Stars



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Starstruck

Have you ever looked up at the night sky and been amazed by the scattered twinkling lights? You are not alone! People have been captivated by the stars for thousands of years. Some were so starstruck that they studied their every move.

Early stargazers learned the stars could provide useful information. Ancient Egyptians planned their lives around Sirius, the Dog Star. Egyptian farmers knew they could plant crops in the moist soil after Sirius rose in the sky. The ancient Phoenicians (fi-NEE-shuhnz) navigated the seas using the night sky. They learned the annual patterns of the stars. At certain times of the year, the sun and the stars would be at fixed distances from the horizon. They used their fingers to measure the stars' positions. The Greeks named the stars after gods, heroes, and animals from their stories. The Chinese from the Han Dynasty grouped the **constellations** by the four directions—East (Dragon), West (Tiger), North (Tortoise), and South (Scarlet Bird). The Native American Tewa tribe named the Milky Way the "Endless Trail." They saw the constellation Orion as Long Sash, a hero who led his people away from their troubles on the Endless Trail.

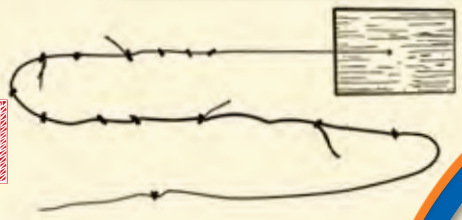
Astronomy is the study of things in space. Many people get astronomy confused with astrology. Astronomy is based in science, while astrology is not.



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Navigation

Ancient and modern navigators have used stars and fascinating tools to guide their travels at night. The kamal is an early device that measures **latitude**. The astrolabe (AS-truh-leyb) is used to locate and predict positions of the sun, moon, planets, and stars. The sextant is one-sixth of a circle and measures the angle between an object in the sky and the horizon.



kamal



astrolabe



sextant

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Modern day **astronomers** use powerful telescopes to see stars. They also use **satellites**. Computers and other instruments help scientists learn what stars are made of, how far away they are, and much more.

Astronomers have learned there are different kinds of stars. Some are hundreds of times larger than our sun, while others are much smaller. Stars come in a range of colors: blue, red, orange, yellow, and white. Their temperatures and distances from Earth range widely as well. Some stars are closer to Earth than others. The sun is our closest star.



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By studying the sun, astronomers have learned many things about stars. The sun is about 150 million kilometers (93 million miles) away. Flying in a jet plane, it would take you 17 years to get to the sun! The next closest star is Proxima Centauri, at a whopping 40 trillion km (25 trillion mi.) away. Many other stars are even farther away than Proxima Centauri. Despite their vast distance from us, those twinkling stars continue to fascinate us.



Stars are old! Most stars are between 1 and 10 billion years old.

Step Back in Time

Proxima Centauri is four light years away from Earth. This means that the light we see from it is four years old. Other stars are billions of light years away. Light left the stars billions of years ago, and it is just reaching us. Some of these stars may have already burned out. Looking at stars is like looking back in time.

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Science of Stars

Over the years, astronomers have been challenged to learn more about stars. Since stars are light years away, this is a difficult task. Research shows that stars are huge balls of burning hot gases. The main chemical elements that make up stars are hydrogen and helium. These elements form clouds and collapse into stars due to **gravity**. Astronomers are still learning about stars and are trying to figure out ways to organize their information.

Classifying Stars

In order for people to understand and learn more about stars, astronomers define and classify them. They group stars by their size and by their temperature. Stars that are the size of the sun or smaller are called **dwarfs**. Stars that are 10 times the size of the sun are called *giants*. **Supergiants** are hundreds of times larger than the sun.

To your eye alone, stars may look completely white. But when seen through a telescope, we can see that stars come in many colors. The color is related to a star's temperature. The hottest stars appear blue, and the coolest are red. There are also white, yellow, and orange stars.



Always Shining

Stars are out all the time. We just can't see them during the day because the sun's light blocks them from view. Look at a star chart, a smartphone app, or the Internet to find out which stars we could see if we could turn off the sun's light.

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Twins!

Sometimes, one star turns out to be two stars. The stars orbit each other and are called *binary stars*. Often, one star is much larger or brighter than the other. Astronomers can find the second star by observing its "wobble." As the stars orbit each other, each star's gravity pulls on the other, causing it to wobble back and forth. Astronomers also look to see if a star drifts from time to time as another star passes in front of it.



Supergiant stars have a shorter lifespan than other stars, around 10–50 million years. The larger a star is, the shorter its life will be.

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Think Like a Scientist

How do scientists compare light from different stars? Experiment and find out!

What to Get

- box (cube-shaped is best)
- cardboard tube
- CD
- duct tape
- paper
- thin cardboard
- transparent, milky plastic film such as tape or a white grocery bag

