

St Benedict's Catholic Secondary School 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, as well as our monthly *Night Sky News*, please contact: JGregory@st-benedicts.suffolk.sch.uk

### **STARS IN YOUR EYES**

For most people the fact that the days now begin to lengthen is welcomed. Not so the hardcore, winter stargazers. Although there are the magnificent southern sky constellations that will dominate well into March-April, this month's *News* has decided to follow last month's example and feature a lesser known, and somewhat fainter, northern sky constellation: **DRACO**.



To find Draco, go out at around 20:00 and use the tip in November's *News* to find the North Pole Star, **Polaris**, in its constellation **Ursa Minor**. Directly below and winding to either side of Ursa Minor will be the extended constellation that is **Draco**.

Although it has 17 officiallynamed stars, only 3 of them are brighter than magnitude 3.0 and the brightest of these is only magnitude 2.3. You will therefore need a good, dark sky with minimal light pollution.

The brightest star is *Eltanin* ( $\gamma$  Draconis - Gamma Draconis) which is at the extreme left, western, end of the constellation and a good place to start.

Although Draco is not particularly bright, it is actually the eighth largest constellation in the night sky, occupying an area of 1083 square degrees. Draco belongs to the **Ursa Major family** of constellations, along with Coma Berenices, Boötes, Camelopardalis, Canes Venatici, Corona Borealis, Leo Minor, Lynx, Ursa Major and Ursa Minor.



Draco is one of the **Greek constellations** and was first catalogued by the Greek astronomer **Ptolemy** in the 2nd century. It is also a **circumpolar constellation**, so it never sets below the horizon from the UK. The constellation represents **Ladon**, the dragon that guarded the gardens of the Hesperides in Greek mythology. The name Draco means "the dragon" in Latin. As you might expect, there are numerous, colourful myths associated with Draco. Most frequent is the story about the 12 labours of **Heracles**, represented by the neighbouring constellation **Hercules**. In the myth, Draco represents **Ladon**, the dragon that guarded the golden apples in the gardens of the **Hesperides**. The golden apple tree was a wedding present to **Hera** when she married **Zeus**. She planted the tree in her garden on **Mount Atlas** and tasked Atlas' daughters, the **Hesperides**, with guarding it. She also placed the dragon Ladon around the tree so that the Hesperides would not pick any apples from it.

As part of his **12 labours**, **Heracles** was asked to steal some golden apples from the tree. He defeated Ladon with his poisoned arrows and took the apples. Saddened by the dragon's passing, Hera placed its image in the sky among the depicted coiled around the North Pole, with one foot of Heracles on its head

constellations. Draco is usually depicted coiled around the North Pole, with one foot of Heracles on its head

### THE MOON THIS MONTH

#### **PHASE**

2nd
9th
17th
25th

The January Moon, unsurprisingly, is often referred to as the **Cold Moon** for obvious reasons. Another name that derives from the Northern Hemisphere where wolves are native is **WOLF MOON**.

It's thought that January's Moon came to be known as the Wolf Moon because wolves were more likely to be heard howling at this time. It was traditionally believed that wolves howled due to hunger during winter, but we know



today that wolves howl for different reasons. Howling and other wolf vocalisations are generally used to define territory, locate pack members, reinforce social bonds, and coordinate hunting.

Many of the Moon's nicknames have come to us from Native American culture because for their way of life, the cycles of the lunar phases were just as important a method of timekeeping as the longer solar cycle of the year (from which the modern Gregorian calendar is derived). The number of Moon names differs slightly from tribe to tribe, but many assign either 12 or 13 full moons to the year. These names were then adopted by the Colonial Americans and have entered popular culture.

## THE PLANETS THIS MONTH

**MERCURY**: An evening planet just after sunset. Best time is the first half of the month.

<u>VENUS</u>: Starts the month as an "evening star" until the 9<sup>th</sup>. Venus watchers will have noticed that throughout the last few weeks it has been sliding closer to sunset in the sky. This is because its orbit is taking it between the Earth and the Sun to a point called *Inferior Conjunction*. This will occur on the 9<sup>th</sup> when Venus will be on a line between the Earth and the Sun. Thereafter it will be seen as a "morning star" becoming notably brilliant by the end of the month at magnitude -4.5.

MARS: The "red planet" can be seen in the morning rising about 2 hours before the Sun. It will brighten as the month progresses.

