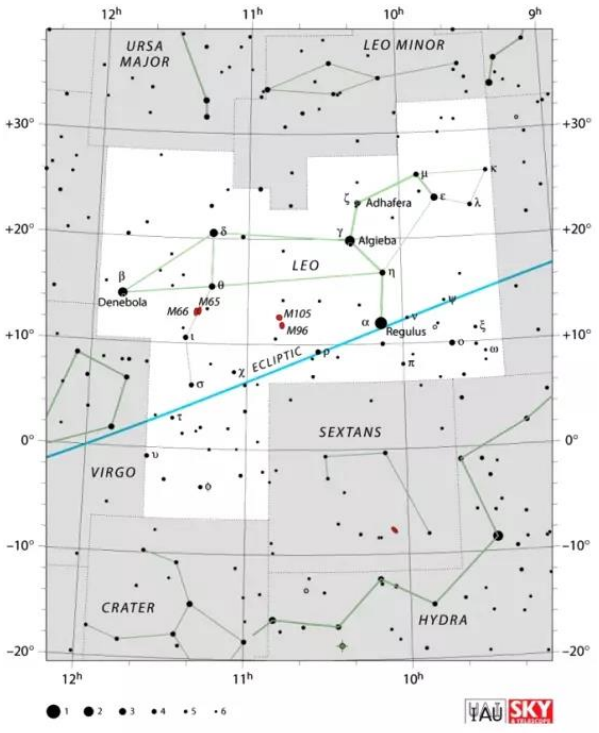
St Benedict's NIGHT SKY NEWS – Mar 2023

St Benedict's is a member of the **SOCIETY FOR POPULAR ASTRONOMY** and receives regular newsletters regarding astronomical events and information. If you would like to be included on the mailing list for these, please contact JGregory@st-benedicts.suffolk.sch.uk

STARS IN YOUR EYES

March is the month of the Spring Equinox when winter transitions into spring and we really begin to notice how the days are getting longer. However, the nights are still long and dark enough for stargazers to admire the constellations. This month we shall feature a constellation that is almost as instantly recognisable as last month's Orion – **LEO**, the "Lion".



In the northern hemisphere, the constellation of Leo is easily seen during spring, particularly around the spring equinox during the months of March, April, and May. It can be seen soon after sunset, looking to the south-east, and for most of the night as it moves westwards until sunrise.

Leo is one of the easiest constellations to spot and the best way to start is by looking for its bright blue-white star Regulus or "Alpha Leonis." Located at the bottom of Leo's backward question-marked sickle from Regulus skywatchers can trace out the head of Leo by spotting its second brightest star and the brightest in the curve of the sickle, Algeiba, which means "the lion's mane." The rest of the sickle of Leo is made up of the fainter stars ζ Leo (Adhafera), μ Leo (Ras Elased Borealis), and ε Leo (Ras Elased Australis).

After spotting the lion's head, skywatchers may next want to trace its haunches and its tail, which are formed by a triangle of stars the brightest of which is Denebola, or the "tail of the lion."

Leo is one of the twelve constellations that comprise the zodiac with the others being Aries, Taurus, Gemini, Cancer, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius, and Pisces. They were all first catalogued by Ptolemy in the 2nd century. It follows the naming convention of these groupings taking its name from an animal.

Leo's brightest star, Regulus, at mag 1.3 is only the 22nd brightest star in the world's skies, but it is notable. Regulus appears as a single star to the unaided eye, but it is in fact a multiple star system consisting of two pairs of stars and possibly more components. The components are designated as Alpha Leonis (Regulus) A, B, C, and D. Regulus A is a spectroscopic binary system consisting of a large (subgiant) blue-white main sequence star and a dim companion that has not yet been seen directly, but is believed to be a white dwarf.

Regulus A is unusual in that it rotates at a very fast rate. It is nearly 4x more massive than our Sun and has a rotation period at of just under 16 hours – our Sun takes 24.5 days for its rotation! As a result of its high rotational velocity, the star's shape has been distorted into a highly oblate spheroid, with its equatorial diameter 32 percent larger than its diameter at the poles. Regulus is one of the best known examples of gravity darkening. Due to the star's oblate shape, its poles are closer to the centre of mass and have a higher temperature and brightness, while the equatorial region is cooler and less bright. The poles are said to be "gravity brightened," while the equator is "gravity darkened." The poles of Regulus are five times brighter than the equator.

