EXPERIMENT MANUAL

TK1 TELESCOPE & ASTRONOMY KIT

REFRACTOR 60/700

THAMES & KOSMOS

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A Word to Parents!

Dear Parents,

With this telescope, your child will be able to explore the stars in the night sky, or study natural objects all around us right here on Earth with the help of the image reversal lens. To be sure that this optical instrument is handled correctly, it is essential to pay careful attention to the instructions and tips provided in this manual. Please stand by your child's side when he or she is learning the relevant skills, and be ready to offer help when it is needed. In particular, please note the adjacent safety information and discuss these points with your child.

To view the night sky, your child may sometimes need to work at a time or in a place requiring you to accompany him or her or at least to help plan evening outings.

Safety Information

WARNING! Never look directly into the sun — whether with your naked eye, or with the telescope or its viewfinder! You could blind yourself!

Never inadvertently leave the telescope and its viewfinder in the sun — it could start a fire!

Keep the packaging and instructions as they contain important information.

When observing the stars outside, appropriate tools and equipment are advisable (depending on the weather and season, this could mean warm clothing, a Thermos with some hot cocoa, a red-light flashlight (see page 16), this instruction manual, and maybe a separately-purchased star wheel or star map app). Please help your child with these things.

We wish you and your child lots of fun with the telescope!

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››› KIT CONTENTS

What's inside your experiment kit:

Checklist: Find – Inspect – Check off

✔	No.	Description	Count
❍	1	Aluminum stand with telescope cradle	1
❍	2	Shelf for accessories	1
❍	3	Telescope tube with dew shield and pitch arm for height adjustment	1
❍	4	Viewfinder	1
❍	5	Star diagonal (mirror diagonal)	1
❍	6	Eyepiece (10 mm)	1
❍	7	Eyepiece (20 mm)	1
❍	8	Barlow lens	1
❍	9	Image reversal lens (erecting lens)	1
❍	10	Star-knob tighteners for securing the telescope in the cradle	2
❍	11	Attachment screws for securing the legs of the stand	3
❍	12	Moon filter	1

TIP!

Any parts that are not included with the kit are indicated in *italic letters* in the "You will need" sections.

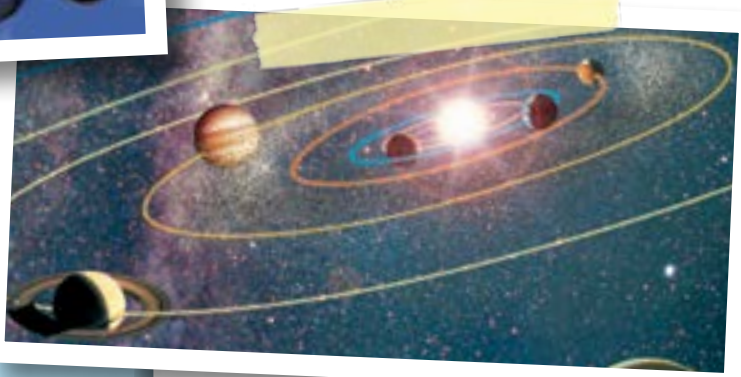
You will also need:

Homemade red-light flashlight

Possibly: warm clothing for outside

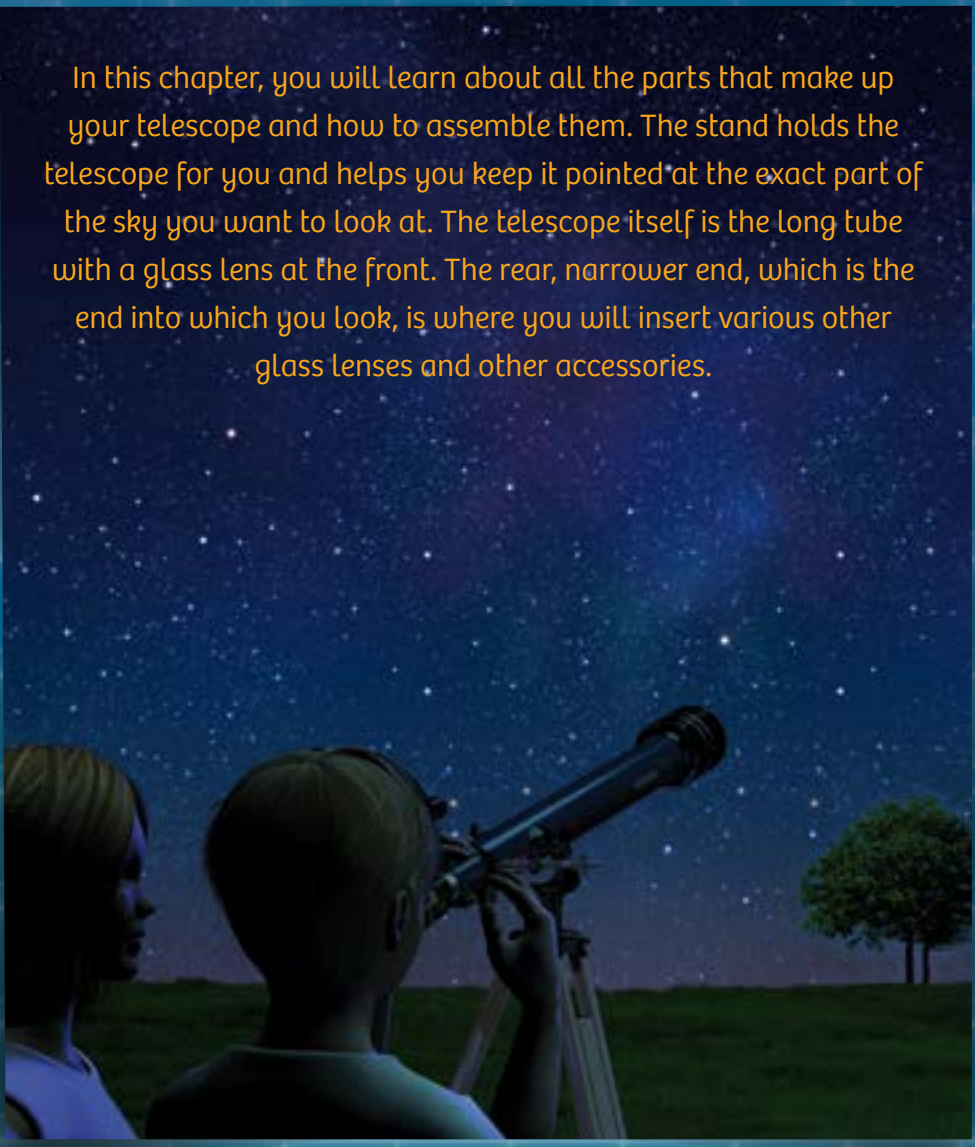
Optional: rotating star map (planisphere), star finder app

››› CONTENTS



Assembling Your Telescope

In this chapter, you will learn about all the parts that make up your telescope and how to assemble them. The stand holds the telescope for you and helps you keep it pointed at the exact part of the sky you want to look at. The telescope itself is the long tube with a glass lens at the front. The rear, narrower end, which is the end into which you look, is where you will insert various other glass lenses and other accessories.



