



## INFORMATION PARTIAL SOLAR ECLIPSE 26 JANUARY 2009

### 1.0 ANNULAR SOLAR ECLIPSE

Chinese society all around the world will celebrate Chinese New Year on the 26<sup>th</sup> of January 2009 and Annular Solar Eclipse will be visible on the same day for about 3 hours and 46 minutes from the Indian Ocean to western Indonesia (Figure 1 and 2). This happens when the Moon passes directly in front of the Sun, but doesn't completely cover it because the apparent size of the Moon is smaller than that of the Sun. Hence the Sun appears as a very bright ring, or annulus, surrounding the outline of the Moon (Figure 3).

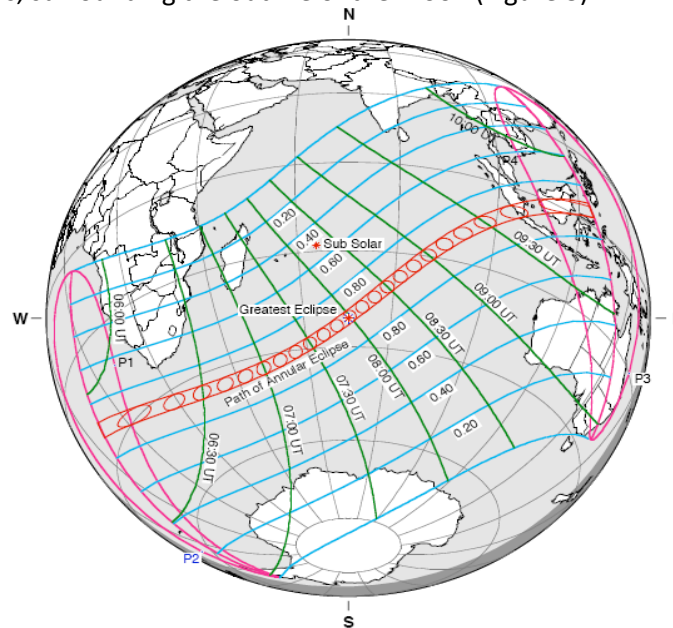


Figure 1: Path of Annular Solar Eclipse of 26 Jan. 2009 across the Earth (red in colour).

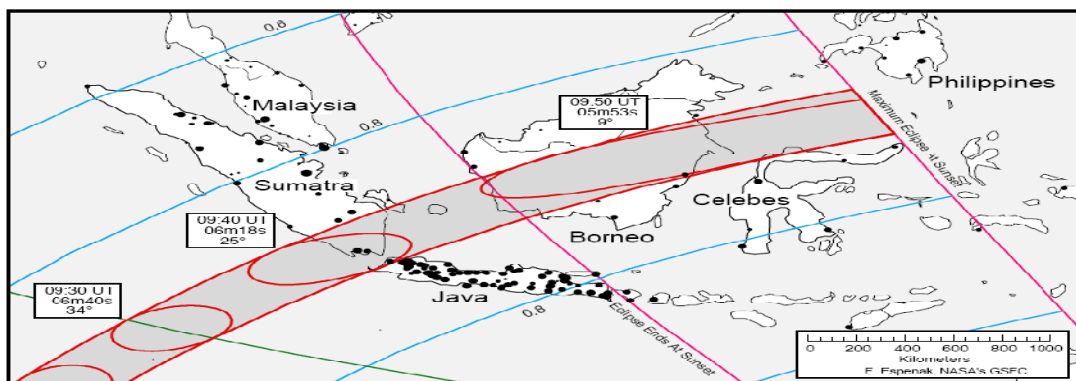


Figure 2: Path of Annular Solar Eclipse of 26 Jan. 2009 through Indonesia.



