

What's Out Tonight?

January 2020 Sky Chart

OPTIMIZED FOR
1½ HOURS
AFTER SUNSET

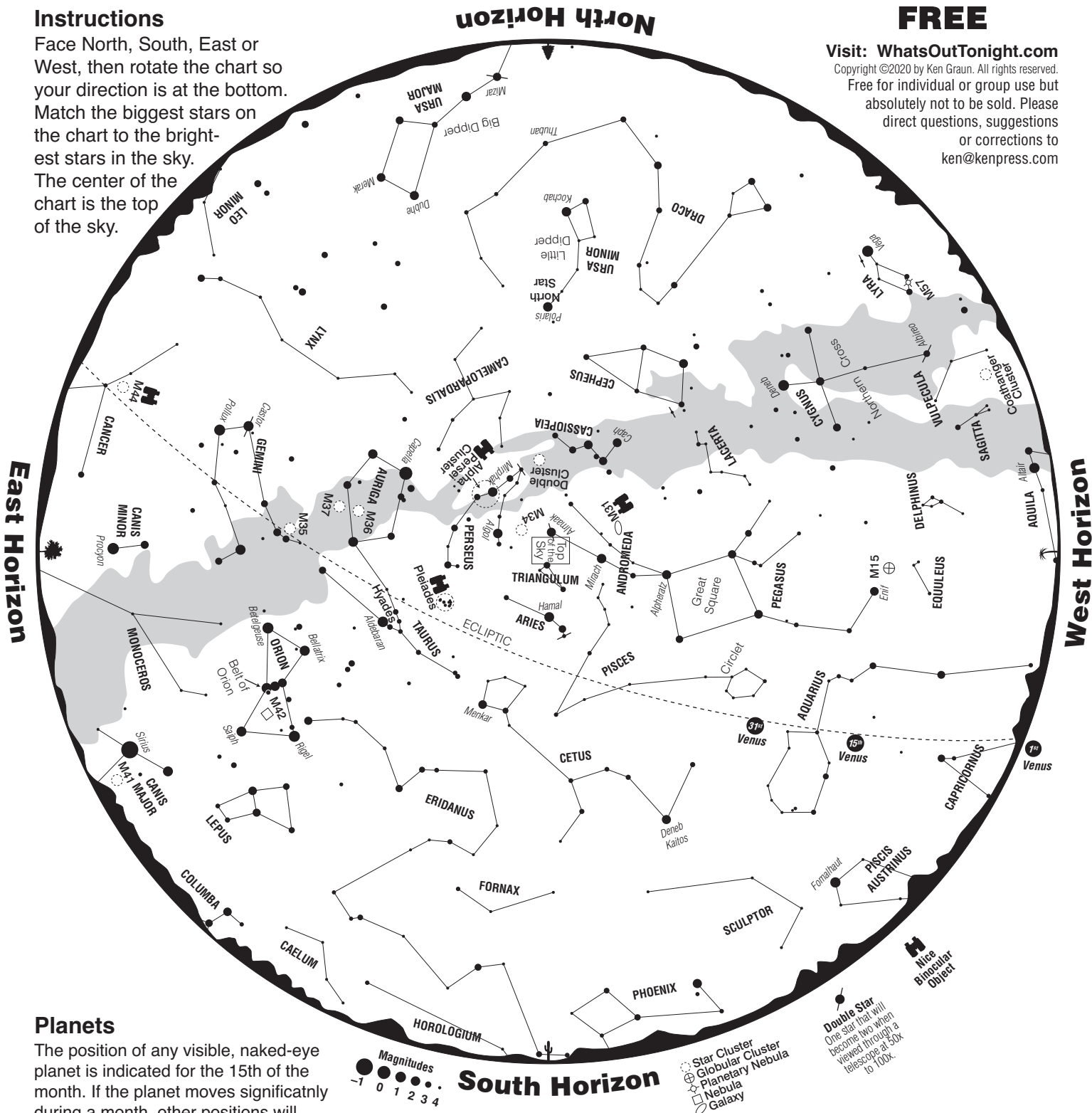
Instructions

Face North, South, East or West, then rotate the chart so your direction is at the bottom. Match the biggest stars on the chart to the brightest stars in the sky. The center of the chart is the top of the sky.