Assembling the telescope

YOU WILL NEED

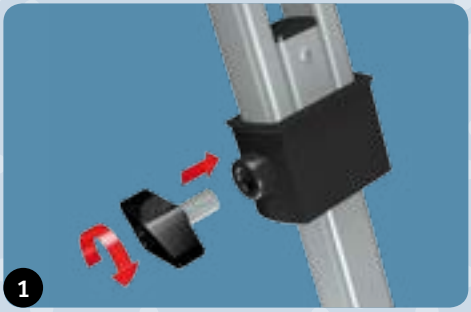
- Stand
- Three attachment screws
- Shelf with three wingnuts
- Telescope
- Two star-knob tighteners
- Eyepiece

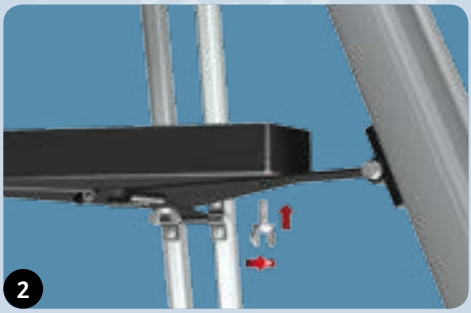
HERE'S HOW:

1. Extend the three legs of the stand to their full length. Insert the three attachment screws into the threads in the center of the legs. The legs should not collapse when you set up the stand with its legs spread apart.

2. Screw the shelf to the stand's attachment bars with its rimmed side oriented upward. To do that, first unscrew the three wingnuts from the shelf and then screw them back in through the holes in the stand's attachment bars. Keep screwing until the shelf stops jiggling.

3. Insert the shiny height adjustment rod, which is mounted on the side of the telescope, into the opening in the telescope cradle.



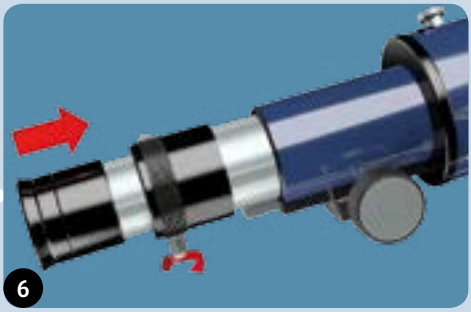


NOTE! This applies to both assembly and subsequent use of the telescope: Tighten all the screws carefully and only by hand (not using tools!). Only tighten them as much as they need to be tightened, not as much as you can tighten them.

4. Attach the telescope securely to its cradle by screwing in the two star-knob tighteners equally on both sides. The telescope should then swivel without much force, but it also shouldn't be so loose that it moves on its own.

5. Now, gently tighten the height adjustment screw.

6. Slide an eyepiece into the eyepiece extension until it hits the stop and secure it in place with at least one of the eyepiece extension's knurled screws. It is best to start with the eyepiece with the largest millimeter readings.



TIP!

All of your telescope's optical elements have covers to protect them from dust. If you remove the cover only while you are using the telescope for your observations and then place it back on afterwards, the glass lens will stay clean longer. Try to avoid touching the sensitive glass surfaces with your fingers.

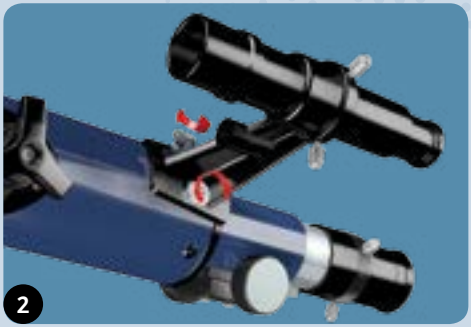
Mounting and adjusting the viewfinder

YOU WILL NEED

› **Assembled telescope**
› **Viewfinder**

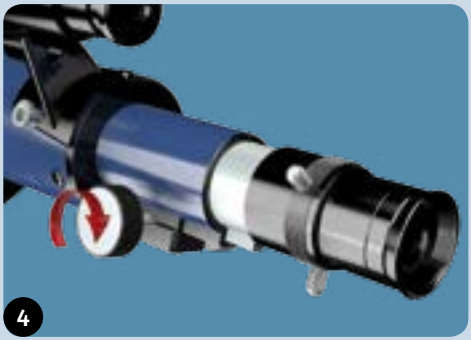
HERE'S HOW:

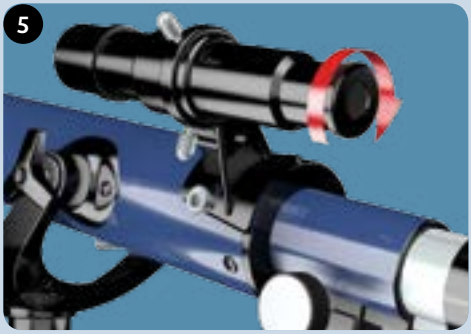
1. The viewfinder must have its larger opening (the objective) pointing away from the viewer.
2. Loosen the two knurled screws at the end of the telescope, insert them into the two holes in the viewfinder bracket, and tighten them again. The holes in the bracket are elongated. Make sure that the viewfinder sits parallel to the telescope.
3. Outside during the day, point the telescope at a target on the horizon at least 500 meters away (such as a tower, tree, or building).



TIP!
You should adjust the viewfinder during the daytime.

4. Focus the telescope by turning the eyepiece extension and move the observation target right into the middle of the field of view.
5. Look through the viewfinder and focus it by turning its eyepiece.





TIP!

When looking through the viewfinder or the telescope, you will notice that everything is turned upside-down. It's supposed to look that way (see page 10). For observation targets on the ground, your telescope comes equipped with an image reversal lens (see page 21), which will display images in their usual orientation.

6. When you look through the viewfinder, you will notice that the observation target is not in the center of its field of view, but shifted off to the side instead. Use the three knurled screws to adjust the viewfinder until the center of its field of view matches that of the telescope. To do this, keep loosening one or two of the screws while you tighten the other(s). You will probably have to repeat this several times. Keep looking into the viewfinder to verify that the observation target is moving toward the center of the field of view.

