

NCERT Mind Maps

This set of mind maps is intended to cover origin and evolution of the earth efficiently .

We have taken care to illustrate all trivial and non trivial things related to this topic using images .

All data is presented in form of mind maps .

The notes closely follow the new NCERT XI Physical Geography second chapter and NCERT VI first chapter .

Please read the chapter from original NCERTs and then from the mind maps .

Once done , you can further revise the chapters later only using these mind maps .

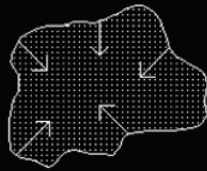
If you have not received this material directly from us but by sharing by others , send your email ID to us with "subscription" written in the subject on this email address : notesforias@gmail.com so as not to miss out on any future material .

nebula generally means cloud

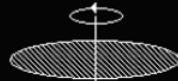
Origin of the Earth

EARLY THEORIES

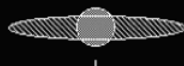
Nebular Hypothesis



self-gravity contracts a gas cloud



conservation of angular momentum pulls cloud into a disk



disk begins to rotate

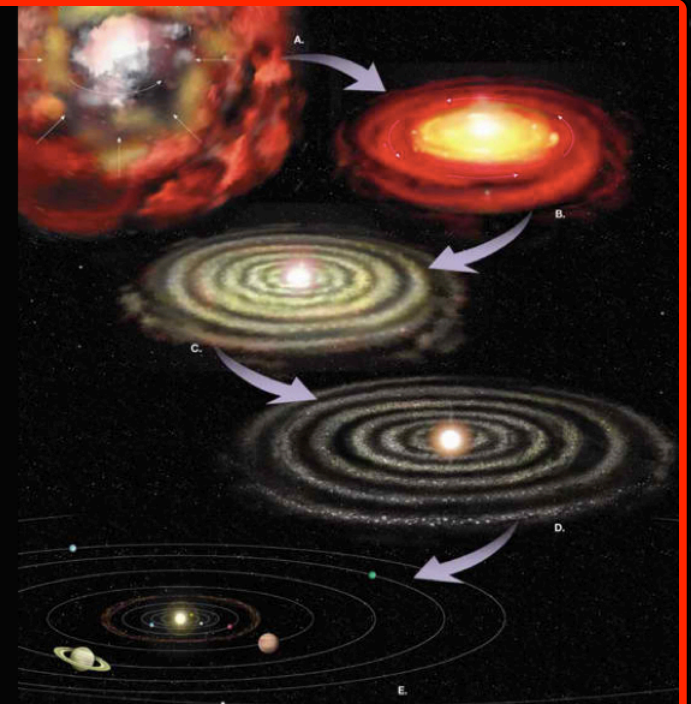
central mass forms (proto-Sun)



centrifugal force balances gravitational forces and a ring forms



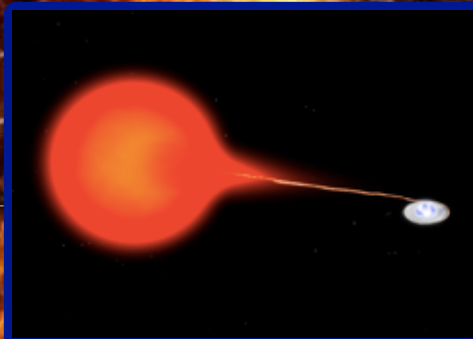
ring forms into a planet



By Immanuel Kant . Revised by Laplace (1796) → modified in 1950 ⇒ sun surrounded by solar nebula (H , He , Dust) → friction and collision of particles ⇒ formation of disk shaped cloud ⇒ planets formed as a result of accretion



Binary theories



wandering star approached the sun ⇒ cigar shaped extension of material separated from sun

the separated material continued to revolve around sun

later , arguments were made of a companion to the sun coexisting

eventually , condensed into planets

The Star Formation

early universe → matter and energy distribution - not uniform

⇒ differences in gr. forces ⇒ matter drawn together → basis for devp of galaxies

galaxies

large no. of stars

spread measured in thousands of light years

formation : accumulation of H gas - as a large cloud (nebula)

develops localised clumps of gas

grow into denser bodies ⇒ stars

Formation of Planets - stages

stars- localised lumps of gas

gr. force within lumps ⇒ formation of gas cloud core

rotating disc of gas and dust around this core

condensation of gas cloud

matter around core develops into small rounded objects

by cohesion they develop into planetesimals

larger bodies form by collision and gravitation makes the material stick together

planetesimals accrete ⇒ form planets

Light year:
distance travelled by light in 1 year
= 9.46×10^{12} km

Mnemonics :