FREE

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Planets

The position of any visible, naked-eye planet is indicated for the 15th of the month. If the planet moves significantly during a month, other positions will be noted with dates. The **ECLIPTIC** is the path of the Sun through the sky but the planets and Moon move along it, too. It passes through the constellations of the zodiac.



South Horizon

- Star Cluster
- Globular Cluster
- ⊕ Planetary Nebula
- ☄ Nebula
- ☉ Galaxy

Double Star
One star that will become two when viewed through a telescope at 50x to 100x.

January 2020 Planet Notes

Venus (15th of month), at magnitude -4.0 , sets in the west about 3 hours after the Sun. **Mars**, at magnitude $+1.5$, at the top of Scorpius, rises in the east around 4 AM. **Jupiter**, at magnitude -1.8 , at the top of Sagittarius, rises in the east about 1 hour before the Sun. **Saturn**, at magnitude $+0.5$, is too close to the Sun to be seen.

Distances planets are from Earth the 15th of this month:
Venus: 111,000,000 miles, **Mars:** 195,000,000 miles
Jupiter: 576,000,000 miles, **Saturn:** 1,023,000,000 miles.

January Notes

Cygnus still lingers from summer, “standing” on the western horizon. High in the west is PEGASUS, which contains the **Great Square**. The **Andromeda Galaxy** is closeby in ANDROMEDA. On the eastern horizon is *Sirius*, the brightest star in the whole sky. Above are the bright constellations of ORION, TAURUS, AURIGA and GEMINI that dominate the sky. And, atop them all, high in the eastern sky is the **Pleiades**, best viewed with binoculars. **Orion’s belt** of 3 stars are easy to see and point toward Sirius. The names of these stars, from the top are: *Mintaka*, *Alnilam* & *Alnitak*. Nearby are the blood-red eye of TAURUS, the Bull and the even redder, Betelgeuse, physically one of the largest stars in the sky.

Clusters, Nebulae, Galaxies +

ly = Light year, a unit of distance. 1 ly = 6 trillion miles.

☛ **Alpha Persei Cluster**. Distance: 600 ly / Diameter: 31 ly / Mag 1.2 / Spans 3° / 30 stars. In PERSEUS.

☛ **Andromeda Galaxy**. Companion to our Milky Way Galaxy. Distance: 2,400,000 ly / Diameter: 120,000 ly / Mag 3.5 / Spans 3° x 1°. In ANDROMEDA.

Castor Double Star. Favorite double star. Need a telescope with 50x to 100x to see Castor separate into two stars. Magnitudes of two stars are 1.9 and 3.0. In GEMINI.

Double Cluster. Two side-by-side clusters. Distances: 7,200 ly / Diameters: 63 ly / Mag 3.5 / Span 1° / 320 stars total. Best in a telescope but visible with eyes in dark skies. In PERSEUS.

M15. Globular Cluster. Distance: 34,000 ly / Diameter: 122 ly / Mag 6.2 / Spans 13'. In PEGASUS

M35. Cluster. Distance: 3000 ly / Diameter: 24 ly / Mag 5 / Spans 28' / 200 stars. In GEMINI.

M34. Large Cluster. Distance: 1,400 ly / Diameter: 14 ly / Mag 5.2 / Spans 35' / 60 stars. Try with binoculars, too. In PERSEUS.

M36. Cluster. Distance: 3,700 ly / Diameter: 13 ly / Mag 6.0 / Spans 12' / 60 stars. Try with binoculars, too. In AURIGA.

M37. Cluster. Distance: 4,200 ly / Diameter: 29 ly / Mag 5.6 / Spans 24' / 150 stars. Try with binoculars, too. In AURIGA.

M42. Orion Nebula. Brightest nebula in the northern sky. About 30 ly in diameter and 1,760 ly away. Mag 4 / Spans 1°.

☛ **M44. Beehive Cluster**. Distance: 610 ly / Diameter: 16 ly / Mag 3 / Spans 1.6° / 50 stars. In CANCER.

☛ **Pleiades**. Cluster. Spans about 2° in sky or 4 Moon diameters. To the eyes, it looks like a little dipper but it is NOT the Little Dipper! Distance: 440 ly / Diameter: 15 ly / Mag 1.2 / 100 stars. In TAURUS.

