IGCSE PHYSICS • EXERCISE SHEET

1.3 Mass and weight

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

Objective

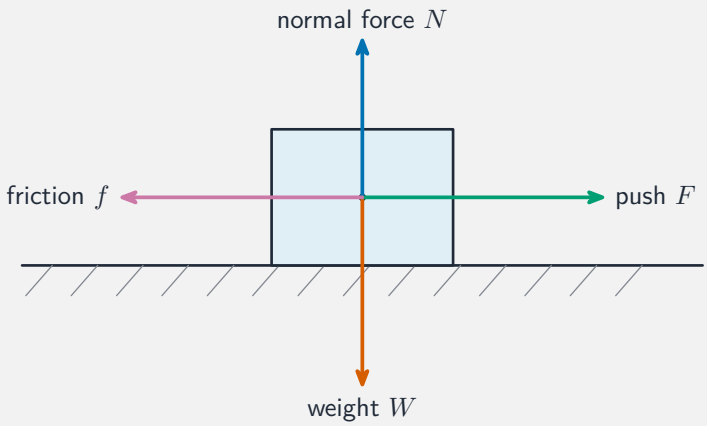
Build the skills to answer exam questions on **mass and weight** 质量与重力—the difference between them, $W = mg$, and **gravitational field strength** 重力场强度.

You must be able to:

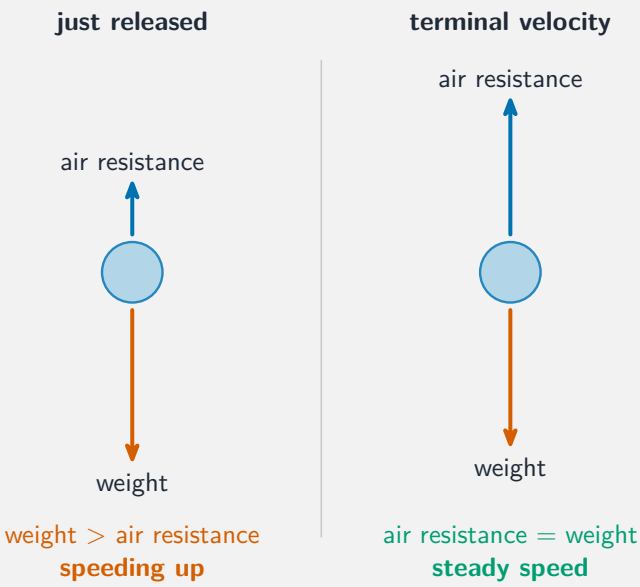
- distinguish mass (kg, constant) from weight (N, depends on gravity)
- use $W = mg$ and $g = \dfrac{W}{m}$
- explain why weight differs on the Moon

1 Worked examples

Mass vs weight



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



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

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

4 Go further

You are now ready for the real exam questions on this subtopic. Open the **1.3 Mass and weight** past-paper sheet in the Library, or try these in **Practice mode**:

- 0625/22 N25 —Q3 (mass and weight)
- 0625/23 N25 —Q4 (weight)
- 0625/41 N25 —Q2 (gravitational field strength)

Solutions

2.1 $W = mg = 6.0 \times 10 = 60$ N.

2.2 weight in newtons (N); mass in kilograms (kg).

3.1 B. Mass is unchanged; weight is less because the Moon's gravity is weaker.

3.2 (a) $m = \dfrac{W}{g} = \dfrac{48}{10} = 4.8$ kg.
(b) $W = mg = 4.8 \times 1.6 = 7.7$ N.

3.3 mass is the amount of matter, which does not change with location; weight is the force of gravity, which is smaller on the Moon because its gravitational field strength is weaker.