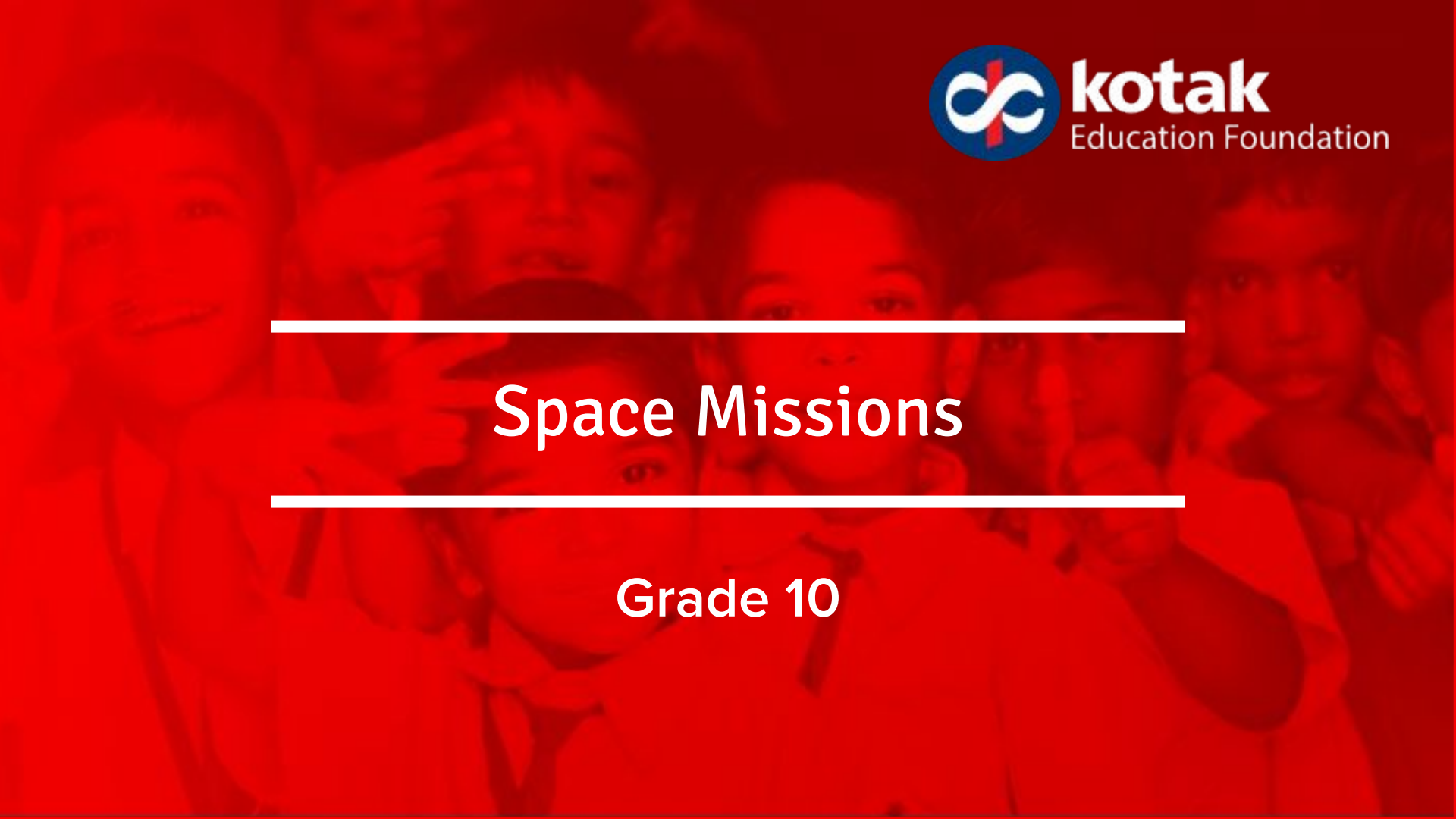

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Space Missions

Grade 10

Space Mission (Check while online)

http://www.bbc.com/future/bespoke/20140304-how-big-is-space-interactive/

Go through the above link and make a note of everything that you observe on your journey of space exploration..

