



Reaching for the Moon

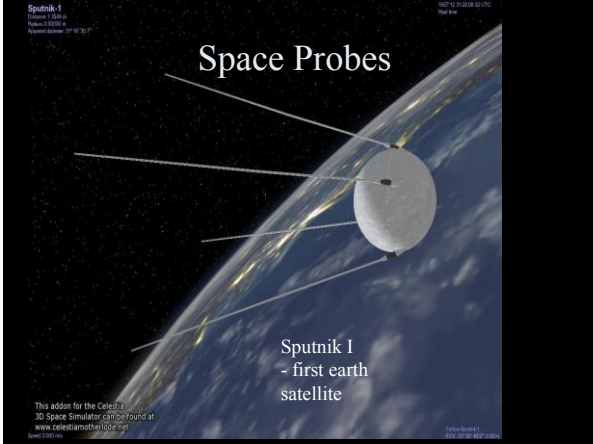
- Information from the moon via
 - Telescopes
 - Space probes
 - Manned Missions

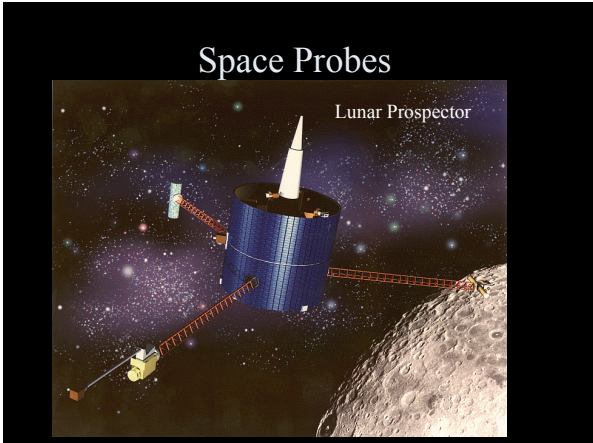
Telescopes

– Apollo Missions to Land on Moon

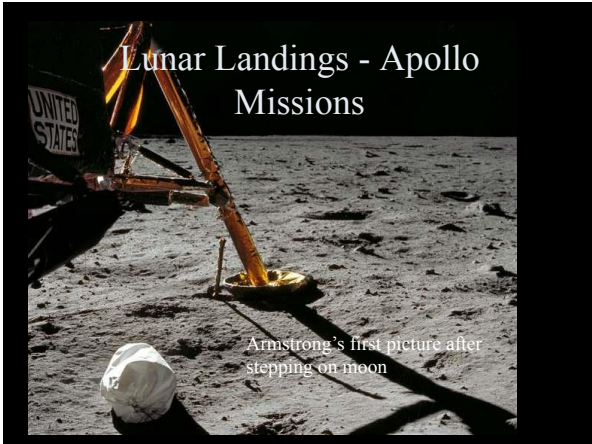
refracting

reflecting









Reaching for the Moon

- Information from the moon via
 - Telescopes
 - Reflecting & Refracting
 - Space probes
 - Sputnik I
 - Mercury missions
 - Lunar Orbiter
 - Apollo Missions
 - Man lands on the moon
 - Take samples - Leave various sensors
 - Return home!

Many Moons?

