

GAT-Geography Our Solar System

Geography: An Introduction

In simple words geography refers to description of earth. The word geography itself had its root in Greek language. Eratosthenes (276-194 BC) was the first person to use the word Geography.

Though geography is simply a description of earth it actually covers a range of disciplines. The subject itself is a parent discipline for many branches of science like Biology, Physics, chemistry, environment Etc. in general it is devoted subject to study of everything that we can see & feel Physically. It covers the study of earth, landforms and their origin, oceans and its formations, environment, life forms, climate and climatic regions, Crops, Minerals, Forests etc.

The geography is one of the important subject of study because every difference that we see in this world; weather it is in food habits, of clothing styles, languages we speak, the color of skin that we have is rooted in the geography of region. The quality of life we live to a greater extent is the product of geography we have.

Human being constantly interacts with Nature and are responsible for many changes in natural world by making dams, farming, climate change etc. geography also studies all these changes as interactive relationship between Natural physical world and human activities.

Everything around us is continuously changing. There is continuous formation and destruction of landforms, addition of salt in ocean water, changing structure of Gases in air etc. this Takes geography to an arena of dynamism. The geography of the region cannot be same the forces of

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nature and human activity are changing the world continuously.

For example, Indus Valley civilization was once the fertile region in the world which give rise to one of the most brilliant mercantile civilization of the world. But with time Yamuna which once was the tributary of River Indus changed its course and river Sarasvati Started flowing as Underground river, the region is now converted to desert.

The Place where now Himalaya Mountain is once inhabited by Tethys Sea. With the Plate movement the debris of Tethys sea is now uplifted to form Great Himalayas and its Height is still increasing every by few centimeters.

The India is still moving towards Tibetan plateau. The rivers in Himalaya still changes their course. The earthquakes, volcanos, cyclones, everything is changing our world continuously.

The Geography of India and world will not remain same for times to come

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Geography For NDA.

- UPSC Syllabus For NDA Geography is as following
- The solar System
- The Earth, its shape and size. Latitudes and Longitudes, Concept of time. International Date Line.
- Movements of Earth and their effects.
- Origin of Earth.
- Rocks and their classification; Weathering – Mechanical and Chemical, Earthquakes and volcanoes.
- Ocean Currents and Tides
- Atmosphere and its composition; Temperature and Atmospheric Pressure, Planetary Winds, cyclones and Anti-cyclones; Humidity; Condensation and Precipitation; Types of Climate. Major Natural regions of the World.
- Regional Geography of India – Climate, Natural vegetation. Mineral and Power resources; location and distribution of agricultural and industrial activities.
- Important Sea ports and main sea, land and air routes of India.
- Main items of Imports and Exports of India

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Out of 600 Marks General ability test(GAT) paper the geography covers 80 Marks. If you have gone through previous year papers, You will learn that Geography is the second toughest subject in NDA exam after Mathematics. In all paper around 20 questions are asked on geography syllabus each of 4 marks. These questions are ranged from easy to tough. UPSC generally asks the questions given in syllabus, or the questions which shows first line relationship with syllabus. But student are supposed to cover all important bits given in 5th Std to 12th Std NCERT. And the bits in discussion in news recently.

20 questions * 4 Marks = 80 Marks

These twenty questions are generally based on following important branches of Geography

Physical geography

Human Geography

Indian Geography

World Geography

Economic Geography

Environment science

If we study the previous 10 years question papers carefully we can clearly observe a pattern in which the marks are dedicated to each bit in syllabus.

Most of the questions asked in NDA exam are easy to Medium in difficulty level and can be attempted with basic knowledge, conceptual clarity, and application of simple logic to question and answers. Even if student could score 50% questions correctly, they are going to make huge difference in Score table.

GAT-Geography Branches Of Geography

1.	Geology	Study of geomorphology of the earth
2.	Padology	Study of soil
3.	Petrology	Study of rocks
4.	Botany	Study of plants
5.	Zoology	Study of animals
6.	Anthropology	Study of human culture
7.	Meteorology	Study of climate
8.	demography	Study of population and related data
9.	Hydrology	Study of oceans and water bodies
10.	Climatology	Study of climate and its dynamism
11.	Geomorphology	Study of landforms
12.	Ecology	Study of species balance

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Some important units to major space distances.

