

# National 5 Physics Data Booklet

## Relationship Sheet

$$d = vt$$

$$d = \bar{v}t$$

$$s = vt$$

$$s = \bar{v}t$$

$$a = \frac{v-u}{t}$$

$$F = ma$$

$$W = mg$$

$$E_w = Fd$$

$$E_p = mgh$$

$$E_k = \frac{1}{2}mv^2$$

$$Q = It$$

$$V = IR$$

$$V_2 = \left( \frac{R_2}{R_1 + R_2} \right) V_S$$

$$\frac{V_1}{V_2} = \frac{R_1}{R_2}$$

$$R_T = R_1 + R_2 + \dots$$

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$$

$$P = \frac{E}{t}$$

$$P = IV$$

$$P = I^2R$$

$$P = \frac{V^2}{R}$$

$$E_h = cm\Delta T$$

$$E_h = ml$$

$$p = \frac{F}{A}$$

$$p_1V_1 = p_2V_2$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{pV}{T} = \text{constant}$$

$$f = \frac{N}{t}$$

$$v = f\lambda$$

$$T = \frac{1}{f}$$

$$A = \frac{N}{t}$$

$$D = \frac{E}{m}$$

$$H = Dw_t$$

$$\dot{H} = \frac{H}{t}$$

## Relationship Sheet: Explained

Symbol	Quantity	SI Unit & Symbol	
$a$	acceleration	$\text{ms}^{-2}$	metres per second per second
$A$	activity	Bq	becquerels
$A$	area	$\text{m}^2$	metres squared
$c$	specific heat capacity	$\text{J kg}^{-1} \text{°C}^{-1}$	joules per kilogram per degree Celsius
$d$	distance	m	metres
$D$	absorbed dose	Gy	grays
$E$	energy	J	joules
$E_h$	heat energy	J	joules
$E_k$	kinetic energy	J	joules
$E_p$	potential energy	J	joules
$E_w$	work done	J	joules
$f$	frequency	Hz	hertz
$F$	force	N	newtons
$g$	gravitational field strength	$\text{N kg}^{-1}$	newtons per kilogram
$h$	height	m	metres
$H$	equivalent dose	Sv	sieverts
$\dot{H}$	equivalent dose rate	$\text{Sv s}^{-1}$ etc	(many possible units)
$I$	current	A	amps
$l$	specific latent heat	$\text{J kg}^{-1}$	joules per kilogram
$m$	mass	kg	kilograms
$N$	Number of waves	—	(no units)
$N$	Number of radioactive nuclei decaying	—	(no units)
$p$	pressure	Pa	pascals
$P$	power	W	watts
$Q$	charge	C	coulombs
$R$	resistance	$\Omega$	ohms
$R_T$	total resistance	$\Omega$	ohms
$s$	displacement	m	metres

## Relationship Sheet: Explained (cont.)

Symbol	Quantity	SI Unit & Symbol	
$t$	time	s	seconds
$T$	period	s	seconds
$T$	temperature	K	kelvin
$\Delta T$	change in temperature	°C	degrees Celsius
$u$	initial velocity	$\text{ms}^{-1}$	metres per second
$v$	velocity (or final velocity)	$\text{ms}^{-1}$	metres per second
$\bar{v}$	average velocity	$\text{ms}^{-1}$	metres per second
$V$	volume	$\text{m}^3$	metres cubed
$V$	voltage	V	volts
$V_s$	supply voltage	V	volts
$W$	weight	N	newtons
$\lambda$	wavelength	m	metres
$w_R$	radiation weighting factor	—	(no units)

## Additional Relationships

### Circle

$$\text{circumference} = 2\pi r$$

$$\text{area} = \pi r^2$$

### Sphere

$$\text{area} = 4\pi r^2$$

$$\text{volume} = \frac{4}{3}\pi r^3$$

### Trigonometry

$$\sin \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\tan \theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\sin^2 \theta + \cos^2 \theta = 1$$