

**The Solar System: Asteroids,
Dwarf Planets, Meteoroids and
Comets**

The Solar System consists of the Sun, planets, moons, asteroids, meteoroids, comets, dust, gases and primarily empty space



What Keeps Our Planets & Other
Objects In Space In Orbit??

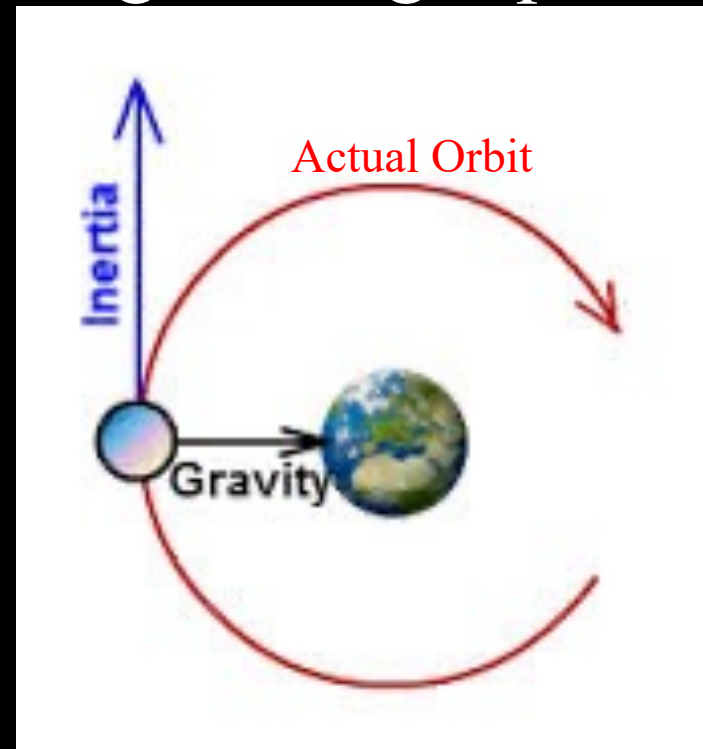
GRAVITY & INERTIA

GRAVITY and INERTIA

- Gravity – *A force that pulls all objects toward each other.
- Inertia – The tendency of an object to stay either at rest or in motion along a straight path

So how does these 2 forces keep everything in orbit?

**Example: The picture to the right shows how inertia & gravity work together to keep the moon orbiting the Earth.



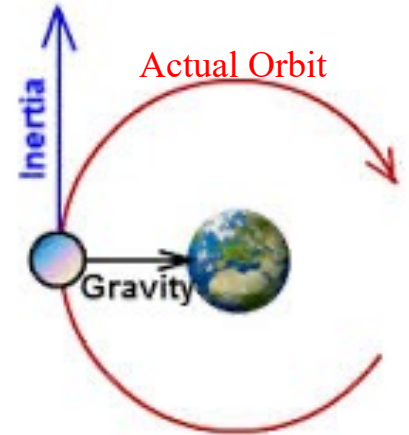
GRAVITY & INERTIA



If **inertia** was stronger than gravity then objects would stay on their straight path & fly off into space.



If **gravity** was stronger than inertia then objects would crash



Inertia & **gravity** work together to keep the moon orbiting the Earth. And they work together to keep planets orbiting the sun

