2.3: Work and energy

Energy

- When a force acts on a moving body, energy is transferred although the total amount of energy remains constant.
- An object can possess energy because of its motion (kinetic energy), position (gravitational energy) and deformation (elastic energy).

Work

- a measure of energy transfer
- work = force × distance
- work = energy transfer (in the absence of thermal transfer)

Kinetic energy

- kinetic energy $= \frac{\text{mass} \times \text{velocity}^2}{2}$; $\text{KE} = \frac{mv^2}{2}$

Change in gravitational potential energy

- gravitational potential energy = mass × gravitational field strength × change in height ; $\text{PE} = mgh$

Springs

- force = spring constant × extension; $F = kx$

Force extension (F-x) graphs

- area under graph = work done in stretching; $W = \frac{Fx}{2}$ (in a linear relationship)

2.5: Stars and planets

The main features of our solar system

- the Sun
- terrestrial/rocky planets
- gaseous giant planets
- dwarf planets
- comets
- moons (that orbit some planets)
- asteroids

The order of the planets

- Mercury
- Venus
- Earth
- Mars

terrestrial/rocky

- Jupiter
- Saturn
- Uranus
- Neptune

gaseous

The asteroid belt

- located between Mars and Jupiter
- comprises many rocky asteroids and dwarf planets

Comets

- have highly elliptical orbits, passing out far out of our solar system

Planetary systems

- comprises a star and all the objects that orbit it

Galaxies

- large collections of stars