

Summary of the Last Lecture

- ❑ Looking for geological records beyond Earth
- ❑ Learning about Earth's solar system neighbours
- ❑ The Dynamic Sun
- ❑ Star represents a group / Our Sun is a member
- ❑ Our solar system vs other solar systems
- ❑ What is a better reference? What is standard?
- ❑ Planets & Dwarf Planets
- ❑ Moon
 - *Earth's moon is called 'The Moon'*
 - *Other planet's moons have specific names...*



(Credit: Chuck Carter, Caltech, NRAO/AUI/NSF)

Continue the journey of the moons...

The moons of Planets in our Solar System

Solar System Major Moons

The Solar System contains 18 or 19 natural satellites of planets that are large enough for self-gravity to make them round. (Why the uncertain number? Neptune's moon Proteus is on the edge.) Two of them are larger than Mercury, seven are larger than Pluto and Eris. If they were not orbiting planets, many of these worlds would be called "planets," and scientists who study them are called "planetary scientists."

Images from Galileo (Jupiter's moons), Cassini (Saturn's moons), Voyager 2 (Uranus and Neptune's moons). Data from NASA/JPL, processed by Ted Stryk, Gordan Ugarkovic, Emily Lakdawalla, and Jason Perry. Earth's Moon photo by Gari Arrillaga. Montage by Emily Lakdawalla. The Planetary Society, blog@planetary.org.

Jupiter...



Io



Europa



Ganymede



Callisto



Titan

Saturn...



Mimas



Enceladus



Tethys



Dione



Rhea

Uranus...



Miranda



Ariel



Umbriel



Titania



Oberon

Neptune...



Proteus



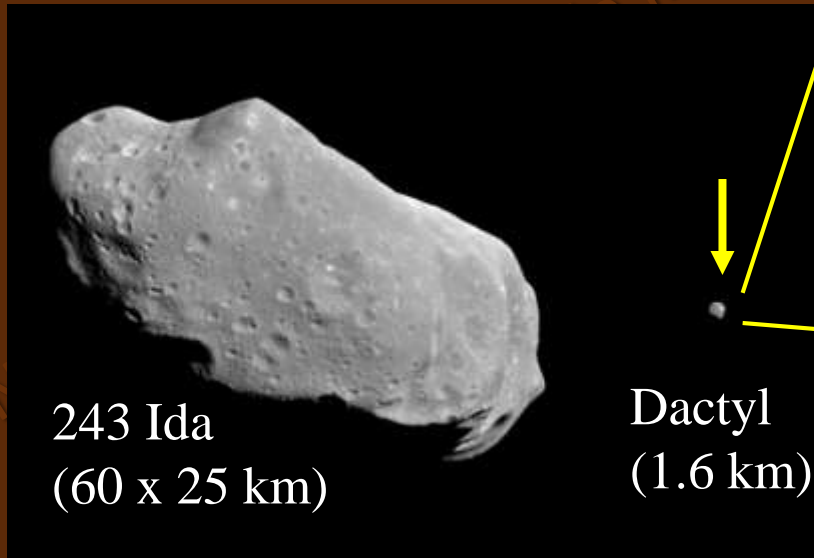
Triton

Earth...



The Moon

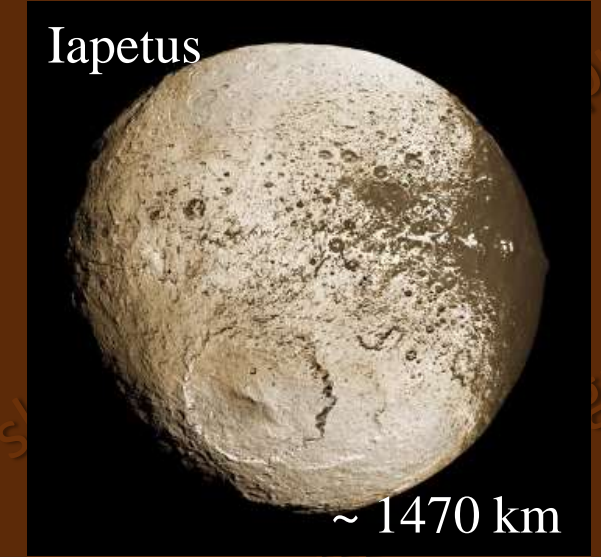
The moons of Planets in our Solar System



