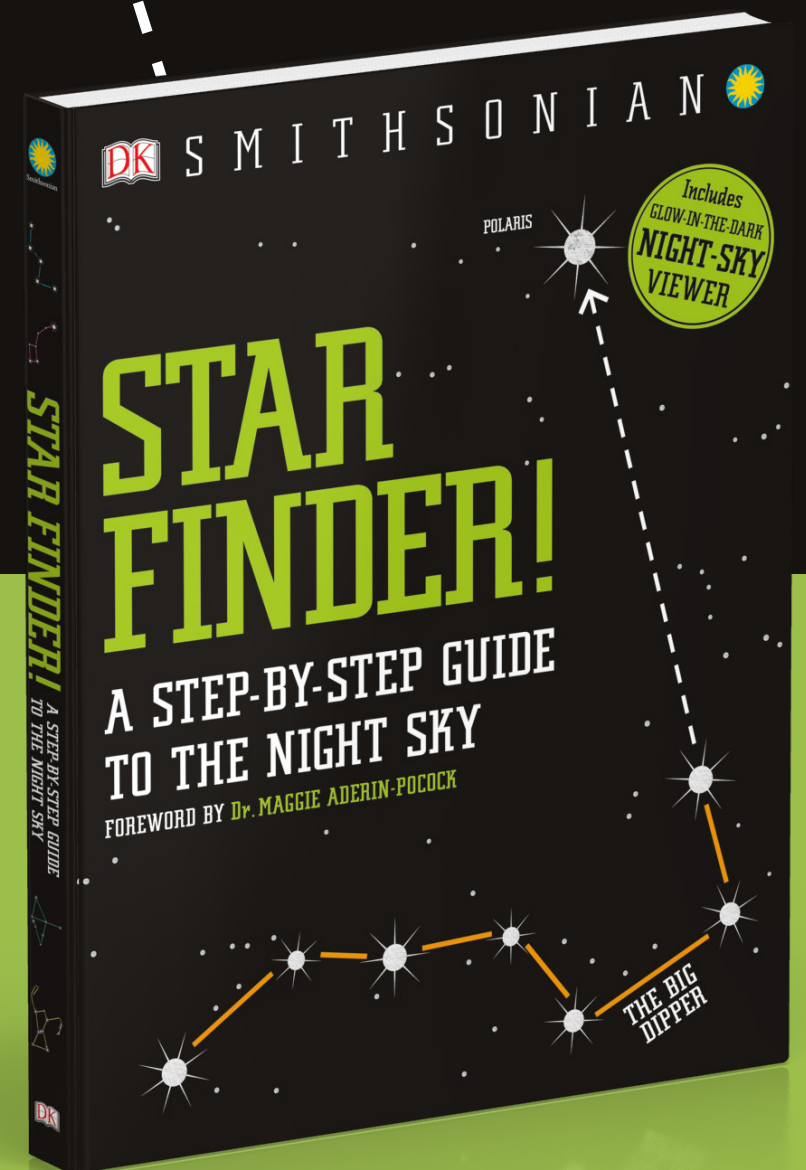




STAR FINDER!

