

6.1 The Earth and the Solar System

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS orbit • solar system • orbits and gravity • planet • sun

Objective

Build the skills to answer exam questions on **the Earth and the Solar System**

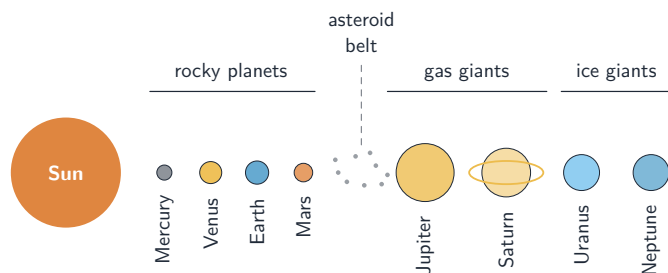
– day/night/seasons, **orbital speed** $v = \frac{2\pi r}{T}$, the planets, and **orbits and gravity**.

You must be able to:

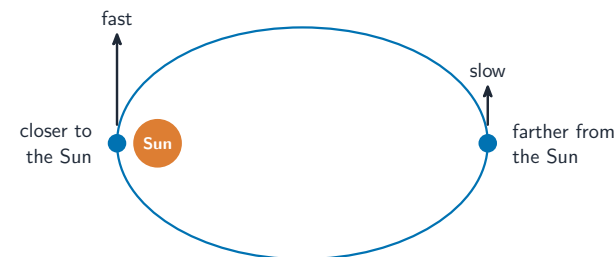
- explain day, year, seasons and Moon phases
- use $v = \frac{2\pi r}{T}$ for an orbit
- describe the Solar System and elliptical orbits

1 Key knowledge and worked examples

Orbits and orbital speed



Four small rocky planets, then the asteroid belt, then four large gaseous planets



An object speeds up when closer to the Sun (PE→KE) and slows down when farther away

Space station, $r = 7.0 \times 10^6 \text{ m}$, $T = 5800 \text{ s}$: $v = \frac{2\pi r}{T} = \frac{2\pi(7.0 \times 10^6)}{5800} \approx 7600 \frac{\text{m}}{\text{s}}$.

2 Practice

2.1 State what causes day and night. [1]

2.2 Name the force that keeps a planet in orbit around the Sun. [1]

3 Exam-style questions

3.1 Compared with the inner planets, the outer planets orbit the Sun: [1]

- ☐ **A** faster
☐ **B** more slowly
☐ **C** at the same speed
☐ **D** in the opposite direction

3.2 A moon orbits a planet at a radius of 4.0×10^8 m with a period of 2.0×10^6 s.

(a) Find its orbital speed. [3]

(b) State what happens to the gravitational field strength of the planet as you move further from it. [1]

3.3 A comet moves in a very stretched elliptical orbit. Explain why it moves fastest when closest to the Sun. [2]