ASTEROIDS
METEOROIDS
COMETS

Comparison video

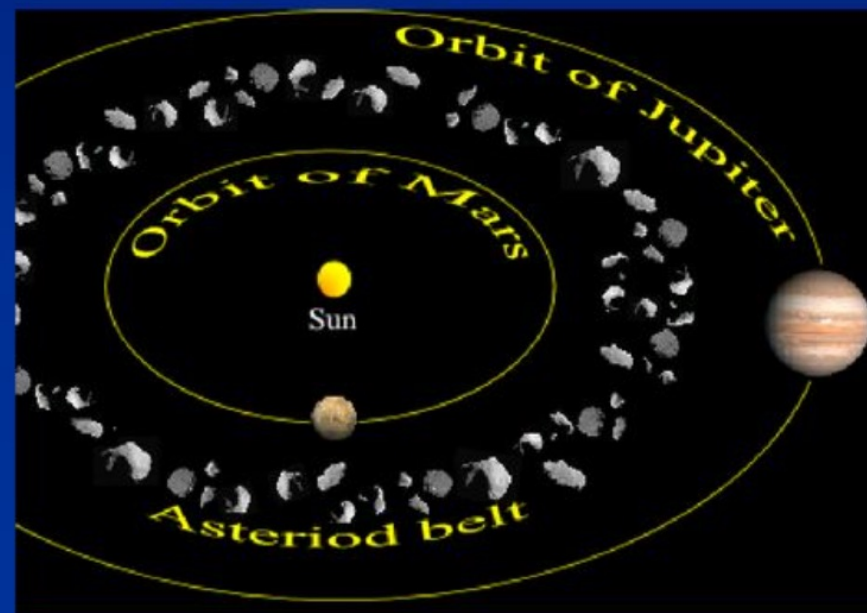
What is an asteroid?



- ***Asteroids are large pieces of space rock made up of metallic minerals and ice.**
- **They are also known as planetoids or minor planets that revolves around our sun**

Asteroid Belt

- The region of space between Mars and Jupiter; about 2.8AU
- Hundreds of thousands of asteroids known. Probably millions.
- Three Largest
 - Vesta
 - Pallas
 - Hygiea



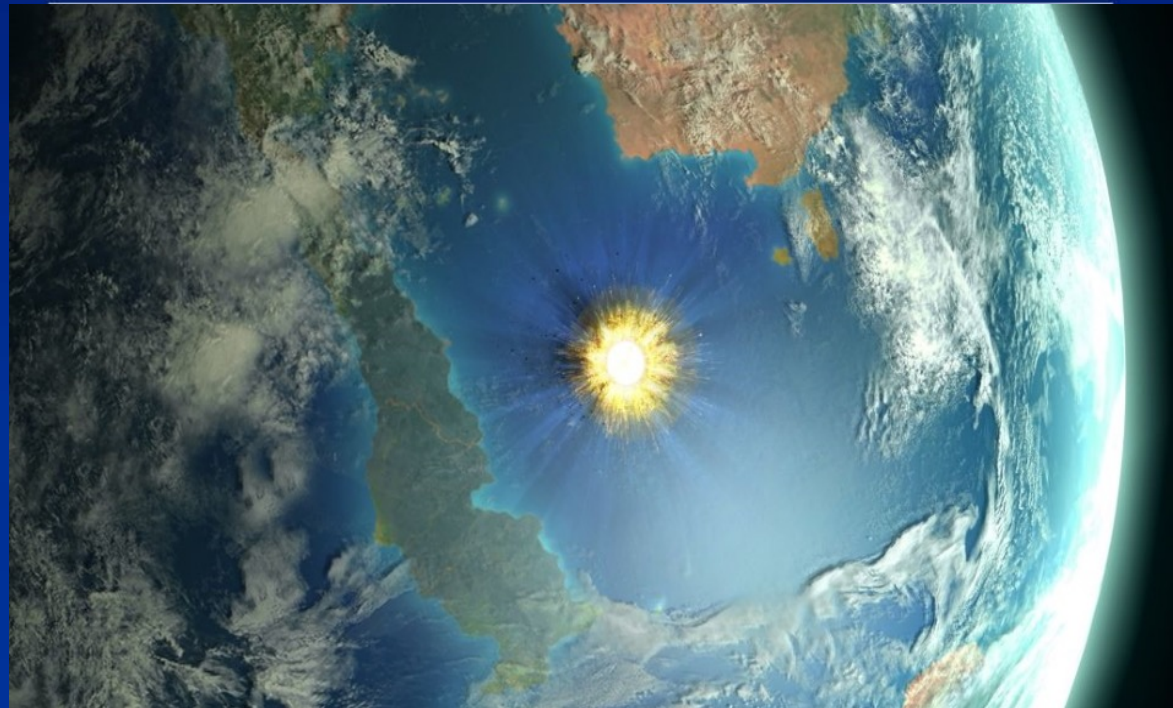
Kuiper Belt

- **Discovered in 1992**
- **Named for Dutch Astronomer Gerard Kuiper, who had PREDICTED its existence in 1951.**