NIGHTTIME DISCOVERY
STARTER PACK



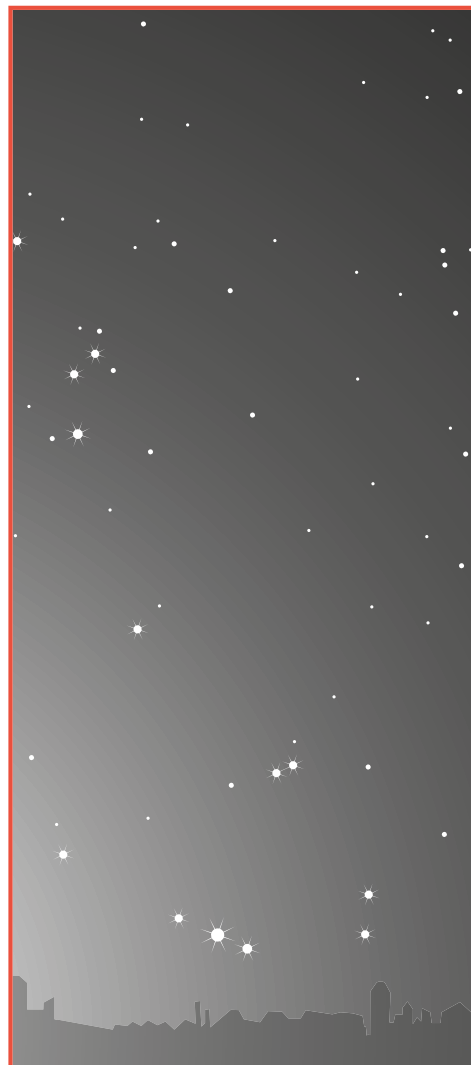


STARGAZING TIPS ADVICE FOR STARGAZERS

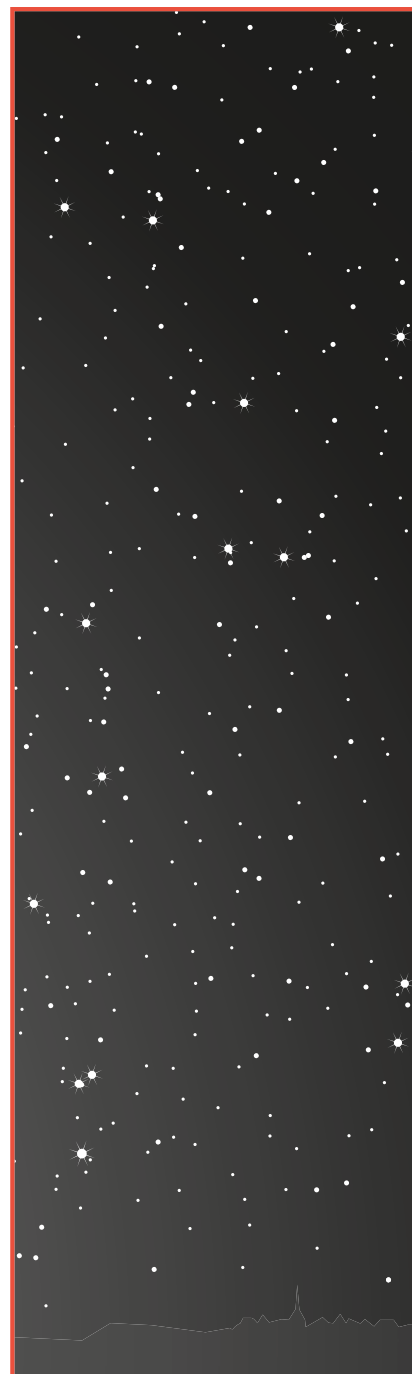
The best time to stargaze is on a **clear, dark night**. Your location will affect how many stars you can see. An open space, like a field, lets you **view more of the sky**. Places with bright lights can make it difficult to find some stars. The less light there is at your location, the more stars you will be able to see.



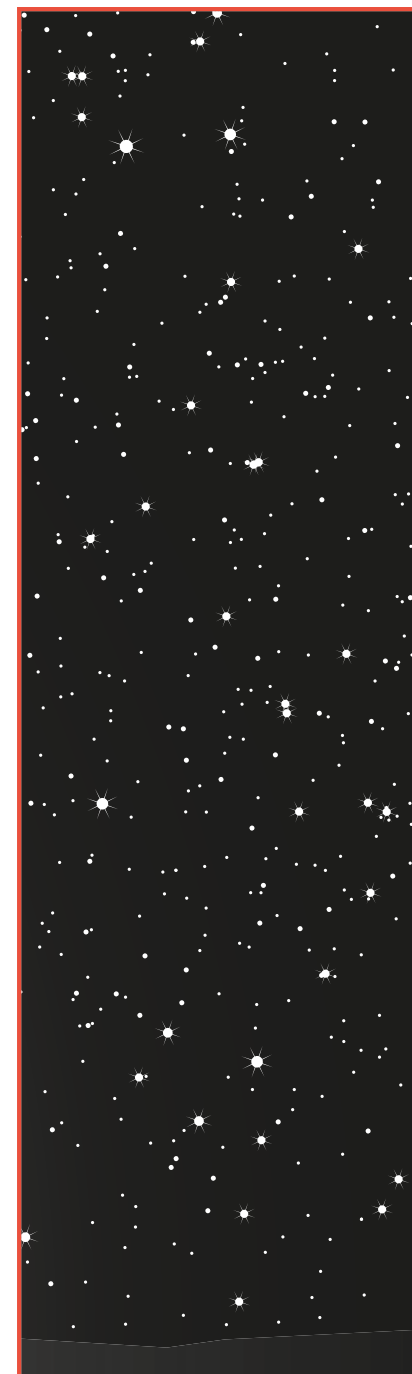
1 The bright lights of cities give the sky a hazy glow called light pollution. In a city sky you will only see the brightest stars, but by looking carefully you can find some familiar asterisms.