Moon - a natural satellite of a planet

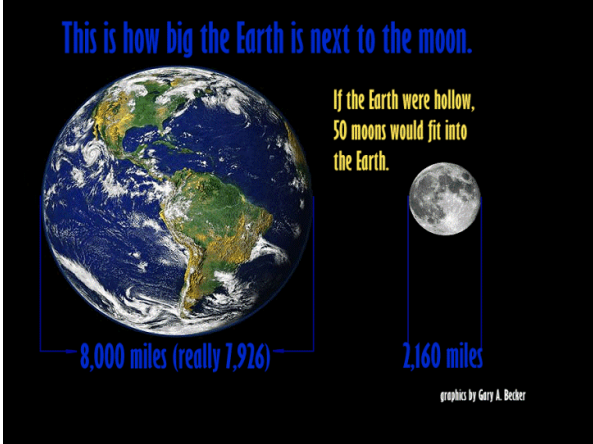
Mars - 2 moons

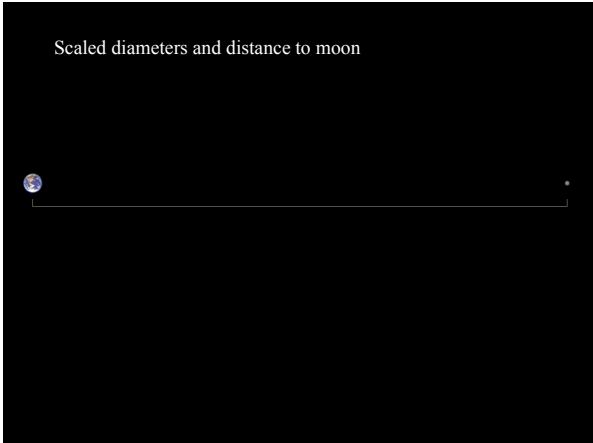
Venus - zero moons

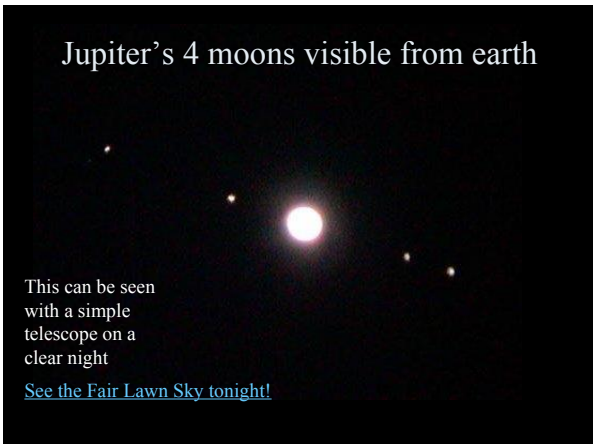
Jupiter - 61 Moons

Earth - 1 moon

- Unique in size and orbit









Moons of Jupiter



TABLE 11.1 The Major Moons of Jupiter*

Name	Distance from Jupiter (km)	Distance from Jupiter (planetary radii)	Orbital Period (days)	Size (longest diameter, km)	Mass ^b (Earth Moon masses)	Density (kg/m ³)	Density (g/cm ³)
Metis	128,000	1.79	0.29	40			
Adrastea	129,000	1.80	0.30	20			
Amalthea	181,000	2.54	0.50	260			
Thebe	222,000	3.10	0.67	100			
Io	422,000	5.90	1.77	3640	1.22	3500	3.5
Europa	671,000	9.38	3.55	3130	0.65	3000	3.0
Ganymede	1,070,000	15.0	7.15	5270	2.02	1900	1.9
Callisto	1,880,000	26.3	16.7	4800	1.46	1900	1.9
Leda	11,100,000	155	239	10			
Himalia	11,500,000	161	251	170			
Lysithea	11,700,000	164	259	24			
Elara	11,700,000	164	260	80			
Ananke	21,200,000	297	-631 [†]	20			
Carme	22,600,000	316	-692 [†]	30			
Pasiphae	23,500,000	329	-735 [†]	36			
Sinope	23,700,000	332	-758 [†]	28			

* This table does not include the 45 recently discovered small moons described in the text. All of these small moons move on inclined, eccentric, mainly retrograde orbits some 10–25 million km from the planet.
^b Mass of Earth's Moon = 7.4×10^{22} kg = 3.9×10^{-5} Jupiter masses.
[†] Retrograde orbit.

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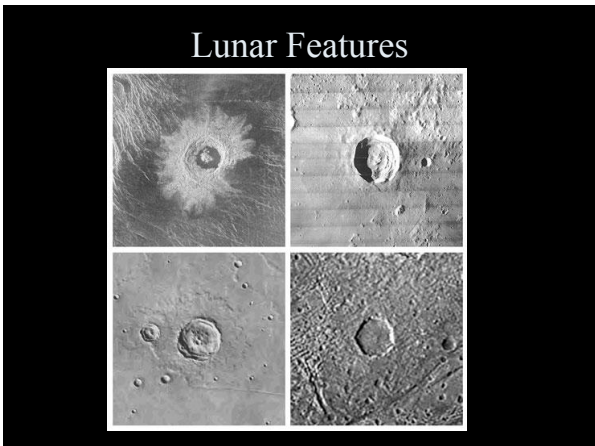
The Lunar Surface

- Why does the moon light up at night?
- Reflected Sunlight off of Lunar Surface
- Albedo – amount of sunlight reflected by a surface
- Moon= 7% Earth=30%
- no atmosphere - lunar surface temperatures range -173C to 127 C



Lunar Features

- Highlands – mountains
light color
covered in craters
- Maria – ancient lava flows
Dark Color
Smooth plains



Lunar Features

- Impact craters – objects from space crashed into lunar surface
- Ejecta – material that fell back to surface
- Rays – ejecta that radiate outward from impact center
- Rilles – valley like structures
- Regolith – loose ground up rocks at surface

Lunar composition

- The Moon is made up of minerals similar to those of Earth—mostly silicates.
- The highlands are predominately lunar breccias, which are rocks formed by the fusing together of smaller pieces of rock during impacts.
- The maria are predominately basalts that contain no water.
- moonwalking astronauts returned 2,415 samples weighing a total of 842 lbs
- a federal court set the value of the moon rocks at \$50,800 per gram

Lunar History

- Capture theory
- Simultaneous formation theory
- Impact theory (most accepted)
- Explains the similar composition
- Explains the impacts / impact timing / distribution
- Explains why there is limited water