5th Grade Science

Quarter 1

Remote Learning

Practice and Enrichment Packet

Hello SCS Family,

This resource packet was designed to provide students with activities which can be completed at home independently or with the guidance and supervision of family members or other adults. The activities are aligned to the TN Academic Standards for Science and will provide additional practice opportunities for students to develop and demonstrate their knowledge and understanding.

A suggested pacing guide is included; however, students can complete the activities in any order over the course of several days. Below is a table of contents which lists each activity.

5th Grade Science Project: Moon Phases	
Grade Level Standard(s)	5.ESS1.4: Explain the cause and effect relationship between the positions of the sun, earth, and moon and resulting eclipses, position of constellations, and appearance of the moon.
Caregiver Support Option	Help your student by reading by guiding them through the directions.
Materials Needed	See below
Essential Question	How do the Sun Earth and Moon interact?
Learning Outcome	Students will explore the appearance of the moon during the month.

Name____Date ______________ EXPLORE

Inquiry Activity

Moon Phases

How does the Moon's orbit affect its appearance?

Make a Prediction How does the Moon's apparent shape change during the month? Explain.

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Materials

- [ ] pencil
- [ ] drawing paper
- [ ] small foam ball that is half white and half black
- [ ] sharpened pencil
- [ ] circle cut from yellow construction paper
- [ ] tape

Carry Out an Investigation

BE CAREFUL Always use science materials appropriately.

1. Attach the “Sun” circle to the wall with tape.
2. Carefully insert the sharpened pencil into the foam ball on the dividing line between the white and black sides. The white side represents the half that is lighted by the Sun. The black half represents the dark side.
3. Havea classmate sit and represent Earth while youstand,

holding up the pencil and ball that represents the Moon.

4 Beginning directly between the Sun and your partner, hold the Moon so that the white half faces the Sun.

5 Your partner should observe the Moon and draw the shape that represents how much of the Moon's white side is visible.

6 Move in an arc about 45° to your partner's right, making sure that the white side of the Moon is still facing the Sun.

7 Your partner should again observe the Moon and draw the shape that represents how much of the Moon's white side is visible.

8 Continue moving around your partner, stopping every 45° for a drawing until you are back in front of the Sun. Make sure the white side is always pointed toward the Sun.

9 Switch places with your partner, and repeat steps 3-8.

EXPLORE Name________________________ Date __________

Communicate Information

1. Are all of your drawings the same? Explain.

2. Did the amount of sunlight reaching the Moon ever change? Explain.

3. If not, then why are your drawings different?

4. **Construct an Explanation** Explain how this activity models the phases of the Moon.

5. Compare your drawings to photos of the Moon's phases. How well do your drawings match the photos?

5th Grade Science Project: The Role of Gravity	
Estimated Time	20 - 30 Minutes
Grade Level Standard(s)	**5.ESS1.5** Relate the tilt of the Earth's axis, as it revolves around the sun, to the varying intensities of sunlight at different latitudes. Evaluate how this causes changes in day-lengths and seasons.
Caregiver Support Option	Help your student by reading by guiding them through the directions.
Materials Needed	tennis ball, cloth large enough to cover the ball (approximately 25 cm^2), 1.5 m of string
Essential Question	How do the Sun Earth and Moon interact?
Learning Outcome	Students will simulate the role of gravity between the Sun and Earth.

EXPLAIN Name______________________________ Date ____________

Inquiry Activity

The Role of Gravity

How does gravity affect the movement of objects in space? You will use a ball and string to simulate the role of gravity between the Sun and Earth.

Materials

- [ ] tennis ball
- [ ] cloth large enough to cover theball, approximately 25 cm^2
- [ ] 1.5 meters of string

Carry Out an Investigation

1. Wrap the cloth around the ball. Pull the corners of the cloth together and tie them in a knot.
2. Securely tie the string to the cloth at the knot.
3. Stand apart from other students, and slowly spin the ball in a circle.
4. On your teacher's signal, let go of the string. Be sure no students are in the way.

Communicate Information

5. What happened when you let go of the string?

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6. What forces caused this to happen? Explain.

7. While swinging the ball, what did you feel happening between the string and your hand?

8. How does this activity model interaction between the Sun and Earth?

Name______________________________Date ____________ EXPLAIN

9. In the left box, draw a diagram of you swinging the ball in a circle. Use arrows to indicate the directions of the two forces involved. In the right box, draw a second diagram of Earth orbiting the Sun. Use arrows to indicate the directions of the two forces involved.

What is Gravity?

Read the *What is Gravity?* about the effects of the force of gravity. Answer the following questions after you have finished reading.

10. When does the force of gravity between two objects decrease?

5th Grade Science Project: Modeling Moon Craters	
Grade Level Standard(s)	5.ESS1.2: Research and explain the position of the Earth and the solar system within the Milky Way galaxy, and compare the size and shape of the Milky Way to other galaxies in the universe. 5.ESS1.3: Use data to categorize different bodies in our solar system including moons, asteroids, comets, and meteoroids according to their physical properties and motion.
Caregiver Support Option	Help your student by guiding them through the directions. Help your student to understand that craters form when an object in space hits another object. Data should follow a pattern that larger marbles will make larger craters.
Materials Needed	safety goggles or protective eye wear, newspaper, shallow pan, sand, flour, or fine dirt, different sized marbles, plastic spoon, ruler
Essential Question	What are stars, and why are some stars brighter than others?
Learning Outcome	Students will be able to support an argument to explain how the force of gravity affects the location of objects in space.

Name____________________________ Date ____________ EXPLORE

Inquiry Activity

Modeling Moon Craters

What factors affect the size of craters that form when speeding objects strike the surface of the Moon?

Make a Prediction How does the size of an object affect the size of the crater it forms when it strikes the Moon?

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Materials

- ☐ safety goggles
- ☐ newspaper
- ☐ shallow pan
- ☐ sand, flour, or fine dirt
- ☐ different sized marbles
- ☐ plastic spoon
- ☐ ruler

Carry Out an Investigation

BE CAREFUL Wear safety goggles or protective eye wear.

1. Cover the floor with newspaper, and place the pan on the newspaper.
2. Fill the pan with sand or flour to about 2 centimeters (cm) deep.

3 Drop each of the marbles from the same height into a different area of the pan.

4 **Record Data** Carefully remove each marble with the plastic spoon and measure the diameter of each crater and record it in the table.

Size of Marble	Diameter of Crater Formed

EXPLORE Name________________________________ Date ____________

Communicate Information

Analyze Data Answer the questions based on the data you collected.

1. What did you see at the crater sites? Why did this happen?

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2. How does the size of the crater compare to the size of the marble?

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3. How does this model represent what happens when an object hits the surface of the Moon?