2 Suburban towns have less light pollution than cities, so you will be able to see a few more stars and can start picking out the constellations.



3 Rural areas have very little light pollution and are good spots for stargazing. You will be able to see lots of stars and many of the constellation.



4 Dark-sky locations are far from any light and are the best places to stargaze. You will be able to see constellations, thousands of stars, and the band of our galaxy, the Milky Way.

STARGAZING TIPS



Light pollution

Get as far away from artificial light as possible and try to find an open space to get a larger view of the sky.



Lunar phases

Find out the phase of the Moon—a full moon gives off so much light that it will be hard to see the stars.



Weather

Check the weather because thick clouds will block your view of the stars. The air cools down quickly at night, so dress in warm layers to stay comfortable while stargazing.



Adjust to the dark

It can take at least 10 minutes for your eyes to adjust to the darkness, so be patient. Use a red light to see your star charts, because red light does not disturb your vision like white light does.



Seeing farther

The naked eye can identify patterns in the stars, but a pair of binoculars or a telescope will enhance the detail of the night sky and allow you to find amazing sights such as double stars, galaxies, and nebulae.





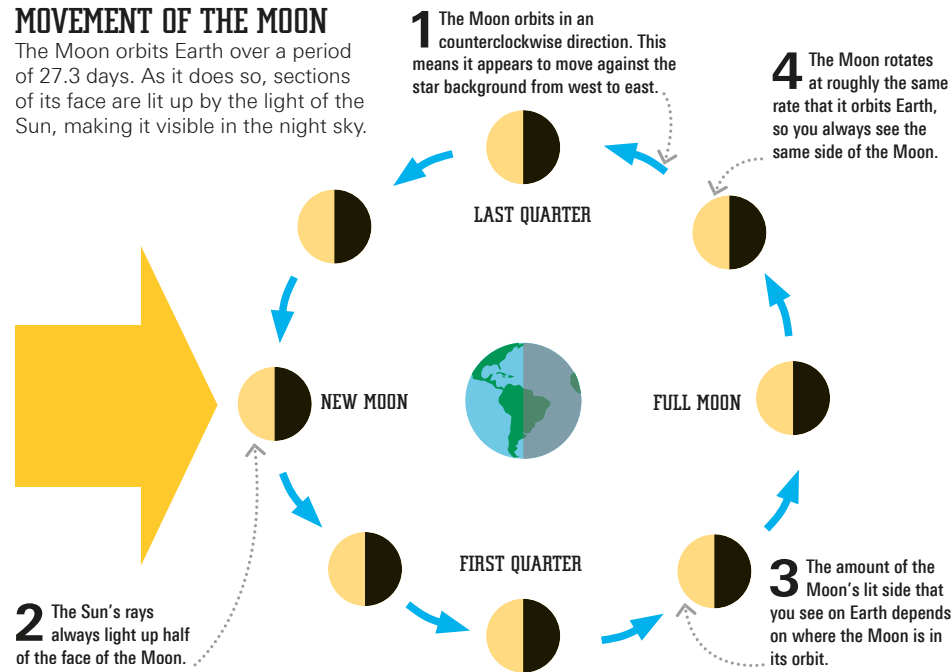
THE MOON

LUNAR PHASES AND SOLAR ECLIPSES

The Moon is the **largest object in the night sky**. While it appears to be bright, the Moon emits no light. Instead, it **reflects the light of the Sun**.