Observing Tips

If possible, observe at a dark location and when the Moon is not bright. A bright Moon will make it more difficult to see the stars and impossible to see clusters, nebulae and galaxies. Only a small telescope at lower magnifications, around 50x, is required to see the objects listed above. The planets and Moon are best observed with a telescope around 100x. To get a feel for the size of objects, the Moon extends 30' (30 arc minutes). The binocular objects are best with binoculars because these objects are large in size—telescopes have too much magnification.

Meteor Showers

QUADRANTIDS. Peaks around **January 3** with 60–200 meteors/hour.

Brightest Stars

Aldebaran. In TAURUS. Magnitude +1. Distance: 65 ly. Orange Giant star 45 times the diameter of our Sun.

Betelgeuse. In ORION. Magnitude +0.56. Distance: 428 ly. Red Supergiant with a diameter 650 times the Sun’s.

Capella. In AURIGA. Magnitude +0.1. Distance: 42 ly. Diameter: 15 times the Sun’s. It’s actually 4 orbiting stars.

Castor. In GEMINI. Magnitude +1.6. Distance: 52 ly. Favorite double star that is twice the diameter of the Sun.

Deneb Kaitos. In CETUS. Magnitude +2.0. Distance: 96 ly. Smaller Giant star with diameter 17 times the Sun’s.

Mirach. In ANDROMEDA. Magnitude +2.1. Distance: 199 ly. Diameter: 89 times the Sun’s.

Mirphak. In PERSEUS. Magnitude +1.8. Distance: 592 ly. Diameter: 64 times the Sun’s.

Polaris. In URSA MINOR. Magnitude +2. Distance: 431 ly. 2,400 times brighter than the Sun. Supergiant star.

Pollux. In GEMINI. Magnitude +1.2. Distance: 34 ly. Diameter is 8.8 times the Sun’s & 46 times brighter.

Rigel. In ORION. Magnitude +1.3. Distance: 3200 ly. Diameter: 222 times the Sun’s. Blue-White Supergiant.

Sirius. Rising in CANIS MAJOR. Magnitude –1.44. Distance: 8.6 ly. The very brightest star in the whole sky but some planets, like Jupiter and Venus, are brighter. It has a diameter 1.8 times that of the Sun and is 23 times brighter. 7th closest star to us.

Mythology

FOR THE CENTRAL CONSTELLATIONS, NORTH TO SOUTH

King **CEPHEUS** and Queen **CASSIOPEIA** ruled Ethiopia. Their daughter **ANDROMEDA** is being rescued by **PERSEUS** from the Sea Monster, **CETUS**. Andromeda was to be sacrificed to Cetus because Cassiopeia boasted that her and her daughter’s beauty surpassed the gods.

PEGASUS, the Winged Horse is the deliverer of Jupiter’s thunderbolts. **PISCES** represents Venus and Cupid who changed themselves into Fishes tied with a length of string to stay together and escape the monster Typhoon.

AURIGA, the Charioteer supervised the royal livestock, including a goat that provided milk for growing Jupiter.

The **Pleiades** or Seven Sisters rise before **ORION**, out-of-reach of his amorous clutches. Orion is a great Hunter and battles the Bull, **TAURUS**. Below his feet is **LEPUS**, the Hare. **ERIDANDUS**, the River is before Orion, representing the water of life.

GEMINI is the warlike Twins, Pollux and Castor, protectors of seafarers. Pollux is immortal but Castor is not.

Moon Phases

- ☾ **First Quarter**. Thursday, **January 2**, 10:45 pm, CT
- ☽ **Full Moon**. Friday, **January 10**, 1:21 pm, CT
- ☾ **Third or Last Quarter**. Friday, **January 17**, 6:58 am, CT
- **New Moon**. Friday, **January 24**, 3:42 pm, CT

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What's Out Tonight?

Sky Chart Supplement

Clusters, Nebulae & Galaxies

An **Open Cluster** is a group of several to hundreds of stars that were born out of the same nebula cloud. A group often forms a pretty pattern. The Pleiades and Praesepe are great examples. Open clusters reside in our Milky Way Galaxy. Our Sun is no longer in its group.

Globular Clusters look like fuzzy balls because they contain tens of thousands stars held together by their mutual gravity. All of the globulars that can be seen in the sky are part of our Milky Way Galaxy, and there are about 200 of them that surround our galaxy like a halo. M22 in SAGITTARIUS is a northern favorite.