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Crosscutting Concepts

Cause and Effect

4. Consider how space objects colliding with Earth could lead to impact craters. If our closest neighbor, the Moon, has impact craters, is it likely that Earth has also been hit by space objects? What effects of these collisions might we find?

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5. Many of the Moon's craters were created long ago. Since there is no erosion on the Moon to destroy the craters, there is a near perfect record of the impacts. Why aren't craters as visible here on Earth?

146 Module The Solar System and Beyond

5th Grade Science Project: Star Wheel	
Grade Level Standard(s)	5.ESS1.6: Use tools to describe how stars and constellations appear to move from the Earth's perspective throughout the seasons.
Caregiver Support Option	Help your student by reading by guiding them through the directions.
Materials Needed	Circular sky map (attached); star wheel's outer sleeve (attached); scissors; stapler with staples
Essential Question	How do the Sun Earth and Moon interact?
Learning Outcome	Students will explore the appearance of stars and constellations.

HOW TO MAKE A STAR WHEEL THE SIMPLE WAY

It takes just a few minutes to make this handy Star Wheel, which helps you navigate the night sky with ease! Click on image for a larger view.

Kelly Beatty

Like most people, you probably enjoy getting out under a clear night sky to gaze up at the beautiful tapestry of stars and planets overhead. But what if you can't tell Polaris from Pollux, or Saturn from Sagittarius? No problem! Using this simple, easy-to-make Star Wheel, you'll be navigating the night sky with confidence in no time.

The motion of the stars marks the passage of time during the night. As Earth turns on its axis, the stars appear to rise in the east and set in the west, just as the Sun and Moon do. This means that you'll see different stars overhead at different times of night. Likewise, as Earth makes its annual trek around the Sun, you'll see different stars from month to month.

So what stars will be in your sky tonight? To find out, follow these simple directions to make a star wheel you can use tonight!

MAKE A STAR WHEEL

Each part for the Star Wheel is sized to fit on a single sheet of letter-size paper. Print out both sheets and cut out the parts. For the sky map (Part 1), trim away the gray corners so that you're left with a circle 8 inches across. For the outer sleeve (Part 2), make sure you keep the large white rectangle at the bottom; also, cut out the white oval in the middle.

To make a Star Wheel, fold the white rectangle at the bottom of the outer sleeve so it's underneath the front. Then staple the rectangle to the front at the locations marked by short white lines to either side of the oval. Now slip in the circular sky map so it shows through the oval. That's it!

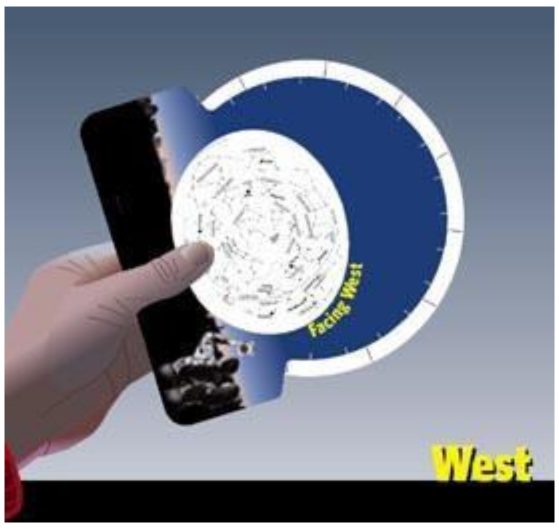
To use the Star Wheel, align the desired date with the desired time. This example is set for 10 p.m. (daylight-saving time) on June 15th.

Kelly Beatty

USING THE STAR WHEEL

Pick the date and hour you want to observe, and set the Star Wheel so this date (on the rim of the circular disk) matches the time indicated along the edge of the outer sleeve. Use white hours when standard time is in effect and orange hours when clocks are set for daylight-saving (summer) time.

The Star Wheel's large oval shows the whole sky, and the oval's curved edge represents the horizon you're facing. Once outside, hold the Star Wheel out in front of you and look at the yellow "Facing" labels around the oval. Turn the entire wheel so that the yellow label for the direction you're facing is on the bottom, with the lettering right-side up. If you're unsure of your directions, just remember where the Sun sets; that's west.

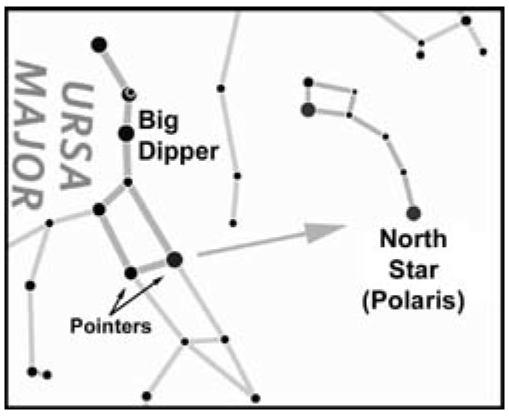


Once you've set the date and time, turn the Star Wheel so the 'Facing' label at the bottom of the oval matches the direction in the sky you're looking.

Kelly Beatty

Now the stars above the map's horizon should match the real stars in front of you. Remember that star patterns will look much larger in the sky than they do on the map. The farther up from the edge of the oval the stars appear, the higher up they'll be shining in your sky. Stars in the center of the oval will appear directly overhead.

This Star Wheel is usable for northern latitudes between 30° and 50°, which covers virtually all of the continental U.S., southern Canada, and Europe. It includes the names of the brightest stars and the most prominent constellations. Depending on how dark the sky is in your area, there may be more stars overhead than are shown on the map. Everyone's sky looks a little different. If there are fewer stars visible to you than appear on the Star Wheel, try to find an observing site that is not flooded by house or streetlight. Also, the longer you're outside, the better the chance that your eyes will adapt to the darkness and the more stars you'll be able to see.

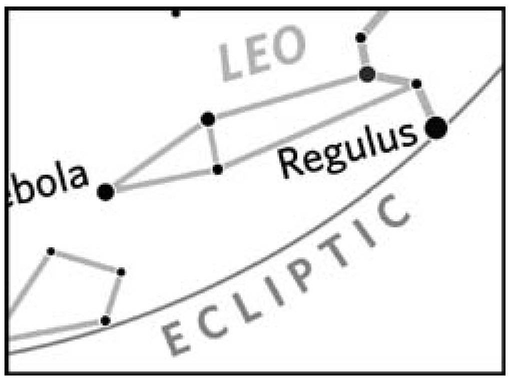


By drawing a line through the 'pointer' stars at the end of the Big Dipper's bowl, you can easily find the North Star.