7. If adjustment of the three knurled screws is not enough, you will have to loosen the two knurled screws again on the viewfinder bracket and correct the viewfinder's orientation before returning to the viewfinder alignment instructions described in step 6.

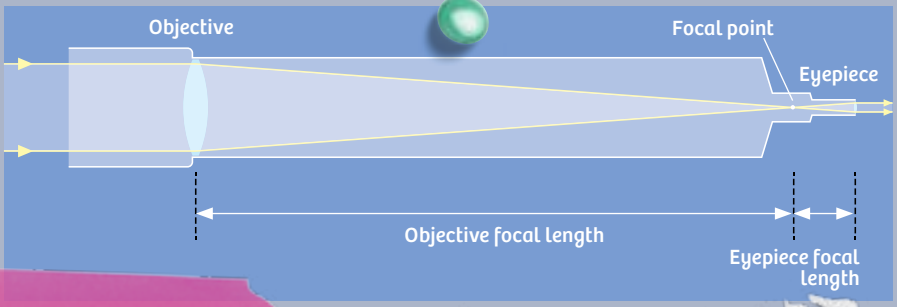
8. After orienting the viewfinder, all three knurled screws should be gently tightened again so that the viewfinder doesn't inadvertently shift in its bracket. Finally, check one last time to make sure that the viewfinder and the telescope show the same observation target in the center of their fields of view.

View through the telescope (top); view through the viewfinder: misaligned (center) and aligned (bottom).

CHECK IT OUT

How Your Telescope Works

When we are in the dark, our pupils grow larger in order to take in (or gather) as much light as possible. That's exactly what a telescope does — it gathers light — with the main differences being that its "pupil" (the objective) is a lot larger than our pupils and the objective's diameter always remains the same. The light of an observation target enters the objective and is concentrated at the focal point. With the use of a second lens (the eyepiece) that functions like a magnifying lens, you can view the observation target's image created at the focal point.



Magnification

If you divide the objective focal length by the eyepiece focal length, it gives you the telescope's magnification. Bright observation targets, such as the Moon or planets, can handle greater magnification than fainter ones.

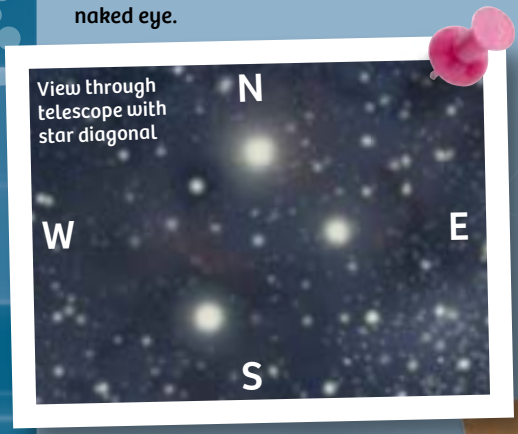
The Visual Field

When you look through the eyepiece, you can only see a very small portion of the sky. The greater the magnification, the smaller that portion will be. With the viewfinder, on the other hand, you can survey a relatively large area. That is why it's easier to orient toward the observation target with the viewfinder than with the telescope.

CHECK IT OUT

EVERYTHING'S UPSIDE DOWN

If you look through the telescope, everything will look upside down and left-right reversed. The reason for that is because it has optical advantages in astronomical telescopes. But that means that if you look through your telescope in, say, a southerly direction, south will be at the top of the visual field, north will be at the bottom, east to the right and west to the left — in other words, exactly the opposite of when you look at the sky with your naked eye.



FACT SHEET
Your Telescope's Specifications

Objective:
Diameter: 60 mm
Focal length: 700 mm

Eyepieces:
20 mm focal length: 35x magnification
10 mm focal length: 70x magnification

How to Use Your Telescope

Your telescope is now ready for viewing. Find a location where you won't be too bothered by the light from houses or street lights. If your backyard or the balcony of your own home doesn't work, take a parent or older brother or sister with you to find someplace darker.

Viewing through the telescope

YOU WILL NEED

› Telescope
› Optional: red-light flashlight (see p. 16)
› Possibly: a warm jacket

SETTING IT UP:

1. Make sure that you aren't blinded by light (from nearby buildings, street lights, and cars) at the location that you have selected.
2. Set up the stand with its legs fully spread out and select a height that is comfortable for you by extending the stand's legs as far as you want. You can view in a standing or sitting position. Take any accessories that you won't be needing right away and place them on the shelf.
3. The stand should be stable. If the ground is soft, you can press the tips of the legs into the soil a little. That will help stabilize the telescope.
4. Be sure that the shelf remains more or less horizontal.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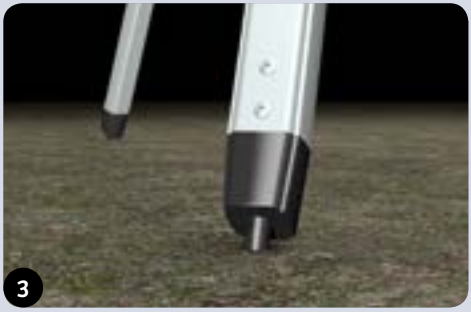
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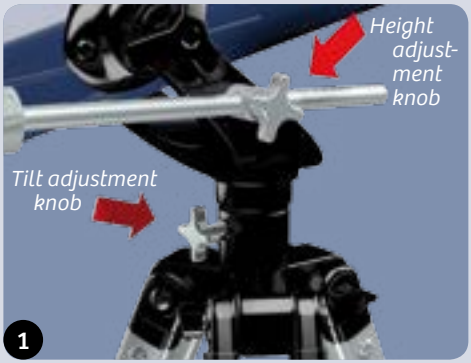
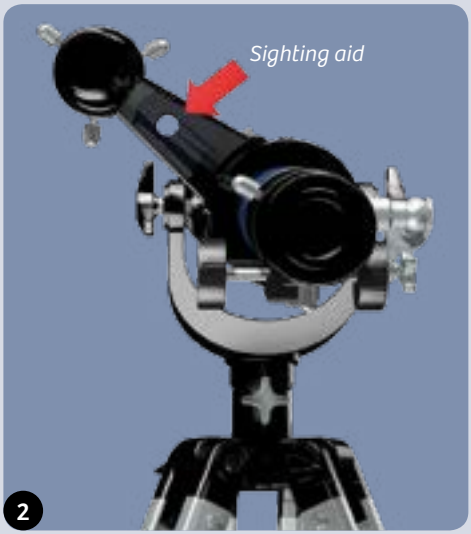
4