PaReSH (946) rawal
travelling @ speed of light

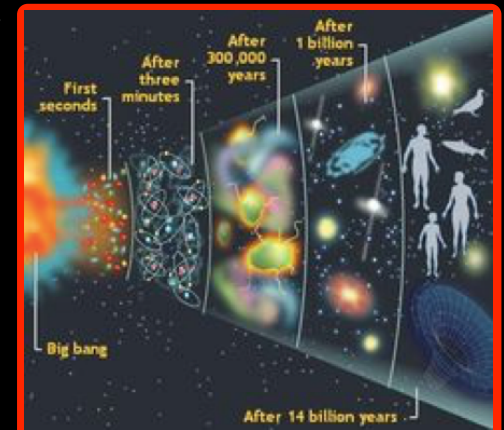
Modern Theories

Origin of the Universe

Big Bang Theory (expanding universe hypothesis)

universe expanding - galaxies moving further apart

but galaxies themselves are not expanding



Stages in the devp of the universe

Big Bang : beginning - tiny ball → infinitely small volume , infinite T and density - explode violently ⇒ huge expansion till today

First seconds : rapid expansion (then slowed down)

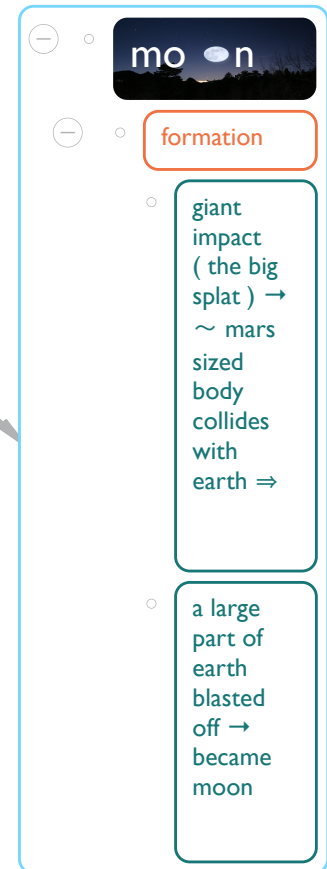
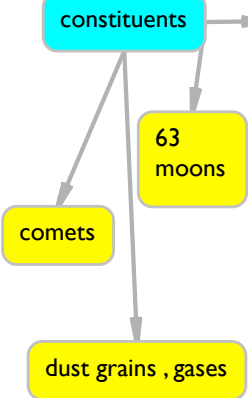
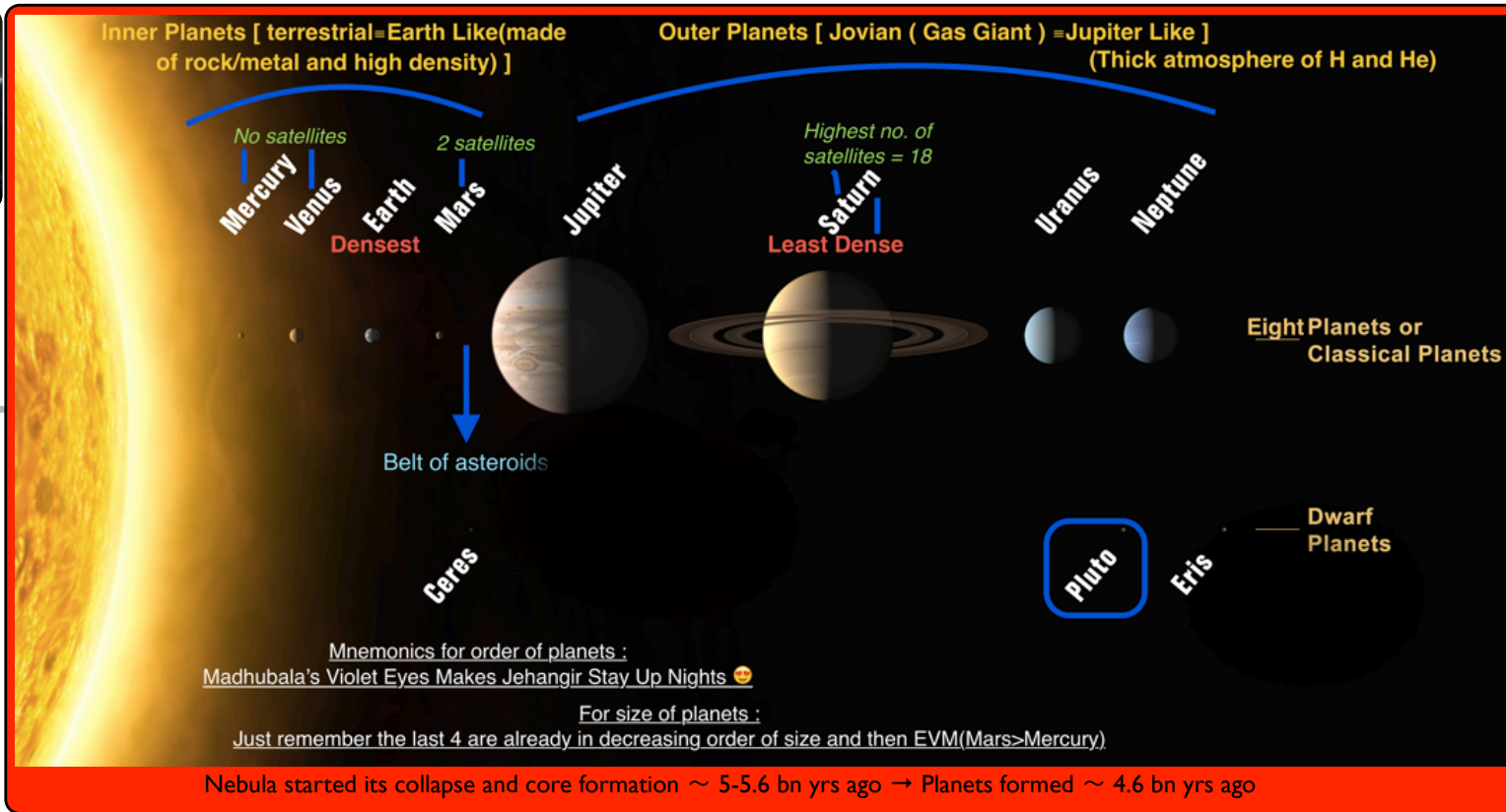
After 3 mins : first atom begins to form