Asteroid: impact

- An asteroid impact may cause the extinction of the dinosaurs and many other species 65 million years ago
- An iridium-rich layer within limestone strata was discovered (1979)
 - Found at numerous sites around the world
 - Geological dating reveals deposition 65 million years ago
- By a 10-km diameter asteroid
- The site is possibly the 180-km-diameter Chicxulub crater on the Yucatan Peninsula, Mexico (1992).



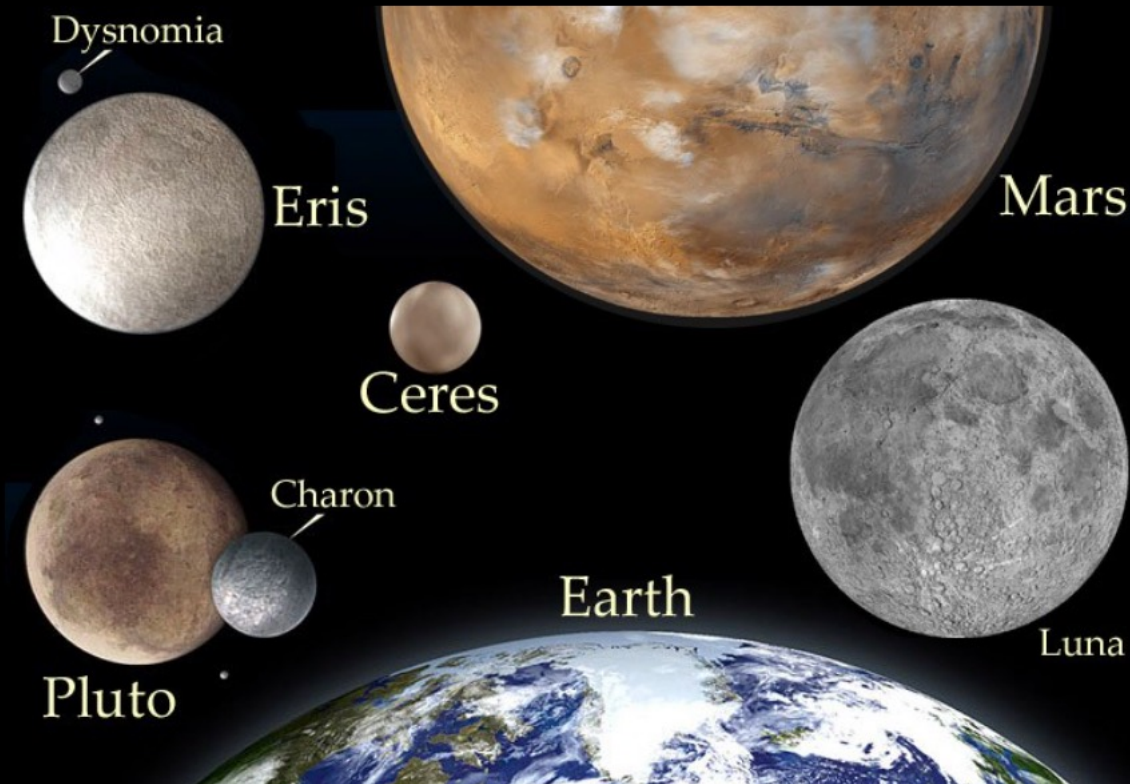