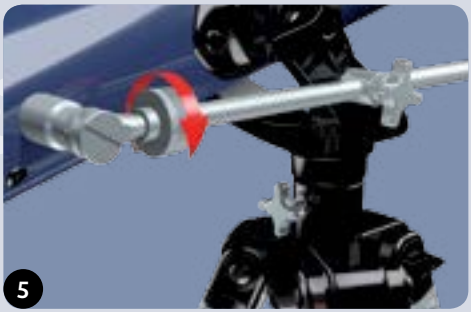
SETUP

VIEWING:

1. Loosen the cradle's height and tilt adjustment knobs and swing the telescope toward your observation target.
2. Use the viewfinder to check whether the telescope is pointed at the right part of the sky. Your observation target must be right in the cross-hairs of the viewfinder. If you have a bright target, such as the Moon, use the viewfinder bracket's sighting aid.
3. Re-tighten the height and tilt adjustment knobs.
4. Insert the 20-mm eyepiece into the eyepiece extension, secure it in place with at least one of the two knurled screws, and turn the eyepiece extension until the image is sharp.
5. Always place your observation target in the center of the visual field. For the cradle tilt, you can leave the knob fairly loose so you can swing the telescope without having to adjust the knob every time. Pivot the telescope in the height direction by turning the fine adjustment ring.







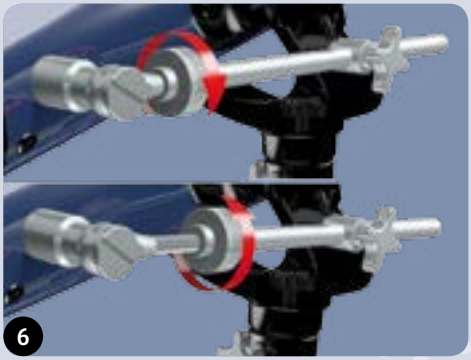
6. If the fine height adjustment ring can't be turned anymore in a given direction, you will have to turn it back to the middle and readjust to your target by loosening the height knob. Then you can use the fine adjustment ring again.

7. For optimal viewing, do not touch your telescope when looking through it.

8. Start viewing any given target at the lowest possible magnification (the eyepiece with the greatest focal length) and increase it to the extent that your target permits. You will have to refocus every time you change the eyepiece.

9. If you watch an astronomical target for a long time, you will notice that it gradually moves out of the field of view. Turn the fine height adjustment ring and loosen the tilt knob to swivel the telescope horizontally until your target is once again in the middle of your visual field.

10. You will notice that you will see more and more details in the target the longer you practice.



DID YOU KNOW?

When you look through the telescope, you will see how the brighter stars will flicker and change color. This is a result of Earth's atmosphere. You probably already know the same effect from hot summer days when the air shimmers above a hot road's surface. With the Moon and the planets, too, you can see this kind of shimmering. The image in the telescope may get sharper, and then become blurrier again. Sometimes, Earth's atmosphere is very calm for a few seconds or minutes. When that happens, you will see the target very clearly and sharply.

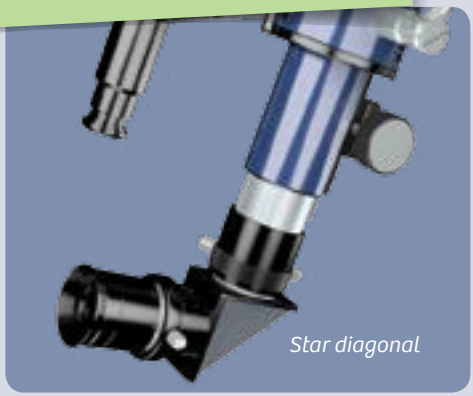
TIP!
If the Moon looks too bright when you look through the telescope, which may happen if it's close to full, screw the Moon filter into the front opening of the eyepiece. It will soften the light.

Moon filter

TIP!

If you want to look at something high in the sky, your telescope may point almost straight up. That can make it pretty uncomfortable to peer through the eyepiece. It will be more comfortable if you first insert the star diagonal and then mount the eyepiece on the eyepiece extension. It will deflect the light at a right angle. If you do use the star diagonal, you will need to readjust the eyepiece extension to get a clear image. Don't forget to tighten the knurled screws on the eyepiece extension and the star diagonal!

NOTE: If your telescope is coming from the warm house, it will cool off a lot in the first half hour. While it cools, your observation targets may look unstable and washed-out. They will look better once it has cooled down to the surrounding temperature.



Star diagonal

Barlow lens

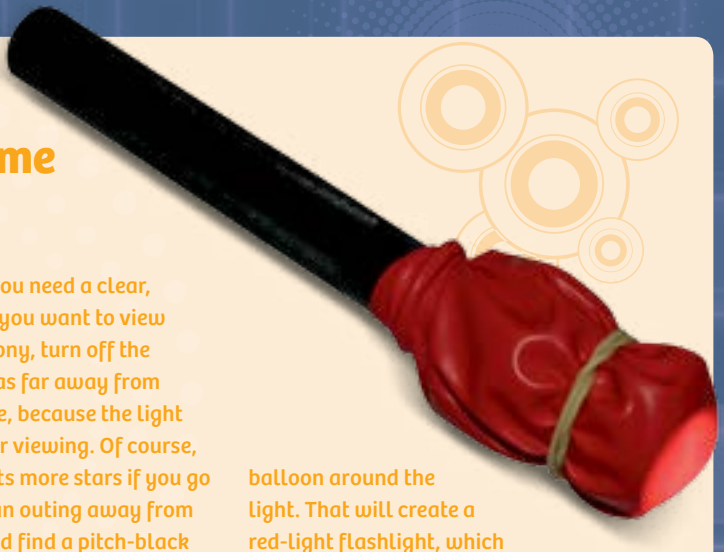
CARE

On some nights, it can be so damp outside that your telescope, the objective, or the eyepiece can become wet with dew. With an eyepiece, you can pretty much avoid that by keeping it in its cover and putting it in your pants or jacket pocket. The objective can also get condensation on it when you bring your telescope back into the warm house from the cold. If that happens, be sure to let everything dry thoroughly — especially the lenses, before you put their dust covers back on them. Don't wipe the glass lenses when they are dry, because you might scratch them. Feel free to wipe the stand and telescope tube off with a rag, if you like.

TIP!

