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Periodic Table

Group 1 1A	1 H Hydrogen 1.008	Group 2 2A	3B	4B	5B	6B	7B	8B	9B	10B	11B	12B	13A	14A	15A	16A	17A	18 8A	
Period 1	3 Li Lithium 6.941	4 Be Beryllium 9.012	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.847	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Al Aluminum 26.982	13 B Boron 10.81	14 Si Silicon 28.086	15 P Phosphorous 30.974	16 S Sulphur 32.06	17 Cl Chlorine 35.453	18 Ar Argon 39.948
Period 2	11 Na Sodium 22.990	12 Mg Magnesium 24.305	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 Ga Gallium 69.723	50 Ge Germanium 72.61	51 As Arsenic 74.922	52 Se Selenium 78.96	53 Br Bromine 79.904	54 Kr Krypton 83.80	
Period 3	19 K Potassium 39.098	20 Ca Calcium 40.078	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 Ga Gallium 69.723	50 Ge Germanium 72.61	51 As Arsenic 74.922	52 Se Selenium 78.96	53 Br Bromine 79.904	54 Kr Krypton 83.80
Period 4	37 Rb Rubidium 85.468	38 Sr Strontium 87.62	56 Ba Barium 137.327	57 La Lanthanum 138.905	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.2	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222
Period 5	55 Cs Caesium 132.905	56 Ba Barium 137.327	88 Ra Radium 226.025	89 Ac Actinium 227.028	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.2	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222
Period 6	87 Fr Francium 223	88 Ra Radium 226.025	104 Rf Rutherfordium (261)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (264)	108 Hs Hassium (265)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)	109 Mt Meitnerium (266)
Period 7																			

58 Ce Cerium 140.12	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium 252.083	100 Fm Fermium 257.095	101 Md Mendelevium 258.099	102 No Nobelium 259.101	103 Lr Lawrencium 260.105

1 H Hydrogen 1.008	2 He Helium 4.003
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Periodic Table of Elements
(Based on ¹²C = 12.0000)

Atomic Number: 1
Symbol: H
Name: Hydrogen
Atomic Mass: 1.008

Metals ← Non-metals

Lanthanide series
Actinide series

Inner Transition Metals

Transition Metals

Representative Elements

Formulas

Symbols	Variable (Unit)
$a = \frac{v - u}{t}$	Average Acceleration (m/s ²) = $\frac{\text{Change in Velocity (m/s)}}{\text{Time of Change (s)}}$
$F = \frac{mv^2}{r}$	Centripetal Force (N) = $\frac{\text{Mass (kg)} \times [\text{Velocity (m/s)}]^2}{\text{Radius (m)}}$
$I = \frac{Q}{t}$	Current (A) = $\frac{\text{Charge (coulomb)}}{\text{Time (s)}}$
$D = \frac{m}{v}$	Density (kg/m ³) = $\frac{\text{Mass (kg)}}{\text{Volume (m}^3\text{)}}$
$s = ut + \frac{1}{2}at^2$	Final Displacement (m) given Initial Velocity (m/s), Time (s), and Acceleration (m/s ²)
$e = \frac{W_{out}}{W_{in}} \times 100$	Percentage Efficiency (%) = $\frac{\text{Work out (J)}}{\text{Work in (J)}} \times 100$
$E = mc^2$	Energy (J) = Mass (kg) × [Speed of Light (m/s)] ²
$E = Pt$	Electrical Energy (J) = Power (W) × Time (s)
$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$	Combined Gas Law: Relationship between First Pressure (Pa), Volume (cm ³), and Temperature (K) of a fixed mass of an Ideal Gas and its Second values
$PV = nRT$	Ideal Gas Law: Relationship between Pressure (Pa) and Volume (m ³), and Number of Moles, Universal Gas Constant (J/K/mol), and Temperature (K)
$F = ma$	Force (N) = Mass (kg) × Acceleration (m/s ²)
$F = mg$	Weight, Force Due to Gravity (N) = Mass (kg) × Acceleration due to Gravity (m/s ²)
$F = G \frac{m_1m_2}{r^2}$	Gravitational Force (N) is proportional to the product of the Masses (kg), and inversely proportional to the square of the Distance (m) between the masses
$f = \frac{1}{T}$	Frequency (Hz) = $\frac{1}{\text{Time for 1 oscillation (s)}}$
$PE = mgh$	Potential Energy (J) = Mass (kg) × Acceleration due to Gravity (m/s ²) × Height (m)