After 3 lakh years : T ↓ to 4500 K and give rise to atomic matter . Universe- transparent

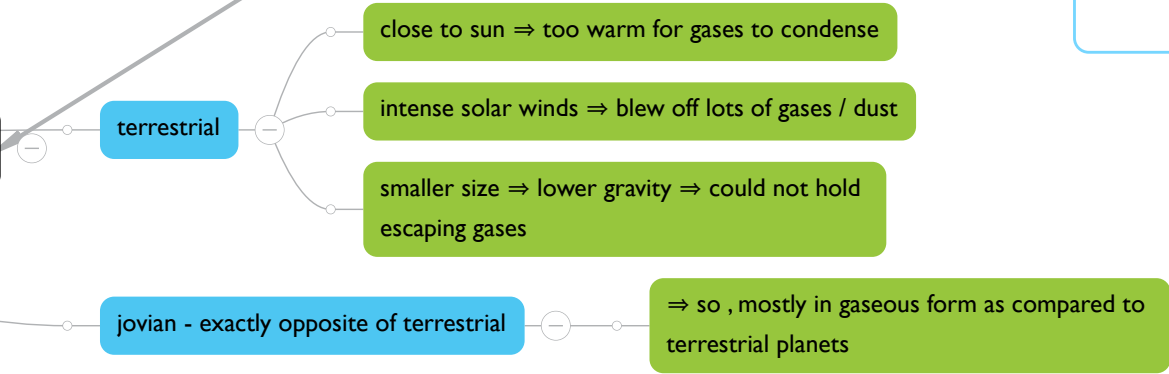
As it grew, some energy converted to matter