Figure 3: Annular Solar eclipse at Tanjungkarang Telukbetung, Indonesia

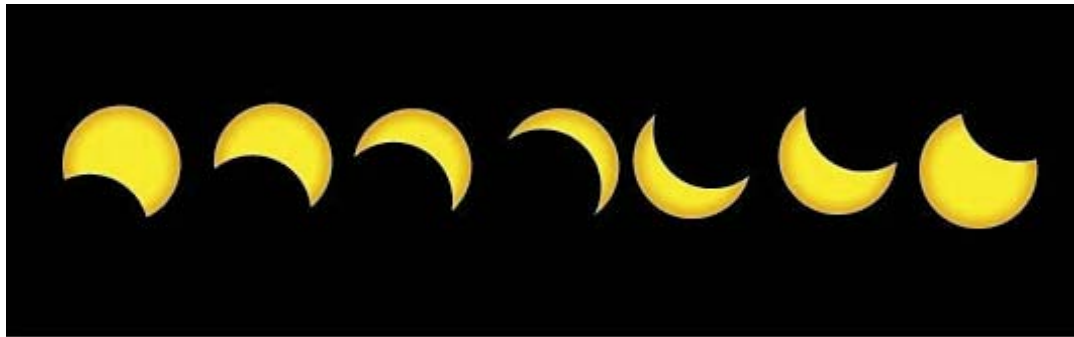


Figure 4: Partial Solar Eclipse at Kuala Lumpur – Coverage 64.1%.

During its trajectory across the Earth, the path of annular eclipse forms a narrow track of approximately 280.2 kilometres wide and 14,500 kilometres long which covers only 0.9% of Earth's surface area (Figure 1). Greatest eclipse takes place at the central track when the eclipse magnitude reaches 0.9282. At this instant, the annular duration is approximately 7 minutes and 54 seconds.

A partial eclipse will be seen within the much larger path of the Moon's penumbral shadow, which includes the southern third of Africa, Madagascar, Australia except Tasmania, southeast India, Southeast Asia and Indonesia.

## 2.0 PARTIAL SOLAR ECLIPSE IN MALAYSIA

Here in Malaysia we would be able to see the moon obscuring approximately 82.6% of the Sun and it occurs just before sunset. We will have the opportunity to observe a partial solar eclipse from 4.30 p.m. until 7:00 p.m. before sunset.

In general, a solar eclipse occurs when the Moon passes between the Sun and the Earth so that the Sun is wholly or partially obscured. This can only happen during a new moon, when the Sun and the Moon are in conjunction as seen from the Earth (Figure 5).

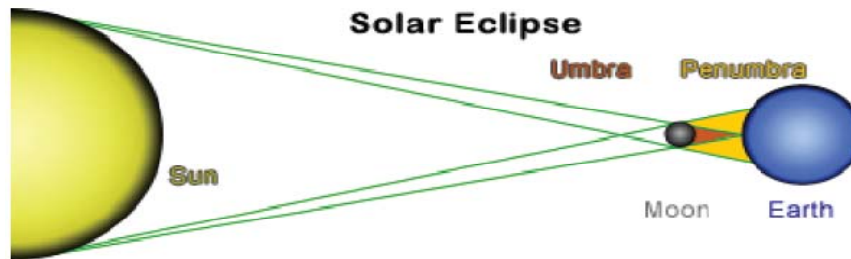


Figure 5: Geometry of Solar Eclipse

**Note:**

Umbra – The darkest part of a shadow

Penumbra - The region in which only a portion of the occulting body is obscuring the light source

Partial solar eclipse will begin at approximately 4:30 p.m. in Malaysia when the Moon appears first touches the Sun's disk. This is called the "first contact" where the partial phases of the eclipse start. Most observers will not be able to visually detect the eclipse at this instant because the Sun is so bright. The eclipse can only be seen when the Moon slowly covers the Sun to form a crescent shape until the maximum obscuration occurs at approximately 5:50 p.m.. At its final contact of approximately 6:55 p.m., the Moon's shadow slowly disappears just before sunset. Local circumstances for a number of cities in Malaysia are listed in Table 1. Figure 6 illustrates local circumstances in Malaysia for the partial eclipse. Figure 4 shows what we can see from Kuala Lumpur.

