

List of Astronomical Events for 2011

(Singapore Timezone: UT/GMT +8 hrs)

Phases of the Moon



New Moon
(Not Visible)



Half Moon – 1st Quarter
(Visible: 6pm-12am)



Full Moon
(Visible: 8pm-6am)



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

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New Moon	4 th	3 rd	4 th	3 rd	3 rd	1 st	1 st	-	-	-	-	-
Half Moon (1st Quarter)	12 th	11 th	13 th	11 th	10 th	9 th	8 th	6 th	4 th	4 th	2 nd	2 nd
Full Moon	19 th	18 th	19 th	18 th	17 th	15 th	15 th	13 th	12 th	12 th	10 th	10 th
Half Moon (last Quarter)	26 th	24 th	26 th	25 th	24 th	23 rd	23 rd	21 st	20 th	20 th	18 th	18 th
New Moon	-	-	-	-	-	-	30 th	29 th	27 th	26 th	25 th	24 th

Planets

The table below indicates the months in which you can view the planets in both the evening sky and morning sky.

Evening Sky (7:30pm-11pm)

Planet	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mercury							●				●	
Venus											●	●
Mars	----- Not visible in the evening until 2012 -----											
Jupiter	●	●								●	●	●
Saturn				●	●	●	●	●	●			
Uranus*									●	●	●	●
Neptune*								●	●	●	●	●

Morning Sky (5am-7am)

Planet	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Mercury	●				●							●
Venus	●	●	●	●	●							
Mars					●	●	●	●	●	●	●	●
Jupiter					●	●	●	●	●	●		
Saturn	●	●	●								●	●
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.

Date	Significant Planetary Events	Remarks
8 th Jan	Venus - Greatest western elongation	Highest point in the morning sky. (47° high at sunrise)
9 th Jan	Mercury Greatest western elongation	Highest point in the morning sky. (23° high at sunrise)
4 th Feb	Mars - Conjunction with Sun	Alignment of Earth, Sun & Mars. Mars directly behind Sun, therefore not visible.
25 th Feb	Mercury - Superior conjunction	Alignment of Earth, Sun & Mercury. Mercury behind Sun, therefore not visible.
23 rd Mar	Mercury - Greatest eastern elongation	Highest point in the evening sky. (19° high at sunset, maybe too low to see)
4 th Apr	Saturn - At opposition	Alignment of Saturn, Earth & Sun. Saturn at its fullest and brightest.
6 th Apr	Jupiter - Conjunction with Sun	Alignment of Jupiter, Sun & Earth. Jupiter directly behind Sun and not visible.
9 th Apr	Mercury - Inferior conjunction	Alignment of Sun, Mercury & Earth. Mercury in front of Sun and not visible.
7 th May	Mercury - Greatest western elongation	Highest point in the morning sky. (27° high at sunrise)
13 th Jun	Mercury - Superior conjunction	Alignment of Earth, Sun & Mercury. Mercury behind Sun, therefore not visible.
20 th July	Mercury - Greatest eastern elongation	Highest point in the evening sky. (27° high at sunset)
16 th Aug	Venus - Superior conjunction	Alignment of Earth, Sun & Venus. Venus behind Sun, therefore not visible.
17 th Aug	Mercury - Inferior conjunction	Alignment of Sun, Mercury & Earth. Mercury in front of Sun, therefore not visible.
22 nd Aug	Neptune - At opposition	Alignment of Neptune, Earth & Sun. Neptune at its fullest and brightest.
3 rd Sept	Mercury – Greatest western elongation	Highest point in the morning sky. (18° high at sunrise, maybe too low to see)
25 th Sept	Uranus - At opposition	Alignment of Uranus, Earth & Sun. Uranus at its fullest and brightest.
28 th Sept	Mercury - Superior conjunction	Alignment of Earth, Sun & Mercury. Mercury behind Sun, therefore not visible.
13 th Oct	Saturn - Conjunction with Sun	Alignment of Saturn, Sun & Earth. Saturn directly behind Sun and not visible
29 th Oct	Jupiter - At opposition	Alignment of Jupiter, Earth & Sun. Jupiter at its fullest and brightest.
14 th Nov	Mercury – Greatest eastern elongation	Highest point in the evening sky. (23° high at sunset)
4 th Dec	Mercury - Inferior conjunction	Alignment of Sun, Mercury & Earth. Mercury in front of Sun, therefore not visible.
23 rd Dec	Mercury - Greatest western elongation	Highest point in the morning sky. (22° high at sunrise)

Eclipses of 2011

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. Always occurs at night.

Date	Eclipse type	Location & Visibility
4 th Jan	Partial Solar Eclipse	Europe, North Africa, Middle East. Not visible in Singapore
1 st Jun	Partial Solar Eclipse	Arctic and North America. Not visible in Singapore
15 th Jun	Total Lunar Eclipse	India and South-East Asia Visible in Singapore: 2:20am – 6am (16th Jun) Mid-eclipse: 3:20am-5:05am
1 st July	Partial Solar Eclipse	Antarctica Not visible in Singapore
25 th Nov	Partial Solar Eclipse	Antarctica Not visible in Singapore
10 th Dec	Total Lunar Eclipse	Asia and Australia Visible in Singapore: 8pm – 1:30am Mid eclipse: 10pm-11pm

Meteor Showers

Every year, on specific dates the Earth travels through several areas of debris left over from a comet or passing asteroid. This debris consists of rock or ice particles similar to grains of sands. As Earth collides with these particles, they streak through the atmosphere, resulting in a bright flash as they burn up.

Timings & Rates: Meteor showers are best viewed between midnight and sunrise on the peak dates. The highest rate of meteors usually occurs around 2am-5am. The rates given below are estimates for the best seeing conditions requiring clear, dark skies.

Brightly lit, urban environments like Singapore will see significantly less meteors.

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.

Radiants: 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	Meteor Shower Name	Details
Jan 3 rd & 4 th	Quadrantids	Estimated Rate: 40/hr Origin: Comets C/1490 Y1 & C/1385 U1 Radiant: Bootes
April 21 & 22	Lyrids	Estimated Rate: 20/hr Origin: Comet Thatcher Radiant: Lyra
May 5 & 6	Eta Aquarids	Estimated Rate: 10/hr Origin: Comet 1P/Halley (Halley's Comet) Radiant: Aquarius
July 28 & 29	Southern Delta Aquarids	Estimated Rate: 20/hr Origin: Comet 93P/Machholz Radiant: Aquarius
August 12 & 13	Perseids	Estimated Rate: 60/hr Origin: Comet 109P/Swift-Tuttle Radiant: Perseus
Oct 21 & 22	Orionids	Estimated Rate: 20/hr Origin: Comet 1P/Halley (Halley's Comet) Radiant: Orion
Nov 17 & 18	Leonids	Estimated Rate: 40/hr Origin: Comet 55P/Tempel-Tuttle Radiant: Leo
Dec 13 th & 14 th	Geminids	Estimated Rate: 40/hr Origin: Asteroid 3200 Phaethon Radiant: Gemini

Resources:

Science Centre Observatory (Singapore)

www.omnitheatre.com.sg/stargazing.asp

<http://scobbers.blogspot.com>

Sky & Telescope – Interactive Sky Chart

<http://www.skyandtelescope.com/observing/skychart/>

Stellarium Planetarium Software

<http://www.stellarium.org/>

NASA Eclipse Website

<http://eclipse.gsfc.nasa.gov/eclipse.html>

Phases of the Moon

<http://tycho.usno.navy.mil/vphase.html>