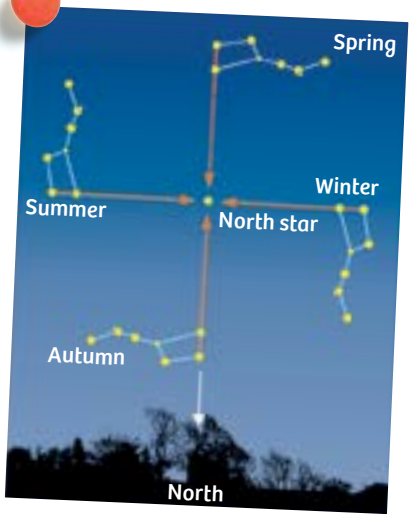
You can use the Barlow lens to double the magnification of any eyepiece. It will only work well, though, if the air is calm and you're watching a bright object, such as the Moon. Insert the Barlow lens into the eyepiece extension until it hits the stop and clamp it in place with the two knurled screws. Then insert the eyepiece into the Barlow lens. Don't forget to screw it on tight!

Preparing for Nighttime Viewing



For good stargazing, you need a clear, cloudless night sky. If you want to view from a terrace or balcony, turn off the inside lights and stay as far away from streetlights as possible, because the light will interfere with your viewing. Of course, you can always see lots more stars if you go with your parents on an outing away from any towns or cities, and find a pitch-black location with an unobstructed view of the sky all around.

To help you see in the dark to look at what's on your star wheel, for example, take a flashlight with you. But first wrap a red balloon around the light. That will create a red-light flashlight, which won't cause your pupils to dilate and reduce your night vision. Before viewing, give your eyes a few minutes to get used to the darkness. After 15 minutes in the dark, you will start seeing things that you hadn't noticed before.



TIP!

You can use the Big Dipper to figure out what direction you're facing even if you have no compass or GPS. Just extend the line between the two stars at the front edge of the ladle about five times, away and up from the bottom front star. You will come to a single brighter star known as Polaris, or the North Star. Turn your face to the North Star and look down to the horizon. You will be looking exactly north. South is behind you, east to the right and west to the left.

CHECK IT OUT

Ten Observations to Get You Started

Stars will always be points of light, no matter what kind of telescope or magnification you use. They are just too far away. But there are also the Moon, planets, binary stars, star clusters, galaxies, and nebulae — all highly worthwhile targets. Start by selecting an easy one like the Moon or a planet. The following ten suggestions are ideal choices for your first astronomical observations.

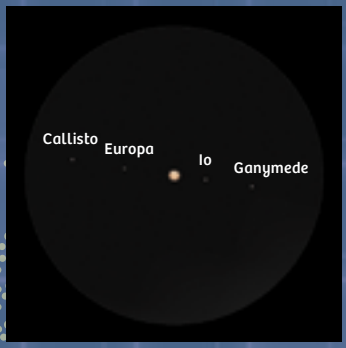
THE MOON

You can see craters, mountains, and lava-filled plains. It will astound you how many details you can make out. When the moon is full, you won't be able to see its features so well because they will only cast short shadows. The waxing or waning moon is better for watching through the telescope. Try a variety of magnifications.

SATURN

You will see a yellowing-white disk surrounded by a ring. You might also notice Saturn's brightest moon, Titan, which stands well off from the planet's disk and almost looks like a weak star. It changes its position from one night to the next. Use a high magnification. For more, see page 31.

CHECK IT OUT



JUPITER

On the clearly oval disk of this planet, you will see two parallel bands of clouds and four moons. The moons change their positions from one night to the next. Use high magnification.

VENUS

This planet displays patterns of light similar to those of our Moon. Sometimes, you can see it as a sickle, other times as an almost-full disk. Unlike our Moon, Venus won't show all these shapes within a single month. Instead, they will only appear over a period of several months. Use high magnification.

TIP!

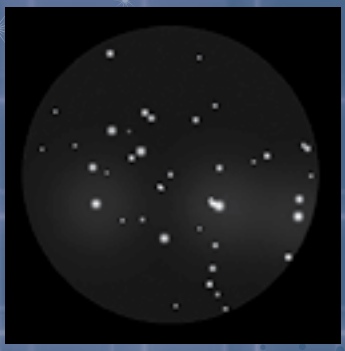
See page 31 for how to identify the positions of the planets.

MARS

Of all the planets, this one shows the most obvious color. Its orange disk can look significantly larger or smaller at different times of the year, depending on its distance from Earth. When it's large, you will also be able to see dark and light structures on its surface. Use high magnification.

MIZAR/ALCOR

Even with your naked eye, you can distinguish these two stars in the bend of the Big Dipper's handle. With the help of the telescope, you should be able to see how Mizar, the brighter of the two, is actually two stars. Use high magnification. (See the star charts on pages 27 and 29.)



PLEIADES

This star cluster in the Taurus constellation is also visible with the naked eye. With the telescope, you will be able to see lots more stars within Pleiades. Can you make out the chariot or dipper shape formed by the brightest stars in the cluster? It looks like the Little Dipper only much smaller. Use a lower magnification for this. (See the chart on page 30.)

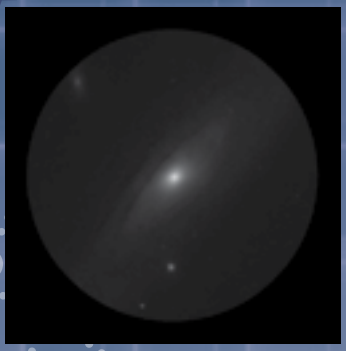
ORION NEBULA

In the constellation of Orion, there is a pale patch of light known as the Orion Nebula beneath the stars forming the belt. You will be able to see its irregular shape more clearly with the help of the telescope. Use low to medium magnification. (See the chart on page 30.)

CHECK IT OUT

ALBIREO

This star, which forms the head of the swan in the constellation Cygnus, is actually a double star. With the help of your telescope, you will be able to make out the two stars and their different colors — one reddish and the other blue. Use high magnification. (See the star chart on page 28.)



ANDROMEDA GALAXY

Andromeda is our closest neighboring galaxy. With your naked eye, you will only be able to see it as a weak glow. With the telescope, it will reveal itself as a long, diffuse patch — the light from billions of stars belonging to the Andromeda galaxy. Use a lower magnification for this. (See the chart on page 29.)

TIP!

There are a lot of books and apps that offer descriptions of interesting things that you can view in the nighttime sky. A lot of good observation targets are also noted on your star chart (see page 24).

