



COMBINED SCIENCE

5129/11

Paper 1 Multiple Choice

May/June 2018

1 hour

Additional Materials: Multiple Choice Answer Sheet
 Soft clean eraser
 Soft pencil (type B or HB is recommended)

* 2 8 4 6 0 2 8 4 8 7 *

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, Centre number and candidate number on the Answer Sheet in the spaces provided unless this has been done for you.

DO NOT WRITE IN ANY BARCODES.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 16.

Electronic calculators may be used.

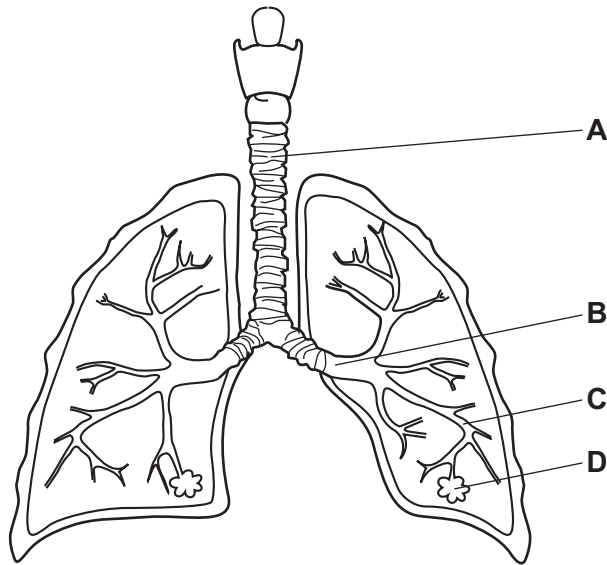
This document consists of **15** printed pages and **1** blank page.

1 What is the name of the process by which water passes through a partially permeable membrane?

- A evaporation
- B excretion
- C osmosis
- D transpiration

2 The diagram shows the human breathing system.

Where does diffusion of oxygen and carbon dioxide take place?



3 Four test-tubes contain starch solution and amylase. They are placed in water baths at different temperatures and provided with different pHs, as shown in the table.

After 30 minutes, iodine solution is added to each tube.

In which test-tube do the contents remain yellow-brown?

	temperature / °C	pH
A	35	2.5
B	35	6.9
C	75	2.5
D	75	6.9

4 A farmer uses faeces and urine from his cattle as fertiliser.

What is the main element provided by fertiliser that the plants use to make proteins?

- A carbon dioxide
- B nitrogen
- C oxygen
- D water

5 What is the name of the process that moves food along the alimentary canal?

- A absorption
- B assimilation
- C digestion
- D peristalsis

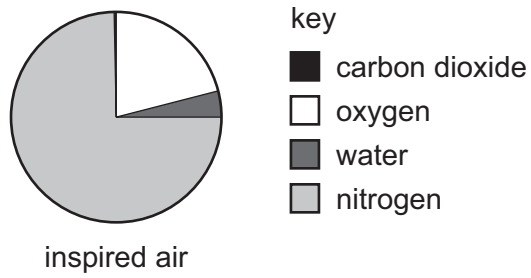
6 What is transpiration?

- A absorption of water by root hairs
- B loss of water vapour from stomata
- C movement of water up through the xylem
- D wilting

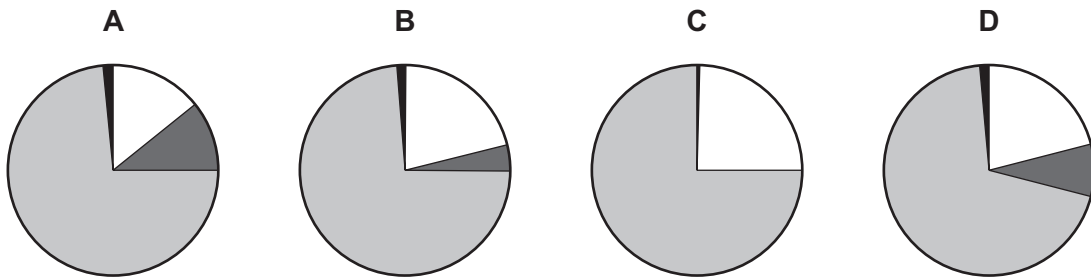
7 What is a cause of coronary heart disease?

- A blockage of the valves in the heart
- B bursting of the coronary arteries
- C deposit of fat in the coronary arteries
- D irregular heartbeat

- 8 The pie chart shows the proportion of gases in inspired air.