Lightyear: lightyear is the unit of distance. Light travels with the speed of light. i.e. 3 lakh km per second. The distance travelled by light in one year is known as one light year.

1 lightyear = 9.4607×10^{12} km

Astronomical Unit (AU): it is mean distance between earth and sun.

Sidereal Year: it is time taken by earth to orbit the sun once with respect to the fixed star.

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Whenever we see the sky at night we feel astonished by the creation of almighty nature. The stars, planets, and other cosmic bodies has always not just impressing us but they leave us questioned about their formation, age and end.

Human beings are trying to solve many puzzles regarding the universe for thousands of years. The study is done not only under geography but mathematics, Physics, philosophy, astronomy, cosmology are some other branches of study which are trying to solve the riddles related to universe. Let us discuss Some theories by some of the early mathematicians.

Nebular Hypothesis by Immanuel Kant and revised by Laplass. This theory states than the earth and planets were formed out of gases associated with youthful sun.

Binary hypothesis states that the companion of the sun coexisted.

But in later time the focus of study shifted to appeal more deep question about the origin of universe of which earth is just the part.

Big-Bang Theory

The Big Bang theory also known as expanding universe theory is one of the modern theories which explains the origin of the universe. According to theory initially there was only a single particle of infinitesimally small size 'Tiny Ball' having infinite mass, density and temperature. This particle exploded some 13.7 billion years back and started expanding in the space. The process of expansion is still going on and can be physically proved.

Formation of stars and planets

After the explosion the energy spread in all direction of tiny ball in uneven way. The differences in mass and density given way to differences in gravitational forces and formation of cosmic structures like galaxies. These galaxies were

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separated by the distance of many lightyears. _Every galaxy formed by accumulation of hydrogen gas in form of nebula which ultimately leads to formation of stars.

Planets are formed out of the materials associated with star formation. During the process of planets formation, the separated material from the nebula other than star starts condensing around itself. Generally, every planet has coexisted with the planet star and there is no separate process for planet formation and every planet is a unique condition for its formation depending upon its mass, the distance from sun, the gravity of parent star etc.

Solar System

The solar system of earth consists of Sun, eight planets, 63 moons of different planets, asteroid belt, comets, meteors etc. out of these eight planets Mercury, Venus, earth and Mars are inner planets and other four are outer planets.

Inner planets	Outer planets
Mercury, Venus, Earth, Mars.	Jupiter, Saturn, Uranus, Neptune
Also called- terrestrial planets as their surface is hard	Also called- Jovian planets as their surface is gaseous and one cannot stand on it.
They are very small in size and made of metallic materials.	They are big size mainly made of gases like hydrogen and helium.
Their atmosphere is thin and new as solar flames have blown out their original atmosphere.	They have their own thick atmosphere of primordial time as solar sun are not very efficient At long distance.
Very few or no satellites	Large number of satellites and planetary bodies move around them.
They are inside of the asteroid belt	They are outside of the asteroid belt

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Some facts about planets.

1. Mercury has almost no atmosphere due to its vicinity to sun and solar flames.
2. Venus is nearest planet to earth and known as earths twin. It is hottest planet in solar system.
3. Mars is known as red planet. The red color is due to its iron rich soil. The scientists are very interested in this planet because of possibility of lifeforms due to evidences of water and methane gas. Various Scientific institutions including NASA, ISRO has send missions to study the planet. India also send Mars Orbiter Mission (MOM) or Mangalyaan to Mars in November 2013.
4. Jupiter is the largest planet in solar system. Gannymeda, the largest satellite of Jupiter is also a largest satellite in solar system. Mission JUNO is one of the important Mission Send to Jupiter By NASA to study its atmosphere.
5. Uranus is known as green planet
6. The size of sun is so big that about one million earths will fit into it. it covers 99.8%of total weight of our solar system. the sun is made of hydrogen and helium mainly. On surface of sun Hydrogen is converted into helium (Nuclear fusion reaction) and some part of mass is released in form of energy. We get this energy in form of sunlight. it will take around 8 minutes to reach sunlight to Earth.