Planets vs Dwarf Planets

Planets

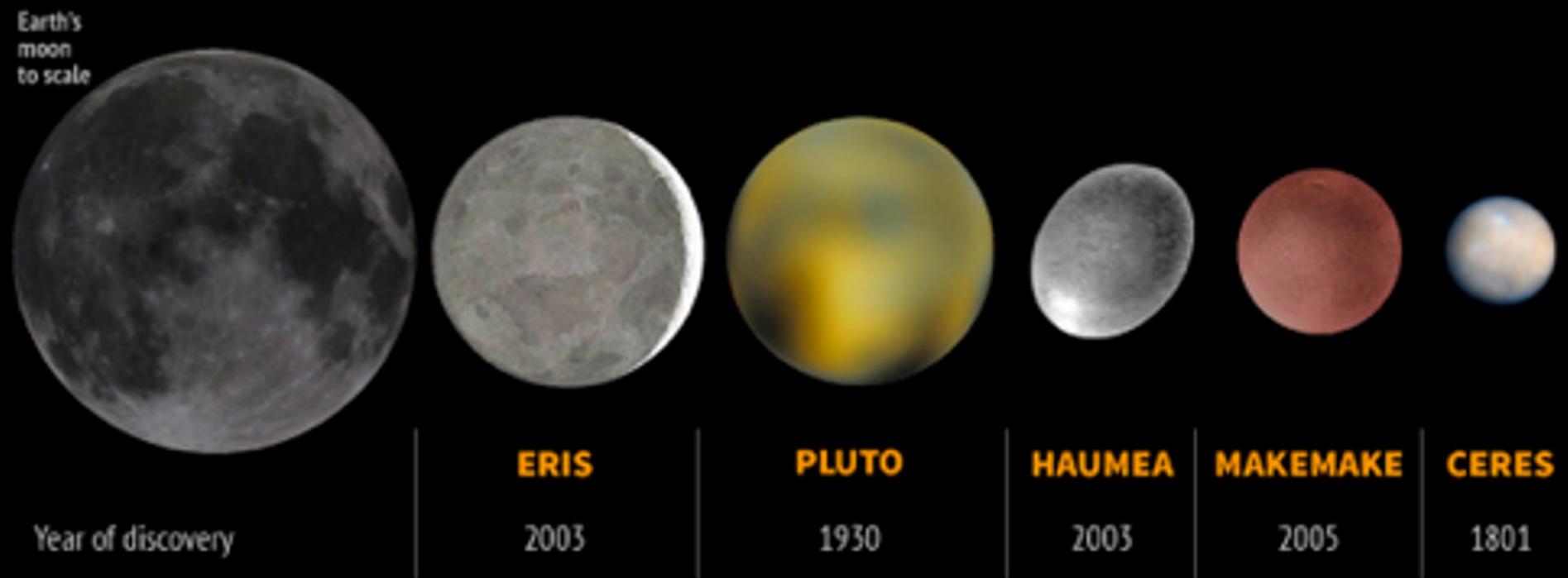
- Orbits the Sun directly
- Massive enough to be rounded by its own gravity
- Has cleared the smaller bodies from its orbit

Dwarf Planets

- Orbits the Sun directly
- Massive enough to be rounded by its own gravity
- Has **not** cleared the smaller bodies from its orbit



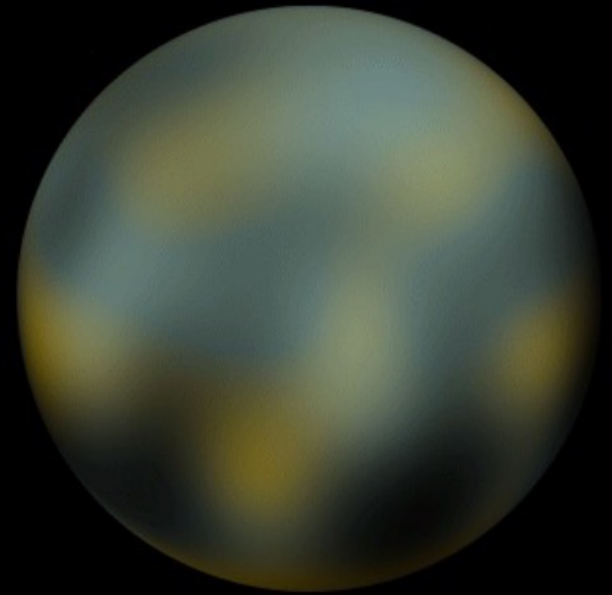
There are actually five Dwarf Planets in our Solar System.



Dwarf Planets compared with moon.