Which pie chart represents expired air?



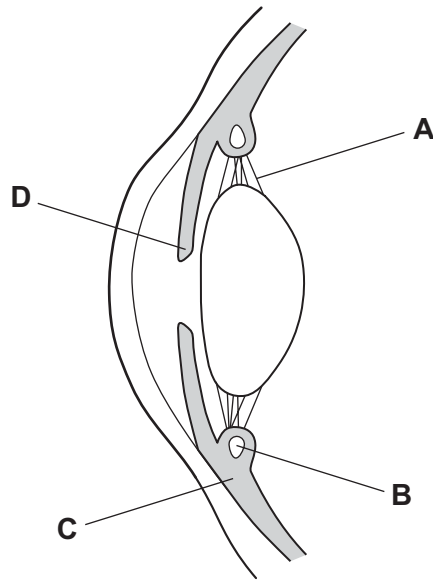
- 9 The body cannot store amino acids.

Which flow chart correctly shows what happens to excess amino acids in blood?

- A** excess amino acids in the blood → broken down in kidney → urea in the urine → travel to liver → urea in the blood
- B** excess amino acids in the blood → broken down in kidney → urea in the blood → travel to liver → urea in the urine
- C** excess amino acids in the blood → broken down in liver → urea in the urine → travel to kidney → urea in the blood
- D** excess amino acids in the blood → broken down in liver → urea in the blood → travel to kidney → urea in the urine

10 The diagram shows a section through part of a human eye.

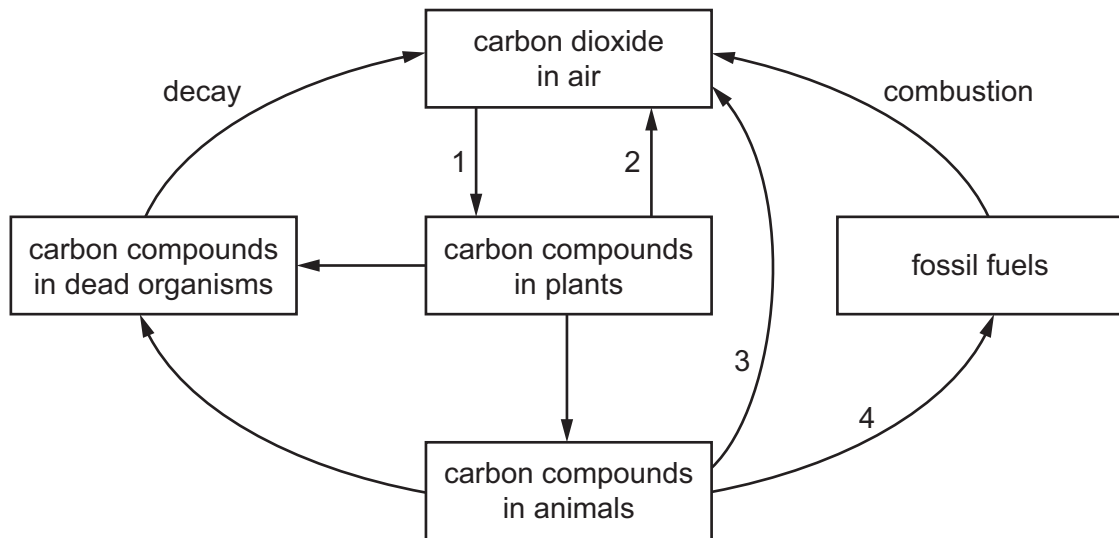
Which structure contains the muscles that contract to control pupil size?



11 Which row best describes some of the effects of alcohol abuse?

	short-term effect	long-term effect
A	addiction	liver disease
B	addiction	reduced self-control
C	liver disease	addiction
D	reduced self-control	liver disease

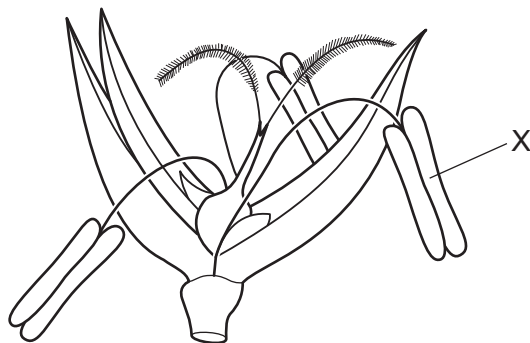
12 The diagram shows the carbon cycle.