MOVEMENT OF THE MOON

The Moon orbits Earth over a period of 27.3 days. As it does so, sections of its face are lit up by the light of the Sun, making it visible in the night sky.



PHASES OF THE MOON

As it orbits Earth, the shape of the Moon appears to change. These different shapes, called lunar phases, occur because each day the Moon is in a different position relative to the Sun. The full cycle takes 29.5 days.

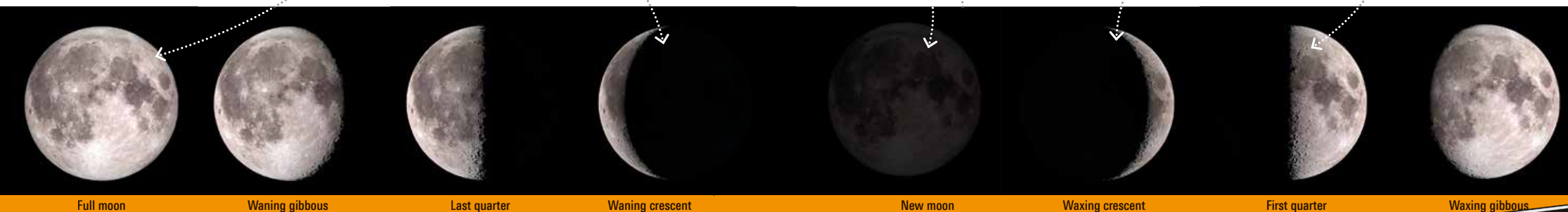
1 When the Moon is on the opposite side of Earth from the Sun, its face is fully lit.

2 The Moon is said to be "waning" when it appears to be shrinking.

3 When the Moon lies between Earth and the Sun, the side that faces Earth is not lit by the Sun and the Moon cannot be seen.

4 The Moon is said to be "waxing" when it appears to be growing.

5 Only half of the Moon is visible when it lies at a right angle to the Sun.



Full moon

Waning gibbous

Last quarter

Waning crescent

New moon

Waxing crescent

First quarter

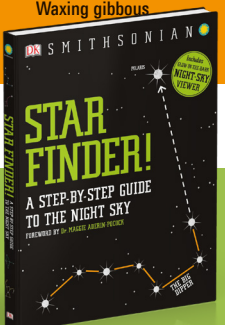
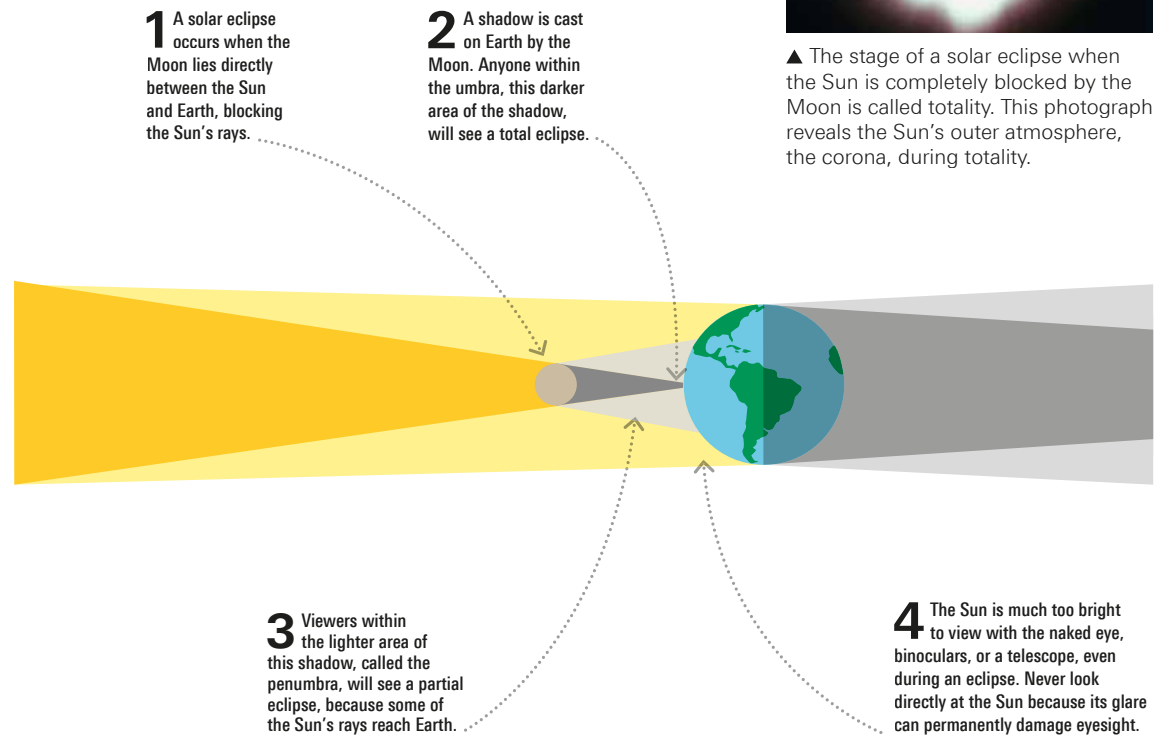
Waxing gibbous