LEO - the myth Leo is one of the oldest constellations in the sky. Archaeological evidence suggests that Mesopotamians had a constellation similar to Leo as early as 4000 BC. The Persians knew the constellation as Shir or Ser, Babylonians called it UR.GU.LA ("the great lion"), Syrians knew it as Aryo, and the Turks as Artan. Babylonians knew the star Regulus as "the star that stands at the Lion's breast," or the King Star. Both the constellation and its brightest star were well-known in most ancient cultures.

Of the mythological tales associated with the constellation of Leo, arguably the best known is Hercules' battle with the Nemean lion. A fierce monster of Greek mythology, Hercules (or Heracles) had to battle the beast as part of his first of 12 labours. The lion lived in a cave in Nemea, a town located to the south-west of Corinth. It set upon the local inhabitants and could not be defeated because it had impenetrable skin. Heracles could not defeat the lion with arrows, so he trapped it in its cave, grappled with the beast and eventually defeated it.

The Nemean lion was so feared because while its golden mane protected it from any assault, its claws were sharper than any weapon forged by humanity. Hercules defeated the lion when Athena instructed him to use the lion's own claw as a weapon against it. He used the lion's claws to cut off its pelt, and then wore the pelt as a cloak, complete with the lion's head. The cloak both protected Hercules and made him appear even more fearsome.

LEO – in Egypt Following last month's controversial theory about the stars of Orion's belt being used by the ancient Egyptians to locate the three Great Pyramids of Giza, there is also a theory about the constellation Leo.

Leo was an important constellation to the ancient Egyptians who associated it with the flooding of the Nile. This event occurred during the hottest time of year, also when the Sun entered Leo. The flooding of the Nile was a good omen as the event was for thousands of years a source of irrigation transforming arid and dry land into fertile regions. This means they held Leo in high regard. It is also inescapable to note the likeness between the shape of the constellation Leo – a reclining lion – and the Sphinx at Giza.

The Sphinx has become part of the **Orion Correlation Theory**. The Great Sphinx of Giza is commonly accepted by Egyptologists to represent the likeness of King Khafre who is often credited as the builder as well. This would place the time of construction somewhere between 2520 BC and 2494 BC. Because the limited evidence giving provenance to Khafre is ambiguous, the idea of who built the Sphinx, and when, continues to be the subject of debate. Indeed, the Orion Correlation Theory puts the Sphinx's construction back considerably to around 10,500 BC. The theory proposes that the Sphinx's lion-shape is a definitive reference to the constellation of Leo; and that the layout and orientation of the Sphinx, the Giza pyramid complex and the Nile River are an accurate reflection or "map" of the constellations of Leo, Orion (specifically, Orion's Belt) and the Milky Way, respectively.

It must be stressed, once again, that the Orion Correlation Theory is controversial and not widely accepted – it is often referred to as *pseudoarchaeology* – however, it may provide an insight into how the ancient Egyptians may have been influenced by astronomical observations.

THE MOON THIS MONTH

PHASE

Full Moon	7th
3rd Quarter	15th
New Moon	21st
1st Quarter	29th

March's Full Moon goes by the name **WORM MOON**. For many years, it was thought that this name referred to the earthworms that appear as the soil warms in spring. This invites robins and other birds to feed—a true sign of spring! However, more research revealed another explanation. In the 1760s, Captain Jonathan Carver visited the Naudowessie (Dakota) and other Native American tribes and wrote that the name Worm Moon refers to a different sort of "worm"—beetle larvae—which begin to emerge from the thawing bark of trees and other winter hideouts at this time of year.

There are quite a few names for the March Moon that speak of the transition from winter to spring. Some refer to the appearance (or reappearance) of certain animals, such as the **Eagle Moon**, **Goose Moon** (Algonquin, Cree), or **Crow Comes Back Moon** (Northern Ojibwe), while others refer to signs of the season: The **Sugar Moon** (Ojibwe) marks the time of year when the sap of sugar maples starts to flow. The **Wind Strong Moon** (Pueblo) refers to the strong windy days that come at this time of year. The **Sore Eyes Moon** (Dakota, Lakota, Assiniboine) highlights the blinding rays of sunlight that reflect off the melting snow of late winter.

March's full Moon often plays a role in religion, too. Specifically, in Christianity, this Moon is known as the **LENTEN MOON** if it is the last full Moon of the winter season (i.e., if it occurs before the spring equinox) or as the **PASCHAL FULL MOON** if it is the first full Moon of spring (i.e., if it occurs after the spring equinox). This year, March's full Moon (March 7, 2023) occurs before the spring equinox (March 20, 2023), making it the Lenten Moon. April's full Moon (April 6, 2023) will be the first full Moon to occur after the spring equinox and will therefore determine the date of Easter this year.

