1.3 Mass and weight

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS gravitational field strength • mass and weight • mass • weight • matter

Objective

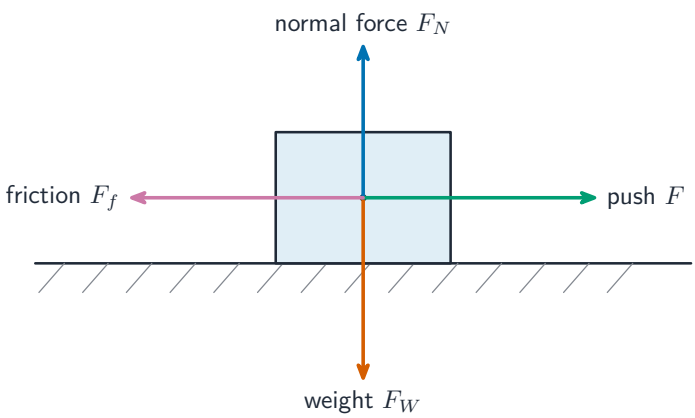
Build the skills to answer exam questions on **mass and weight** – the difference between them, $F_W = mg$, and **gravitational field strength** .

You must be able to:

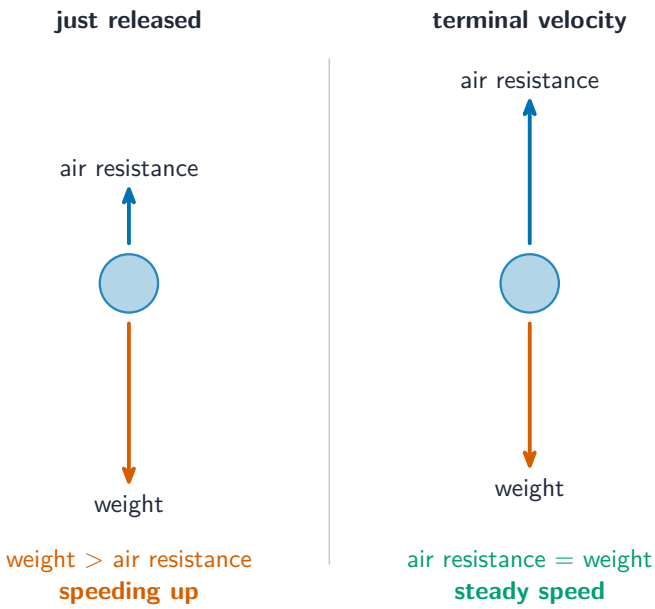
- distinguish mass (kg, constant) from weight (N, depends on gravity)
- use $F_W = mg$ and $g = \dfrac{F_W}{m}$
- explain why weight differs on the Moon

1 Key knowledge and worked examples

Mass vs weight



Weight is the downward force of gravity on a mass: $F_W = mg$



Weight is the downward force, balanced by drag at terminal velocity

- **mass** = amount of matter (kg), the **same** everywhere.
- **weight** = force of gravity (N); $F_W = mg$; smaller on the Moon (weaker gravity).
- **gravitational field strength** $g = \dfrac{F_W}{m}$ (≈ 10 N/kg on Earth).

2 Practice

2.1 Find the weight of a 6.0 kg bag on Earth ($g = 10$ N/kg). [2]

2.2 State the unit of weight and the unit of mass. [1]

3 Exam-style questions

3.1 When an astronaut goes to the Moon, their: [1]

☐ **A** mass and weight both decrease
B mass stays the same but weight decreases
C mass decreases but weight stays the same
D mass and weight both stay the same

3.2 An object has a weight of 48 N on Earth, where $g = 10$ N/kg.

(a) Find its mass. [2]

(b) Find its weight on the Moon, where $g = 1.6$ N/kg. [2]

3.3 Explain why mass does not change when an object is taken to the Moon, but weight does. [2]