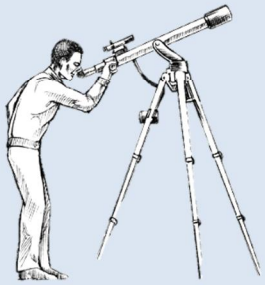
GM Astronomy Club



Newsletter

July 21, 2017

Welcome!

Welcome to the GM Astronomy Club's monthly observing night! We are excited to share the night sky with you and be a resource for your interest in astronomy. As we work to establish the club and grow our network, membership is free and open to every GM employee.

In addition to enjoying the planets and deep sky objects tonight, we hope you will also take this opportunity to meet new people and discuss activities you would like the club to host in the future. We plan to continue hosting a monthly observing night here at MPG, as well as a monthly sidewalk astronomy night in the warmer months. However, we could also explore options for daytime activities, guest speakers, and community outreach, provided there is interest and participation from our members.

We hope to provide a monthly newsletter with a guide to upcoming local events as well as celestial events. If there is any information you would like to add or any services you can provide for the club, please let us know.

Don't worry if you don't have a telescope, because you will find most amateur astronomers to be friendly and eager to share their equipment and knowledge with newcomers to the hobby.

Clear Skies!

Tonight's Observing Guide

Sunset	9:06pm
Civil twilight ends	9:39pm
Nautical twilight ends	10:21pm
Astronomical twilight ends	11:09pm

- We are two days away from the New Moon, so the Moon will not be visible tonight.
- Mercury visible, low in the western sky shortly after sunset, setting at 10:17pm.
- Jupiter visible in the southwestern sky, setting at 12:18am.
- Saturn visible in the southern sky, setting at 3:35am.
- Neptune visible late in the eastern sky, rising at 11:06pm
- Three iridium flares visible before midnight

Time	Brightness	Altitude	Azimuth	Satellite
Jul 21, 23:13:58	1.0	15°	273° (W)	Iridium 49
Jul 21, 23:23:07	-5.3	13°	275° (W)	Iridium 11
Jul 21, 23:32:17	-0.8	10°	276° (W)	Iridium 3
Jul 22, 03:38:29	-2.8	34°	137° (SE)	Iridium 13

- No ISS passes visible before midnight

Site Information

MPG Softball Fields
42°36'15"N 83°41'49"W (42.604167, -83.696944)
Elevation: 303 meters (995 ft)

MPG Security Emergency: +1 248 685 5911
Jim Goodall, Astronomy Club: +1 586 709 5888

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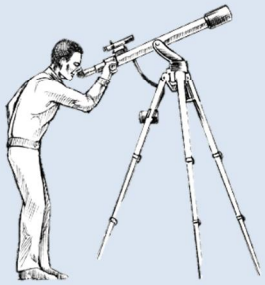

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Accessories

Head Lamp - Coleman Divide+ 225 lm LED Headlamp with Battery Lock - this to be a good headlamp for star parties because it has a red lamp and you don't have to cycle through all the bright modes to turn it on and off. It is also very bright when you need it to be.

Cell Phone Holder - Gosky Universal Cell Phone Adapter Mount – this is a fun accessory to have to take some basic images and share what you are seeing with others online.

Star Finder - The Night Sky 40°-50° (Large) Star Finder – this is nice to have on hand even if you don't have a telescope but wish to learn more about constellations.

Solar Eclipse Equipment - Celestron EclipSmart Ultra Solar Observing & Imaging Kit – this kit offers some basic items to view the eclipse come August.

Websites

GM Astronomy Club – astronomy.mpgunderground.com

The Sky Live – www.theskylive.com

Heavens Above – www.heavens-above.com

Stellarium – www.stellarium.org

Equipment

There are many different types of telescopes, and the choice is very much dependent on the interests of the individual, but these are some general recommendations:

Binoculars - Celestron SkyMaster – Celestron makes a few levels of binoculars if you are just starting out and not sure you want to buy a telescope or even if you want something small and compact to view space on the go.

Beginner Telescope - Orion 10014 SkyQuest XT4.5 Classic Dobsonian Telescope - this telescopeis easy to use and great for beginners. The size makes it easy to place on the ground for children to see.

