MR SULLY UNFOLDS PHYSICS ANSWERS

Weight and work done

AQA 4.5.1.3 · 4.5.2
Forces · Paper 2
Foundation & Higher

Name _____ Class _____ Date _____

Weight is the force acting on an object due to gravity. When a force moves an object, **work is done** and energy is transferred.

KEY EQUATIONS

W = m g
weight (N), mass (kg), gravitational field strength (N/kg). On Earth g = 9.8 N/kg.

W = F s
work done (J), force (N), distance moved along the line of the force (m). 1 J = 1 N m.

Section A · Recall and calculate

Grade 4–5

1 What is the difference between mass and weight? [2]

Mass is the amount of matter in an object (kg) and doesn't change.

Weight is the force acting on it due to gravity (N); it depends on g.

2 Calculate the weight of a 65 kg person on Earth. [2]

W = 65 × 9.8 = 637 N

3 Calculate the work done when a 40 N force pushes a box 3 m. [2]

W = 40 × 3 = 120 J

Section B · Rearrange and apply

Grade 5–6

4 An astronaut has a mass of 80 kg. The gravitational field strength on the Moon is 1.6 N/kg.

a Calculate her weight on the Moon. [2]

W = 80 × 1.6 = 128 N

b State her mass on the Moon. Explain your answer. [2]

80 kg

Mass doesn't depend on gravity; only weight changes.

5 Complete the table. [3]

Force (N)	Distance (m)	Work done (J)
25	8	**200**
150	**4**	600
500	0.6	300

6 A student pushes a heavy box across a rough floor. Explain why the box gets warmer. [2]

Work is done against friction,

which transfers energy to the thermal store of the box (and floor).

Section C · Stretch

Grade 7+

7 A crane does 54 000 J of work lifting a load 12 m vertically at a steady speed. Calculate the mass of the load. (g = 9.8 N/kg) [3]

F = W ÷ s = 54 000 ÷ 12 = 4500 N (equal to the weight)

m = W ÷ g = 4500 ÷ 9.8

m = 459 kg

Exam-style question

AQA style

8 A cyclist pedals with a constant force of 120 N and travels 500 m along a flat road.

a Calculate the work done by the cyclist. [2]

W = 120 × 500 = 60 000 J

b The cyclist and bike have a combined mass of 90 kg. Calculate their combined weight. [2]

W = 90 × 9.8 = 882 N

c The cyclist's speed stays constant. Explain what this tells you about the resistive forces. [2]

Constant speed means the resultant force is zero,

so the resistive forces must also total 120 N.

Total: _____ / 24

How confident am I?	Not yet	Nearly	Got it
I can explain the difference between mass and weight	☐	☐	☐
I can use W = mg	☐	☐	☐
I can use W = Fs and link work done to energy	☐	☐	☐