Kelly Beatty

Stars in the northern sky do not rise or set—instead, throughout the night they seem to slowly turn counterclockwise around Polaris, the North Star, which seems to stay in the same place in the sky no matter what time of night or season of the year. So let's find the North Star!

Begin by locating the Big Dipper. This giant spoon is actually part of a larger constellation called Ursa Major, the Great Bear. Find the two end stars in the Dipper's bowl—look opposite the handle. They're known as the "pointers." Why? Because a line drawn between them and extended away from the bottom of the bowl leads you to Polaris, the North Star. Now that you know how find Polaris, you also know how to find due north no matter where you are in the Northern Hemisphere!



Planetsaren'tplottedontheStarWheel,buttheytravelacross theskyalong animaginarylinecalled the*ecliptic.*

Kelly Beatty

TheMoonandplanets aren'tshownonthe mapbecausetheir day-to-daymovements are moreinvolvedthanthemotionsofthe stars. However, thecurvedlinecoursingacrossthemapiscalledthe*ecliptic*.Itrepresentsthepathintheskythatbrightestplanetsfollow.Ifyouseeabright"star" shiningwithasteadyglowonornear thiscurvedline, andtheobjectisn'tplottedontheStarWheel, you'relookingataplanet. TheMoonlikewise travels very near the ecliptic in its orbit around Earth.

You can also use our interactive sky chart (attached) to see what's in the sky for your time and place.

No matter how well you know the sky, you'll find that a star wheel comes in handy for a quick check of "what'sup" on any given night.

Do Constellations Ever Break Apart or Change?

By Dr. Marc Rayman

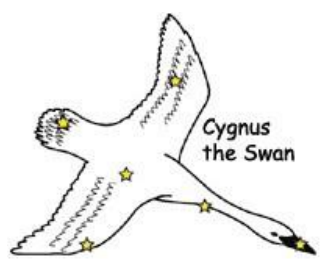
Asked by our friends at the Cable Natural History Museum in Cable, Wisconsin.

00:00 | 00:00

Click play to hear me read this to you!

To answer this, first let's think about what the constellations are, and then we can see whether they change.

When we look at the night sky, we see distant stars shining like faint lights. Now we know they are really brilliant lights, like the Sun, that are incredibly far away from us and from each other. Astronomers have used some wonderfully inventive methods to discover the distances to the stars, but to our eyes, they all look as if they are pinpoints of light at the same distance. As an extreme example of this, the red planet Mars is tens of millions of times closer than the red star Antares (Greek for "Rival of Mars"), but you certainly can't tell that just by looking at them when they appear near each other in our skies.



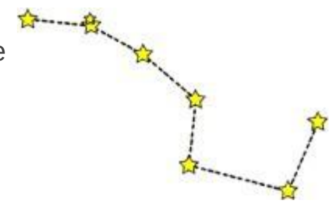
It's normal for us to find patterns in natural arrangements of things. For example, most people can imagine they see faces or other familiar objects in some clouds or rock formations. It's the same with the stars. Ancient observers, without the benefit of our modern understanding of the nature of stars and space, saw these patterns and thought they might be important symbols. Cultures throughout history have created different names and descriptions for the arrangements of stars. The constellations most of us are familiar with were created by people living in the Mediterranean and the Middle East. Many of the stories of the constellations tell us about the myths and legends of the people who gave them names thousands of years ago, but they tell us nothing about the stars themselves.


Andromeda Galaxy, At about 2 million light years away, it is the nearest major galaxy to our own Milky Way galaxy. Astronomers think our own galaxy looks ery much like this one.

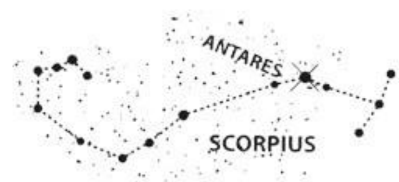
If stars never changed, then constellations wouldn't change. But the stars, including the Sun, travel in their own separate orbits through the Milky Way galaxy. The stars move along with fantastic speeds, but they are so far away that it takes a long time for their motion to be visible to us. You can understand this by moving your finger in front of your eyes. Even when you move it very slowly, it may appear to move faster than a speeding jet that is many miles away.

Even the fastest stars take a long time to travel a noticeable distance. A faint star named Barnard's Star moves the fastest through our skies. Still, for it to change its position only by an amount equal to the width of the moon would take about 180 years. The constellations surely change shape, but seeing the changes would require superhuman patience!

The person who discovered that the stars move was the great British astronomer Edmond Halley, who also has a famous comet named after him. Almost 300 years ago he noticed that a few stars in charts made by Greek sky watchers were not in quite the same location anymore. Those charts were more than 1600 years old then, and even over that time, the bright stars Sirius, Arcturus, and Aldebaran had shifted position only slightly. Still, it was enough for Halley to realize that those stars must have moved.



If you waited long enough, the patterns of stars you would see in the sky would change completely. The Big Dipper is the easily recognizable part of a constellation called Ursa Major, or the Great Bear. The star at the end of the handle and the one at the far tip of the bowl happen to be moving in the opposite direction from the other stars in the Big Dipper. In the future, the handle will appear to be more bent, and the bowl will spread out. To me, the shape in 50,000 years will be more like that of a tadpole than a dipper.



Besides their motion, the appearances of stars change as they age. Take my favorite constellation Scorpius, for example. A couple of years ago, the middle of the three stars that make the head of the scorpion became brighter. The constellation now has a new look!

The constellations are a very convenient way to locate objects in the splendid night sky, making a kind of natural map. If you knew the names of the constellations, you could follow directions to all sorts of beautiful and interesting objects, just as if you knew the names of streets, you could follow directions on how to get to a friend's house. Make your own **Star Finder and learn some of the constellations (/starfinder)**. Then I hope you will go outside to look at the stars, and use the constellations to find your way around. Remember, though, that what's important is not these patterns themselves, but rather the richness of the universe they will help you discover.

Check out Dr. Marc Rayman's answers to more questions! (/dr-marc-questions)

article last updated October 9, 2018

Make a Star Finder

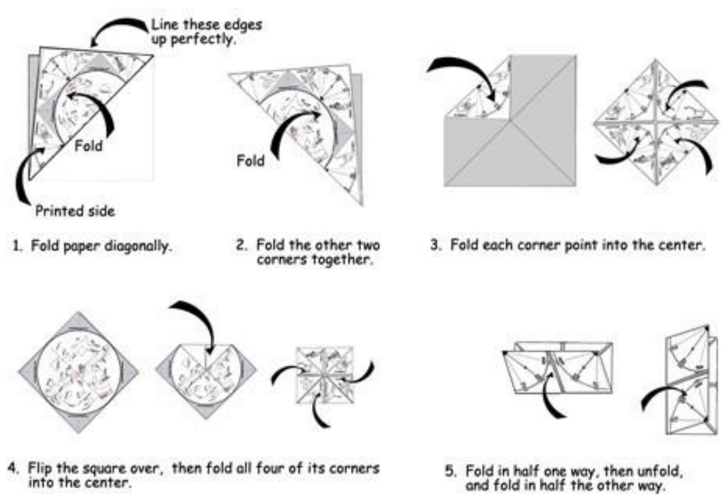
Disclaimer: This material is being kept online for historical purposes. Though accurate at the time of publication, it is no longer being updated. The page may contain broken links or outdated information, and parts may not function in current web browsers.

