

Life cycle of stars:

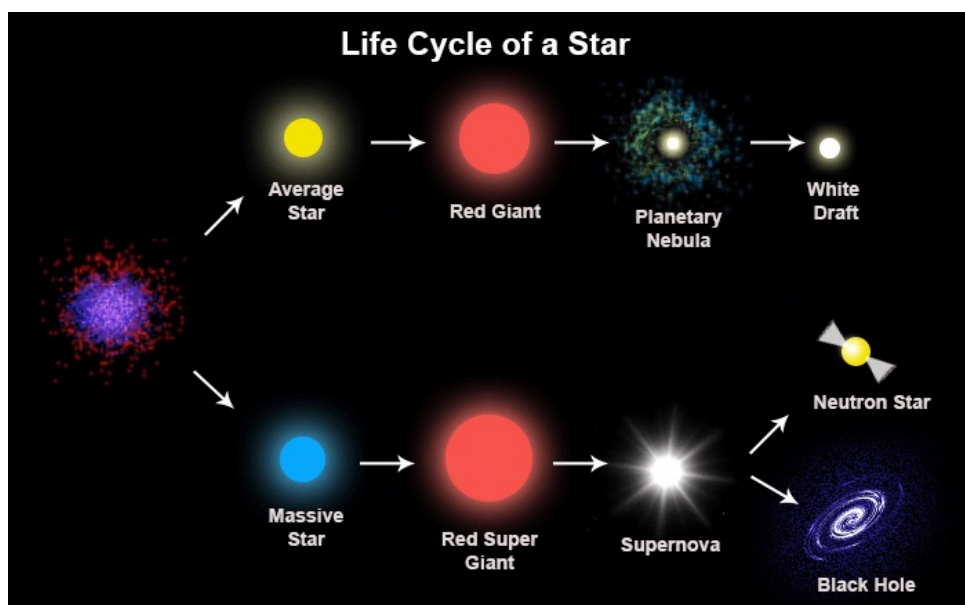
INITIAL STAGES 2 form STAR with hot core:

1. Dust & gas cloud = NEBULA
2. High pressure & high temp = PROTOSTAR
3. Hydrogen nuclei undergo fusion under high temps = HELIUM NUCLEI

STABLE PERIOD:

4. Outward pressure (from nuclear fusion expands star) & force of gravity (pulls inwards) BALANCES = MAIN SEQUENCE STAR

5. Hydrogen runs out & star swells - RED GIANT (small) or RED SUPER GIANT (big star.)
6. Fusion of helium occurs & elements eg iron form in centre of star & star is red as surface cools



SMALL STARS: (similar size to Earth's SUN)

7. Unstable star ejects its outer layer = WHITE DWARF (has a :hot, dense & solid core)
8. Cools & emits less energy - BLACK DWARF

LARGE STARS: (bigger than Earth's SUN)

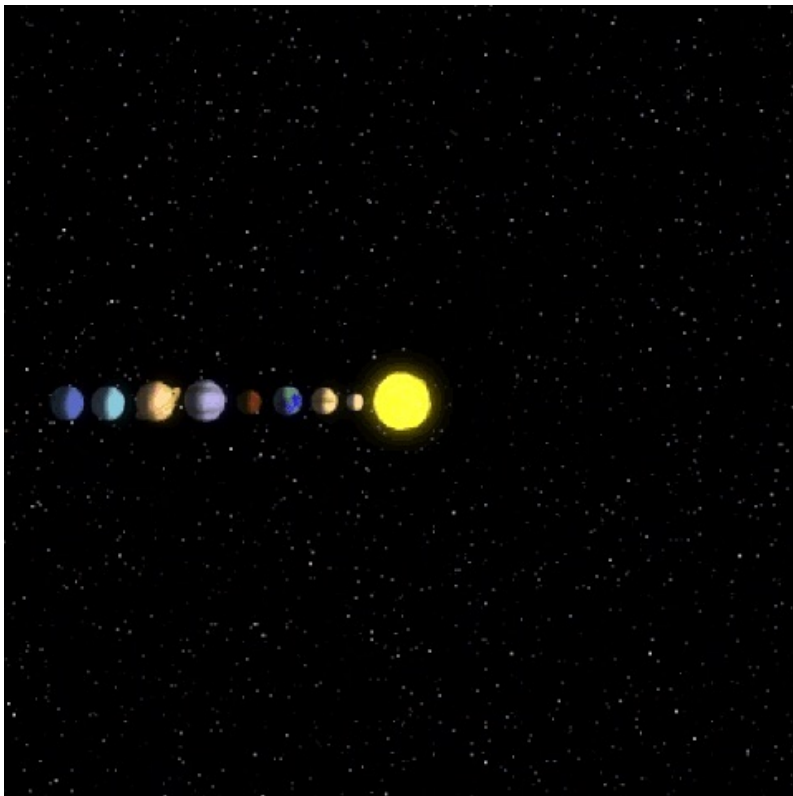
7. Contract + glow due to more fusion & EXPLODE into a SUPERNOVA, forming elements heavier than iron & ejecting them into the universe
8. Exploding supernova ejects outer layer = dense NEUTRON STAR
9. BLACK HOLE created if star is huge