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The Moon

The moon is only natural satellite of earth. Its size is $1/4^{\text{th}}$ of earth and gravitational force is $1/6^{\text{th}}$ of earth. It takes 27.3 days for the moon to travel all the way around the earth to complete its orbit. Moon Shines because of reflected light of sun and don't have its own light. Every day sun lights up the different part of moon's surface and we see the different type of moon every day. These are known as Phases of the Moon. The rotation and revolution period of the moon are roughly same thus we can see only 60% part of moon's surface from earth.



Space Missions to moon

Apollo 11- 1969- NASA – USA -

Neil Armstrong landed On moon

Chandrayan 1 – 2008 – ISRO – INDIA - orbiter mission – discovered water on moon

The Case of Pluto: dwarf planet

Pluto was once recognized in the solar system as planet. But because of its small size International Astronomical Union has decided not to count it as planet in 2006. The size of Pluto’s surface area was even less than former USSR. And we found some planets in solar system bigger in size than that of Pluto such as Eris.

Use your imagination power

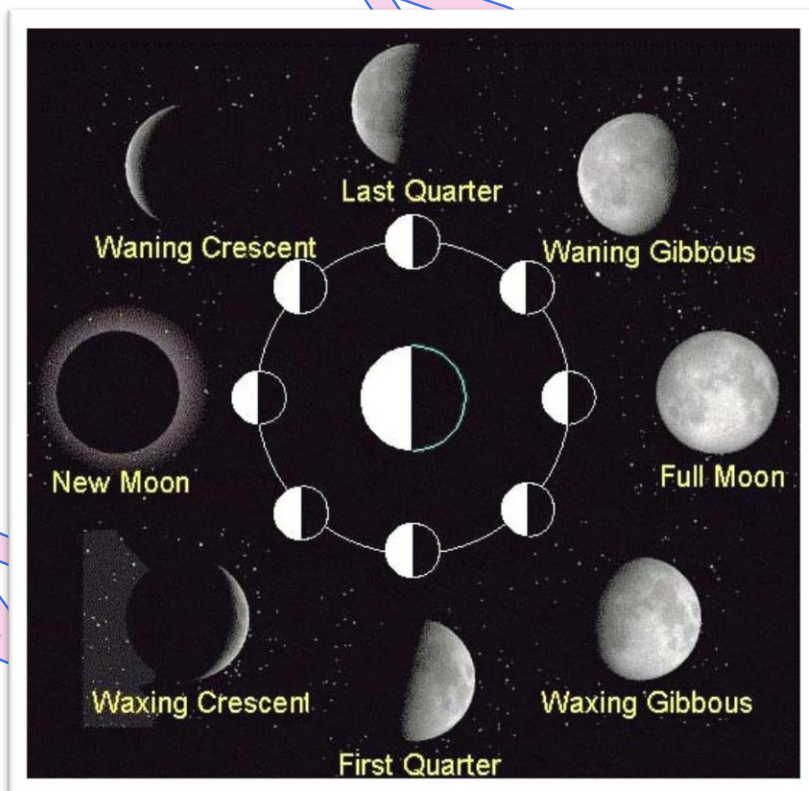
Can there be life of Sun Or Jupiter?