Make a Star Finder. Learn your way around the night sky by finding some of the constellations. Download and print the Star Finder for this month.

January (/review/starfinder/star_finder_jan.pdf)	July (/review/starfinder/star_finder_jul.pdf)
February (/review/starfinder/star_finder_feb.pdf)	August (/review/starfinder/star_finder_aug.pdf)
March (/review/starfinder/star_finder_mar.pdf)	September (/review/starfinder/star_finder_sep.pdf)
April (/review/starfinder/star_finder_apr.pdf)	October (/review/starfinder/star_finder_oct.pdf)
May (/review/starfinder/star_finder_may.pdf)	November (/review/starfinder/star_finder_nov.pdf)
June (/review/starfinder/star_finder_jun.pdf)	December (/review/starfinder/star_finder_dec.pdf)

Color or decorate the Star Finder, if you like. Then cut it out on the solid lines.

Fold it like this:

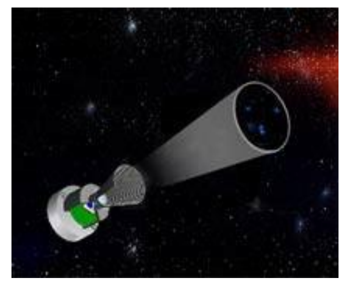


Play the Star Finder game:

1. Stick your thumbs and first two fingers into the four pockets on the bottom of the Star Finder.

()What else are constellations good for?

Star patterns are also very helpful for navigating a spacecraft. Most spacecraft have steered by the stars—or at least checked the stars once in a while to make sure the spacecraft was still on course and pointed in the right direction.



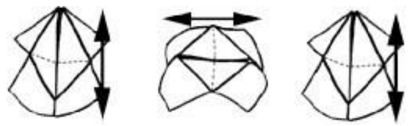
Space Technology 6 is a mission to test a new, very small and energy-efficient kind of reference system. This new system is called an Inertial (in-ER-shul) Stellar Compass, or ISC. The ISC is made up of a star tracker and a gyroscope. Working together, they keep the spacecraft on course.

The star tracker, like a camera, takes a picture of the star patterns in its view and compares the picture with its built-in star maps. This is how it can tell the spacecraft exactly which way it is pointed. In between pictures from the star tracker, the gyroscope tells the spacecraft how it is pointed. Together the star tracker and gyroscope keep the spacecraft stable and oriented in the right direction in space (for example, not flying "upside-down" or sideways).

But the gyroscope can hold stable for only a short time. To keep the gyroscope perfectly accurate, information from the star tracker is sent to the gyroscope every few seconds.

The thing that is new and different with the Space Technology 6 ISC is that the two devices are combined into one tiny, light-weight system that needs little power to run.

2. Ask another person to choose one of the top four squares. Then, depending on the number on the square she chose, open and close the Star Finder that many times (open up and down, close, open side to side, close, etc.). For example, if she chose number 6, open and close the Star Finder 6 times.



3. Then, ask the person to look inside the Star Finder and pick one of the four visible constellations. This time, open and close the Star Finder once for each letter to spell out his choice. For example, if he chose "Lyra," you would open and close the Star Finder 4 times, once for each letter: L - Y - R -A.
4. Ask the player again to pick one of the four constellations visible. Open the panel to see the name of a constellation (highlighted in red) she will try to find in the sky for this month.

   For some of the months, not every part of the Star Finder may show a highlighted constellation for you to find. In this case, just try to find the constellation that is nearest to the part of the sky you picked. Or, just find any constellation!

(TacSat-2_illustration.en.jpg)
Artist's rendition of the TacSat-2 Micro Satellite. (U.S. Air Force)

The ISC was tested on the U.S. Air Force TacSat-2 microsatellite, and it worked just fine. Now the ISC technology can be used on future spacecraft sent on missions of discovery.

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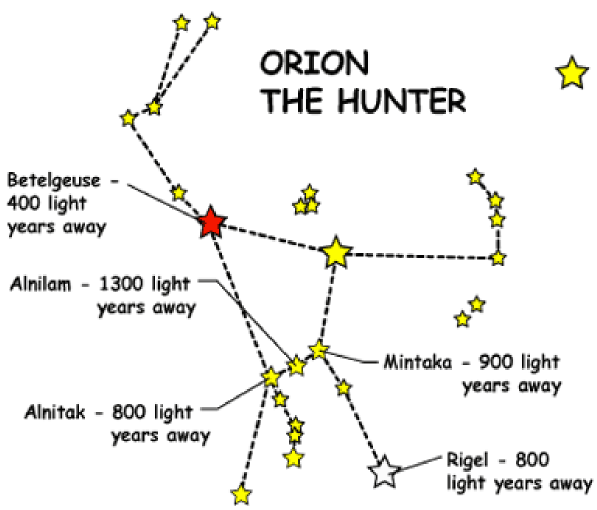
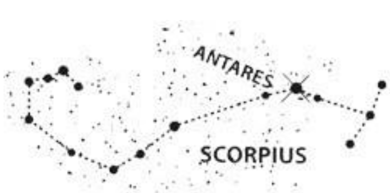
What ARE Constellations Anyway? (/dr-marc-space/#/review/dr-marc-space/constellations.html)

A constellation is group of stars like a dot-to-dot puzzle. If you join the dots—stars, that is—and use lots of imagination, the picture would look like an object, animal, or person. For example, Orion is a group of stars that the Greeks thought looked like a giant hunter with a sword attached to his belt.



Other than making a pattern in Earth's sky, these stars may not be related at all. For example, Alnitak, the star at the left side of Orion's belt, is 817 light years away. (A *light year* is the *distance* light travels in one Earth year, almost 6 trillion miles!) Alnilam, the star in the middle of the belt, is 1340 light years away. And Mintaka at the right side of the belt is 916 light years away. Yet they all appear from Earth to have the same brightness.