Which arrows represent respiration?

- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

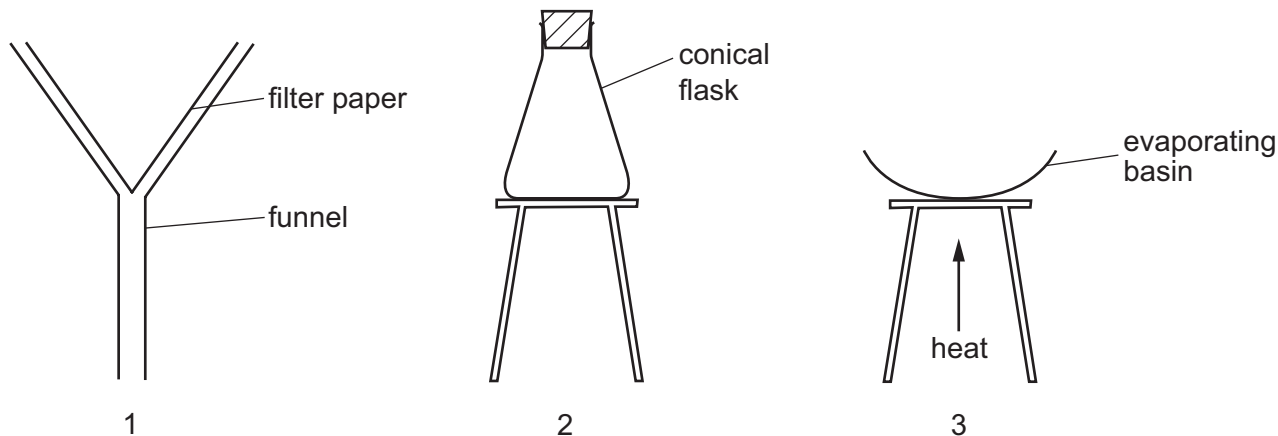
13 The diagram shows a wind pollinated plant.



What is structure X?

- A** anther
B carpel
C petal
D sepal

14 The diagrams show three sets of apparatus.



Which apparatus is used to obtain separate samples of sand and salt from a mixture of sand and salt solution?

- A** 1 and 3 **B** 1 only **C** 2 and 3 **D** 3 only

15 An atom of sodium is represented by ${}_{11}^{23}\text{Na}$.

What is the number of electrons in this atom?

- A** 11 **B** 12 **C** 23 **D** 34

16 Which statement about the formation of ions is correct?

- A** Metal atoms gain electrons to form positive ions.
B Metal atoms lose electrons to form negative ions.
C Non-metal atoms gain electrons to form negative ions.
D Non-metal atoms lose electrons to form positive ions.

17 Which statement about covalent bonding is **not** correct?

- A** A covalent bond forms when a metal atom donates an electron to a non-metal atom.
B A covalent bond is a pair of shared electrons.
C The bonding between oxygen and hydrogen is covalent.
D When atoms form covalent bonds, they get the same electronic configuration as a noble gas.

18 The formula of an ammonium ion is NH_4^+ .

The formula of a sulfate ion is SO_4^{2-} .

What is the formula of ammonium sulfate?

- A** NH_4SO_4 **B** $\text{NH}_4(\text{SO}_4)_2$ **C** $(\text{NH})_4\text{SO}_4$ **D** $(\text{NH}_4)_2\text{SO}_4$

19 Which balanced equation for the reaction between iron and oxygen is correct?

- A $\text{Fe}_2 + \text{O}_3 \rightarrow \text{Fe}_2\text{O}_3$
- B $2\text{Fe} + 3\text{O} \rightarrow \text{Fe}_2\text{O}_3$
- C $4\text{Fe} + 2\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$
- D $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$

20 Which statement about bases is **not** correct?

- A Bases dissolved in water turn red litmus blue.
- B Bases neutralise sodium hydroxide solution.
- C Bases react with acids to form salts.
- D Bases react with ammonium salts to form ammonia.

21 P, Q, R and S are four elements.

The letters are not their chemical symbols.

element	physical state at room temperature	number of electrons in outer shell	metal or non-metal
P	gas	2,6	non-metal
Q	gas	2,7	non-metal
R	solid	2,8,2	metal
S	gas	2,8,7	non-metal

Which elements are in the same group of the Periodic Table?