- Considered the 9th planet from 1930 to 2006
- Classified as a planet for 76 years.
- Named for Roman god of the underworld
- Reclassified as a dwarf planet on August 24, 2006
- Became the first dwarf planet

Pluto



METEORIODS

METEORS &

METEORITES



Meteoroid

- ***Meteoroids are pieces of rock or dust that are smaller than asteroids.**
- **Meteoroids are tiny particles left by an asteroid or a comet & are quite small in size**

- When small meteoroids enters Earth's atmosphere, they usually burn up & make a fiery trail as it falls, it is then called a meteor or a "shooting star"

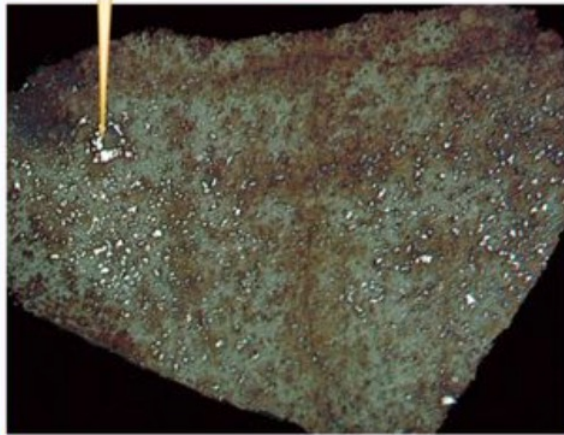


- Meteors that land on Earth are called meteorites.

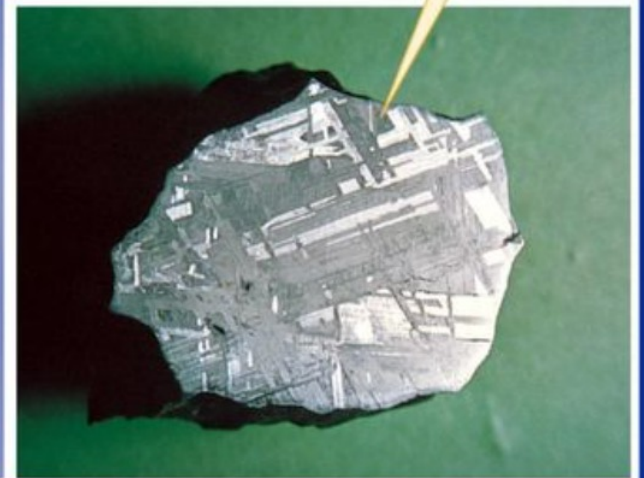
Meteorite

- Meteorites are classified as stones, stony irons, or irons, depending on their composition
- Stony meteorites account for about 95% of all meteoritic material that falls to the Earth
- About 300 tons of extraterrestrial matter falls on the Earth each day, mostly in the form of dust.

...but when cut and polished they reveal tiny specks of iron in the rock.



...and when cut and polished, by interlocking crystals in a Widmanstätten pattern.



COMETS



What is a comet?



- **A comet is a small body made out of dust, rock, gas & ice.**
- **They are kind of like a dirty snowball**
- **Comets come from faraway regions of our solar system beyond the planets**