Explore.... (Check when Online)

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https://academo.org/demos/orbit-simulator/

The above demo shows how a body behaves when under the influence of the gravity of a much more massive object. In our example, we have chosen this to be a moon orbiting a planet, but it could equally be a planet orbiting a star.

You can click anywhere on the demo to reposition the moon. And clicking and dragging from within the moon will display an arrow. The length and direction of this arrow gives the moon an initial velocity, which affects the overall shape of the orbit.

Artificial Satellite

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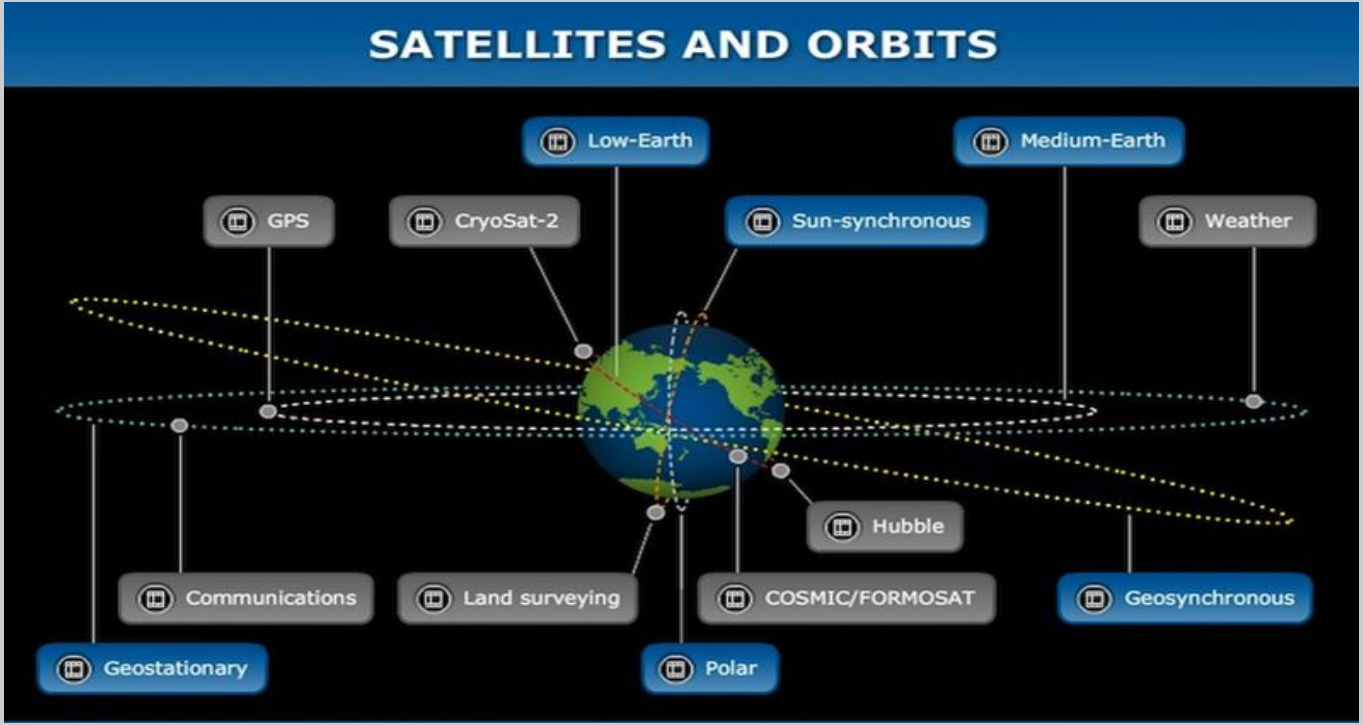
A manmade object revolving around the earth or any other planet in a fixed orbit is called an artificial satellite.

The satellites work on solar energy. So, solar photovoltaic panels are attached on both sides of these satellites like wings.