- A P and Q
- B P and S
- C Q and S
- D R and S

22 A metal is used to make a pipe to transport hydrochloric acid.

Which metal is suitable for making the pipe?

- A copper
- B iron
- C magnesium
- D zinc

23 The table shows some metals and their uses.

For which metal is the correct reason given for the stated use?

	metal	use	reason
A	aluminium	manufacture of aeroplane wings	strength and high density
B	copper	electrical wiring	good conductor of heat
C	iron	manufacturing stainless steel	rusts
D	zinc	galvanising iron	zinc is more reactive than iron

24 A sample of polluted air is shaken with 50 cm³ of distilled water and the pH of the resulting solution is measured.

The experiment is repeated with the same volume of unpolluted air.

The results are shown.

sample	pH
unpolluted air	6
polluted air	2

Which statement explains the pH of the polluted air?

- A** It is polluted with carbon dioxide.
- B** It is polluted with carbon monoxide.
- C** It is polluted with lead compounds.
- D** It is polluted with sulfur dioxide.

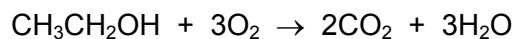
25 Which substance produces hydrogen gas when it reacts with dilute hydrochloric acid?

- A** magnesium
- B** magnesium carbonate
- C** magnesium hydroxide
- D** magnesium oxide

26 Which molecular formula represents an alkane?

- A** C₂H₂
- B** C₃H₈
- C** C₄H₈
- D** C₅H₁₀

27 A reaction of ethanol is shown.



Which statement about this reaction is **not** correct?

- A One of the products turns lime-water cloudy.
- B The ethanol is a fuel.
- C The ethanol is being reduced.
- D The reaction is exothermic.

28 The gradient of the line on a graph gives the acceleration of a moving object.

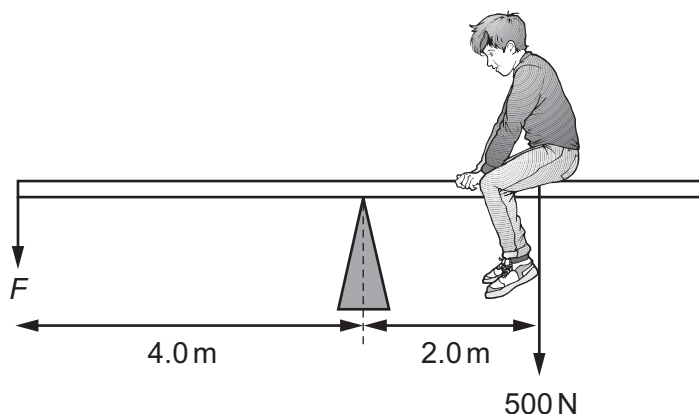
What are the quantities on the horizontal and vertical axes of this graph?

	quantity on horizontal axis	quantity on vertical axis
A	speed	distance
B	speed	time
C	time	distance
D	time	speed

29 Which statement concerning the mass of a body is **incorrect**?

- A Mass can be measured using an appropriate balance.
- B Mass experiences a force due to gravitational attraction.
- C Mass is a measure of the amount of substance in a body.
- D Mass is varied by changes in the strength of a gravitational field.

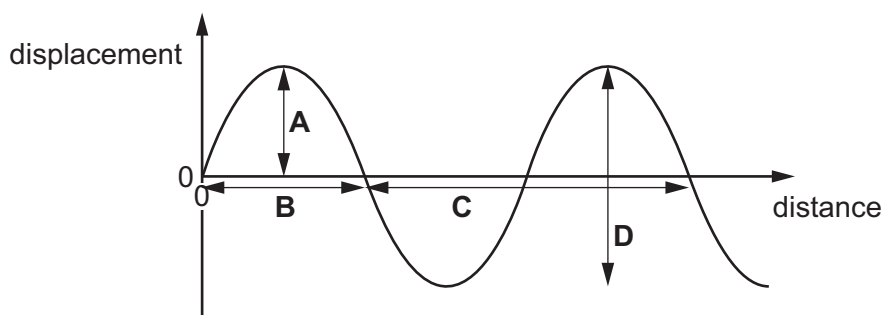
- 30 The diagram shows a boy of weight 500 N sitting on a see-saw. He sits 2.0 m from the pivot.