Not Just Stars and Planets

By now, you have gotten to know a few of the things you can see in the night sky with your telescope. But there's a lot more that the telescope can do. Just as you can use those panoramic telescopes or binoculars to view mountains or vistas at tourist lookout points, so too can you use your telescope to view your surroundings here on the ground. And it has a greater magnification than most tourist binoculars.

You'll be able to see distant animals, mountain tops, or ships on the ocean so close that it's almost as if you could reach out and touch them with your hand!

Viewing in daytime

YOU WILL NEED

› **Fully assembled telescope**
› **Image reversal lens**

HERE'S HOW:

1. Start by inserting the image reversal lens into the eyepiece extension until it hits the stop, and secure it tight with the two knurled screws.
2. Then, insert the eyepiece into the image reversal lens and clamp it on tight.
3. Use the viewfinder to orient your telescope toward the observation target.
4. Bring the target into focus by rotating the eyepiece extension.

TIP!
The image reversal lens is most useful with the 20-mm eyepiece. That gives you a 53x magnification, because the image reversal lens extends the objective focal length by a factor of 1.5.

Identifying Constellations in the Sky

You are now pretty comfortable with your telescope. If you take it outside tonight under clear skies, you will certainly be able to see a lot of stars. With a little practice, you will also be able to recognize constellations and it will become easier to focus your telescope on interesting observation targets.

How a rotating star wheel will help you with your viewing

With a rotating star wheel — also known as a planisphere — you will easily be able to adjust your view of the starry sky to any time of night and any time of year. All planispheres are a little different, so read the instructions on yours to make sure you are using it correctly.

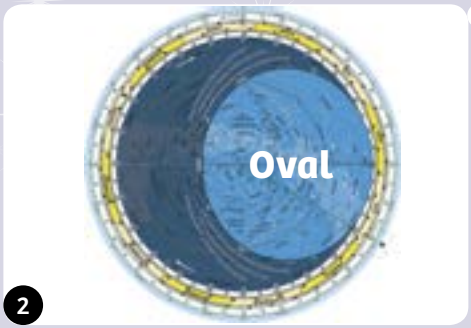
IMPORTANT!
You will need a planisphere that is configured for your latitude. Most of the United States is between latitudes 30° North and 50° North. Most of Europe is between 40° North and 60° North.

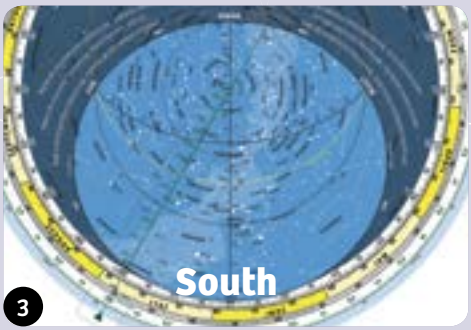
YOU WILL NEED

› *Rotating star wheel (planisphere)*

HERE'S HOW:

1. Rotate the star wheel's cover disk so the current time is lined up with today's date. If, say, it is 9 PM on February 10, turn the 9 PM mark on the cover disk's scale to February 10 on the bordering date scale.
2. Now the wheel is correctly set. The see-through oval section shows all the constellations that you will be able to see in the sky at this time.
3. Turn the wheel — without changing its setting — so the word "South" is oriented to the bottom of the transparent part of the cover disk. Stand so you are facing south.



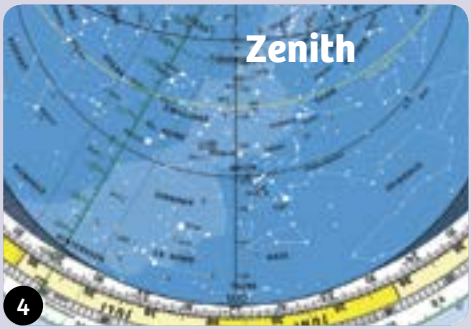


VIEWING

4. From the bottom edge up to the zenith marker, the oval section shows you the stars that are in the southern sky. At 9 PM on February 10, the constellation Lepus is at the bottom of the southern horizon, Orion is halfway up the sky, and the constellation Auriga is up near the zenith.

5. If you want to know which stars are in the northern sky, simply turn the chart upside-down. Then, the word "North" will be at the bottom and it will show you the stars that you can see in a northerly direction between the horizon and the zenith.

6. If you turn the chart so "East" or "West" is at the bottom, it will show you the stars in those directions.



NOTE! During daylight saving time, you will have to subtract one hour from the actual time when adjusting the wheel. So, for example, if it's 9 PM in the summer, use the 8 o'clock mark. You may also need to slightly adjust the time according to your Local Mean Time depending on your longitudinal location within the time zone.

DID YOU KNOW?

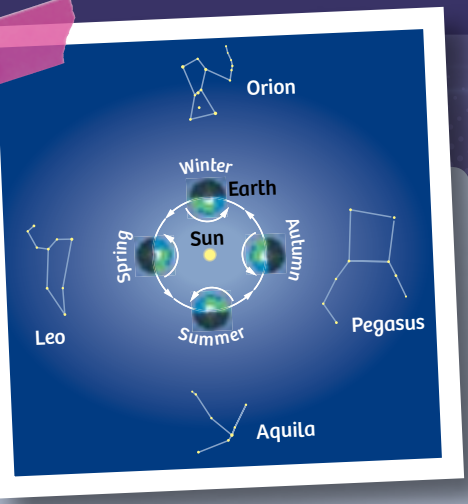
The stars that you see at the bottom edge of the chart are the ones that you will see down near the horizon. And the stars that you see near the zenith are the ones that you will see high in the sky. You will have to tilt your head way back to see them. The actual zenith is the point exactly above your head.

CHECK IT OUT

STARS AND CONSTELLATIONS

People used to believe that the stars were points of light attached to the heavens. Today we know that stars are actually glowing balls of gas in space, just like our Sun. In order to orient themselves in the confusion of all those stars, our ancestors created the constellations over 2,000 years ago. And because they are so old, they still have Latin names. In reality, of course, the stars in a constellation are not close to each other at all, and their actual distances vary quite a bit.

Why is it so difficult to recognize the constellations when you look at the night sky? One reason is that the night sky is constantly changing. Take a look at the stars one evening, and then go back inside and come back out an hour later. You will notice how the entire sky has shifted. That's because our Earth is rotating. In addition, our Earth also rotates around the Sun during the year. That means that the direction in which we look when we look out into space will change a little every night. And that's why the constellations we see in winter are different from the ones we see in summer.



Earth rotates once each day around its own axis and once each year around the Sun. That is why our view of the stars in the sky is always changing.

