

# Moon Sighting Presentation

---

## Aims :

- Overview
- Background
- History of Lunar Calendars
- Explanation of terms
- Science behind Moon sighting
- Case Study - Ramadhan 1416 A.H
- Solutions to the Moon sighting problem

01

## Background

---

- Average Distance from Earth : 238,900 miles (384,400 km)
- Radius : 1,080 miles ( 1,738 km)
- Approximately one-quarter of the size of Earth
- 81.3 times less in mass when compared with Earth
- Sidereal month orbit ( same position in the sky ) : 27 days 7h, 43 mins
- Synodic month orbit ( same phase ) : 29 days 12h, 44mins
- Lunar Year : 354.36 days
- 11 days shorter than tropical year
- Rotation : one sidereal month hence same side towards the Earth at all times.

02

## History of the Lunar Calendar

---

- Earliest complete calendar
- Moon's phases occur over an easily observed interval
- New month declared at first sighting of the new crescent Moon
- Calculated during cloudy weather
- Lunar-Solar calendars developed for agricultural purposes.
- Variations developed in :
  - Greece
  - Rome
  - India
  - China

03

## History of the Lunar Calendar

---

- Islamic Calendar
  - **Begins at the Hijra of the Holy Prophet**
    - » July 16th,622 by the Gregorian calendar
  - **354 days equals a year**
  - **Months move backward through all the seasons**
  - **Cycle is completed every 32 1/2 years**
- Hebrew Calendar
  - **Begins at the Creation ( 3,760 Years before the Christian era)**
  - **12 months**
  - **13th Month is added 7 times every 19 year cycle.**
    - » keeps lunar calendar instep with solar calendar

04

## Important Terms

---

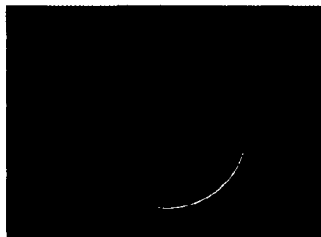
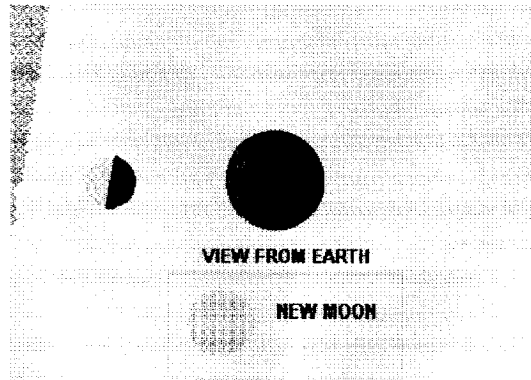
- Birth of the new Moon
- Crescent Moon
- Gibbous Moon
- Full Moon

### THE ASTRONOMICAL NEW MOON

The moment when the Sun, Moon and Earth are in one plane (in Conjunction).

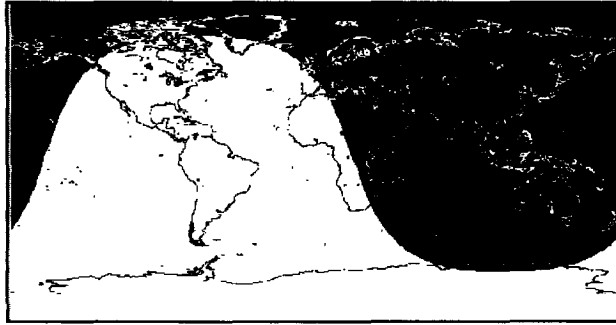
At this time the dark side of the Moon is towards the Earth.