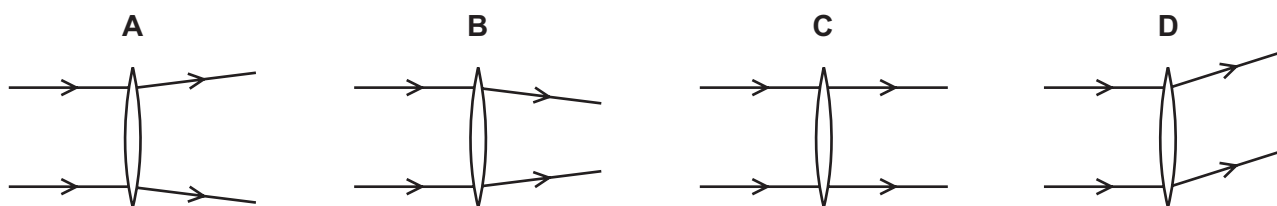
What is the force F needed to balance the see-saw?

- A** 250 N **B** 750 N **C** 1000 N **D** 3000 N
- 31 How much work is done in lifting a mass of 70 g vertically through a distance of 6 m? (gravitational field strength is 10 N/kg.)
- A** 0.42 J **B** 4.2 J **C** 420 J **D** 4200 J
- 32 What makes the metal mercury a suitable liquid for use in a thermometer?
- A** It expands uniformly when heated.
B It is a poor conductor of heat.
C It is more dense than glass.
D It reacts slowly to changes in a temperature.
- 33 The diagram shows the displacement of the particles in a wave.

Which value is multiplied by the frequency to give the speed of the wave?



- 34 Which diagram correctly shows the path of two rays of light after they pass through a thin converging lens?



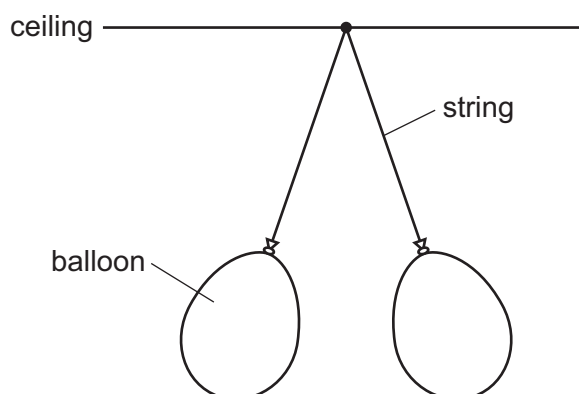
- 35 The diagram shows the main components of the electromagnetic spectrum.

P	X-rays	Q	visible light	infra-red	R	radio waves
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What are the components P, Q and R?

	P	Q	R
A	gamma-rays	microwaves	ultra-violet
B	gamma-rays	ultra-violet	microwaves
C	microwaves	gamma-rays	ultra-violet
D	microwaves	ultra-violet	gamma-rays

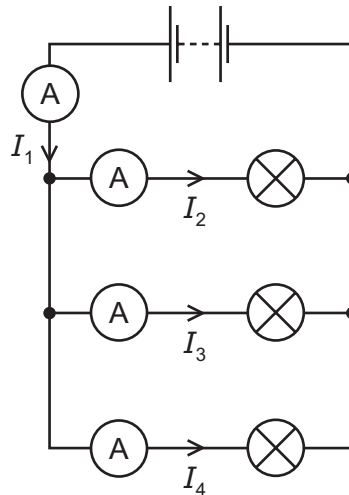
- 36 Two balloons are suspended from the ceiling by string and have moved apart as shown.



Which statement is correct?

- A** One is charged and the other is uncharged.
- B** They are uncharged.
- C** They have like charges.
- D** They have unlike charges.

37 A student sets up the circuit shown.



The currents measured by the ammeters are shown.

Which equation is correct?

- A $I_1 = I_2 + I_3 + I_4$
- B $I_1 = I_2 = I_3 = I_4$
- C $I_2 + I_3 = I_4 + I_1$
- D $I_4 = I_3 + I_2 + I_1$

38 A 5W electric night light is used for 8 hours per day over a period of 7 days.

How much electrical energy is transferred to the night light?