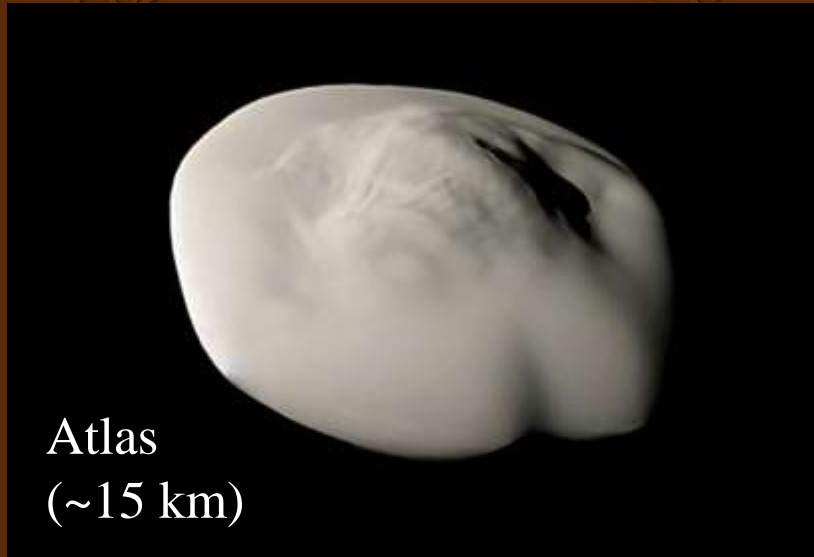
(Image Credit: NASA, JPL, Galileo Mission)



(Credit: NASA/JPL/Space Science Institute)



(Credit: NASA/JPL/Space Science Institute)



(Credit: NASA/JPL-Caltech/Space Science Institute)



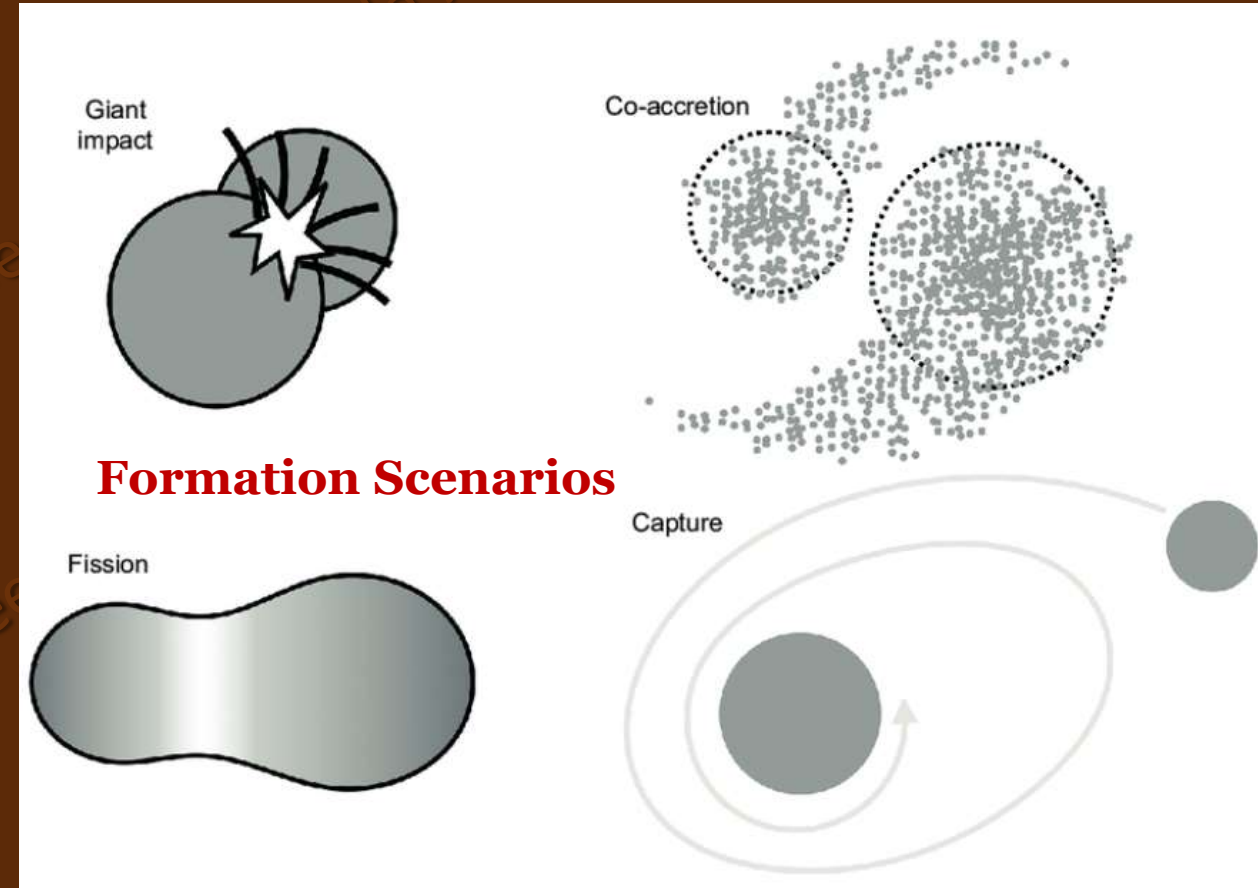
(Credit: NASA/JPL/USGS)