Bayeux Tapestry

Norman Invasion of 1066



Comet of 1577

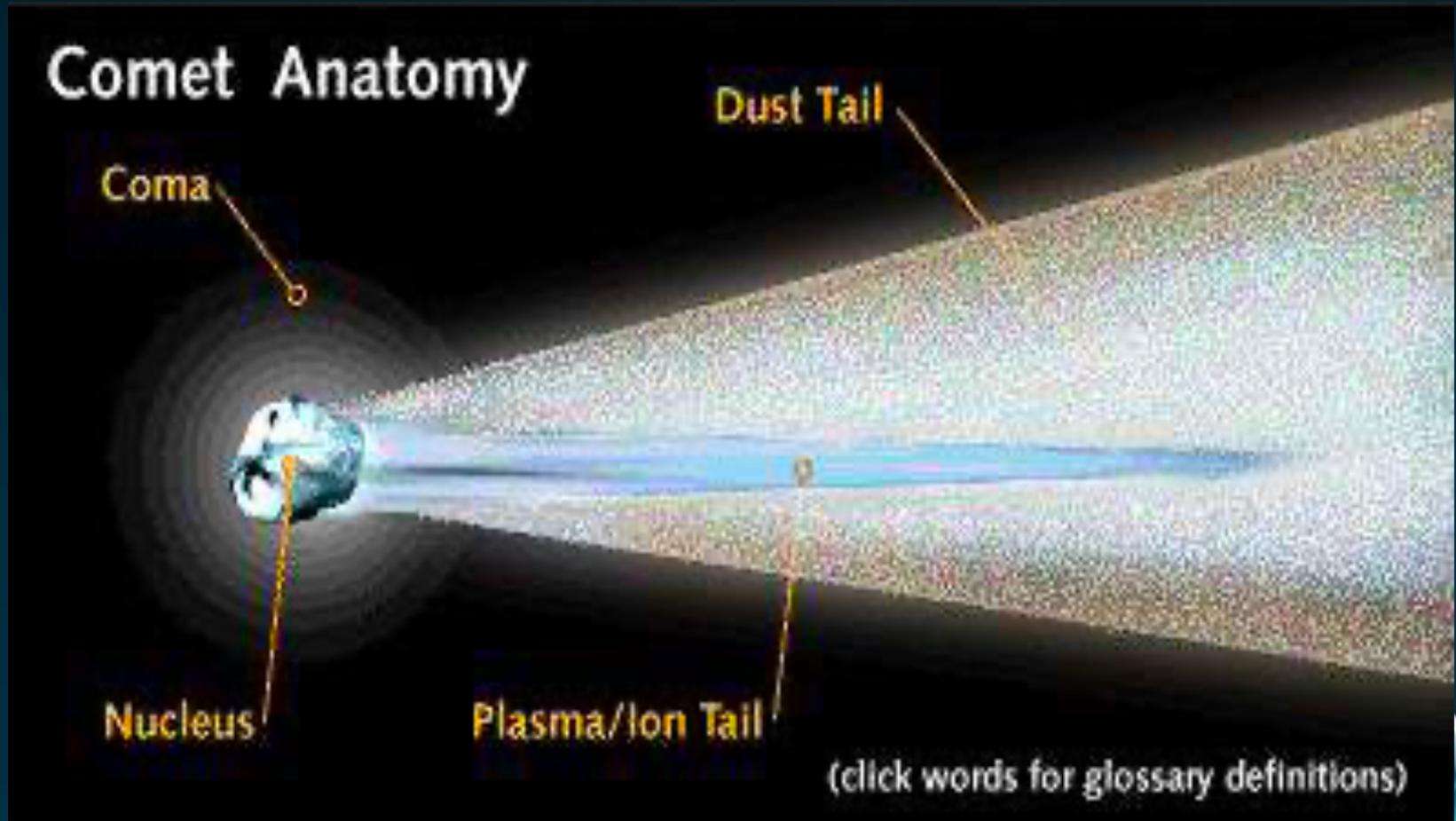


Comets are made up of different parts.

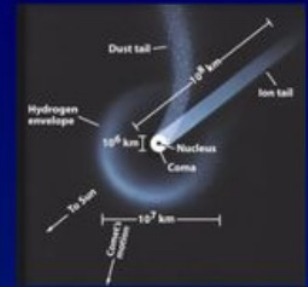


- **The nucleus**
- **The coma**
- **The ion tail**
- **The dust tail**

Parts of a Comet



Comet: structure



- **Nucleus**
 - Solid part of comet from which coma and tails emanate
 - Mixture of ice and dust
 - Typically a few kilometers across
- **Coma**
 - the fuzzy, luminous gas ball produced by the liberated gas as the comet nears the Sun
 - Typically 1 million km in diameter
- **Tails**
 - Caused by the luminous gas streaming outward
 - About 100 million km in length

Famous Comets



Completes its orbit every 76 years!

Comet Halley (1P/Halley) – named after Edmund Halley. This is the most famous comet of the 20th century.



Comet link

References

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