List of Astronomical Events for 2017

Phases of the Moon

New Moon
(Not Visible)

Half Moon – First Quarter
(Visible: 6pm-12am)

Full Moon
(Visible: 8pm-6am)

Half Moon – Third Quarter
(Visible: 1am-8am)

Special Moon Dates	
9 Jun 2017	Micro Full Moon (Full Moon at its furthest distance from the Earth)
7 – 8 Aug 2017	Partial Lunar Eclipse
22 Aug 2017	Black Moon (Third New Moon in a season with four New Moons)
3 Dec 2017	Super Full Moon (Full Moon at its nearest distance from the Earth)

Moon phases on Fridays

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
6th First Quarter	3rd Waxing Crescent	3rd Waxing Crescent	7th Waxing Gibbous	5th Waxing Gibbous	2nd Waxing Gibbous	7th Waxing Gibbous	4th Waxing Gibbous	1st Waxing Gibbous	6th Full Moon	3rd Waxing Gibbous	1st Waxing Gibbous
13th Waning Gibbous	10th Full Moon	10th Waxing Gibbous	14th Waning Gibbous*	12th Waning Gibbous	9th Full Moon	14th Waning Gibbous*	11th Waning Gibbous*	8th Waning Gibbous	13th Waning Crescent*	10th Waning Gibbous*	8th Waning Gibbous*
20th Third Quarter*	17th Waning Gibbous*	17th Waning Gibbous*	21st Waning Crescent	19th Third Quarter*	16th Waning Gibbous*	21st Waning Crescent*	18th Waning Crescent*	15th Waning Crescent*	20th New Moon*	17th Waning Crescent*	15th Waning Crescent*
27th New Moon*	24th Waning Crescent*	24th Waning Crescent*	28th Waxing Crescent*	26th New Moon*	23rd Waning Crescent*	28th Waxing Crescent	25th Waxing Crescent	22nd Waxing Crescent*	27th Waxing Crescent	24th Waxing Crescent	22nd Waxing Crescent
		31st Waxing Crescent			30th Waxing Crescent			29th Waxing Gibbous			29th Waxing Gibbous

*Not visible during the Observatory opening hours of 7.45pm – 10.00pm.

Planets

The table below indicates the months in which you can view the planets.

Planet	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mercury	O	O			O	O			O			O
Venus				O	O	O	O	O	O	O	O	
Mars									O	O	O	O
Jupiter	O	O	O	O							O	O
Saturn	O	O	O	O	O	O						
Uranus*												
Neptune*												

*Uranus and Neptune require telescopes to be seen.
Mercury, Venus, Mars, Jupiter and Saturn can be seen with the unaided eye or with binoculars. Pluto and other dwarf planets are not visible.

O Morning Sky (5.00 am – 7.00 am)

Evening Sky (8.00 pm – 10.30 pm)

Planetary events

Oppositions (outer planets only) – Alignments between the Sun, Earth and an outer planet such as Mars, Jupiter, Saturn, Uranus or Neptune. During this time the planet is seen at its brightest and fullest. During an opposition, the planets will generally be visible after 9pm.
Conjunctions – Alignments of the planets or stars such that they appear very close to each other in the sky, when observed from Earth.
Elongations – The angle between the planet and the Sun from the Earth's view. The planet will be at its highest point in the sky at greatest elongation.

Date	Significant Planetary Events	Remarks
12-Jan	Venus - Greatest Eastern Elongation	Venus reaches greatest eastern elongation of 47.1 degrees from the Sun.
19-Jan	Mercury - Greatest Western Elongation	Visible in Singapore from 05.32am to about 07.00am, no higher than 18˚ above the south-eastern horizon. Mercury reaches greatest western elongation of 24.1 degrees from the Sun.

1-Apr	Mercury - Greatest Eastern Elongation	Visible in Singapore from 19.24pm to about 20.18pm, no higher than 12˚ above the western horizon. Mercury reaches greatest eastern elongation of 19 degrees from the Sun.
7-Apr	Jupiter - Opposition	Alignment of Jupiter, Earth and Sun. Jupiter at its fullest and brightest.
17-May	Mercury - Greatest Western Elongation	Visible in Singapore from 05.19am to about 06.40am, no higher than 18˚ above the eastern horizon. Mercury reaches greatest western elongation of 25.8 degrees from the Sun.
3-Jun	Venus - Greatest Western Elongation	Venus reaches greatest western elongation of 45.9 degrees from the Sun at 13.58pm Singapore time.
15-Jun	Saturn - Opposition	Alignment of Saturn, Earth and Sun. Saturn at its fullest and brightest.
30-Jul	Mercury - Greatest Eastern Elongation	Mercury reaches greatest eastern elongation of 27.2 degrees from the Sun. It will be low in the western sky (21˚) just after sunset.
5-Sep	Neptune - Opposition	(Neptune is generally not visible from Singapore due to light pollution and cloud cover.) Alignment of Neptune, Earth and Sun. Neptune at its fullest and brightest.
12-Sep	Mercury - Greatest Western Elongation	Not visible in Singapore. Mercury reaches greatest western elongation of 17.9 degrees from the Sun.
19-Oct	Uranus - Opposition	Alignment of Uranus, Earth and Sun. Uranus at its fullest and brightest.
13-Nov	Conjunction of Venus and Jupiter	Venus and Jupiter appear in close proximity in the early morning before sunrise at the eastern horizon.
24-Nov	Mercury - Greatest Eastern Elongation	Mercury reaches greatest eastern elongation of 22.0 degrees from the Sun. It will be low in the western sky (no more than 17˚) just after sunset.