05



06

**Birth of the New Moon : Global Event**  
**Sighting of the New Moon : Local Event**



07

## **Conditions for sighting the new Moon.**

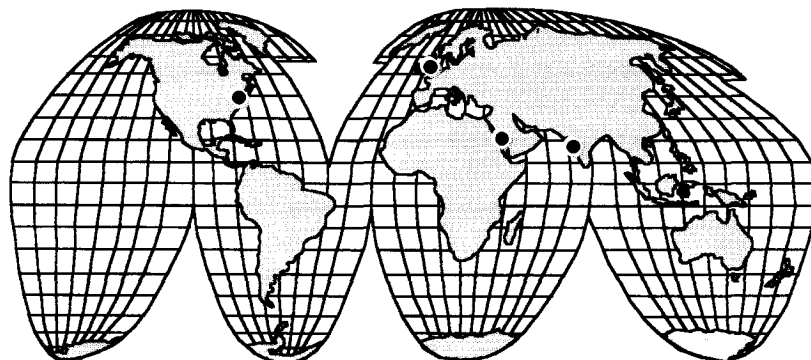
---

- **Age condition needs to be satisfied**
- **The Moon set is not too soon after sunset**
- **The sky is fairly clear as to allow visibility**
  
- **Angle of separation between the Sun and the Moon needs to be not too small**

08

## Case Study : Ramadhan 1416 A.H January/February 1996

---



Examination using 4 reference points :  
New York, London, Mekkah and Lahore

09

### Start Of Ramadhan [1]

---

**New Moon : 20th Jan 1996 at 12:51:28 PM (GMT)**

		Sunset	Moon Age
Saturday 20th Jan	New York	4:56 PM	9 h 5 m
	London	4:28 PM	3 h 37 m
	Mekkah	6:01 PM	2 h 10 m
	Lahore	5:24 PM	- 27

- Moon was not visible in Mekkah or any part of the world according to scientific data.
- In England 30 days of Shabaan were completed.
- Saudi Arabia and followers started Ramadhan.

10

## Start Of Ramadhan [2]

---

**New Moon : 20th Jan 1996 at 12:51:28 PM (GMT)**

		Sunset	Moon Age
<b>Sunday 21st Jan</b>	New York	4:57 PM	33 h 6 m
	London	4:30 PM	27 h 39 m
	Mekkah	6:02 PM	26 h 11 m
	Lahore	5:25 PM	23 h 34 m

- Moon was old enough to be visible across the world.
- Pakistan and India sighted the Moon and started Ramadhan.
- Mauritius ( Tropical island in the Indian Ocean )
  - Sky was Clear
  - Moon was 24 Hours Old
  - Moon was not sighted in the country
  - They completed 30 days of Shabaan
  - 1st Ramadhan : 23rd January

11

## Start Of Ramadhan [3]

---

### Summary

**Group A : Started 21st January ( Saudi Arabia and followers )**

**Group B : Started 22nd January ( Pakistan,India,UK,USA, etc )**

**Group C : Started 23rd January ( Special Cases )**

12

## Eid [1]

---

**New Moon : 18th Feb 1996 at 11:31:07 PM (GMT)**

		Sunset	Moon Age
Sunday 18th Feb	New York	5:32 PM	- 59 m
	London	5:19 PM	- 6 h 12 m
	Mekkah	6:19 PM	- 8 h 12 m
	Lahore	5:50 PM	-10 h 41 m

- Moon was NOT even born at the time of sunset !
- Group A people had completed 29 fasts
  - Should be looking for a moon that hasn't been born !
- Did not affect the rest of the world.

13

## Eid [2]

---

**New Moon : 18th Feb 1996 at 11:31:07 PM (GMT)**

		Sunset	Moon Age
Monday 19th Feb	New York	5:33 PM	23 h 2 m
	London	5:21 PM	17 h 50 m
	Mekkah	6:19 PM	15 h 48 m
	Lahore	5:51 PM	13 h 20 m

- Group A : Completed 30 fasts
  - Must Celebrate Eid on the 20th.
  - Moon Just old enough over Mekkah
- Group B : Completed 29 fasts
  - Moon is Sighted : London announces Eid
  - Moon is not sighted in Pakistan : Complete 30 fasts