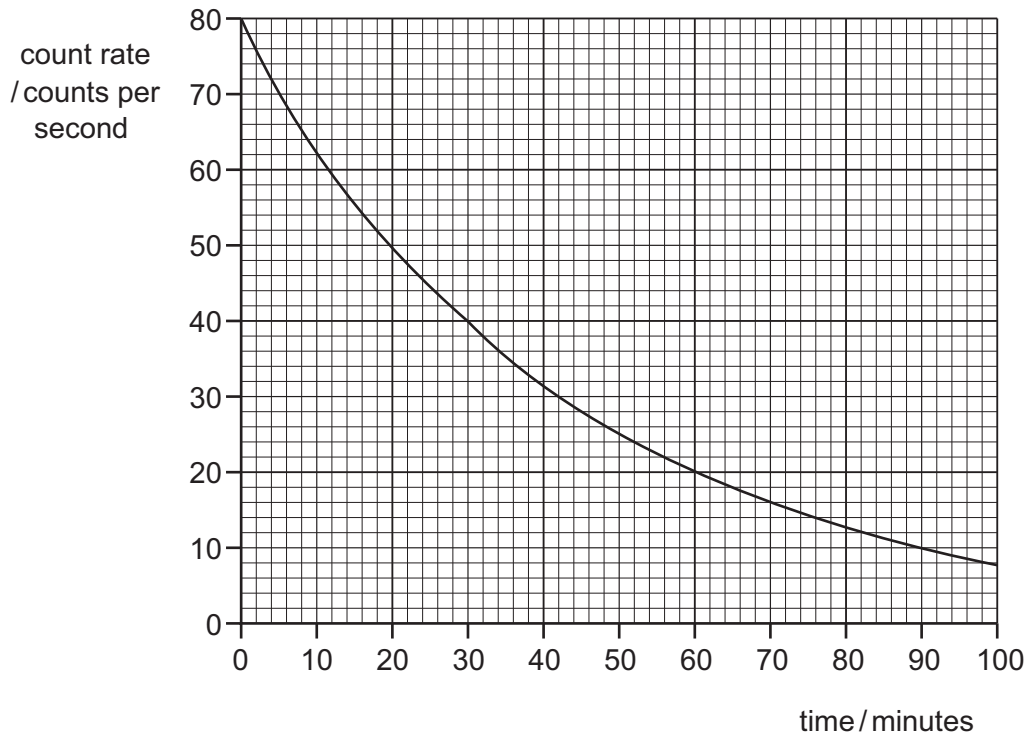
- A 280 J
- B 16 800 J
- C 144 000 J
- D 1 008 000 J

39 In a simple a.c. generator, a coil is rotated in a uniform magnetic field.

Which action would **not** increase the size of the maximum e.m.f. generated?

- A increasing the number of turns of the coil
- B increasing the rate of rotation of the coil
- C increasing the resistance of the coil
- D increasing the strength of the magnetic field

40 The graph shows how the count rate measured from a radioactive nuclide changes with time.



What is the half-life of this nuclide?

- A** 17 minutes **B** 25 minutes **C** 30 minutes **D** 50 minutes

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The Periodic Table of Elements

		Group																	
I	II	III	IV	V	VI	VII	VIII												
3 Li lithium 7	4 Be beryllium 9	11 Na sodium 23	12 Mg magnesium 24	<table border="1"> <thead> <tr> <th colspan="2">Key</th> </tr> <tr> <th>atomic number</th> <th>atomic symbol name relative atomic mass</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>H hydrogen 1</td> </tr> </tbody> </table>										Key		atomic number	atomic symbol name relative atomic mass	1	H hydrogen 1
Key																			
atomic number	atomic symbol name relative atomic mass																		
1	H hydrogen 1																		
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84		
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium —	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131		
55 Cs caesium 133	56 Ba barium 137	57–71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium —	85 At astatine —	86 Rn radon —		
87 Fr francium —	88 Ra radium —	89–103 actinoids	104 Rf rutherfordium —	105 Db dubnium —	106 Sg seaborgium —	107 Bh bohrium —	108 Hs hassium —	109 Mt meitnerium —	110 Ds darmstadtium —	111 Rg roentgenium —	112 Cn copernicium —	114 Fl flerovium —	116 Lv livermorium —	118 Og oganesson —	119 Uue unbinilium —	120 Uub unbinilium —	121 Uut unbinilium —		

57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium —	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
89 Ac actinium —	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium —	94 Pu plutonium —	95 Am americium —	96 Cm curium —	97 Bk berkelium —	98 Cf californium —	99 Es einsteinium —	100 Fm fermium —	101 Md mendelevium —	102 No nobelium —	103 Lr lawrencium —

lanthanoids

actinoids

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.).