General Telescope - Celestron Advanced VX 8in Schmidt-Cassegrain (SCT) Telescope: the Celestron C8 on an equatorial mount, an excellent scope for intermediate users. The long focal length lends well to planetary viewing, although it is still very capable for deep sky observing and astrophotography.

Sponsors

GM2020
Our Best At Work

The Evening Sky Map

FREE* EACH MONTH FOR YOU TO EXPLORE, LEARN & ENJOY THE NIGHT SKY

WWW.SKYMAPS.COM

NORTHERN HEMISPHERE
JULY 2017

Sky Calendar – July 2017

Get Sky Calendar on Twitter
http://twitter.com/skymaps

1 **First Quarter Moon** at 0:51 UT.

1 **Moon near Jupiter** (evening sky) at 9h UT. Mag. –2.0.

2 **Moon near Spica** (evening sky) at 5h UT.

3 **Earth at Aphelion** (farthest from Sun) at 20h UT. The Sun-Earth distance is 1.016676 a.u. or about 152.1 million km.

5 **Venus 6.6° SSE of the Pleiades** (43° from Sun, morning sky) at 8h UT. Mag. –4.1.

6 **Moon at apogee** (farthest from Earth) at 4h UT (distance 405,934 km; angular size 29.4').

7 **Moon near Saturn** (evening sky) at 4h UT. Mag. 0.1.

9 **Full Moon** at 4:07 UT.

10 **Mercury 0.3° NNE of Beehive cluster** (19° from Sun, evening sky) at 7h UT. Mag. –0.4.

13 **Venus 3.1° N of Aldebaran** (42° from Sun, morning sky) at 23h UT. Mags. –4.1 and 0.9.

16 **Last Quarter Moon** at 19:27 UT.

19 **Moon near the Pleiades** (morning sky) at 8h UT.

19 **Moon near Aldebaran** (48° from Sun, morning sky) at 22h UT. Occultation visible from SW Asia.

20 **Moon near Venus** (morning sky) at 12h UT. Mag. –4.0.

21 **Moon at perigee** (closest to Earth) at 17:13 UT (361,236 km; angular size 33.1').

23 **New Moon** at 9:46 UT. Start of lunation 1170.

25 **Moon near Mercury** (27° from Sun, evening sky) at 9h UT. Mag. 0.3.

25 **Moon near Regulus** (evening sky) at 10h UT. Occultation visible from west Indonesia.

25 **Mercury 0.9° SSW of Regulus** (27° from Sun, evening sky) at 22h UT. Mags. 0.3 and 1.4.