Symbols	Variable (Unit)
$KE = \frac{1}{2}mv^2$	Kinetic Energy (J) = $\frac{1}{2} \times \text{Mass (kg)} \times [\text{Velocity (m/s)}]^2$
$[m_1v_1+m_2v_2]_i = [m_1v_1+m_2v_2]_f$	Initial Momentum (kgm/s) = Final Momentum (kgm/s)
$P = mv$	Momentum (kgm/s) = Mass (kg) \times Velocity (m/s)
$P = \frac{W}{t}$	Power (W) = $\frac{\text{Work (Nm)}}{\text{Time (s)}}$
$P = IV$	Power (W) = Current (A) \times Voltage (V)
$P = I^2R$	Power (W) = $[\text{Current (A)}]^2 \times \text{Resistance } (\Omega)$
$p = \frac{F}{A}$	Pressure (Pa) = $\frac{\text{Force (N)}}{\text{Area (m}^2\text{)}}$
$Q = m\Delta tC_p$	Heat Energy (J) = Mass (kg) \times Temperature Change (K) \times Specific Heat Capacity (J/kgK)
$Q = ml_f$	Heat Energy (J) = Mass (kg) \times Latent Heat of Fusion (J/kg)
$Q = ml_v$	Heat Energy (J) = Mass (kg) \times Latent Heat of Vaporization (J/kg)
$\Delta U = Q - W_{(\text{by the system})}$	First Law of Thermodynamics : When heat is converted to work, the process is never totally efficient
$V = IR$	Ohm's Law: Voltage (V) = Current (A) \times Resistance (Ω)
$v = \frac{s}{t}$	Average Speed (m/s) = $\frac{\text{Displacement (m)}}{\text{Time (s)}}$
$v = u + at$	Final Velocity (m/s) = Initial Velocity (m/s) + $[\text{Acceleration (m/s}^2\text{)} \times \text{Time (s)}]$
$v = f\lambda$	Wave Speed (m/s) = Frequency (Hz) \times Wavelength (m)
$\lambda = \frac{v}{f}$	Wavelength (m) = $\frac{\text{Velocity (m/s)}}{\text{Frequency (Hz)}}$
$W = Fs$	Work (J) = Force (N) \times Displacement (m)
$W = Q_i - Q_f$	Work done by a Heat Engine (J) = Initial Heat Energy (J) - Final Heat Energy (J)

Units of Measure

m = metre

kg = kilogram

s = second

N = newton

J = joule

W = watt

cm = centimetre

g = gram

l = litre

1 N = 1 kgm/s²

1 J = 1 N m

1 W = 1 J/s

AU = Astronomical Unit = Distance between the Earth and the Sun, approximately 150 million kilometres.

Constants

Acceleration Due to Gravity : $g = 9.8 \text{ m/s}^2$

Universal Gas Constant : $R = 8.3145 \text{ J/K/mol}$

Volume of Ideal Gas at STP : 22.4 l/mol

Gravitational Constant : $G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$

Speed of Light in a Vacuum : $c = 3.0 \times 10^8 \text{ m/s}$

Speed of Sound at 20°C : 343 m/s

Specific Heat Capacity of Water : $C_p(\text{H}_2\text{O}) = 4.18 \text{ kJ/kgK}$

Latent Heat of Fusion of Water : $l_f(\text{H}_2\text{O}) = 3.34 \text{ J/kg}$

Latent Heat of Vaporization of Water : $l_v(\text{H}_2\text{O}) = 22.6 \text{ J/kg}$

Conversions

$1 \text{ cm}^3 = 1 \text{ ml} = 1 \text{ dm}^3$

$1 \text{ watt (W)} = 1 \text{ J/s} = 1 \text{ Nm/s}$

$1 \frac{\text{wave}}{\text{second}} = 1 \text{ hertz (Hz)}$

$1 \text{ newton (N)} = 1 \text{ kgm/s}^2$

$1 \text{ joule} = 1 \text{ Nm}$

Absolute Temperature : $\text{K} = \text{°C} + 273$

Pressure : $1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ Torr} = 101.325 \text{ kPa}$