What’s Out Tonight?

July 2020 Sky Chart

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.

Planets

The position of any visible, naked-eye planet is indicated for the 15th of the month with a size matching its magnitude. 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.

July 2020 Planet Notes

<table>
<thead>
<tr>
<th>Planet</th>
<th>Position</th>
<th>Magnitude</th>
<th>Rising Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venus</td>
<td>15th of month</td>
<td>-4.5</td>
<td>2.5 hours before the Sun.</td>
</tr>
<tr>
<td>Mars</td>
<td>15th of month</td>
<td>-0.8</td>
<td>Near Pisces, rises in the east around 11 PM.</td>
</tr>
<tr>
<td>Jupiter</td>
<td>15th of month</td>
<td>-2.8</td>
<td>Rises in the east about 8:30 PM.</td>
</tr>
<tr>
<td>Saturn</td>
<td>15th of month</td>
<td>+0.1</td>
<td>Rises around 9 PM.</td>
</tr>
</tbody>
</table>

Distances planets are from Earth the 15th of this month:

- **Venus**: 46,000,000 miles
- **Mars**: 68,000,000 miles
- **Jupiter**: 385,000,000 miles
- **Saturn**: 837,000,000 miles

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**July Notes**

At the top of the sky is HERCULES, containing the 4 stars of the Keystone and on one of its sides, the favorite globular cluster, M13. To its west side is CORONA BOREALIS and BOOTES, punctuated by Arcturus. The Big Dipper’s handle curves and points to Arcturus and then “speeds on” to Spica in VIRGO. To the east of Hercules is small LYRA and then, CYGNUS, the Northern Cross. The three stars, Vega, Deneb and Altair form the Summer Triangle. Due south, just above the horizon, is SCORPIUS and to its left SAGITTARIUS. The center to our Milky Way Galaxy lies in this direction, where a giant black hole resides. This is the thickest part of the Milky Way Band and is a great area to scan with binoculars—you will see many interesting objects and “clumps.”

SELECTED Clusters, Nebulae, Galaxies +

Albireo. This 3rd magnitude stars becomes two stars, a blue and gold splendor, in a telescope with just 50x.

Coma Cluster. Sprinkle of 40+ stars. Appears as a faint haze in dark skies. Spans 4.5°. In COMA BERENICES.

Coathanger Cluster. Ten stars that form the shape of a single-wire coathanger. In VULPECULA.

IC4665. A cluster of 30 stars that is best in binoculars. It spans an area larger than the Moon. In OPHIUCHUS.

Kemble’s Cascade. Twenty magnitude 8 stars in a 2.5° line. The middle star is a “bright” 6th mag. In CAMELopardalis.


M6. Similar to and above M7, this cluster also has 80 stars but it is a little fainter and 1/4 the size. In SCORPIUS.

M7. Ptolemy’s Cluster. A great cluster, nice in binoculars or telescope. About 80 stars at magnitude 3.3 spanning an area larger than the Moon. Can see as a “patch” with eyes. In SCORPIUS.


M22. Globular Cluster. Distance: 10,400 ly / Diameter: 88 ly / Mag 5.1 / Spans 29’. 100,000+ stars. In SAGITTARIUS.

M57. Ring Nebula (Planetary). Distance: 1360 ly / Diameter: 0.5 to 1 ly / Mag 9 / Spans 1.3’. In LYRA. Remnants of a dying star.


Mizar. Two stars with good eyes or binoculars. Three stars with a telescope at 50x. Located in the handle of the Big Dipper.

**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**

The Southern Delta AQUARIDS peak around July 29 with 20 meteors/hour.

**July Mythology**

FOR THE CENTRAL CONSTELLATIONS, NORTH TO SOUTH

Arcas and his beautiful mother, Callisto were turned into the Little and Big Bears, Ursa MINOR and MAJOR because of jealous Juno, wife of promiscuous Jupiter.

During a war between the Titans and Olympians, DRACO, the Dragon was flung to the North and frozen in place by the cold. CANES VENATICI are the Hunting Dogs of BOOTES who is sometimes seen as a Ploughman. CORONA BOREALIS is the crown of Bacchus, the god of wine.

HERCULES, the Strongman, was tasked with 12 labors to fulfill for a virtuous life.

LYRA, the Lyre was invented by Mercury and mastered by Apollo’s son, Orpheus whose music had magical powers.

Aquila is Jupiter’s Eagle that carries out tasks. SAGITTARIUS, the Archer is a warlike centaur.

CYGNUS, the Swan helped Helios find the pieces of his son, having fallen from the chariot that pulls the Sun across the sky.

Mother Earth lets the Scorpion, SCORPIUS crawl out of the great Milky Way crack to kill Orion, for boasting, but it is kept at bay by OPHIUCHUS, a Healer handling the Snake, SERPENS that has medicinal powers. LIBRA, the Scales, weighs the length of day and night.

When VIRGO, the Virgin is in the night sky, crops grow. The growing season ends when, in the early evening, she sets on the western horizon.

**Moon Phases**

- **Full Moon.** Saturday, July 4, 11:44 pm, CDT
- **Third or Last Quarter.** Sunday, July 12, 6:29 pm, CDT
- **New Moon.** Monday, July 20, 12:33 pm, CDT
- **First Quarter.** Monday, July 27, 7:32 am, CDT

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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 of 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. The nebulae we can see are inside our galaxy.

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

What’s Out Tonight?

Sky Chart Supplement

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 hangs 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.

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 rate 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.

Guide to the Stars

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