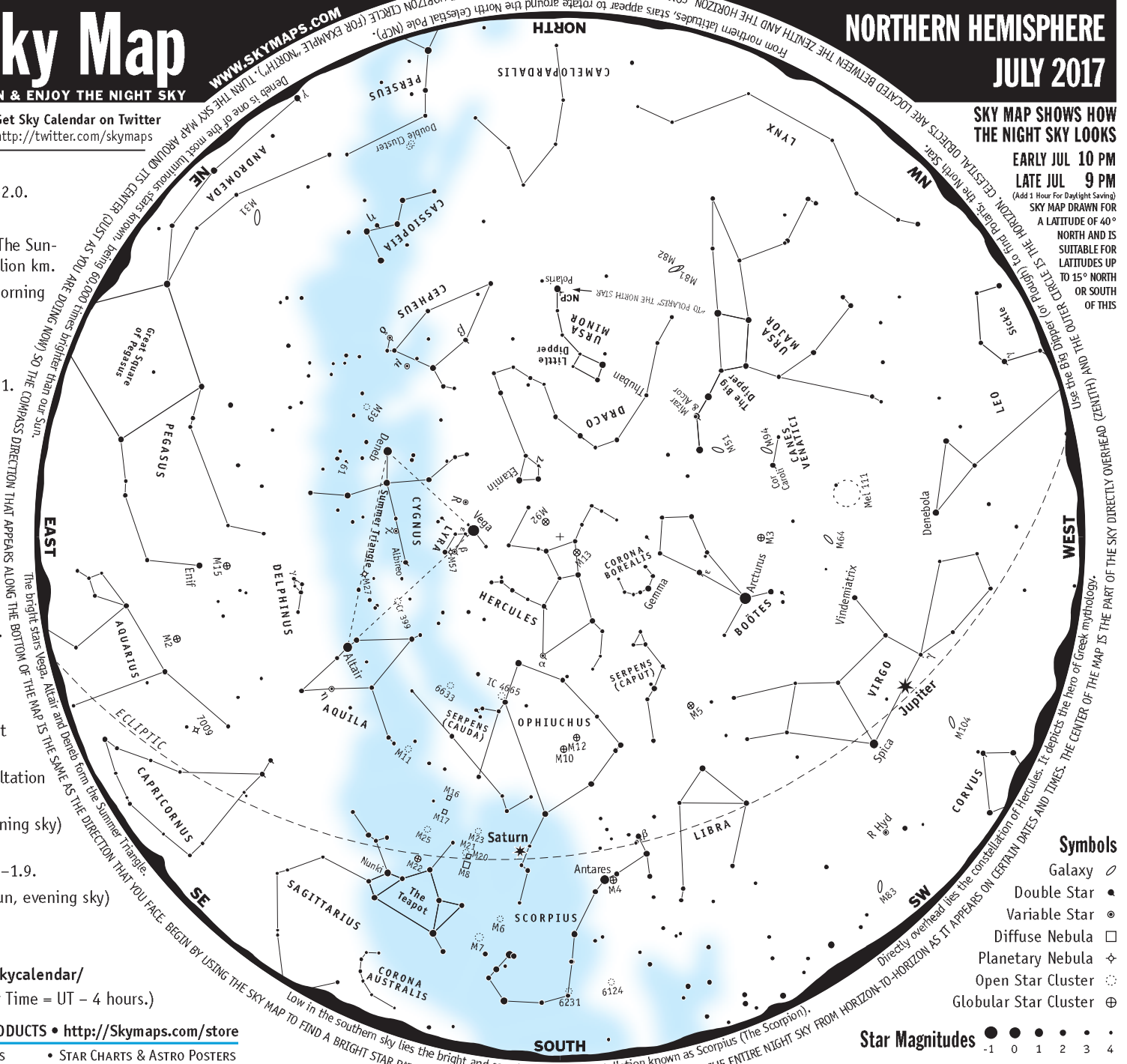
28 **Moon near Jupiter** (evening sky) at 22h UT. Mag. –1.9.

30 **Mercury at greatest elongation east** (27° from Sun, evening sky) at 5h UT. Mag. 0.4.

30 **First Quarter Moon** at 15:23 UT.

More sky events and links at http://Skymaps.com/skycalendar/

All times in Universal Time (UT). (USA Eastern Summer Time = UT – 4 hours.)



SKY MAP SHOWS HOW THE NIGHT SKY LOOKS
EARLY JUL 10 PM
LATE JUL 9 PM
(Add 1 Hour For Daylight Saving)
SKY MAP DRAWN FOR A LATITUDE OF 40° NORTH AND IS SUITABLE FOR LATITUDES UP TO 15° NORTH OR SOUTH OF THIS

Symbols
Galaxy
Double Star
Variable Star
Diffuse Nebula
Planetary Nebula
Open Star Cluster
Globular Star Cluster

Star Magnitudes -1 0 1 2 3 4

INSTRUCTIONS: THE SKY MAP SHOWS THE ENTIRE NIGHT SKY FROM HORIZON-TO-HORIZON AS IT APPEARS ON CERTAIN DATES AND TIMES. THE CENTER OF THE MAP IS THE PART OF THE SKY DIRECTLY OVERHEAD (ZENITH) AND THE OUTER CIRCLE IS THE HORIZON. CELESTIAL OBJECTS ARE LOCATED BETWEEN THE ZENITH AND THE HORIZON. COMPASS DIRECTIONS ARE INDICATED ALONG THE HORIZON CIRCLE (FOR EXAMPLE "NORTH"). TURN THE SKY MAP AROUND SO THAT YOUR DIRECTION FACES THE BOTTOM OF THE MAP.

About the Celestial Objects

Listed on this page are several of the brighter, more interesting celestial objects visible in the evening sky this month (refer to the monthly sky map). The objects are grouped into three categories. Those that can be easily seen with the naked eye (that is, without optical aid), those easily seen with binoculars, and those requiring a telescope to be appreciated. **Note, all of the objects (except single stars) will appear more impressive when viewed through a telescope or very large binoculars.** They are grouped in this way to highlight objects that can be seen using the optical equipment that may be available to the star gazer.