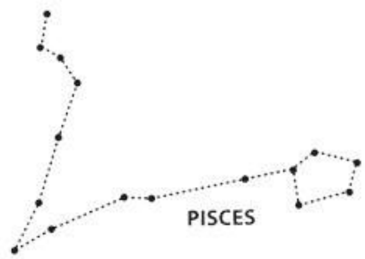


Even the closest star is almost unimaginably far away. Because they are so far away, the shapes and positions of the constellations in Earth's sky change very, very slowly. During one human lifetime, they change hardly at all. So, since humans first noticed the night sky they have navigated by the stars. Sailors have steered their ships by the stars. Even the Apollo astronauts going to the Moon had to know how to navigate by the stars in case their navigation instruments failed.

Finding the Constellations

We see different views of the Universe from where we live as Earth makes its yearly trip around the solar system. That is why we have a different Star Finder for each month, as different constellations come into view. Also, as Earth rotates on its axis toward the east throughout the hours of the night, the whole sky seems to shift toward the west.

The Star Finder charts are for a latitude of 34° N, which is about as far north of the equator as Los Angeles, California. (Charts are from *The Griffith Observer* magazine.) The farther north you are, the more the constellations will be shifted south from the Star Finder charts. The Star Finder charts show the sky at about 10 PM for the first of the month, 9 PM for the middle of the month, and 8 PM for the last of the month. These are local standard times. For months with Daylight Savings Time, star chart times are an hour later.



The star charts are maps of the sky overhead. So, to get the directions lined up, hold the map over your head and look up at it, and turn it so the northern horizon side is facing north.

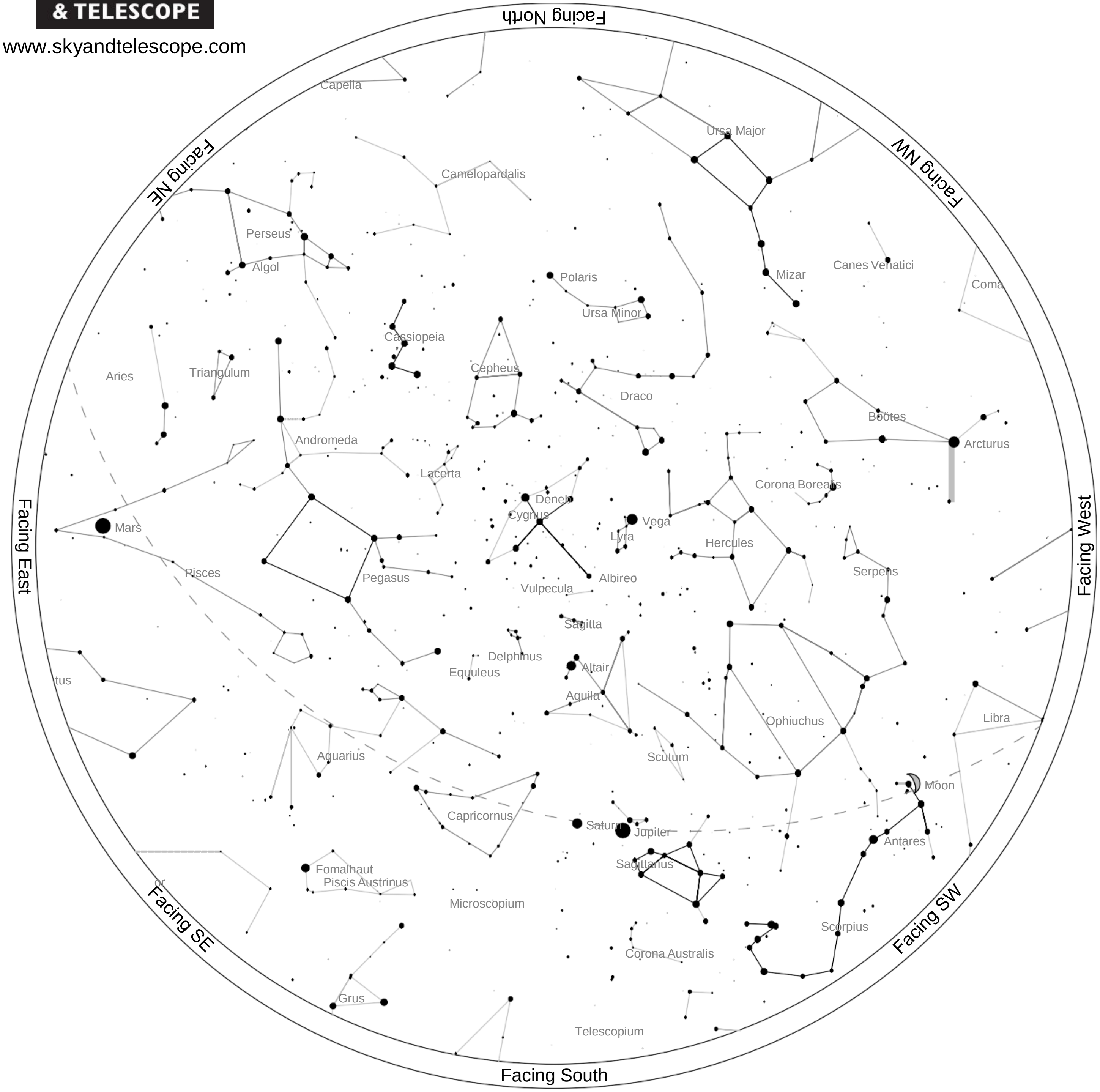
If you live where big city lights drown out the beauty of the stars, you may see only a few of the brightest stars and planets. How sad! But see if you can find at least one or two constellations on a clear, Moonless night.

Ever wondered about the difference between astrology and astronomy? (/starfinder2)