Solar system & Orbits:

Orbiters of the Sun:

1. Planets (8 in Milkyway), high gravity strength 2 pull in nearby objects
2. Dwarf planets eg Pluto
3. Moons; natural satellites
4. Artificial satellites; synthetic



GRAVITY:

Planets have circular orbits (constant acceleration & changing velocity), forces are directed towards centre of planet (causes changes in direction.)

Planet accelerates constantly towards what it's orbiting & the INSTANTANEOUS VELOCITY (@ right angles to the acceleration) keeps planets travelling in circles.

Force due to: gravity between planet & Sun/satellites

Orbital size:

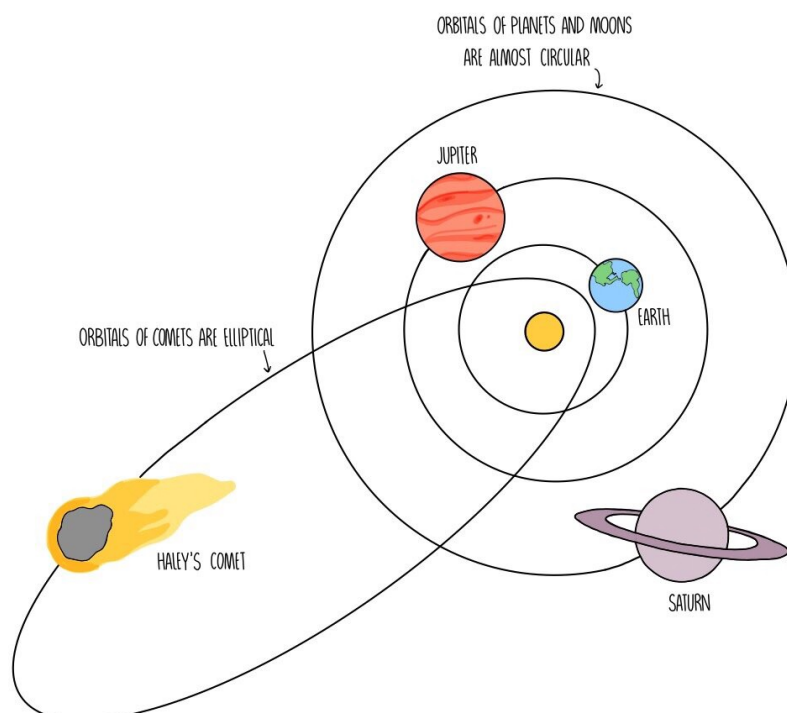
Closer 2 planet = higher gravitational force

Stronger force = faster planet travels to remain in orbit

Stable orbits: if speed changes, radius of orbit does too

Faster moving objects move in stable orbits with a smaller radius than slower ones

Very stable orbit: fast object & small radius!



Red shift

Universe = expanding

Evidence: light from distant galaxies has higher wavelength (shift towards red end of spectrum)= source of light is moving AWAY from us

So... source of light is receding rapidly in all directions

Big Bang

Galaxies expanded from the 'point of singularity' from an explosion

All matter in universe occupied TINY space (dense & hot) then it exploded, prompting an ongoing expansion

But just a THEORY (CORRELATION doesn't equal CAUSATION)

1998 supernovae observations show RAPID universe expansion

Dark matter (holds galaxies together but doesn't emit EM), dark energy-> cause of rapid expansion?