A **Planetary Nebula** is an old term that has nothing to do with the planets. Instead, it is a round or symmetrical nebula that is the shed atmosphere of a dying star. At its center is a white dwarf star. When our Sun dies, it will create a planetary nebula. These objects have diameters of a few light years and are located in our galaxy. The Ring Nebula, M57, in LYRA is a favorite.

A **Nebula** is a giant hydrogen gas cloud that is located in our galaxy. Within these clouds, concentrations of gas can occur and gravitationally condense to form stars and accompanying planets. A set of stars created by a nebula is known as an Open Cluster. The Orion Nebula, M42 is a favorite.

Galaxies contain billions of stars. All galaxies are beyond our Milky Way Galaxy, where our Sun resides. When you are observing a galaxy, you are looking through our galaxy into the true depths of the universe. The Andromeda Galaxy, M31 can be seen with the naked eye.

Double Stars

A Double Star is a star that looks like one star but when magnified sufficiently (from 6x to 200x), it separates into two or more stars. Some are very pretty because of contrasting colors. *Castor* in GEMINI is a favorite and *Albireo* in CYGNUS is well liked for its blue & gold colors.

Moon

Starting from New Moon, the Moon cycles through phases every 29 days, 12 hours, 44 minutes, 3 seconds. It is 2,160 miles in diameter and averages 239,000 miles from Earth. A New Moon is not visible in the sky because the Moon is positioned very close to the Sun. Solar eclipses occur at New Moon. The best time to observe the Moon is during a phase because the craters appear their sharpest near the terminator, the line that separates the lighted side (day side) from the dark side (night side).

Cycle of Moon Phases



Planets

The planets are best observed with a telescope using magnifications from 50x to 200x. The five naked-eye planets are Mercury, Venus, Mars, Jupiter and Saturn. Venus is extremely bright and hugs close to the Sun, so you see it for a short time in the west after sunset or in the east before sunrise. Jupiter can be out all night and always outshines any star. Everyone enjoys its 4 Galilean moons and cloud bands, easily visible at 50x. It is possible to see the moons with well-focused binoculars. Saturn is everyone's favorite because of its beautiful rings. Mars gets close to Earth about every 2 years at which time it is very bright. This is the best time to observe it but you need higher magnifications around 150x to see the surface coloration.

At arm's length...



One thumb width is 4 Moon diameters.



Orion's height is one hand span.



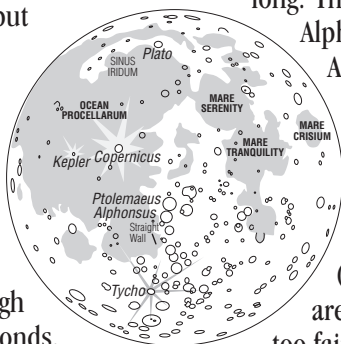
The width of a fist spans the Big Dipper's bowl.

	Diameter In Miles	Rotation Its Day	Distance from Sun In Miles	Revolution Its Year
SUN	865,000	30 days	—	—
MERCURY	3,032	59 days	36,000,000	88 days
VENUS	7,521	243 days	67,000,000	225 days
EARTH	7,926	24 hours	93,000,000	365 days
MARS	4,228	24.6 hours	142,000,000	687 days
JUPITER	88,844	9.8 hours	484,000,000	11.8 years
SATURN	74,900	10.2 hours	887,000,000	29 years
URANUS	31,764	17.9 hours	1,800,000,000	84 years
NEPTUNE	30,777	19.2 hours	2,800,000,000	164 years
PLUTO	1,433	6.4 days	3,700,000,000	248 years

Light Year (ly) & Nearest Stars

A Light Year (ly) is a unit of length and is equal to the distance light travels in one year. Since light moves at the speed of 186,282 miles a second, one light year is nearly 6 trillion miles long. The closest nighttime star visible to the naked eye is Alpha (α) Centauri in the constellation CENTAURUS. Alpha Centauri shines brightly at magnitude -0.01 and is just 4.4 light years away. The very closest star is Proxima in CENTAURUS at just 4.22 ly away. It is too faint to see with the eyes because it shines at magnitude $+11$. The second closest star visible to the naked eye is Sirius at 8.6 ly followed by Epsilon (ϵ) Eridani at 10.5 ly and Procyon at 11.4 ly. There are several stars closer than these three but they are too faint to be seen with the naked eye.

Our Moon



Guide to the Stars

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