article last updated September 18, 2013

www.skyandtelescope.com

Sky Chart



Location: Set from geolocation service

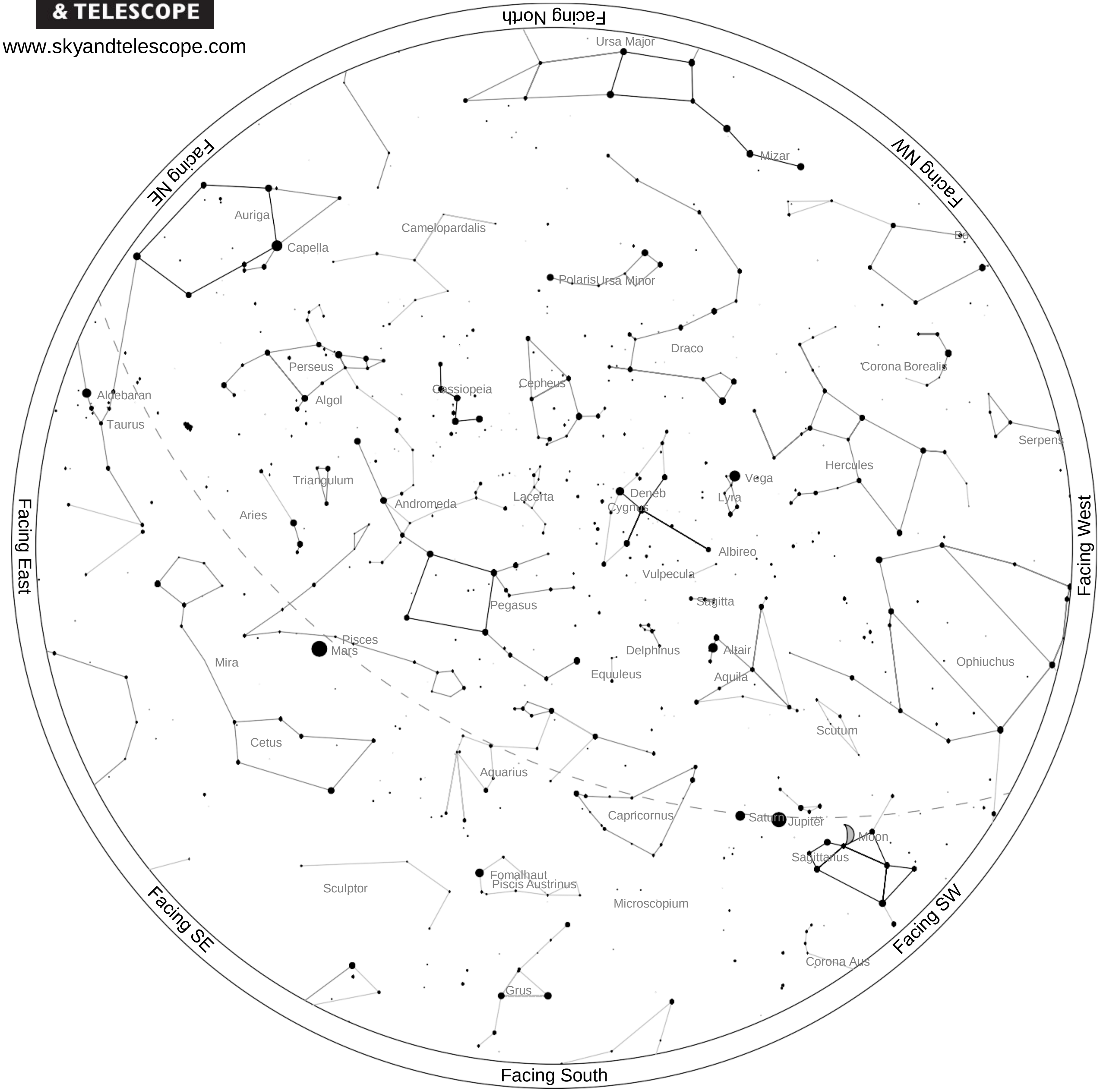
Latitude: 34° 58' N, longitude: 90° 03' W

Time: 2020 September 21, 21:00 (UTC -05:00)

Powered by: Heavens-Above.com

www.skyandtelescope.com

Sky Chart



Location: Set from geolocation service

Latitude: 34° 58' N, longitude: 90° 03' W

Time: 2020 October 21, 21:00 (UTC -05:00)

Powered by: Heavens-Above.com

SKY & TELESCOPE
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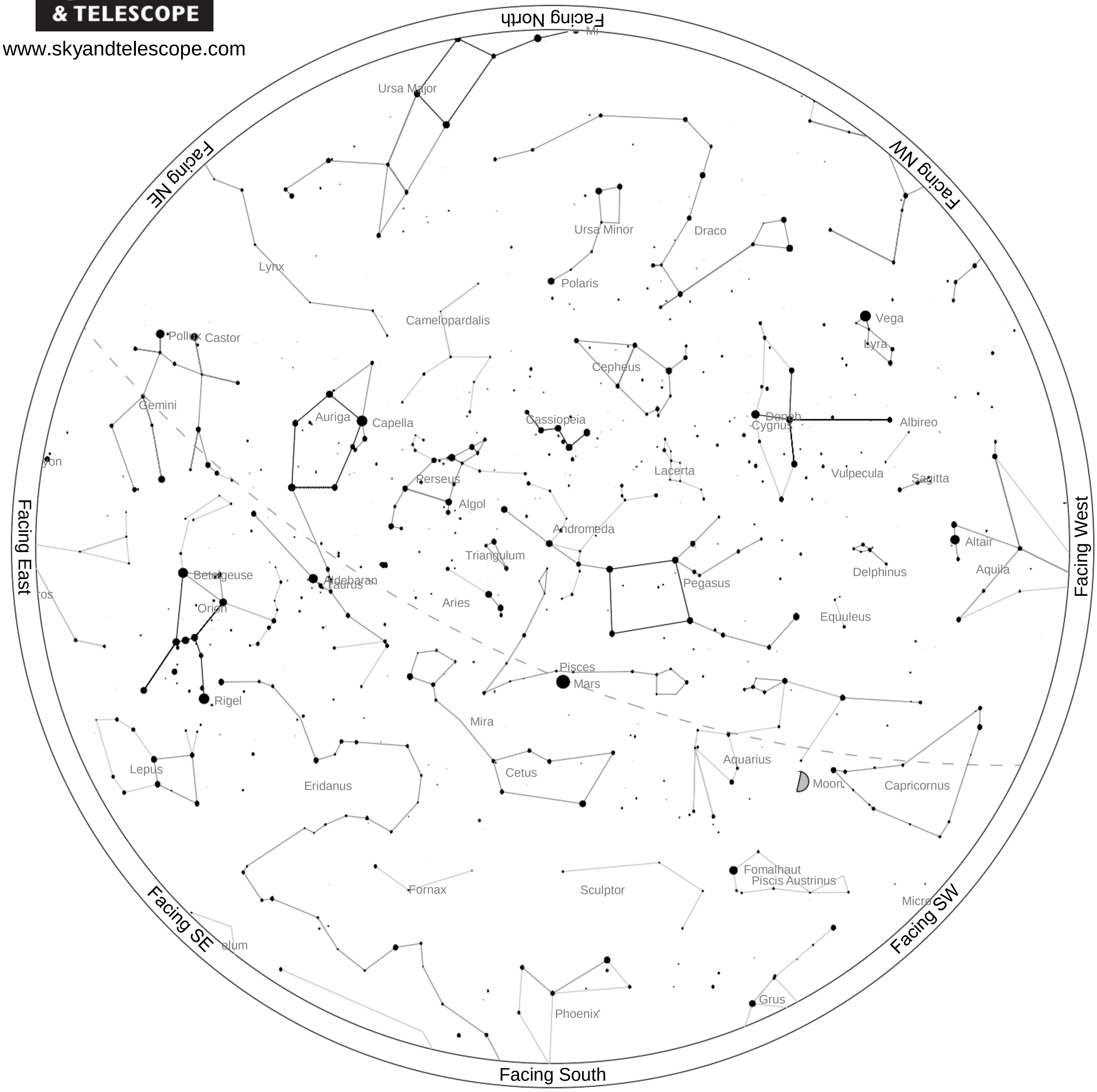
Sky Chart



