

Units, Scalars and Vectors

Instructions: Write the correct unit for each quantity, then tick **Scalar** or **Vector**. Quantities marked * are **Physics (P)** only.

Scalar Quantities

DEFINITION

USE THESE WORDS

magnitude (size)

only

no direction

LIST SIX EXAMPLES

Vector Quantities

DEFINITION

USE THESE WORDS

magnitude (size)

and

a direction

LIST SIX EXAMPLES

Units — and Is It a Scalar or a Vector?				tick one box in each row			
Quantity	Unit	Scalar	Vector	Quantity	Unit	Scalar	Vector
mass		☐	☐	momentum*		☐	☐
distance		☐	☐	change in momentum*		☐	☐
displacement		☐	☐	moment of a force*		☐	☐
speed		☐	☐	energy		☐	☐
velocity		☐	☐	work done		☐	☐
acceleration		☐	☐	power		☐	☐
time		☐	☐	density		☐	☐
force		☐	☐	current		☐	☐
weight		☐	☐	potential difference		☐	☐
gravitational field strength, g		☐	☐	temperature		☐	☐

* Physics (P) only — not needed for the Double Award.

Results — Finish the Unit, Then Decide			if it can change direction, it is a vector		
Result — write the unit	Can it change direction?	Is it a vector?	Result — write the unit	Can it change direction?	Is it a vector?
Force = 20 _____	☐ Y ☐ N	☐ Y ☐ N	Momentum* = 36 _____	☐ Y ☐ N	☐ Y ☐ N
Mass = 4.5 _____	☐ Y ☐ N	☐ Y ☐ N	Time = 8.0 _____	☐ Y ☐ N	☐ Y ☐ N
Velocity = 12 _____	☐ Y ☐ N	☐ Y ☐ N	Displacement = 15 _____	☐ Y ☐ N	☐ Y ☐ N
Distance = 250 _____	☐ Y ☐ N	☐ Y ☐ N	Energy = 500 _____	☐ Y ☐ N	☐ Y ☐ N
Acceleration = 3.2 _____	☐ Y ☐ N	☐ Y ☐ N	Moment** = 24 _____	☐ Y ☐ N	☐ Y ☐ N

Units

A · Multiple choice — put a tick (✓) in the correct box

1 Which of these is the unit of electric charge?

☐ A ampere (A)

☐ B coulomb (C)

☐ C volt (V)

☐ D ohm (Ω)

2 Which quantity is measured in ohms (Ω)?

☐ A current

☐ B voltage

☐ C resistance

☐ D power

B · Units of electricity

Complete the table (the first row is done for you)

	Quantity	Unit	Unit in other units
e.g.	Current	A	C/s
	Charge		
	Voltage		
	Energy		
	Resistance		
	Time		
	Power		

Draw a line to link each dimension to its unit

Power	●	●	V
Voltage	●	●	W
Current	●	●	A

C · Write the missing unit (use symbols, e.g. Ω)

1 The current is 2.3 _____

2 The charge that flows is 12 _____

3 The energy transferred is 450 _____

4 The resistance of the wire is 8.0 _____

5 The lamp is switched on for 30 _____

6 The voltage across the cell is 1.5 _____

7 The power of the heater is 24 _____

Units

Choose the correct unit

tick one box for each

1 The **activity** of a radioactive source is measured in:

☐ Bq ☐ cm ☐ s ☐ min

3 The **range of alpha radiation in air** is measured in:

☐ Bq ☐ cm ☐ s ☐ min

5 A GM tube records **counts per minute**. To convert this to Bq you must:

☐ $\times 60$ ☐ $\div 60$ ☐ $\times 3600$ ☐ $\div 3600$

2 An activity of **1 Bq** means:

☐ 1 decay per hour ☐ 1 decay per minute

☐ 1 decay per second

4 Which unit of time must be used when you **substitute into an equation**?

☐ hours ☐ minutes ☐ seconds ☐ days

6 The **thickness of lead** needed to reduce gamma radiation is measured in:

☐ Bq ☐ cm ☐ min ☐ s

Add the correct unit

write Bq, cm, s, min or h on each line

(a) A source gives 120 decays each second. Activity = 120

.....

(c) The count rate halves every 25 minutes. Half-life = 25

.....

(e) Gamma is only reduced by several of lead.

(b) Alpha travels about 5 in air before it is absorbed.

(d) The half-life of technetium-99m is 6

(f) The background count rate is 0.4

Unit conversions

fill in the missing number

2 hours = s

30 min = s

5 min = s

1.5 hours = min = s

250 cm = m

0.5 m = cm

The golden rule — always convert before you calculate. Every physics equation needs **time in seconds (s)** and **distance in metres (m)**. Minutes $\rightarrow$ seconds: $\times 60$. Hours $\rightarrow$ seconds: $\times 3600$. Centimetres $\rightarrow$ metres: $\div 100$.

Exam-style question

A sealed radioactive source is kept in a school laboratory.

- (a) State the unit that is used to measure the activity of the source. [1]
- (b) The activity of the source is 4800 Bq. State what this tells you about the source. [1]
- (c) The half-life of the source is 2 hours. Calculate the half-life in seconds. [2]
- (d) A student measures the range of the radiation in air to be 4.5 cm. Give this distance in metres. [1]
- (e) A detector next to the source records 1200 counts in 1 minute. Calculate the count rate in counts per second. [2]

(Total for question = 7 marks)

ANSWER

Units

Edexcel International GCSE Physics · Energy

A · Multiple choice — put a tick (✓) in the correct box

1 Which of these is the unit of energy?

☐ A newton

☐ B joule

☐ C watt

☐ D kilogram

2 One watt (W) is the same as:

☐ A 1 joule

☐ B 1 newton per second

☐ C 1 joule per second

☐ D 1 metre per second

3 Which quantity is measured in metres per second squared (m/s^2)?

☐ A speed

☐ B force

☐ C power

☐ D acceleration

4 Which of these is the unit of force?

☐ A joule

☐ B watt

☐ C newton

☐ D metre

5 The activity of a radioactive source (decays per second) is measured in:

☐ A joules (J)

☐ B watts (W)

☐ C becquerels (Bq)

☐ D newtons (N)

B · Units and symbols

Write the correct unit symbol

	Quantity	Symbol
e.g.	Energy	J
	Mass	
	Speed	
	Force	
	Power	
	Activity	

Draw one line from each quantity to its unit symbol

Distance

m/s^2

Acceleration

N

Time

m

Kinetic energy

s

Weight

J