<u>JUPITER</u>: Still seen as a bright evening planet to the south west. It will follow Saturn setting in the west and after the end of the month will be gone to our sight until seen again as a morning object, following Saturn, later in the spring/early summer.

**<u>SATURN</u>**: Last chance to see Saturn as it sets in the west not long after sunset and we shall not see it again until later in the spring when it will be visible, low to the eastern horizon, as a morning object.



Stargazers are mostly thought of as evening or late night folk, but there is also much to be seen in the night sky just before dawn. For those who want to take their dog for an early morning walk, set the alarm for 06:30 on the 29<sup>th</sup>, get outside and look to the south-eastern horizon. Sunrise will not be until 07:44, so the sky will still be dark enough for you to see the crescent Moon forming a line with faint Mars and brilliant Venus.

Note also that this crescent Moon is not a "New Moon". It is actually rather "old" as it is entering its  $3^{rd}$  quarter before being lost to our view as the February new Moon, after which we shall see it again as a thin crescent  $1^{st}$  quarter Moon before sunset in the west at the beginning of February.

Did you know that NASA has opened a bar/restaurant on the Moon?

The problem is that, although the food is great, there's no atmosphere.

### **METEORS THIS MONTH**

Early January sees the peak of one of the strongest and most consistent meteor showers of the year: the **QUADRANTIDS** and, on a good clear night, they could reach a maximum of up to 120 per hour.

The shower officially runs from 28<sup>th</sup> December to 12<sup>th</sup> January, with its peak coming in the early hours of the 4<sup>th</sup> January. Unlike most meteor showers whose peaks may be spread out over 2-3 days, the Quandrantids have a very sharply defined peak that lasts for only a few hours. Being a new Moon period, the sky will not be awash with moonlight, so if you are somewhere where there is minimal light pollution, there might be a good show.

The radiant point is located in the constellation **Boötes**, which will be high in the east. The constellation is easily found as it contains one of the night sky's brightest and distinctive stars, the red-giant **Arcturus**. You may ask where the name Quadrantids comes from, given that the radiant point is in the constellation Boötes? Why are they not called the Boötids? The reason is that they are named, historically, after a former (now obsolete) constellation, **Quadrans Muralis**, which is now part of Boötes.

Quadrantids are also known for their bright fireball meteors. Fireballs are larger explosions of light and colour that can persist longer than an



average meteor streak. This is due to the fact that fireballs originate from larger particles of material. Fireballs are also brighter, with magnitudes brighter than -3.

Unlike most meteor showers which originate from comets, the Quadrantids originate from an asteroid: asteroid **2003 EH1**. Asteroid 2003 EH1 takes 5.52 years to orbit the sun once. It is possible that 2003 EH1 is a "dead comet" or a new kind of object being discussed by astronomers called a "**rock comet**."

2003 EH1 was discovered on Mar. 6, 2003 by the Lowell Observatory Near-Earth Object Search (LONEOS). 2003 EH1 is a small asteroid—its diameter measures only about two miles (three kilometres) across. It was astronomer and research scientist Peter Jenniskens who realized that 2003 EH1 is the source for the Quadrantid meteors.

### **ISS SIGHTING TIMETABLE**

The timetable is kept up to date online at relatively short notice. Although the January sightings seem to be restricted to just the first few days of the month, it is possible that further sighting opportunities will be posted later. Keep fully up to date throughout the month by visiting the official website:

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

You can also sign up to receive daily alerts (email/text) notifying you of sighting opportunities on those days.

Date	Visible	Max Height	Appears	Disappears
Sat Jan 1, 4:31 AM	< 1 min	<b>11</b> °	11° above E	10° above E
Sat Jan 1, 6:04 AM	4 min	61°	$50^\circ$ above WSW	10° above ESE
Sun Jan 2, 5:18 AM	2 min	30°	30° above ESE	10° above ESE
Sun Jan 2, 6:50 AM	5 min	28°	15° above W	10° above SSE
Mon Jan 3, 4:31 AM	< 1 min	<b>11</b> °	11° above E	10° above E
Mon Jan 3, 6:04 AM	4 min	38°	36° above SW	10° above SE
Tue Jan 4, 5:18 AM	2 min	27°	27° above SE	10° above SE
Tue Jan 4, 6:51 AM	4 min	15°	11° above WSW	10° above S
Wed Jan 5, 6:04 AM	2 min	21°	21° above SSW	10° above SSE
Thu Jan 6, 5:18 AM	1 min	16°	16° above SSE	10° above SSE