Table 1: Local Circumstances in Malaysia for the Partial Solar Eclipse

No.	Location	Start of Partial Eclipse Hour:Minute:Second	Mid Eclipse Hour:Minute:Second	End of Partial Eclipse Hour:Minute:Second	Coverage (%)
1	Alor Setar	16:36:51	17:53:32	18:59:57	53.4
2	Bahau	16:31:41	17:50:42	18:58:50	65.7
3	Bandar Sri Aman	16:35:25	17:50:39	18:56:14*	82.6
4	Batu Pahat	16:30:14	17:49:45	18:58:15	69.3
5	Beaufort	16:43:05	17:54:22	18:57:12*	76.6
6	Bidor	16:33:23	17:51:46	18:59:25	60.4
7	Bintulu	16:39:02	17:52:36	18:57:02*	79.5
8	Georgetown	16:35:38	17:52:57	18:59:49	55.3
9	Ipoh	16:34:11	17:52:12	18:59:35	58.6
10	Johor Bahru	16:30:13	17:49:34	18:57:58	71.5
11	Kajang	16:31:33	17:50:42	18:58:54	64.3
12	Kangar	16:37:24	17:53:48	19:00:00	52.3
13	Kerteh	16:35:32	17:52:46	18:59:38	62.6
14	Klang	16:31:23	17:50:39	18:58:55	63.6
15	Kluang	16:30:55	17:50:06	18:58:21	69.3
16	Kota Bahru	16:37:52	17:54:03	19:00:09	56.3
17	Kota Belud	16:44:33	17:55:05	18:57:22*	74.6
18	Kota Kinabalu	16:43:57	17:54:48	18:57:20*	75.3

19	Kuah	16:36:59	17:53:35	18:59:55	52.0
20	Kuala Kangsar	16:34:27	17:52:20	18:59:38	58.0
21	Kuala Lumpur	16:31:32	17:50:42	18:58:55	64.1
22	Kuala Pilah	16:31:24	17:50:34	18:58:47	65.7
23	Kuala Terengganu	16:36:51	17:53:30	18:59:56	59.8
24	Kuantan	16:34:09	17:52:00	18:59:19	64.4
25	Kuching	16:35:07	17:50:52	18:56:48*	80.6
26	Kudat	16:45:21	17:55:25	18:57:24*	73.5
27	Kulim	16:35:27	17:52:51	18:59:47	55.7
28	Labuan	16:42:47	17:54:20	18:57:22*	76.3
29	Lahad Datu	16:43:36	17:53:47	18:55:52*	80.4
30	Lumut	16:33:11	17:51:41	18:59:24	59.0
31	Maran	16:33:22	17:51:38	18:59:13	64.2
32	Melaka	16:30:23	17:49:58	18:58:29	67.2
33	Miri	16:41:05	17:53:40	18:57:23*	77.4
34	Muar	16:30:21	17:49:53	18:58:23	68.1
35	Petaling Jaya	16:31:38	17:50:46	18:58:57	63.8
36	Port Dickson	16:30:39	17:50:11	18:58:39	65.6
37	Sandakan	16:44:28	17:54:27	18:56:23*	77.9
38	Segamat	16:31:23	17:50:28	18:58:39	67.2
39	Seremban	16:31:08	17:50:27	18:58:46	65.2
40	Shah Alam	16:31:30	17:50:42	18:58:56	63.6
41	Sibu	16:37:09	17:51:44	18:56:52*	80.4
42	Sungai Petani	16:36:00	17:53:08	18:59:52	54.8
43	Taiping	16:34:29	17:52:22	18:59:38	57.5
44	Tapah	16:33:30	17:51:50	18:59:26	60.1
45	Tawau	16:42:32	17:53:13	18:55:38*	81.9
46	Telok Anson	16:32:59	17:51:33	18:59:20	60.3

**Note:**

Coverage – The percentage of the sun’s disk covered at mid eclipse

Asterisk (\*) – The event occurs while the Sun is below the horizon

Table 2: Sun Rise and Sun Set Data in Malaysia on 26th January 2009.