SOLAR ECLIPSE

A solar eclipse occurs when the Sun, the Moon, and Earth are directly aligned so that the Moon blocks sunlight from reaching Earth. A shadow is cast on Earth by the Moon, plunging that part of Earth into darkness for several minutes.



▲ The stage of a solar eclipse when the Sun is completely blocked by the Moon is called **totality**. This photograph reveals the Sun's outer atmosphere, the **corona**, during totality.





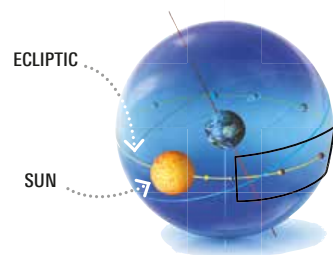
PLANET SPOTTING

NIGHT SKY WANDERERS

Ancient astronomers noticed several bright **starlike lights** that moved gradually through the sky against the background of stars. They named these lights “**planets**,” meaning “**wanderers**.” All of the planets in our Solar System travel along roughly the **same path**, which runs through the **twelve constellations of the zodiac**. Most of the planets can be seen with the naked eye.

WHERE TO FIND THE PLANETS

- 1 This imaginary line, called the ecliptic, roughly traces the path of the Sun and the planets through our sky. The planets, including Earth, all orbit the Sun on much the same plane, so they all cross our sky along the same path.
- 2 The ecliptic runs through the constellations of the zodiac—Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius, and Pisces. So, the planets will always be found moving through one of these constellations.
- 3 If you see something that looks like a very bright star along this line that doesn't belong in a constellation, you are probably looking at a planet.
- 4 There are many helpful websites and cell phone apps that list when planets will be crossing our skies and which constellation they will be moving through.



▲ The ecliptic, the yellow line in this image, traces the path of the Sun and the planets in our Solar System through our sky.

NAKED-EYE PLANETS

Because of their distance from Earth, we cannot see all of the planets in the Solar System with the naked eye, but we are able to spot Mercury, Venus, Mars, Jupiter, and Saturn (shown right, not to scale). The two most distant planets in the Solar System, Uranus and Neptune, can be seen with a telescope.



Mercury
Mercury is very difficult to see because it is always low in the sky and close to the Sun. It is best observed just before sunset or just after sunrise.



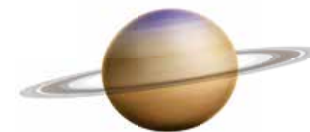
Venus
Venus is an easy planet to spot. Known as the brilliant evening or morning “star,” it is the brightest object in the night sky after the Moon. The best time to look for Venus is just before sunset or just after sunrise.



Mars
For much of the time, Mars appears like a reddish star. Every two years and two months, however, there is a two-month window where it is the second-brightest planet in the sky, after Venus.



Jupiter
Jupiter appears brighter than the brightest star in our night sky, Sirius. Using a pair of binoculars, you can even see four of Jupiter's moons, which look like faint stars on either side of it.



Saturn
Saturn looks like a creamy-colored star and moves very slowly through the sky. Through a telescope, you will be able to see its rings.