The first artificial satellite ‘Sputnik’ was sent to space by Soviet Union in 1957

Orbits of Artificial Satellite(Check when Online)



Explore-https://maps.esri.com/rc/sat2/index.html#
(Click the link. Choose country and type of satellite. Go to preset to see LEO, MEO & HEO)

Watch and understand-
https://www.youtube.com/watch?v=ror4P1UAv_g
(English)

https://www.youtube.com/watch?v=XFlmeIsuR54
(Hindi)

Artificial Satellite

What is meant by the orbit of a satellite? On what basis and how are the orbits of artificial satellites classified?

Answer

Orbit of a satellite Is its path around the earth.

Orbits of artificial satellites can be classified on various basis.

(1) On the basis of the angle of the orbital plane : Orbital plane of a satellite can be the equatorial plane of the earth or it can be at an angle to it

(2) On the basis of the nature of the orbit : Orbital plane can be circular or elliptical in shape.

(3) On the basis of the height of the satellite : Orbit of a satellite can be HEO, MEO or LEO

Orbits of Satellite

HEO- If the height of the satellite's orbit above the earth's surface is greater than or equal to 35780 km, the orbit is called High earth Orbit. Satellites in this orbit also called geosynchronous satellites. Example-meteorology and for carrying signals for telephone, television, radio etc. Satellite takes 24 hrs for one revolution- matching with the earth's

MEO- If the height of the satellite orbit above the earth's surface is in between 2000 km and 35780 km, the orbits are called medium earth orbits. The geostationary satellites orbit above the equator. Satellite takes 2-24 hrs for one revolution. Example- Global positioning satellites

LEO- If the height of the satellite orbit above the earth's surface is in between 180 km and 2000 km, the orbits are called Low earth Orbits. Satellites takes 90 min for 1 revolution. The satellites used for scientific experiments and atmospheric studies revolve in low earth orbits. **International Space Station** and **Hubble telescope** also revolve in Low earth Orbits.

Why don’t satellite fall from sky

https://scijinks.gov/satellites-orbit/

Satellite Launch Vehicles

Satellite launch vehicles are used, to place the satellites in their specific orbits. The functioning of the satellite launch vehicle is based on the **Newton’s third law of motion.**

The structure of the launch vehicle is decided by the weight of the satellite and the type of satellite orbit.

Some imp full forms

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INSAT: Indian National Satellite

GSAT: Geosynchronous Satellite

IRNSS: Indian Regional Navigation Satellite System

IRS : Indian Remote Sensing Satellite

GSLV: Geosynchronous Satellite Launch Vehicle

PSLV: Polar Satellite Launch Vehicle

Debri management

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This debris can be harmful to the artificial satellites. It can collide with these satellites or space crafts and damage them. This debris is increasing day by day. Soon, it will be difficult to launch new spacecrafts. It is, therefore, very essential to manage the debris. Some studies and experiments are being done with this in view.

https://www.esa.int/kids/en/Games/Space_Cleanup

Some important questions...

State with reasons whether the following sentences are true or false

1 If a spacecraft has to be sent away from the influence of earth's gravitational field, its velocity must be less than the escape velocity.

Answer

False. **Reason**: This is because the minimum velocity with which the spacecraft must be projected so that it escapes the Earth's gravitational pull is known as escape velocity. So, the initial velocity of the spacecraft must be greater than or equal to escape velocity of Earth.

Why are geostationary satellites not useful for studies of polar regions?

Answer

- The geostationary satellites orbit above the equator or in equator plane, these satellites can't fly over the polar regions.
- Also these satellites are HEO satellites and placed at 35780km above the earth's surface.

Thus, these are not useful for studies of polar regions.

a. What is meant by an artificial satellite? How are the satellites classified based on their functions?