Alternative : Steady state concept (Hoyle) - ×

OUR SOLAR SYSTEM



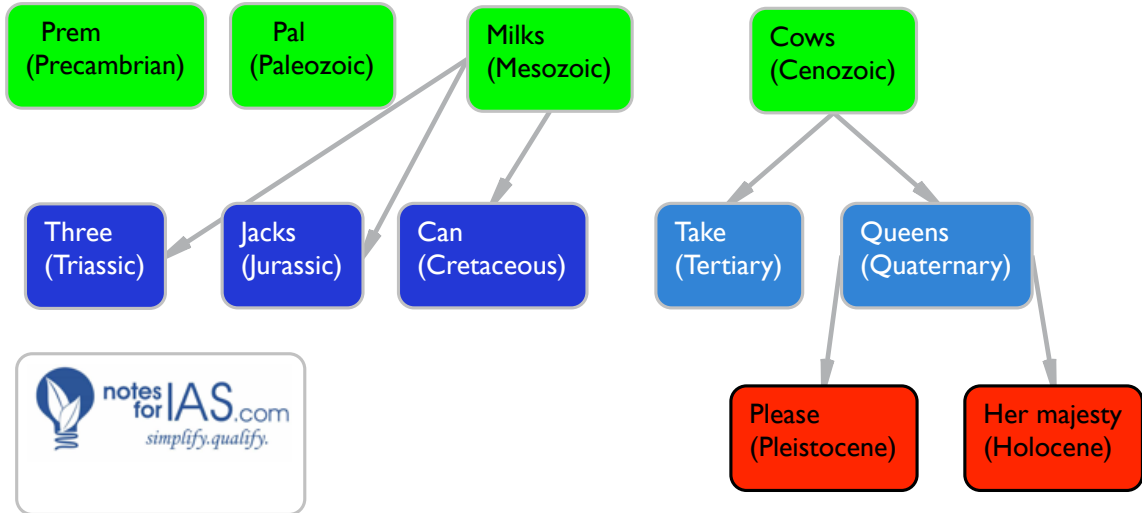
Difference b/w terrestrial and jovian



Geological Time Scale



MNEMONICS
 One should have rough idea of geological timescale so that whenever it is referred to in further studies, one can relate to which timescale is being talked about. Use the Mnemonics given here with the table on the right to memorise the orders roughly.



Eon	Era	Period	Epoch	Development of Plants and Animals	Relative Time Span of Eras		
Phanerozoic	Cenozoic	Quaternary	Holocene	0.01	Humans develop	Cenozoic	
			Pleistocene	1.8		Mesozoic	
		Tertiary	Pliocene	5.3	"Age of Mammals"	Paleozoic	
			Miocene	23.8			
			Oligocene	33.7			
	Mesozoic	Cretaceous	Eocene	54.8	Extinction of dinosaurs and many other species	Precambrian	
			Paleocene	65.0			
			144	"Age of Reptiles"	First flowering plants		
		Jurassic	206	First birds			
		Triassic	248	Dinosaurs dominant			
		Paleozoic	Carboniferous	Permian	248		Extinction of trilobites and many other marine animals
				290	"Age of Amphibians"		First reptiles
			Pennsylvanian	323	Large coal swamps		
			Mississippian	354	Amphibians abundant		
			Devonian	417	"Age of Fishes"		First insect fossils
	Silurian		443	Fishes dominant			
	Ordovician		490	First land plants			
	Proterozoic	Archean	Cambrian	540	"Age of Invertebrates"	First fishes	
			490	Trilobites dominant			
		540	First organisms with shells				
Proterozoic	2500	Collectively called Precambrian, comprises about 88% of the geologic time scale	First multicelled organisms				
Archean	3800	First one-celled organisms					
Hadean	4500	Origin of Earth					

Geological Time Scale : Try to remember the red marked areas .

EVOLUTION OF THE EARTH



Evolution of Lithosphere

- gradual ↑ in density ⇒ inside T ↑ ; giant impact ⇒ further T ↑
- ⇒ differentiation ⇒ material separated according to density ⇒ heavier material (like Fe) → centre ; lighter → surface
- further cooling and solidification ⇒ condensation to smaller size ⇒ outer surface devp as crust and further → mantle → outer core → inner core (with ↑ density)

Evolution of Atmosphere and Hydrosphere



3 stages of atm devp

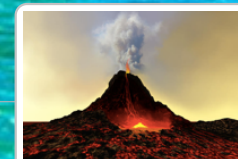
2nd : contribution by hot interior of earth

3rd: Oxygen by photosynthesis

during cooling of earth ⇒ gases released from interior by degassing (H₂O , CO₂ , CH₄ , N₂ , NH₃ , little O₂)

further cooling ⇒ water vapour condense to liquid ⇒ dissolved CO₂ ⇒ more cooling ⇒ more condensation

collect in depressions ⇒ oceans



release from volcanoes

first in oceans → when saturated ⇒ escape into atm

Origin of Life

" A kind of chem. reaction " ⇒ Generated complex organic molecules and assembled them