Tips for Observing the Night Sky

When observing the night sky, and in particular deep-sky objects such as star clusters, nebulae, and galaxies, it's always best to observe from a dark location. Avoid direct light from street lights and other sources. If possible observe from a dark location away from the light pollution that surrounds many of today's large cities.

You will see more stars after your eyes adapt to the darkness—usually about 10 to 20 minutes after you go outside. Also, if you need to use a torch to view the sky map, cover the light bulb with red cellophane. This will preserve your dark vision.

Finally, even though the Moon is one of the most stunning objects to view through a telescope, its light is so bright that it brightens the sky and makes many of the fainter objects very difficult to see. So try to observe the evening sky on moonless nights around either New Moon or Last Quarter.

Astronomical Glossary

Conjunction – An alignment of two celestial bodies such that they present the least angular separation as viewed from Earth.

Constellation – A defined area of the sky containing a star pattern.

Diffuse Nebula – A cloud of gas illuminated by nearby stars.

Double Star – Two stars that appear close to each other in the sky; either linked by gravity so that they orbit each other (binary star) or lying at different distances from Earth (optical double). Apparent separation of stars is given in seconds of arc (").

Ecliptic – The path of the Sun's center on the celestial sphere as seen from Earth.

Elongation – The angular separation of two celestial bodies. For Mercury and Venus the greatest elongation occurs when they are at their most angular distance from the Sun as viewed from Earth.

Galaxy – A mass of up to several billion stars held together by gravity.

Globular Star Cluster – A ball-shaped group of several thousand old stars.

Light Year (ly) – The distance a beam of light travels at 300,000 km/sec in one year.

Magnitude – The brightness of a celestial object as it appears in the sky.

Open Star Cluster – A group of tens or hundreds of relatively young stars.

Opposition – When a celestial body is opposite the Sun in the sky.

Planetary Nebula – The remnants of a shell of gas blown off by a star.

Universal Time (UT) – A time system used by astronomers. Also known as Greenwich Mean Time. USA Eastern Standard Time (for example, New York) is 5 hours behind UT.

Variable Star – A star that changes brightness over a period of time.

CELESTIAL OBJECTS

NORTHERN HEMISPHERE JULY 2017

Skymaps.com

Easily Seen with the Naked Eye

Altair	Aql	●	Brightest star in Aquila. Name means "the flying eagle". Dist=16.7 ly.
Arcturus	Boo	●	Orange, giant K star. Name means "bear watcher". Dist=36.7 ly.
δ Cephei	Cep	◉	Cepheid prototype. Mag varies between 3.5 & 4.4 over 5.366 days. Mag 6 companion.
Deneb	Cyg	●	Brightest star in Cygnus. One of the greatest known supergiants. Dist=1,400±200 ly.
α Herculis	Her	◉	Semi-regular variable. Magnitude varies between 3.1 & 3.9 over 90 days. Mag 5.4 companion.
Vega	Lyr	●	The 5th brightest star in the sky. A blue-white star. Dist=25.0 ly.
Antares	Sco	●	Red, supergiant star. Name means "rival of Mars". Dist=135.9 ly.
Polaris	UMi	●	The North Pole Star. A telescope reveals an unrelated mag 8 companion star. Dist=433 ly.
Spica	Vir	●	Latin name means "ear of wheat" and shown held in Virgo's left hand. Dist=250 ly.