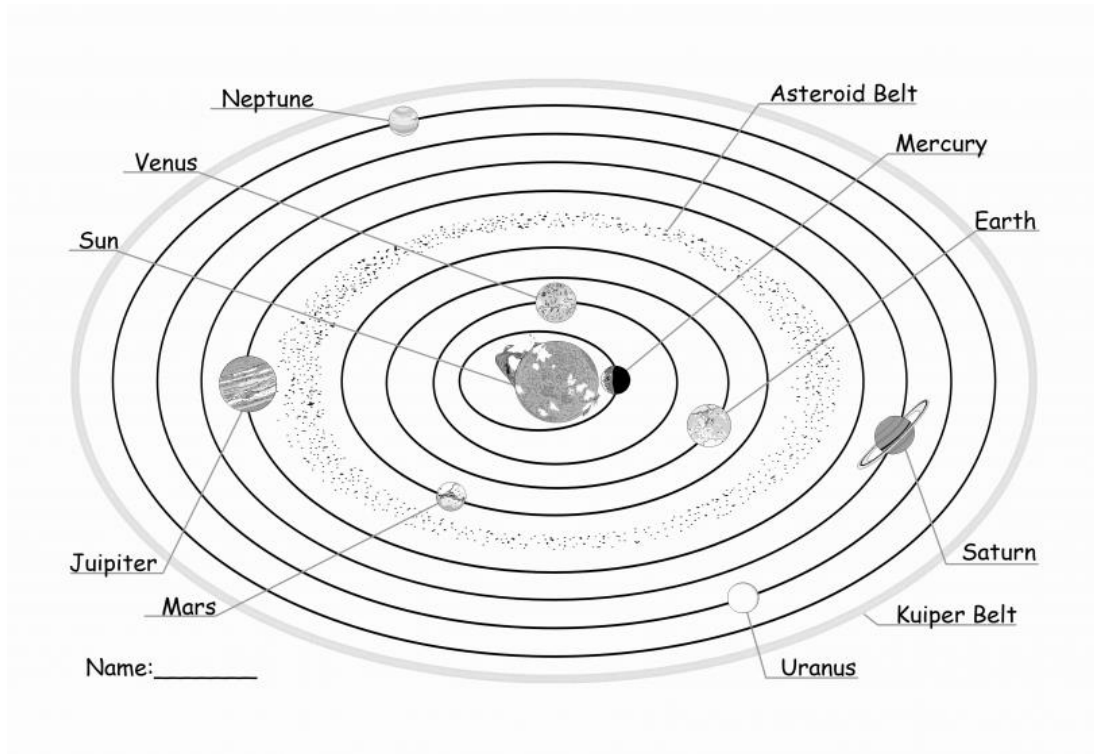
What Type of life it can be?

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Planet	Orbital distance (A.U)	Rotation period	Revolution Period	Diameter Km	Mass compare to the earth	Density compare to the earth		No. of moons	Gravity	Direction of rotation
Mercury	0.4	59 days	88 days	4878	0.055	0.98		0	0.38	West to east
Venus	0.7	243 days	225 days	12,100	0.8	0.95		0	0.90	East to west
Earth	1	1 day	365 days	12,760	1	1		1	1	West to east
Mars	1.5	1.03 day	687 days	6780	0.11	0.71		2	0.38	West to east
Jupiter	5.2	10 hours	11.9 years	1,42,800	318	0.24		67	2.34	West to east
Saturn	9.5	10 hours	29.5 years	1,20,000	95	0.12		62	1.16	West to east
Uranus	19.2	16 hours	84 years	50,800	15	0.23		15	1.15	East to west
Neptune	30.1	18.5 hours	165 years	48,600	17	0.30		5	1.19	West to east

Different Space Agencies of the world		
Name	country	Established on
NASA	USA	1958
ISRO	INDIA	1969
CNSA	CHINA	1993
ESA	EUROPIAN UNION	1975
JAXA	JAPAN	2003
ROSCOSMOS	RUSSIA	1992

Meteors and Meteorites

Meteors also known as shooting stars. They are the rocks coming towards earth. Whenever two cosmic bodies such as asteroids collide with each other the rocks are thrown away in the space. Some of these rocks enter the atmosphere and starts burning by the friction with atmosphere. These burning rocks are known as shooting stars or meteors. The unburnt part of these rocks reaches to earth is known as Meteorites.

Comets

Comets the visitors of solar system. they become visible by the suns light. Generally, they are made up of rocks and ice. The tail of comet is always directed away from sun. comet Halley is a short period comet which visits after very 74-79 years. It last appeared in 1986 and will next appear in 2061.

Constellations

They are the different formations of stars and planet which creates a meaningful unique image. These constellations were very helpful for navigation in past. Some of the important constellations are as follows.

- Ursa major- Saptarshi
- Orion- Mriga
- Draco- kaleya
- The great bear
- Aries
- Gemini

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