Location	Time Sun Rise Hour:Minute	Time Sun Set Hour:Minute
Peninsular	07:26	19:25
Sabah	06:33	18:24
Sarawak	06:50	18:53

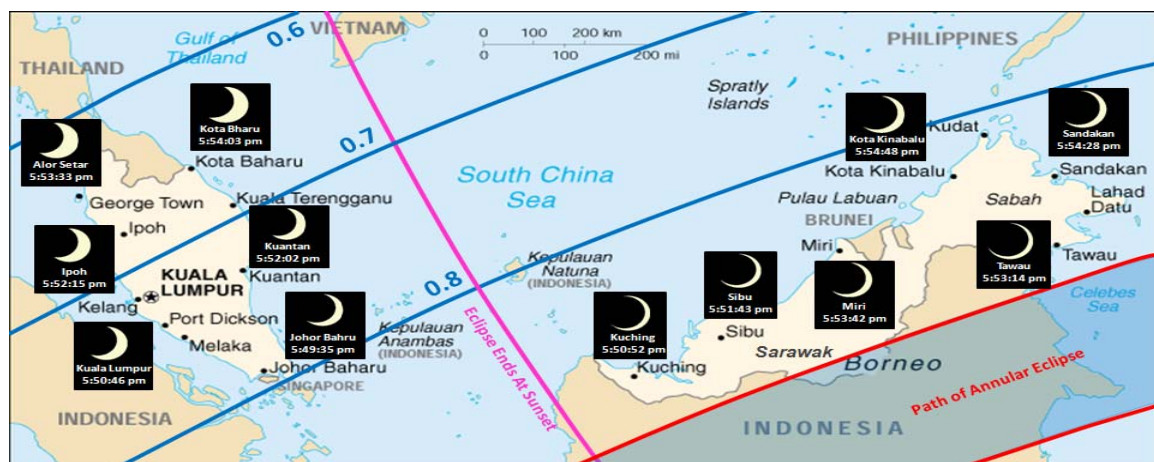





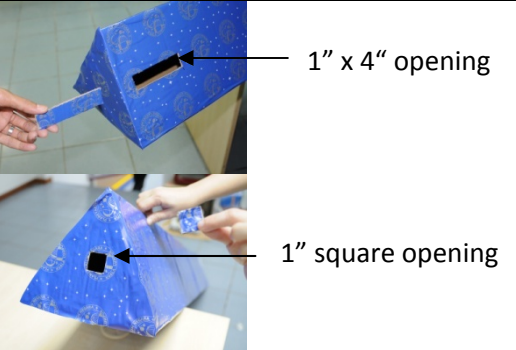

Figure 6: Local Circumstances in Malaysia for the Partial Solar Eclipse.



### 3.0 HOW TO VIEW SOLAR ECLIPSE SAFELY

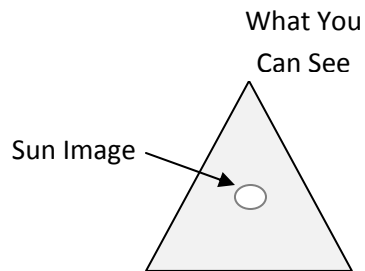
**CAUTION!** Viewing the Sun without safety filters can cause a permanent eye damage or blindness. There are five safe ways to view the Sun:

#### 3.1 Pinhole Projector with Long Box

Follow instructions below to build the pinhole projector with long box:


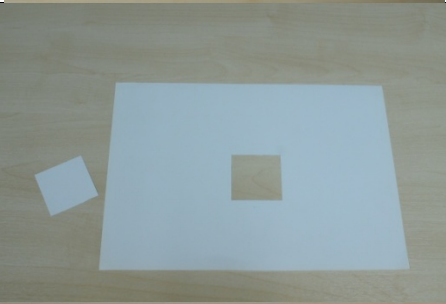
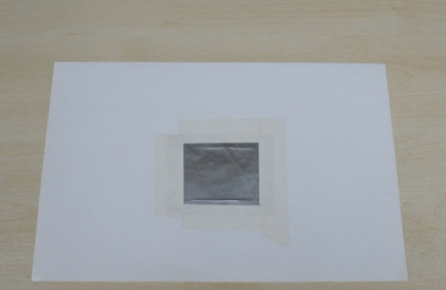
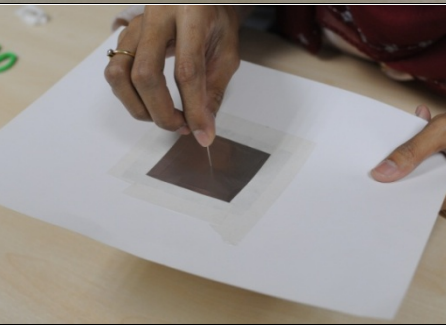
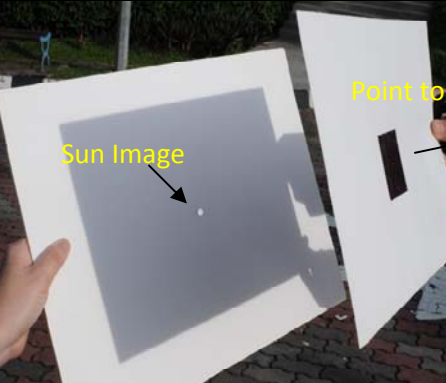
Step	Instruction	Picture
1	Prepare a piece of aluminium foil, a pin, a sheet of white paper, masking tape, penknife, scissors, ruler and pencil.	
2	Find or make a long box or tube. The length of the box is important. The longer the box, the bigger the pinhole image. To find the size of the image, multiply the length of the box by the number 0.00873. For a box that is 1 meter long, the image will be 0.00873 meters (or 8.77 mm) in diameter.	
3	Put together two or more long boxes or tubes to make a longer box or tube.	
4	Cut 1" x 4" opening on side as viewing portal and 1" square opening at an end of the long box.	
5	Tape the foil over the 1" square opening at the end of long box.	

6	<p>Make a small hole on a piece of aluminium foil with a pin and</p>	
7	<p>Put a piece of white paper inside the end of the box near the viewing portal. Point the end of the box with the pinhole at the sun so that you see a round image on the paper at the other end.</p>	



**Do not look through the pinhole at the sun!** Look only at the image on the paper through portal viewing.

### 3.2 Pinhole Projector with Cardboard

Step	Instruction	Picture
1	Prepare a piece of white cardboard, a piece of aluminium foil, a pin, a sheet of white paper, masking tape, penknife, scissors, ruler and pencil.	
2	Cut an opening on a cardboard	
3	Tape a piece of aluminium foil over the square using masking tape	
4	Make a pinhole in the middle of the foil	
5	With the Sun behind you, hold the pinhole cardboard as far from the white cardboard as you can.	

Remember, the farther you are from the screen, the bigger image you will get.

### 3.3 Pinhole Camera from Shade Tree

If you have some shade trees in your location, try looking at the images of the Sun coming through the holes formed by the leaves.



Figure 7: Images of the Partial Solar Eclipse through the Shade Trees

### 3.4 Solar Eclipse Glasses & Solar Viewer

Do not use sunglasses, polaroid filters, smoked glass, exposed color film, x-ray film, or photographic neutral density filters. Make sure that the supplier of your solar eclipse glasses and solar viewer are reputable and reliable.



Figure 8: Viewing Solar Eclipse Using Solar Eclipse Glasses and Solar Viewer.

### 3.5 Solar Filter

If you want to use a filter on a telescope, only use the filter supplied by the manufacturer or by a manufacturer who makes the filter specifically for the instrument you are using such as 'Thousand Oaks' and 'Mylar' filters. A proper solar filter always goes on the front end of the telescope, blocking the sunlight before it enters the optical system.



Figure 9: Solar Viewing with Solar Filters Attached to Telescopes.

