


## July 20, 1969

- On 10:56pm - July 20, 1969 Neil Armstrong stepped onto the Moon.
- On December 19, 1972 Eugene Cernan stepped off the Moon.
- Since then no human has gone to the Moon or even left low earth orbit.
- In the history of mankind, only 12 men ever walked on another world.

SINCE THE FIRST SKY-WONDERER GAZED OUT OF HER CAVE AND INTO THE LIGHT-SPECKLED BLACKNESS, WE HAVE ALWAYS ACHED TO FLY BEYOND THE CONFINES OF THIS LITTLE ROCK CALLED EARTH, SO LONG AS IT CAN BE DONE PRETTY CHEAP.



## PHASES



## WAXING

CRESCENI

$$
\begin{gathered}
\text { FIRSI } \\
\text { QUNRUHET }
\end{gathered}
$$

$$
\begin{aligned}
& \text { MKa MCM } \\
& \text { GIBDBOCO }
\end{aligned}
$$






## Earthshine

## Earthshine



## MOON ILLUSION



-

## Moon Phase Timing

- The Moon orbits the Earth every 27.3 days.
- The full phase Cycle takes 29.5 days.


## Full Moon Names

- January - Wolf Moon • July - Buck Moon
- February - Snow Moon
- March - Worm Moon
- April - Pink Moon
- May - Flower Moon
- August - Sturgeon Moon
- September - Corn Moon
- October - Harvest Moon
- November - Beaver Moon
- June - Strawberry Moon • December - Cold Moon

If there is a second Full Moon in a month it is called a Blue Moon
（3）リノノノ


ECLIPSE


## Lunar Eclipse

Lunar Eclipse



## Total Lunar Eclipses

January 31, 2018 Early Morning (4:51 TO 6:07AM)

January 20, 2019 Evening (8:41 TO 9:43PM)



## Solar Eclipse

Solar Eclipse


Moon's shadow on Earth taken by French cosmonaut Jean-Pierre Haigneré aboard the Mir

e2001 F. Espenak, www. MrEclipse.com
$\bullet$


## Total solar eclipses over

 North America in the 21st century
## Why are

Eclipses Rare?

## THE <br> 