⇒ duplicating themselves and (inanimate matter ⇒ living substance)

record of life

fossils in rocks

first life around 3800 mn years ago





natural (moon)

no water , air

diameter = 1/4 of earth

mountains , plains , depressions ⇒ cast shadows on moon's surface

revolves around earth (and also rotates on its axis) in 27 days ⇒ so , only one side is visible to us on earth



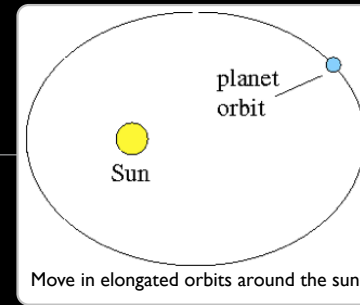
artificial (like INSAT)

Mnemonics for planets :
My Very Efficient Mother Just Served Us Nuts

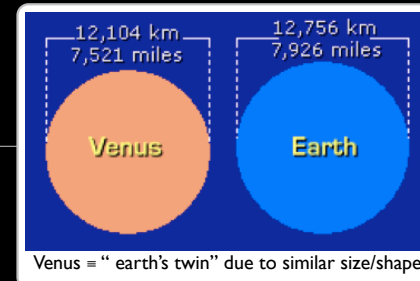
satellite : moves around planets

THE EARTH IN THE SOLAR SYSTEM

Planets



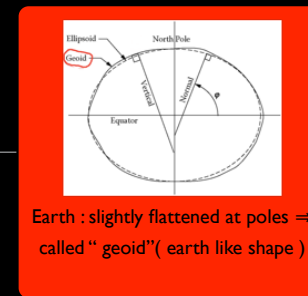
Move in elongated orbits around the sun



Venus = " earth's twin " due to similar size/shape

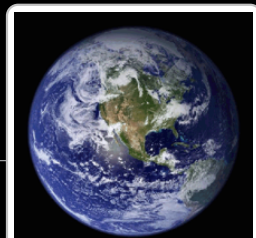
Pluto : " dwarf planet " by international astronomical union in 2006

Jupiter , Saturn , Uranus - have belt of small debris (rings) rotating around them

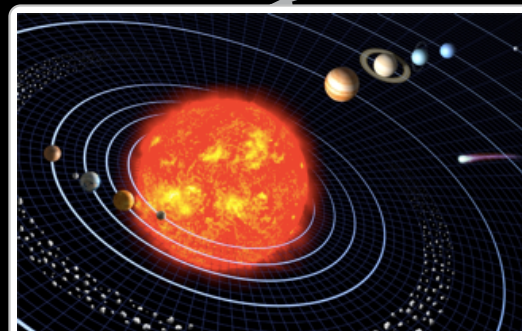


Earth : slightly flattened at poles ⇒ called " geoid " (earth like shape)

uniqueness : right T , water , air , oxygen to support life



2/3 covered with water ⇒ appears blue - "blue planet"

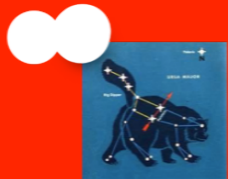


Sun : Pulling force Binding the solar system

Constellations : patterns formed by stars

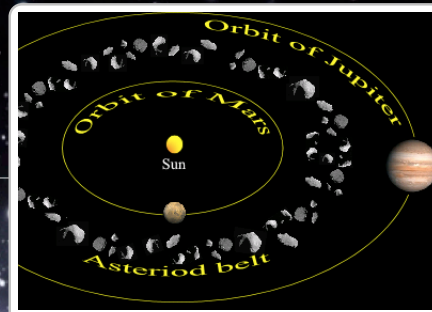


Eg. small bear (saptarishi) - part of ursa major/big bear



line joining pointer stars in small bear extend to pole star (north star : always remains fixed in position)

THE EARTH IN THE SOLAR SYSTEM



asteroids : tiny bodies moving around the sun

part of planet that exploded many years ago

universe made up of millions of galaxies (huge system of stars,dust,gases)



Our galaxy : Milky Way (Akash Ganga)

meteoroids : small pieces of rocks moving around the sun

may drop on earth



heat up due to friction with air and burn => flash of light -> the unburnt part falling on earth - meteor