Easter 2023 will be observed on **Sunday, April 9**. Easter is a "movable feast" that is always held on a Sunday between March 22 and April 25, but why do the Easter dates change (but Christmas doesn't)?

Easter Sunday always occurs on the first Sunday after the Paschal Full Moon. This is specifically the first Sunday following the full Moon that occurs on or after the March or spring equinox (see above).

While Christmas is fixed to a solar calendar (and near the winter solstice), Easter is based on the lunar cycles of the Jewish calendar. In the Christian religion, the Last Supper (which was the final meal Jesus shared with his apostles before his crucifixion) was a Passover feast. It's because Easter is based on a lunar month (which is 29.5 days) that the date of Easter can really vary. Note that the spring equinox date used by the Christian Church is always March 21 just to simplify matters. In fact, the astronomical date of the equinox can shift by a day or so. In 2023, the astronomical date of the equinox is Sunday, March 20. So, you'll often see this called the "ecclesiastical" equinox (i.e., the date used by the Church).

This discrepancy between the astronomical equinox date and the Church's observed equinox date can sometimes cause confusion, as it did in 2019, when the full Moon and the astronomical equinox occurred on the same day—Wednesday, March 20. This should have meant that Easter would be observed on Sunday, March 24. However, because the Church observes the equinox on March 21, the full Moon technically did not occur "on or just after" the equinox, meaning that the next full Moon would determine Easter's date instead. Thus, in 2019, Easter was held on Sunday, April 21, after the full Moon on Friday, April 19!

THE PLANETS THIS MONTH

Not a good month for planet spotters – sorry!

MERCURY: Too close to the Sun to be seen this month.

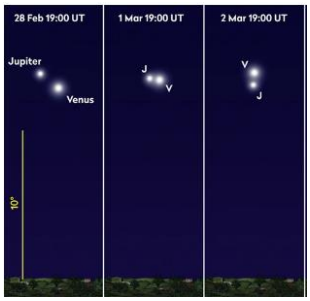
VENUS: Is a very bright (mag -4.0) "evening star".

MARS: Visible in the evening sky to the south, becoming fainter by the end of the month.

JUPITER: Evening planet becoming poorly placed close to the Sun by the end of the month.

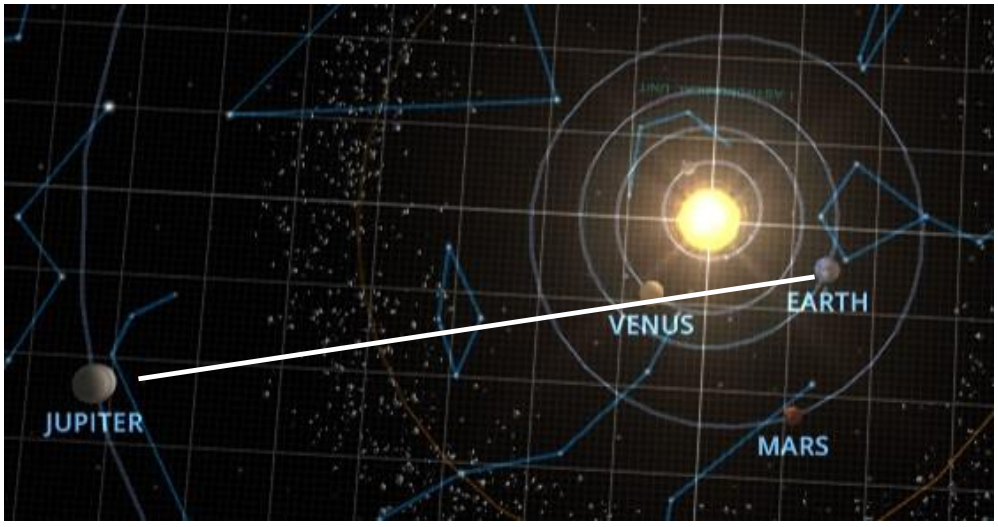
SATURN: Will be lost in the morning twilight.

A CLOSE ENCOUNTER: VENUS and JUPITER on MAR 1 and 2.



Between Feb 28 and Mar 5 Venus and Jupiter will be very close in the western evening sky after sunset, best seen at around 7pm. They will appear particularly close on Mar 1 and 2 after which their separation will increase over successive nights (see image, right).