#### 4.0 PARTIAL SOLAR ECLIPSE PROGRAM AT THE NATIONAL PLANETARIUM, KUALA LUMPUR

In conjunction with Partial Solar Eclipse, National Space Agency (ANGKASA) will organize a **Partial Solar Eclipse Daily Program from the 20<sup>th</sup> until the 30<sup>th</sup> of January 2009 beginning at 10:00 a.m. until 4:30 p.m.** and **Partial Solar Eclipse Observation Program on the 26<sup>th</sup> of January 2009 beginning 4:00 p.m. until 7:00 p.m.** at the **National Planetarium, Kuala Lumpur.**

This program aims to raise public interest and awareness on astronomy and providing widespread access to the universal knowledge of fundamental science through the excitement of astronomy and sky-observing experiences.

Tentative program for the Partial Solar Eclipse Daily Program is shown as below:

**Partial Solar Eclipse Daily Program  
20<sup>th</sup> until 30<sup>th</sup> of January 2009  
The National Planetarium**

<b>Date</b>	<b>Time</b>	<b>Activity</b>	<b>Group</b>	<b>Location</b>
20 – 30 Jan 2009	10:00 am – 4:30 pm	Solar Eclipse Exhibition	Public	Under Mall
20 – 24 Jan 2009 & 27 – 30 Jan 2009	10.30 am – 11.00 am	Solar Eclipse Talk	Public	VIP Lobby
20 – 24 Jan 2009 & 27 – 30 Jan 2009	11.00 am- 12.00 pm	Build Your Own Solar Projector Model	(7 – 12 years old/ Adult)	VIP Lobby
		Eclipse Creative	(4 – 6 years old)	VIP Lobby
20 – 24 Jan 2009 & 27 – 30 Jan 2009	2.30 pm – 3.00 pm	Solar Eclipse Talk	Public	VIP Lobby
20 – 24 Jan 2009 & 27 – 30 Jan 2009	3.00 pm – 4.00 pm	Build Your Own Solar Cap	(7 – 12 years old/ Adult)	VIP Lobby
		Eclipse Creative	(4 – 6 years old)	VIP Lobby

Tentative program for the Partial Solar Eclipse Observation Program is shown as below:

**Partial Solar Eclipse Observation Program  
26<sup>th</sup> of January 2009  
National Planetarium**

<b>Time</b>	<b>Activity</b>	<b>Location</b>
4:00 pm – 6:30 pm	Registration	National Planetarium
4:00 pm – 6:30 pm	Visit to Exhibition Gallery	Exhibition Gallery & VIP Lobby
4:30 pm, 5:00 pm, 5:30 pm, 6:00pm, 6:30 pm	Solar Eclipse Talk & Quizzes	National Planetarium
5:00 pm	Large Format Film on “SOS Planet”	Space Theatre
6:00 pm	Laser Show “ <i>The Legend of the Night Sky</i> ”	Space Theatre
<b>Partial Solar Eclipse Observation (Telescope with Solar Filter, Handheld Solar Viewer, Solar Eclipse Glasses, Pinhole Projector, Live Webcasting)</b>		
4:31:32 pm	Start of Partial Solar Eclipse	National Planetarium
5:50:42 pm	Mid Eclipse	National Planetarium
6:58:55 pm	End of Partial Solar Eclipse	National Planetarium
7:00 pm	Dismiss	

Watch the live webcast Partial Solar Eclipse from 4:30 p.m. until 6:30 p.m. on the 26th of January 2009 at [www.angkasa.gov.my](http://www.angkasa.gov.my) .

For further info, please contact us:

Planetarium Negara  
Lot 53, Jalan Perdana  
50480 Kuala Lumpur  
Tel: 03-22735484  
Faks: 03-22735488

Email: [lau@angkasa.gov.my](mailto:lau@angkasa.gov.my), [latifah@angkasa.gov.my](mailto:latifah@angkasa.gov.my)  
[www.angkasa.gov.my](http://www.angkasa.gov.my)