#### PRINCIPAL SOURCES OF INFORMATION

 Draco Constellation (the Dragon): Stars, Myth, Facts, Location | Constellation Guide (constellation-guide.com)

 Moon Phases 2022 - Lunar Calendar for London, England, United Kingdom (timeanddate.com)

 Wolf Moon: See the Full Moon in January 2022 | The Old Farmer's Almanac

 Viewing the planets in 2022, month by month - BBC Sky at Night Magazine

 Quadrantid meteor shower: when and where to see it in the UK | Royal Museums Greenwich (rmg.co.uk)

 In Depth | Quadrantids - NASA Solar System Exploration

# JAMES WEBB SPACE TELESCOPE HAS LAUNCHED!

Intended as a successor to the aging Hubble Space Telescope, the long-delayed James Webb is named after NASA's administrator during the 1960s. NASA partnered with the European and Canadian space agencies to build and launch the new 7-ton telescope, with thousands of people from 29 countries working on it since its conception in 1989.

Although a launch date in 2005 was originally intended, frustrating delays and problems during the build phase, including a major replanning, meant that the launch would be put back considerably until 2015 at the earliest. As it turned out, the final construction (including the crucial main mirror) was not completed until 2016 after which there would have to be extensive testing. Although a 2018 launch looked possible, this date came and went too as a variety of issues were identified. These would not be resolved until 2020.

And so it came to be that after construction was finished and JWST completed final tests at a Northrop Grumman factory in Redondo Beach, California, a ship carrying the telescope left California on 26 September 2021, passed the Panama Canal, and arrived in French Guiana on 12 October 2021. There it was carefully loaded onto its launch vehicle, an Ariane 5 rocket.



#### At 12:20 GMT on December 25th Ariane flight VA256 lifted off from launchpad ELA-3 carrying the JWST.

Why all the fuss? Two things, really:

- 1. Having now turned 30 Hubble, although still operational, is prone to hardware and software issues arising that will not be resolvable. This was brought into sharp focus earlier this year when a huge ground-based effort managed to fix a potentially career-ending problem. We may not be so fortunate next time.
- 2. Hubble "sees" the Universe in visible and UV wavelengths. However, if we want to resolve the most distant objects and effectively look back in time to the earliest years after the "Big Bang", we need to search in the infrared and that is exactly what JWST is designed to do

#### Webb's 10-year primary mission will address four key science areas:

- Trace the evolution of galaxy formation
- Study star and planetary system formation
- Characterize exoplanetary systems and look for possible signs of life
- Observe some of the earliest stars that formed after the Big Bang

The telescope's primary mirror, 6.5 metres (21 feet) across, is made of 18 hexagonal gold-plated beryllium segments, resulting in a telescope 100 times more powerful than the 2.4-metre Hubble. Along with the Vera C. Rubin Observatory on the ground and the upcoming Nancy Grace Roman Space Telescope, Webb promises to push back the boundaries of modern astronomy. While missions such as NASA's Spitzer Space Telescope and the European Space Agency's Hershel Space Observatory have given us a tantalizing view of the infrared universe, Webb will blow the doors wide open on this field of astronomy. "Webb will be transformative for astronomical research, just as Hubble has been," says Heidi Hammel (NASA/GSFC). "Webb's infrared capabilities will open up a new frontier for imaging and spectroscopy."

The artist image opposite shows the JWST in its fully deployed form. However, it could not be launched into space like this and therefore had to be carefully folded, origami-style, in order to fit into the payload bay of the Ariane rocket – see image below. Once in space and released from the rocket, JWST will be carefully unfolded in a series of pre-programmed operations.



It will take at least 5 weeks to stabilise JWST in its final orbital position, after which there will be at least 5 months during which all systems will be acclimatised to their space environment and accurately calibrated.



There are many novel aspects to this mission including the fact that, unlike other space telescopes, JWST will <u>not</u> be placed in Earth orbit! More about this next time.

*Night Sky News* will have a regular feature providing the latest news on JWST's progress. <u>Webb's Launch GSFC/NASA</u> <u>What Will the James Webb Space Telescope Uncover? - Sky & Telescope - Sky & Telescope</u> (skyandtelescope.org)