

but can be used after that for several more hours.

FREE

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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.



June Notes

At the top of the sky is the ice cream cone-shaped **BOOTES**, punctuated by *Arcturus*, the 3rd brightest star in the whole sky. To its east side is **CORONA BOREALIS** and **HERCULES**. Farther north is **URSA MAJOR**, containing the **Big Dipper** whose handle curves and points to *Arcturus* and then “speeds on” to *Spica* in **VIRGO**. Leo is dominate in the west with its reverse question mark, the **Sickle**, punctuated by the kingly star, *Regulus*. In the east, **CYGNUS**, the **Northern Cross**, lies on its side. Along the southwest horizon, you will find **SAGITTARIUS** and **SCORPIUS** and between them is the thickest part of the **Milky Way** band because it is the direction to center of our Milky Way galaxy where a giant black hole resides.

Clusters, Nebulae, Galaxies +

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

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” 5th mag. In **CAMELOPARDALIS**.

M4. Globular Cluster. Distance: 7,200 ly / Diameter: 68 ly / Mag 5.6 / Spans 30'. Contains 10,000+ stars. In **SCORPIUS**.

M13. Globular Cluster. Distance: 21,000 ly / Diameter: 104 ly / Mag 5.8 / Spans 17'. Contains 500,000 stars. In **HERCULES**.

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

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

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.

M81/82. Bode's Galaxies. Visible in many light polluted skies. M82 shaped like a cigar. Mags 6.8/8.1. In **URSA MAJOR**.

M104. Sombrero Galaxy. Distance: 48 million ly / Diameter: 126,000 ly / Mag 8.1 / Spans 9'. In **VIRGO**.

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

NEXT UP are the **Southern Delta AQUARIDS** which peak around **July 29** with 20 meteors/hour.

Brightest Stars

Antares. In **SCOPRIUS**. Magnitude +1.1. Distance: 604 ly. Diameter: 300 times the Sun's. Red Supergiant.

Altair. In **AQUILA**. Magnitude +0.9. Distance: 17 ly. It has a mass 1.75 times and brightness 11 times that of our Sun.

Arcturus. In **BOOTES**. Magnitude -0.04. Distance: 37 ly. Diameter: 26 times the Sun's. It's an Orange Giant.

Deneb. In **CYGNUS**. Magnitude +1.3. Distance: about 1500 ly. Burning fast & might supernova in a few million years.

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

Regulus. In **Leo**. Magnitude +1.4. Distance: 78 ly. Diameter: 3.5 times the Sun's & 140 times brighter.

Spica. In **VIRGO**. Magnitude +1.1. Distance: 262 ly. Actually two close stars revolving around each other in 4 days.

Vega. In **LYRA**. Magnitude +0.0. Distance: 25 ly. Rotates on axis once ever 12.5 hours. Mass is about 2.3 times our Sun.

June 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.

Regulus, the brightest star in **LEO**, the Lion, has several meanings including regal, king and mighty. Before him is **CANCER**, the Crab sent to prevent **HERCULES** from killing the nine-headed **HYDRA** as one of his twelve labors toward a virtuous life.

CORVUS was a bird placed in the heavens on Hydra's back by Apollo for being slow for bringing water and lying about his tardiness. **CRATER** represents the container of water that is always out of reach of Corvus.

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

☾ **Third or Last Quarter**. Wednesday, **June 2**, 2:24 am, CDT

● **New Moon**. Thursday, **June 10**, 5:53 am, CDT

☽ **First Quarter**. Thursday, **June 17**, 10:54 pm, CDT

☾ **Full Moon**. Thursday, **June 24**, 1:40 pm, CDT

What's Out Tonight?

June 2021 Sky Chart

Visit: WhatsOutTonight.com

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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. 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



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.

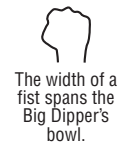
At arm's length...



One thumb width is 4 Moon diameters.



Orion's height is one hand span.

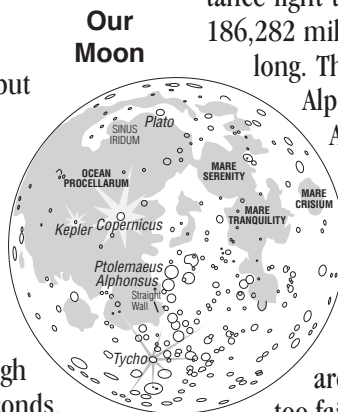


The width of a fist spans the Big Dipper's bowl.

	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 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

- 11-inch diameter, ISBN 1-928771-03-3
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