14

## Eid [3]

---

### Summary

Feb	18	19	20	21	22
Ramadhan	29	30	A		
Ramadhan	28	29	B		

#### Group A

Completed 30  
Eid : 20th



#### Group B

West : Completed 29  
Eid : 20th  
East : Completed 30  
Eid : 21st

15

## Conclusions

---

- Birth of a new Moon : Global
- Sighting of new Moon : MUST be Local
  
- Starting new month on Birth of new Moon
  - Doesn't Work
    - » Problems with implementation
    - » Creates the possibility of a 2 day shift in dates.
    - » Impossible to do globally
- Global Start to Islamic Months
  - Doesn't work
    - » Leads to problems described
    - » Can result in the early end of Islamic Months
    - » Can result in months ending before the Moon is born

16



## Solutions to the Moon Sighting Problem [1]

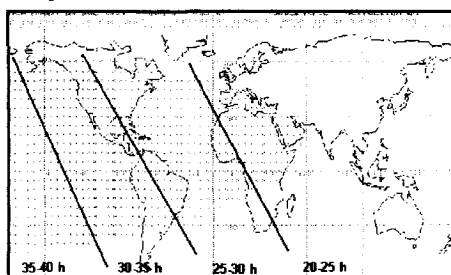
---

### 1. International Lunar Date Line (ILDL) System

- Similar concept to the international time zone system.
- Planet is divided into zones according to the age of the Moon.
- Calculation of Moons age over any given point on any given day.
- Unlike time zone system the ILDL changes every month.

Problems :

- Complicated and different criteria produces different zones.
- Changes every month and difficult to follow



17

## Solutions to the Moon Sighting Problem [2]

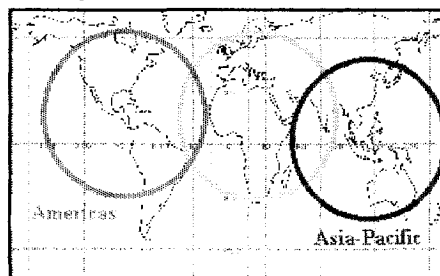
---

### 2. Three Zone System

- Planet is divided into three broad areas.
- Each zone has is independent of other zones.
- Each zone tries to align Islamic dates.

Problems :

- Zones are large.
- Zones include many countries
- Zones include many time zones.



18

## Start Of Ramadhan- 1418 A.H

**New Moon : 29th Dec 1997 at 4:57:38 PM (GMT)**

	<b>Monday 29th Dec</b>		<b>Tuesday 30th Feb</b>	
	<b>Sunset</b>	<b>Moon Age</b>	<b>Sunset</b>	<b>Moon Age</b>
<b>New York</b>	4:35 PM	4 h 37 m	4:36 PM	28 h 38 m
<b>London</b>	4:00 PM	- 58 m	4:01 PM	23 h 3 m
<b>Mekkah</b>	5:47 PM	-2 h 11 m	5:48 PM	21 h 50 m
<b>Lahore</b>	5:07 PM	-4 h 50 m	5:08 PM	19 h 11 m

**Pending actual Moon sighting, Ramadhan should begin in America, Europe, Africa, Middle East, India and Pakistan on 31st December 1997 and the rest of the world on 1st January 1998.**

19

## Eid ul-Fitr- 1418 A.H

**New Moon : 28th Jan 1998 at 6:01:56 AM (GMT)**

	<b>Wednesday 28th Jan</b>		<b>Thursday 29th Jan</b>	
	<b>Sunset</b>	<b>Moon Age</b>	<b>Sunset</b>	<b>Moon Age</b>
<b>New York</b>	5:06 PM	16 h 4 m	5:08 PM	40 h 6 m
<b>London</b>	4:42 PM	10 h 40 m	4:44 PM	34 h 42 m
<b>Mekkah</b>	6:07 PM	9 h 5 m	6:08 PM	33 h 6 m
<b>Lahore</b>	5:32 PM	6 h 30 m	5:33 PM	30 h 31 m

**Pending actual Moon sighting, Eid ul-Fitr may be on 29th January 1998 for USA and 30th January 1998 for the rest of the world.**

**Note : It is expected that the new moon may be visible from the west coast of N. America on the evening of the 28th.**

20