(Credit: NASA/JPL/Space Science Institute)

Planet – Moon Relationship ?

- ❑ Enormous diversity in the moons
- ❑ Size
- ❑ Shape
- ❑ Surface morphology
- ❑ Relation between the planet and the moon?
 - *Co-accretion?*
 - *Moon: Extracted part of planet ?*
 - *Unrelated companions?*
- ❑ How was our moon formed ?
- ❑ Does it have any implications for the Earth?



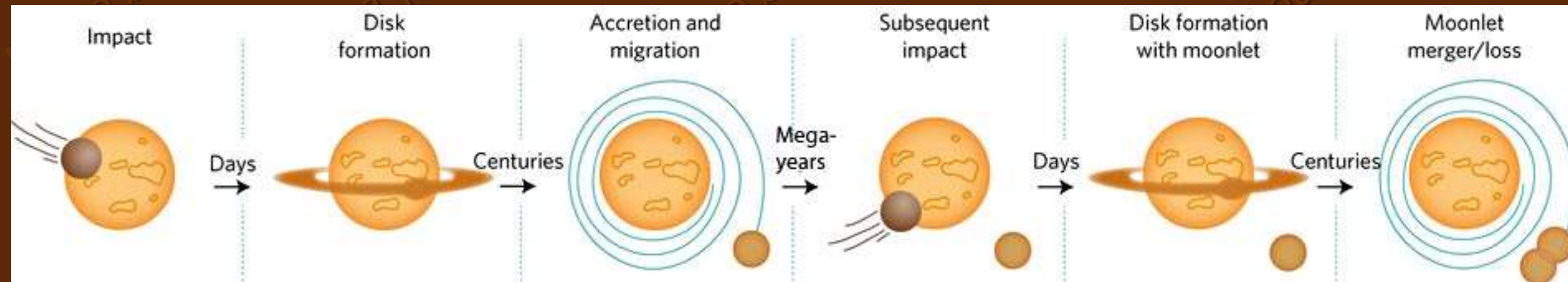
(Credit: Canup et al., 2021)

The story of our Earth and its Moon

Food for thought from the movie:

1. There were a large number of planets orbiting the Sun in the beginning. What happened to them that we only have eight planets today ?
2. The Moon was much closer to the Earth at the time of formation.
 - a) *Does it matter? In what way?*
 - b) *Why the Moon is much farther away today?*
 - c) *Is it still drifting?*
 - d) *How about other moons?*

The story of our Earth and its Moon



(Rufu et al., 2017)

Rufu, R., Aharonson, O. & Perets, H. A multiple-impact origin for the Moon. *Nature Geosci* **10**, 89–94 (2017). <https://doi.org/10.1038/ngeo2866>