Location: Set from geolocation service

Latitude: 34° 58' N, longitude: 90° 03' W

Time: 2020 November 21, 21:00 (UTC -06:00)

Powered by: Heavens-Above.com

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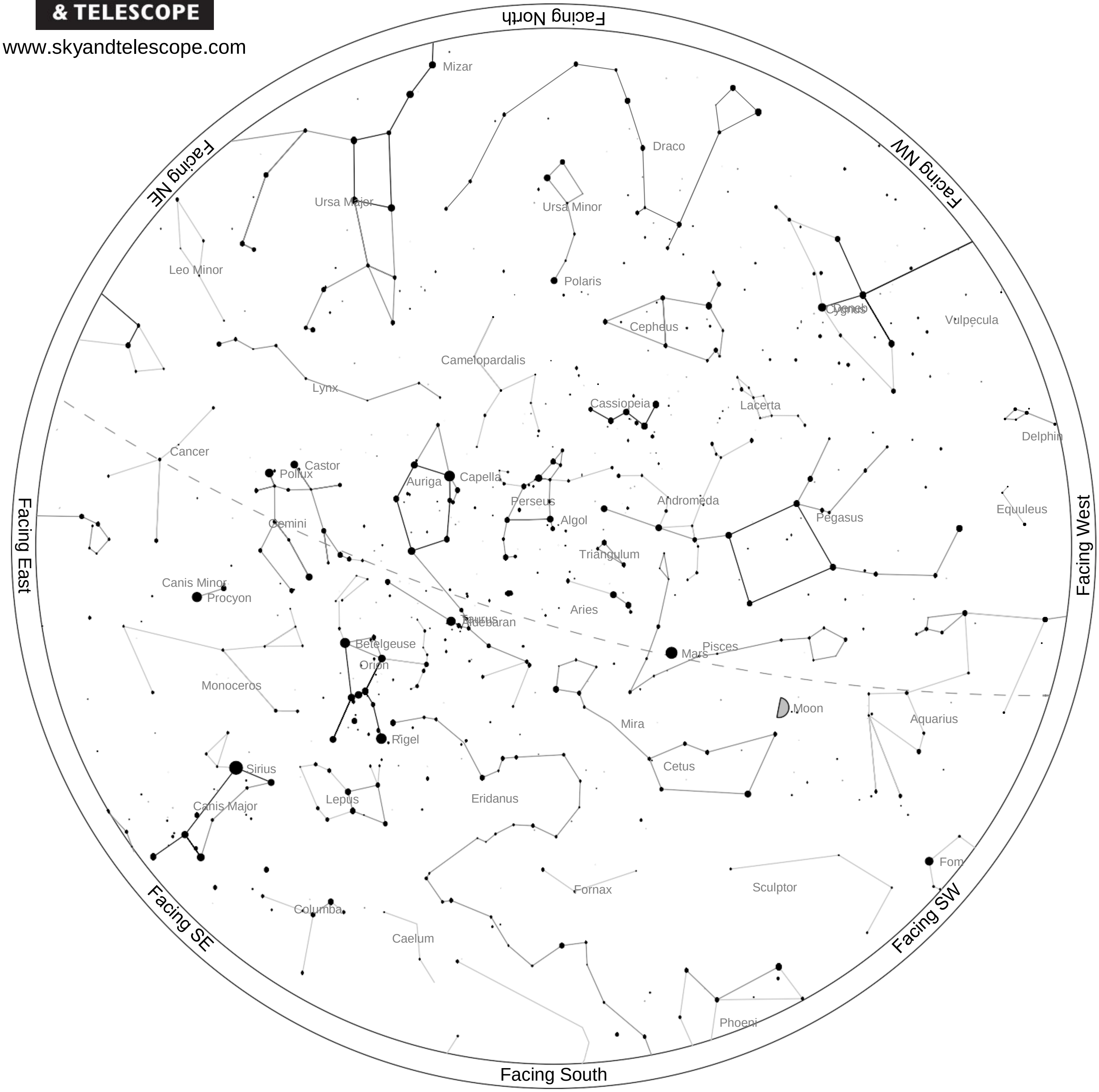
Sky Chart