Easily Seen with Binoculars

η Aquilae	Aql	◉	Bright Cepheid variable. Mag varies between 3.6 & 4.5 over 7.166 days. Dist=1,200 ly.
M3	CVn	⊕	Easy to find in binoculars. Might be glimpsed with the naked eye.
μ Cephei	Cep	◉	Herschel's Garnet Star. One of the reddest stars. Mag 3.4 to 5.1 over 730 days.
Mel 111	Com	☼	Coma Berenices. 80 mag 5-6 stars in 5 deg. Dist=283 ly. Age=400 million years.
χ Cygni	Cyg	◉	Long period pulsating red giant. Magnitude varies between 3.3 & 14.2 over 407 days.
M39	Cyg	☼	May be visible to the naked eye under good conditions. Dist=900 ly.
ν Draconis	Dra	●	Wide pair of white stars. One of the finest binocular pairs in the sky. Dist=100 ly.
M13	Her	⊕	Best globular in northern skies. Discovered by Halley in 1714. Dist=23,000 ly.
M92	Her	⊕	Fainter and smaller than M13. Use a telescope to resolve its stars.
ε Lyrae	Lyr	●	Famous Double Double. Binoculars show a double star. High power reveals each a double.
R Lyrae	Lyr	◉	Semi-regular variable. Magnitude varies between 3.9 & 5.0 over 46.0 days.
M12	Oph	⊕	Close to the brighter M10. Dist=18,000 ly.
M10	Oph	⊕	3 degrees from the fainter M12. Both may be glimpsed in binoculars. Dist=14,000 ly.
IC 4665	Oph	☼	Large, scattered open cluster. Visible with binoculars.
6633	Oph	☼	Scattered open cluster. Visible with binoculars.
M15	Peg	⊕	Only globular known to contain a planetary nebula (Mag 14, d=1"). Dist=30,000 ly.
M8	Sgr	□	Lagoon Nebula. Bright nebula bisected by a dark lane. Dist=5,200 ly.
M25	Sgr	☼	Bright cluster located about 6 deg N of "teapot's" lid. Dist=1,900 ly.
M22	Sgr	⊕	A spectacular globular star cluster. Telescope will show stars. Dist=10,000 ly.
M4	Sco	⊕	A close globular. May just be visible without optical aid. Dist=7,000 ly.
M6	Sco	☼	Butterfly Cluster. 30+ stars in 7x binoculars. Dist=1,960 ly.
M7	Sco	☼	Superb open cluster. Visible to the naked eye. Age=260 million years. Dist=780 ly.
M5	Ser	⊕	Fine globular star cluster. Telescope will reveal individual stars. Dist=25,000 ly.
Mizar & Alcor	UMa	●	Good eyesight or binoculars reveals 2 stars. Not a binary. Mizar has a mag 4 companion.
Cr 399	Vul	☼	Coathanger asterism or "Brocchi's Cluster". Not a true star cluster. Dist=218 to 1,140 ly.

Telescopic Objects

7009	Aqr	✧	Saturn Nebula. Requires 8-inch telescope to see Saturn-like appendages.
ε Boötis	Boo	●	Red giant star (mag 2.5) with a blue-green mag 4.9 companion. Sep=2.8". Difficult to split.
M94	CVn	⌀	Compact nearly face-on spiral galaxy. Dist=15 million ly.
M51	CVn	⌀	Whirlpool Galaxy. First recognised to have spiral structure. Dist=25 million ly.
M64	Com	⌀	Black-Eye Galaxy. Discovered by J.E. Bode in 1775 - "a small, nebulous star".
Albireo	Cyg	●	Beautiful double star. Contrasting colours of orange and blue-green. Sep=34.4".
61 Cygni	Cyg	●	Attractive double star. Mags 5.2 & 6.1 orange dwarfs. Dist=11.4 ly. Sep=28.4".
γ Delphini	Del	●	Appear yellow & white. Mags 4.3 & 5.2. Dist=100 ly. Struve 2725 double in same field.
β Lyrae	Lyr	◉	Eclipsing binary. Mag varies between 3.3 & 4.3 over 12.940 days. Fainter mag 7.2 blue star.
M57	Lyr	✧	Ring Nebula. Magnificent object. Smoke-ring shape. Dist=4,100 ly.
M23	Sgr	☼	Elongated star cluster. Telescope required to show stars. Dist=2,100 ly.
M20	Sgr	□	Trifid Nebula. A telescope shows 3 dust lanes trisecting nebula. Dist=5,200 ly.
M21	Sgr	☼	A fine and impressive cluster. Dist=4,200 ly.
M17	Sgr	□	Omega Nebula. Contains the star cluster NGC 6618. Dist=4,900 ly.
M11	Sct	☼	Wild Duck Cluster. Resembles a globular through binoculars. V-shaped. Dist=5,600 ly.
M16	Ser	□	Eagle Nebula. Requires a telescope of large aperture. Dist=8,150 ly.
M81	UMa	⌀	Beautiful spiral galaxy visible with binoculars. Easy to see in a telescope.
M82	UMa	⌀	Close to M81 but much fainter and smaller.
M27	Vul	✧	Dumbbell Nebula. Large, twin-lobed shape. Most spectacular planetary. Dist=975 ly.