

N5 DYNAMICS AND SPACE

1. Key Definitions

Planet: a rocky or gaseous body, usually spherical, which orbits a central star. Reflects light from stars but does not produce its own light. The Earth is an example of a planet.

Dwarf Planet: a small object orbiting a star that has enough gravity to form an almost round shape

Moon: a rocky body which orbits a planet. Reflects light from stars but does not produce its own light. Our Moon is an example of a natural satellite.

Sun: the star at the centre of our Solar System

Asteroid: a small rocky object that orbits the Sun

Solar System: a system consisting of a central star and all objects, which are gravitationally bound to it, including planets (and their moons), asteroids and comets.

Star: a massive ball of gas that emits light through the release of energy produced by nuclear reactions at its core

Exoplanet: a planet, which is in orbit around a star other than our own as in outside our solar system.

Galaxy: a collection of several million stars and their planets, gravitationally bound and moving through the Universe as a single system. The Milky Way is our galaxy.

Universe: everything we know to exist, all stars planets and galaxies.

2. Satellites

- Satellites benefit us in everyday life through GPS, weather forecasting, communications, scientific discovery and space exploration (for example Hubble telescope, ISS).
- Geostationary satellites have a period of 24 hours and orbit at an altitude of 36 000 km.
- The period of a satellite in a high altitude orbit is greater than the period of a satellite in a lower altitude orbit.

3. Challenges of Space Travel (SQA)

- Travelling large distances with the possible solution of attaining high velocity by using ion drive (producing a small unbalanced force over an extended period of time)
- Travelling large distances using a 'catapult' from a fast moving asteroid, moon or planet
- Manoeuvring a spacecraft in a zero friction environment, possibly to dock with the ISS
- Maintaining sufficient energy to operate life support systems in a spacecraft, with the possible solution of using solar cells with area that varies with distance from the Sun.

7. SPACE EXPLORATION

N5 Past Paper HW

2014 – Sec 2 Q9 (Using your knowledge)
2015 – Sec 2 Q10 (Using your knowledge)

4. Risks with Manned Space Travel (SQA)

- Fuel load on take-off
- Potential exposure to radiation - There is a constant risk of high levels of ionizing radiation from the Sun
- Pressure differential
- Re-entry through an atmosphere - Gravitational potential energy is converted into kinetic energy as a space craft re-enters the atmosphere. Due to air resistance a great deal of heat energy is also generated. This can lead to extreme changes in temperatures.