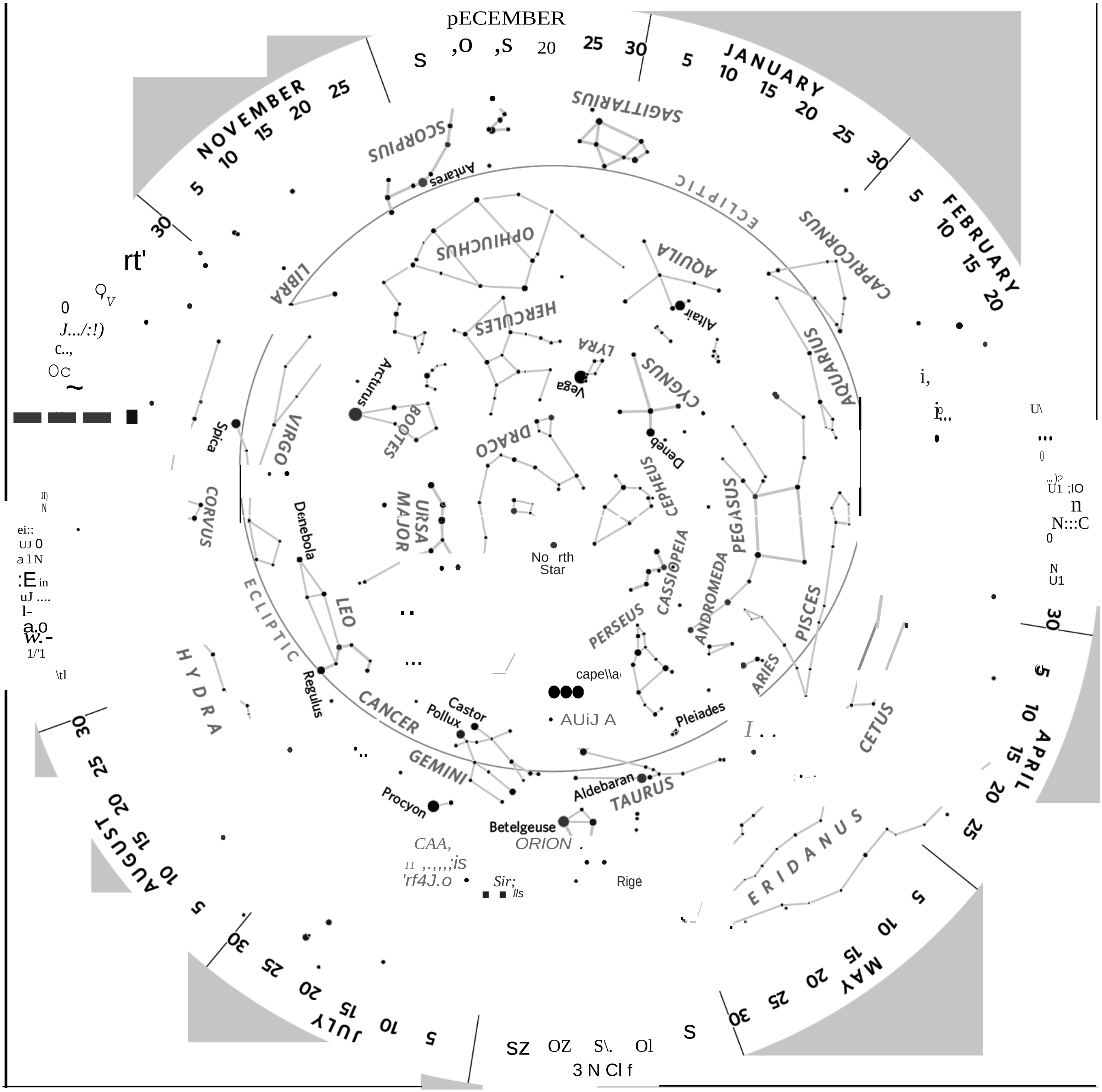


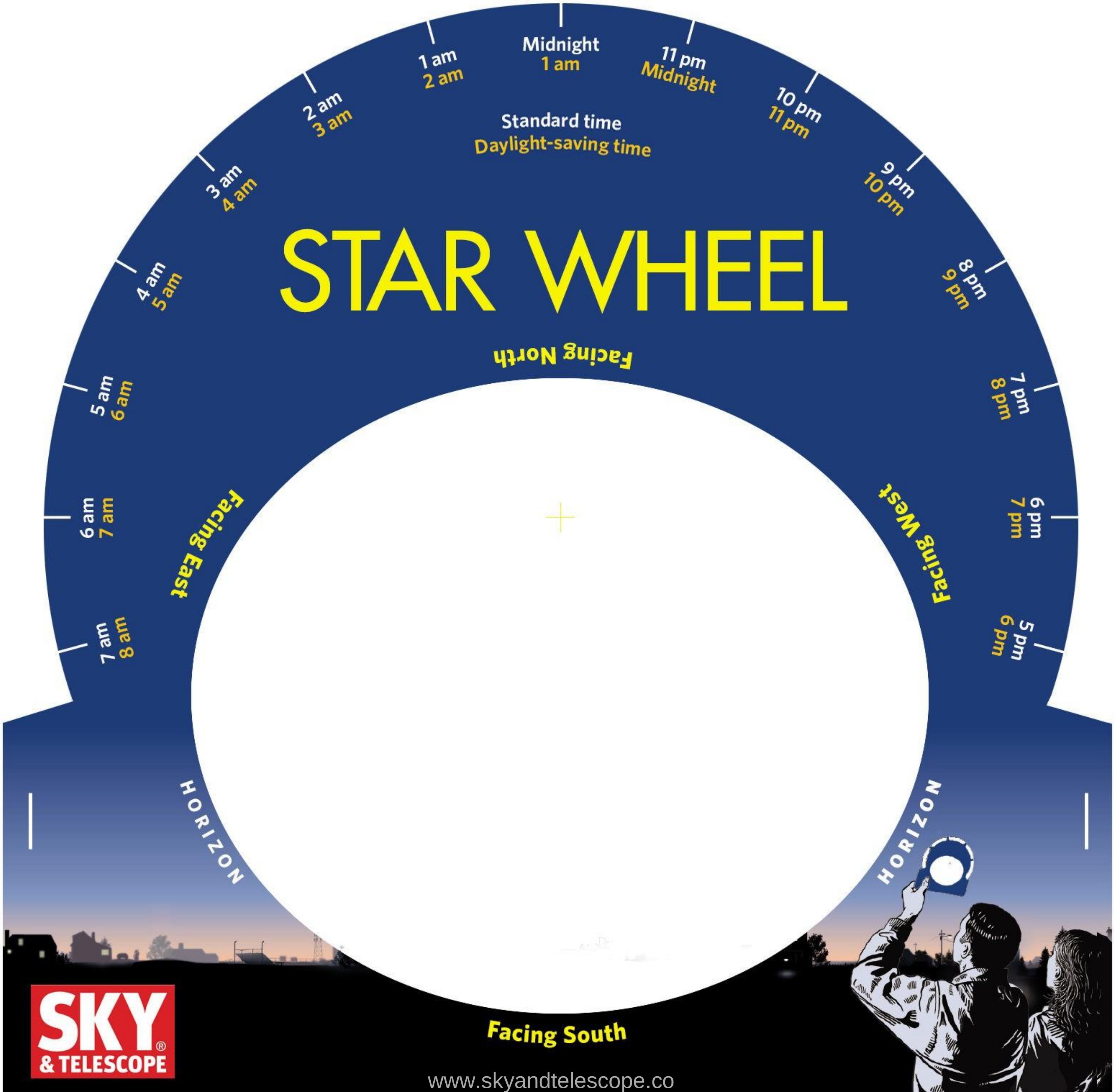
Location: Set from geolocation service

Latitude: 34° 58' N, longitude: 90° 03' W

Time: 2020 December 21, 21:00 (UTC -06:00)

Powered by: Heavens-Above.com


DECEMBER
JANUARY
FEBRUARY
APRIL
MAY
JULY
AUGUST
NOVEMBER
SAGITTARIUS
SCORPIUS
Antares
ECLIPTIC
OPHIUCHUS
CAPRICORNUS
AQUILA
Altair
LIBRA
HERCULES
LYRA
Vega
AQUARIUS
CYGNUS
Arcturus
BOOTES
DRACO
Deneb
Spica
VIRGO
CEPHEUS
PEGASUS
CORVUS
Denebola
URSA MAJOR
North Star
CASSIOPEIA
ANDROMEDA
PISCES
ECLIPTIC
LEO
PERSEUS
HYDRA
Regulus
ARIES
CANCER
Castor
Pollux
Pleiades
CETUS
GEMINI
Procyon
Aldebaran
TAURUS
Betelgeuse
ORION
ERIDANUS



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