Meteor Showers

Every year, on specific dates, the Earth travels through several areas of debris left over from comets or passing asteroids. This debris consists of rock or ice particles, similar to grains of sand. As Earth collides with these particles, they streak through the atmosphere, resulting in bright flashes as they burn up. We see these bright flashes as meteors.

Timings & Rates: Meteor showers are best viewed between midnight and sunrise on the peak dates.
The highest rate of meteors usually occurs between 2am-5am. The rates given below are estimates for the best viewing conditions requiring clear, dark skies. Brightly lit, urban environments like Singapore will see significantly fewer meteors. Light from the moon, if visible, will reduce visibility as well.

Origins: This indicates the comet or asteroid from which the debris originates. The comet/asteroid is not visible at the time of the meteor shower.

Radiant: This indicates the point/constellation in the sky where the meteors appear to start from. The peak rate usually occurs after the radiant has risen above the horizon. However, there is no need to look directly at the radiant as meteor travel out in all directions and can be seen at a variety of distances from the radiant, therefore a clear open view of most of the sky is important for observing meteor showers.

Peak Date	Moon Phase	Meteor Shower Name	Details
Jan 4th & 5th	Waxing Crescent	Quandrantids	**Estimated Rate**: 40 – 80/hr **Origin**: Minor Planet 2003 EH_1 & Comet C/1490 Y1 **Radiant:** Bootes
April 22nd & 23rd	Waxing Crescent	Lyrids	**Estimated Rate**: 20/hr **Origin**: Comet C/1861 G1 Thatcher **Radiant:** Lyra
May 6th & 7th	Waxing Gibbous	Eta Aquariids	**Estimated Rate**: 20 – 40/hr **Origin**: Comet 1P/Halley (Halley's Comet) **Radiant:** Aquarius
July 29th & 30th	Waxing Crescent	Southern Delta Aquariids	**Estimated Rate**: 20/hr **Origin**: Comet 96P/Machholz **Radiant:** Aquarius
August 12th & 13th	Waning Gibbous	Perseids	**Estimated Rate**: 60 – 80/hr **Origin**: Comet 109P/Swift-Tuttle **Radiant:** Perseus
Oct 8th & 9th	Waning Gibbous	Draconids	**Estimated Rate**: 10/hr

			Origin: Comet 21P/Giacobini-Zinner **Radiant:** Draco
Oct 22nd	New Moon	Orionids	**Estimated Rate**: 15/hr **Origin**: Comet 1P/Halley (Halley's Comet) **Radiant:** Orion
Nov 5th	Waning Gibbous	Taurid	**Estimated Rate**: 10/hr **Origin**: Comet 2P/Encke (2nd) **Radiant:** Taurus
Nov 17th & 18th	New Moon	Leonids	**Estimated Rate**: 15/hr **Origin**: Comet 55P/ Tempel-Tuttle **Radiant:** Leo
Dec 13th & 14th	Waxing Crescent	Geminids	**Estimated Rate**: 120/hr **Origin**: Asteroid 3200 Phaethon **Radiant:** Gemini
Dec 22nd & 23rd	New Moon	Ursids	**Estimated Rate**: 10/hr **Origin**: Comet 8P/Tuttle **Radiant:** Ursa Minor

Reference: Shower Calendar 2017, International Meteor Organisation, http://imo.net/files/data/calendar/cal2017.pdf , in-the-sky.org/ and http://www.seasky.org/astronomy/astronomy-calendar-2017.html

Eclipses of 2017

Eclipses occur during an alignment of the Sun, Earth and Moon, resulting in the Sun's light being blocked and a shadow being cast on either the Earth or the Moon.
Each eclipse is only visible in a small number of locations.
The location of an eclipse depends on the Earth's position and tilt, the time, duration and precision of the alignment.

There are two main types of eclipses:
Solar Eclipse: The New Moon moves directly between the Sun and Earth, blocking out the Sun in certain locations on Earth. Always occurs in the daytime.
Lunar Eclipse: The Full Moon moves directly behind the Earth. The Moon becomes covered by Earth's shadow.

Date	Eclipse type	Location & Visibility
11th February	Penumbral Lunar Eclipse	This eclipse is hardly visible as the Moon starts to be covered by Earth's outer shadow at 6.34am, maximum eclipse at 7.12am and moonset at 7.14am.
26th February	Annular Eclipse	Not visible from Singapore.
8th August	Partial Lunar Eclipse	Visible from Singapore, from 01.22am to 03.18am.
21st August	Total Solar Eclipse	Not visible from Singapore.

Reference: https://www.timeanddate.com/eclipse/list.html