists who study the sky have defined 88 official constellations. Many of the 88 were named thousands of years ago and some are modern inventions. Stargazers worldwide recognize the same constellations, the same sky map. Each night where we live, only a couple dozen of the 88 are visible. Over the whole year – as Earth rotates around the Sun – we see a total of about 60 official constellations in Boulder County.

### Appearances are Deceiving

Stars appear crowded close together but the real distances are vast. Neighbor stars in the night sky can be spread enormously far apart. They look near each other because of the way we see them along our line of sight.



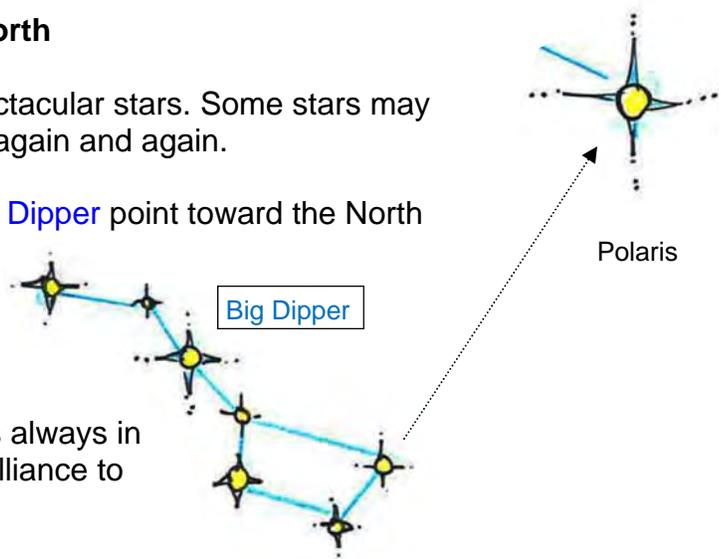
Stars are speeding through space, but they are so inconceivably far away that constellations that guided ancient Greeks or Egyptians still look the same. Over the course of human existence, the stars appear in place within their constellations.



## Dip into a Favorite Star Shape to Find North

Star patterns can help point the way to spectacular stars. Some stars may become like old friends you'll enjoy seeing again and again.

Every night, two stars in the bowl of the **Big Dipper** point toward the North Star. To find north, first locate the Big Dipper. Imagine a line between the two "pointer" stars on the far side of the dipper's bowl. Imagine continuing that line five times its length to find **Polaris, the North Star**. It's not the brightest star, but it's always in place above the North Pole with enough brilliance to make it a reliable guide.



## Get Your Directions Straight

As you face Polaris, look right. That's east. Look left, that's west. Now turn around and look for the three-star belt of the famous hunter **Orion**. He hunts across our southern sky in winter.

## Find Bright Stars in Three Constellations

Below the three stars in Orion's belt is the very bright star, **Rigel**. It marks Orion's right foot and is our fifth brightest star. Look above Orion's belt to find the reddish star **Betelgeuse** in Orion's left shoulder. Betelgeuse is our seventh brightest star.

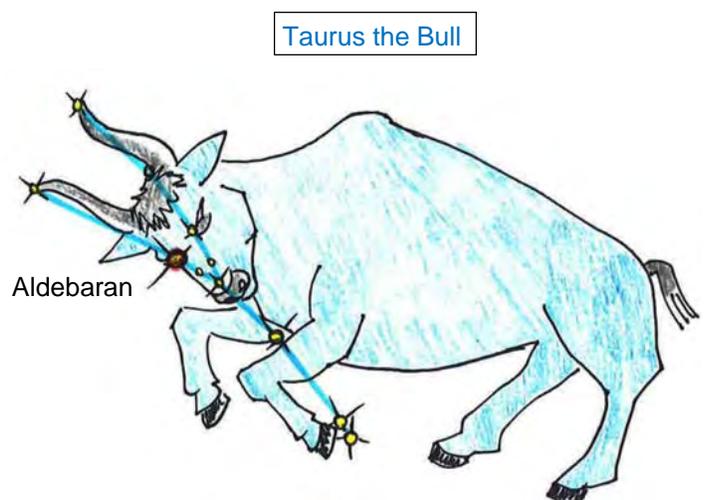
Following behind Orion is his faithful hunting dog, **Canis Major**. In the dog's neck is **Sirius**, the brightest star in the whole night sky. To find Sirius, continue the imaginary line of Orion's belt leftward until you come to the brightest star you see. Sirius is also known as The Dog Star.

Orion is hunting **Taurus the Bull**. Taurus is in front of Orion. Go back to Orion and extend his beltline to the right. Your imaginary line will lead to the ninth brightest star in our sky, **Aldebaran**. See if you can spot it's faint reddish glow, perfect for the eye of a wild bull.

## Winter Nights Bring Early Evening Star Hunting

Stargazing is best on a cloudless night when the moon is not visible or is just a sliver.

In rural areas, you will see more stars, but even in smoggy cities you can see hundreds of stars on a clear, dark night.



## Where Does Orion Go?

Orion is one of the most popular constellations, yet at times people can't find him in the night sky. What's that all about?



To find out, stand in a room with a central table and a ceiling light overhead. Pretend you are the Earth and the table is the Sun. Walk around the table and look up. No matter where you are around the table, you will see the light above you. Imagine the light is Polaris, our North Star. It just happens to be above the North Pole, and when you look to the north, you can find the Big Dipper. Now spin around as you circle the table. The room looks like it's spinning but it's really you. Just like the room, the Big Dipper and other northern constellations appear to circle slowly around the North Star.



Stand in the same place where you started, but face away from the table. (Remember you only see the stars at night, so the Earth has to be facing away from the Sun.) Look at the bottom of the wall in front of you. This is like looking toward the south from Earth. If there were stars on that wall, and if it's winter, that's where you'd find Orion. Move around to face the

opposite wall on the other side of the table, just like the Earth moves halfway around the Sun in half a year. You are now facing the pretend summer stars, and you'd see the constellation Scorpius in the southern sky. Orion is not there.

If you lived in the southern hemisphere, do you think you'd see the North Star? Would you see different constellations?

## Why Do Big Stars Look so Small?



Most of the stars in the sky are much bigger than our Sun but they look like tiny dots. The Sun is 93 million miles away from us, and that is close compared to the distance of the stars outside our Solar System. Here's an experiment you can try.

Get two flashlights – one can be bigger (or brighter) than the other. Go outside to your backyard after dark. Place the larger flashlight as far across the yard as you can. Turn it on and point it towards the other side of the yard. Walk back across the yard along the beam of light.



Now turn on the smaller flashlight and shine it close to your face.

Like the Sun shining on us during the day, it glows bright!

Now turn it off and look across the yard at the

light from large flashlight.

Does it seem as bright? How big does it look?

Imagine if that flashlight were billions of miles away!