The apparent closeness of these two planets in the sky is due to the fact that they are merely "in line of sight" and not physically close. The actual distance between them is around 650 million kilometres. The image below shows the true positions of the planets in the Solar System on the evening of March 1.



METEORS THIS MONTH

There are no major meteor showers this month. However, the Earth is constantly passing through bits of ice and rock as it orbits the Sun, so you can spot a single meteor at any time if you're lucky.

METEOR REPORT – MONDAY 13th FEBRUARY - METEOROID LIGHTS UP SKY ABOVE ENGLISH CHANNEL

A small meteoroid entered the Earth's atmosphere and was seen lighting up the sky above the English Channel shortly before 03:00 GMT on Monday 13TH February, creating a stunning shooting star effect. The size of the object was estimated to be about 1m across.

The remarkable thing about this event was that it was predicted in advance – only the 7th time such a prediction has been possible. The **International Meteor Organization**, a Belgium-based non-profit organisation, said the object would have entered about 4km (2.5 miles) from the French coast, and would create a "fireball" effect. This is indeed what happened and there were many observers out and about to photograph the event.

The metre-sized meteoroid (small asteroid) was spotted only about 7 hours before entering the Earth's atmosphere by a Hungarian astronomer, Krisztián Sárneczky. At this time it was around 233,000 km distant. Sárneczky immediately recognized it was a "near-Earth object" but did not realize it was on course for impact with Earth until he reobserved it half an hour later. Sárneczky gave the object the temporary designation **Sar2667** and reported the discovery to the Minor Planet Center's (MPC's) Near-Earth Object Confirmation Page at 20:49 UTC, calling for further follow-up from other observatories around the world. Astronomers at Višnjan Observatory in Tičan, Croatia observed the asteroid starting at 21:03 GMT and confirmed that it was headed for impact with Earth. The object was renamed **2023 CX_1**. The European Space Agency (ESA) took notice of the asteroid's impending impact and alerted the public through social media.

At 02:59:21 GMT, 2023 CX_1 entered the atmosphere at a velocity of 14.5 km/s (9.0 mi/s) with an inclination 40–50° relative to the vertical. As the meteoroid travelled eastward over the English Channel to the coast of Normandy, France, it experienced significant atmospheric drag and began burning up as a bright meteor at an altitude of 89 km (55 mi). The meteor was seen by witnesses from France, Great Britain, Belgium, the Netherlands, and northern Spain. The meteor began fragmenting at an altitude of 29 km (18 mi) and then completely broke apart at 28 km (17 mi), producing a bright flash due to the rapid vaporization of its fragments.

ISS SIGHTING TIMETABLE

To check the latest sighting times, use the following link:

Newmarket, England, United Kingdom | Sighting Opportunity | Spot The Station | NASA

Date	Visible	Max Height*	Appears	Disappears
Wed Mar 1, 4:45 AM	3 min	82°	80° above SW	10° above E
Thu Mar 2, 3:59 AM	2 min	26°	26° above E	10° above E
Thu Mar 2, 5:32 AM	5 min	68°	21° above W	10° above ESE
Fri Mar 3, 4:46 AM	4 min	77°	66° above WSW	10° above ESE
Sat Mar 4, 4:00 AM	2 min	30°	30° above E	10° above E
Sat Mar 4, 5:33 AM	5 min	44°	18° above W	10° above SE
Sun Mar 5, 3:14 AM	< 1 min	9°	9° above E	10° above E
Sun Mar 5, 4:47 AM	4 min	56°	53° above SW	10° above ESE
Mon Mar 6, 4:01 AM	2 min	25°	25° above ESE	10° above ESE
Mon Mar 6, 5:34 AM	5 min	25°	16° above WSW	10° above SSE
Tue Mar 7, 4:48 AM	3 min	34°	33° above SSW	10° above SE
Wed Mar 8, 4:02 AM	1 min	17°	17° above SE	10° above SE
Wed Mar 8, 5:34 AM	3 min	13°	11° above WSW	10° above SSW
Thu Mar 9, 4:49 AM	1 min	16°	16° above SSW	10° above S

PRINCIPAL SOURCES OF INFORMATION

https://www.constellation-guide.com/constellation-list/leo-constellation/
https://www.space.com/16845-leo-constellation.html
https://www.almanac.com/content/full-moon-march
https://www.almanac.com/content/when-is-easter
https://www.bbc.co.uk/news/uk-64621721
https://www.skyatnightmagazine.com/advice/skills/astronomy-guide-viewing-planets-night-sky/