KEY WORD: "Milky Way"

The Milky Way is a softly glowing strip that you can sometimes see in the night sky if you're in a dark enough location. It consists of thousands of weakly shining stars. The Milky Way is actually our own galaxy. If we could view it from far away, it would look like a vast starry spiral. There are a lot of other systems just like that in space.

VIEWING

The night sky in springtime

YOU WILL NEED

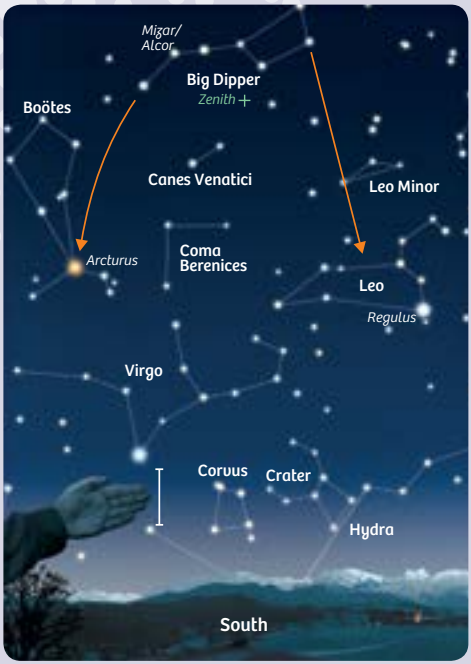
› **Star chart**
› *Red-light flashlight*
› *Warm jacket*

HERE'S HOW:

1. Look for the Big Dipper, which will be high in the sky. You will need to crane your neck back to see its seven more or less equally bright stars. Four make up the dipper's ladle, and three more compose the curved handle.

2. Now extend the curve of the dipper's handle toward the horizon. You will come to the bright star Arcturus in the constellation of Boötes (meaning "herdsman" or "plowman" in Greek). It will be shining with a reddish-orange glow.

3. On the other hand, if you extend a line from the two stars at the front edge of the dipper's ladle and proceed in a downward direction, you will come to the constellation of Leo. This will also be about halfway up the sky, and looks a bit like a large clothes iron. Its brightest star, called Regulus, shines with a slightly blue color.



DID YOU KNOW ...

... that the Big Dipper is not really a constellation? It actually belongs to the constellation of Ursa Major, which also includes a lot of other stars. See the illustration on page 23!

The night sky in summertime

YOU WILL NEED

› Star chart
› Red-light flashlight
› Warm jacket

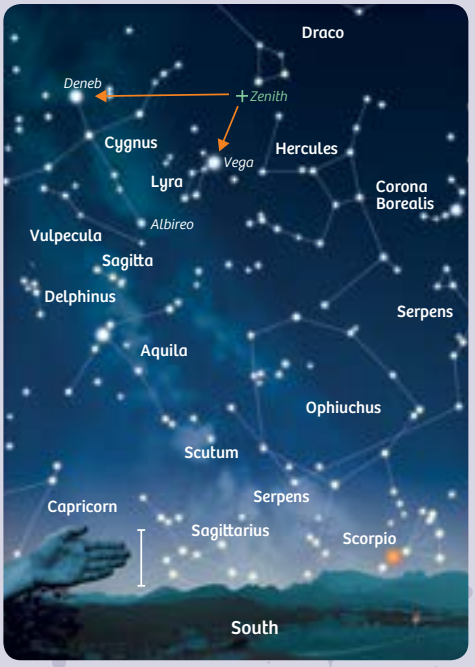
HERE'S HOW:

1. In the summertime it won't get dark until late, so you will have to stay up later to watch the stars. Up high in the sky near the zenith, you will see a bright star. That is Vega, the principal star in the constellation of Lyra.

2. A little to the left next to Vega, you will see another bright star — Deneb, the principal star in the Cygnus constellation. It will also be up high in the sky.

3. The constellation of Cygnus looks a little like a giant cross, so it is sometimes also called the "Northern Cross." If it's really dark, you will be able to see that Cygnus is right in the middle of the Milky Way.

TIP!
If you cannot make out the Milky Way in the night sky, take another look at your star chart. Can you find Cygnus, the swan? It will be gliding along the Milky Way.



TIP!
The Milky Way is easiest to see in late summer or early autumn. It gets dark earlier then, and it's easier to see its gently glowing white strip running across the sky's zenith. Wait until just before or just after a new moon, so its light doesn't interfere with your viewing.

VIEWING

The night sky in autumn

YOU WILL NEED

› **Star chart**
› *Red-light flashlight*
› *Warm jacket*

HERE'S HOW:

1. At this time of year, you will find the Big Dipper low above the northern horizon.
2. If you connect the two right stars of the dipper's ladle and extend that line upward, you will come to the North Star. It will be the brightest star in the Little Dipper constellation.
3. Keep extending this same line the same distance again beyond the North Star and you will come to the constellation of Cassiopeia. It will be riding high in the sky and looks like the letter "M." If you look at it from the other side, it looks like a "W."

TIP!
Pay attention one evening to the way the sky changes over the course of several hours. Do you see how the North Star always stays in the same place?

DID YOU KNOW?

The North Star is positioned exactly above Earth's axis. It is the only star in the sky that doesn't move, always remaining in the same place. The stars around it are called circumpolar stars (literally, "around the pole star" — the North Star is also known as a pole star, or Polaris). While they do move, they never set. So you can always see them on any clear night.

The night sky in winter

YOU WILL NEED

› Star chart
› Red-light flashlight
› Warm jacket, socks, cap, scarf, gloves
› Something warm to drink, a few cookies

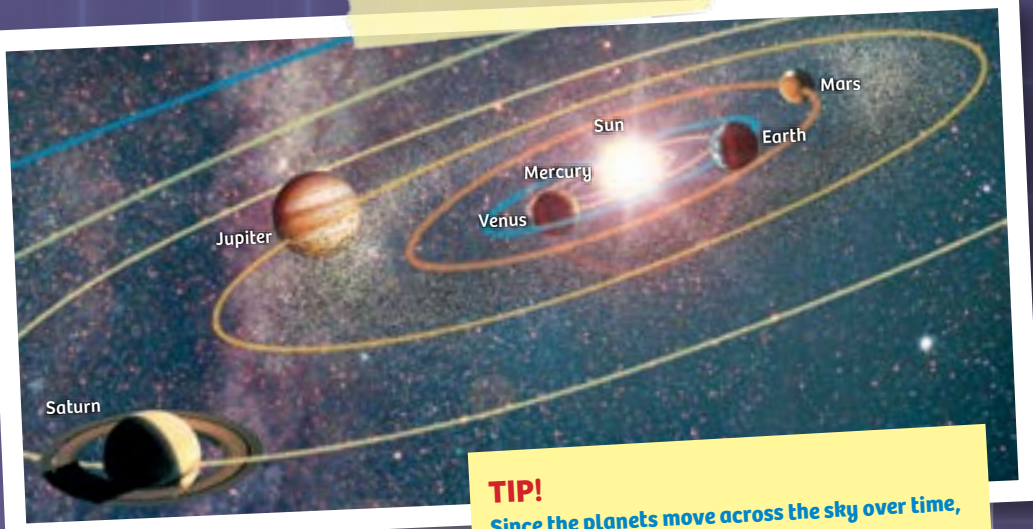
HERE'S HOW:

1. A little above the horizon, you will see the constellation of Orion. You will recognize it by its three stars close together, all in a single line. This is Orion's Belt.
2. To the left just above the belt, you can find the orange-colored star known as Betelgeuse, which is the principal star in the Orion constellation. Beneath the belt and to the right, you will find the bright star Rigel. It has a bluish-white glow.
3. Now tilt your head back and look high in the sky: There, you will see the bright, yellowish Capella, which is the principal star in Auriga.

DID YOU KNOW?

The color of a star can provide information about its temperature. Hotter stars shine white to blue, while cooler ones are yellowish or orange-red.

CHECK IT OUT



TIP!
Since the planets move across the sky over time, they are not drawn on the star charts, any more than the Moon is. But you can always find their current positions online or by using an app for your smartphone or tablet.

Moon and planets

The Moon orbits around Earth once every month. You can clearly see its movement over the course of one or two days if you look at the sky at the same time each night. The full moon in particular is almost impossible to miss. But you can see a particularly nice sight just a few days after a new moon, when it shows itself as a delicate silver sliver in the evening sky.

Along with Earth, there are seven other planets that orbit the Sun: Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. The easiest to find is Venus. For weeks at a time, it shines very brightly just after darkness falls. Jupiter and Saturn are clearly visible in the sky for a few months every year. Jupiter is the largest planet, and shines with a striking brightness. Saturn has a pretty ring, but you will need your telescope to see it. Mars is only clearly visible about every other year. It has a reddish color. The other planets are difficult to see, or can't be seen at all with the naked eye.

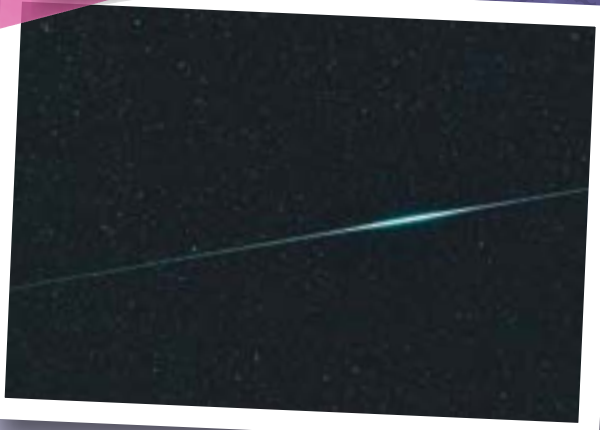
DID YOU KNOW?

...that the Moon and the planets cannot occur just anywhere in the sky? They are only found in certain constellations corresponding to signs of the zodiac. You may know them as horoscope signs. They include, for example, Taurus, Gemini, and Cancer.

CHECK IT OUT

TIP!
With permission from a parent or adult supervisor, visit the website heavens-above.com. This website can tell you the locations of many celestial objects and when to look for the ISS or bright satellite flashes (called iridium flares).

Satellites, shooting stars, and comets



You will often be able to see at least a couple points of light in the sky that seem to be moving fairly quickly. Usually, they are airplanes. If they are blinking, that's what they are. But once in a while you will be able to see a man-made satellite such as the International Space Station (ISS). The ISS will show up as a bright point of light that moves across the entire sky in just a few minutes. Other satellites will flash brightly for a few seconds and then disappear again.

If you are lucky, you might be able to catch a shooting star during one of your evening stargazing sessions. It will look like a bright trail of light flashing briefly across the sky. Shooting stars are small pieces of rock or dust from space that burn up as they enter our atmosphere.

TIP!
Every year around the 12th of August, the chances of seeing shooting stars are especially high. At this time, Earth's orbit around the Sun takes it through a giant cloud of dust left behind by a comet.

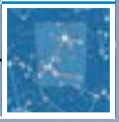
KEY WORD: "Comet"

Very rarely, a comet will appear in the sky. Comets are small bodies of ice and dust. When they approach the Sun, they will often form a glowing tail.

Kosmos Quality and Safety

More than one hundred years of expertise in publishing science experiment kits stand behind every product that bears the Kosmos name. Kosmos experiment kits are designed by an experienced team of specialists and tested with the utmost care during development and production. With regard to product safety, these experiment kits follow European and US safety standards, as well as our own refined proprietary safety guidelines. By working closely with our manufacturing partners and safety testing labs, we are able to control all stages of production. While the majority of our products are made in Germany, all of our products, regardless of origin, follow the same rigid quality standards.

The 20 Prettiest Constellations

	English Name	Latin Name	Visibility	
	◀ The Great Bear	Ursa Major	Always	
	The Queen	Cassiopeia	Always ▶	
	◀ The Lion	Leo	January-June	
	The Herdsman	Boötes	March-September ▶	
	◀ The Virgin	Virgo	March-July	
	The Northern Crown	Corona Borealis	March-October ▶	
	◀ The Harp	Lyra	April-December	
	The Swan	Cygnus	May-December ▶	
	◀ The Eagle	Aquila	June-November	
	The Scorpion	Scorpius	June-August ▶	
	◀ The Dolphin	Delphinus	June-December	
	The Archer	Sagittarius	July-September ▶	
	◀ Andromeda	Andromeda	July-February	
	The Flying Horse	Pegasus	August-January ▶	
	◀ The Charioteer	Auriga	October-May	
	The Bull	Taurus	October-March ▶	
	◀ The Twins	Gemini	November-May	
	The Hunter	Orion	November-March ▶	
	◀ The Lesser Dog	Canis Minor	December-May	
	The Great Dog	Canis Major	January-March ▶	

The table lists a few of the constellations that you can most easily find in our night sky. They are arranged according to their visibility during the year if you look in the evening between about 8 and 10 pm. The Latin names are often used in English and are typically found in books and on star charts, but the English equivalents are also provided here so you can see what they mean.