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Answer

A man made object revolving around the earth or any other planet in a fixed orbit is known as artificial satellites. Based on their functions, satellites are classified as following:

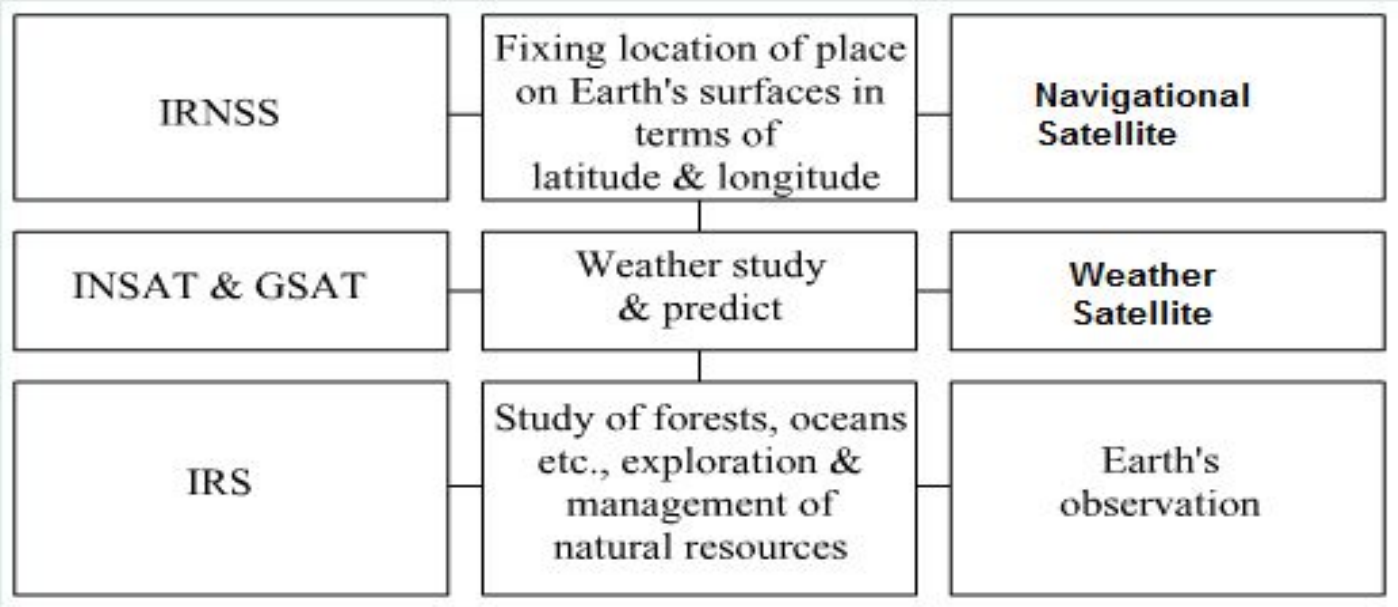
Weather satellite : Collect the information regarding weather conditions of the weather. It records information like, temperature, wind direction, air pressure etc. and sent to the research center on the earth. Based on this information study and prediction of weather is made.

Navigational satellite : Fix the location of any place on the Earth's surface in terms of its very precise latitude and longitude. These satellites assist the user with current live maps as well as real time traffic conditions, also assist the surface, water and air transportation and coordinate their busy schedule.

Broadcasting satellites : Broadcasting satellites are used to transmit various radio and television programmes and even live programmes from any place on the earth to any other place.

Earth observation satellites : Use of these satellites are to observe and provide the real time information about the earth. These satellites also help us to collect the information about the resources, their management, and continuous observation about a natural of natural calamities like flood and earthquake and the changes within it.

Important...


IRNSS
Fixing location of place on Earth's surfaces in terms of latitude & longitude
Navigational Satellite
INSAT & GSAT
Weather study & predict
Weather Satellite
IRS
Study of forests, oceans etc., exploration & management of natural resources
Earth's observation

Free time Space exploration...

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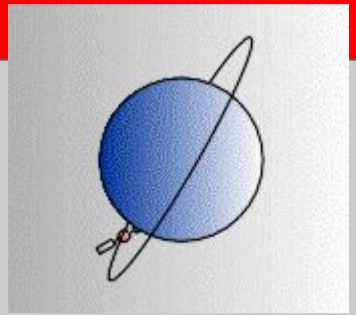

https://www.esa.int/kids/en/Games/Space_Clean up

https://www.sciencelearn.org.nz/image_maps/13-satellites-and-orbits

https://www.nytimes.com/interactive/2020/science/exploring-the-solar-system.html

https://iwant2study.org/lookangejss/02_newtonianmechanics_7gravity/ejss_model_gravity10/gravity10_Simulation.xhtml