Motion, forces and energy

P1.3 Mass and weight

Mass

- Mass is the amount of matter in an object.
- It is measured in kilograms (kg).
- Mass does not change with location (e.g. Earth, Moon).

Weight

- Weight is the force of gravity acting on a mass.
  It is measured in newtons (N).
- Weight depends on the gravitational field strength (g) at the location.

Gravitational Field Strength (g)

- This is the gravitational force per unit mass.
- Equation: $g = \frac{W}{m}$ where W = weight (N), m = mass (kg).
- On Earth, $g \approx 9.8$ N/kg
- A gravitational field pulls objects with mass towards the centre of a planet.
  This pull gives the object its weight.

Acceleration of Free Fall

- Near the Earth's surface, the value of g is the same as the acceleration of free fall.
- This means that freely falling objects accelerate at about 9.8 m/s^2 (ignoring air resistance).