



Cambridge Lower Secondary Sample Test

For use with curriculum published in September 2020

Science Paper 2

Stage 8

45 minutes

Name

No additional materials are needed.

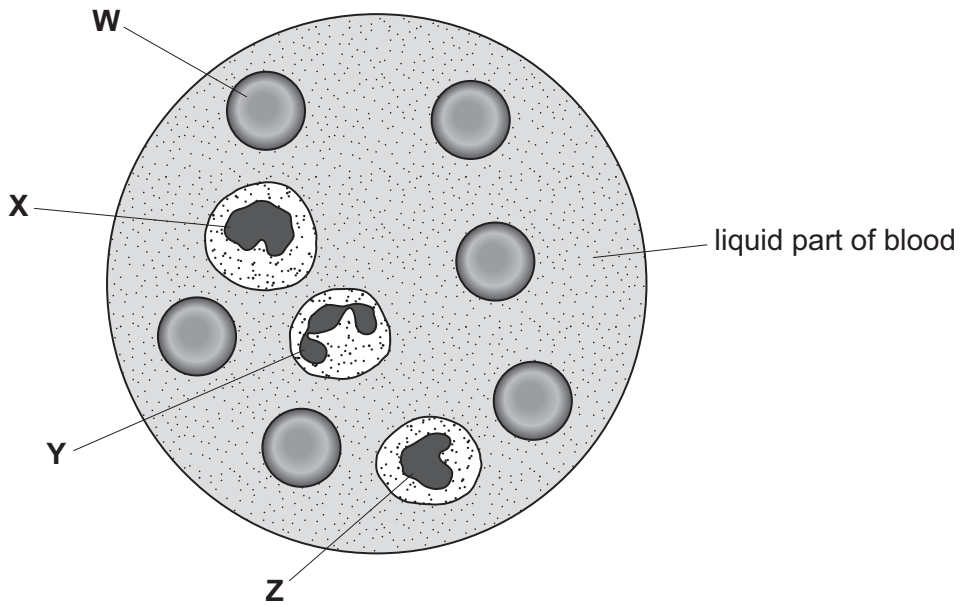
INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

1 The diagram shows a drop of blood as seen with a microscope.



(a) One type of blood cell carries oxygen.

(i) Name this type of blood cell.

..... [1]

(ii) Circle the letter that shows this type of blood cell.

W X Y Z

[1]

(b) When a person has an infection the number of white blood cells increases rapidly.

Explain why this happens.

.....
..... [1]

(c) (i) What is the name of the liquid part of blood?

..... [1]

(ii) Write down one substance that is transported by the liquid part of blood.

..... [1]

(d) (i) Measure the diameter, in mm, of the cell labelled **W**.

diameter = mm [1]

(ii) Use your answer in (d)(i) to calculate the actual diameter of cell **W**.

A 1 mm length on the diagram represents an actual length of 0.5 microns.

actual diameter = microns [1]

2 Atoms contain of protons, neutrons and electrons.

(a) Complete the table to show the electrical charges on each particle.

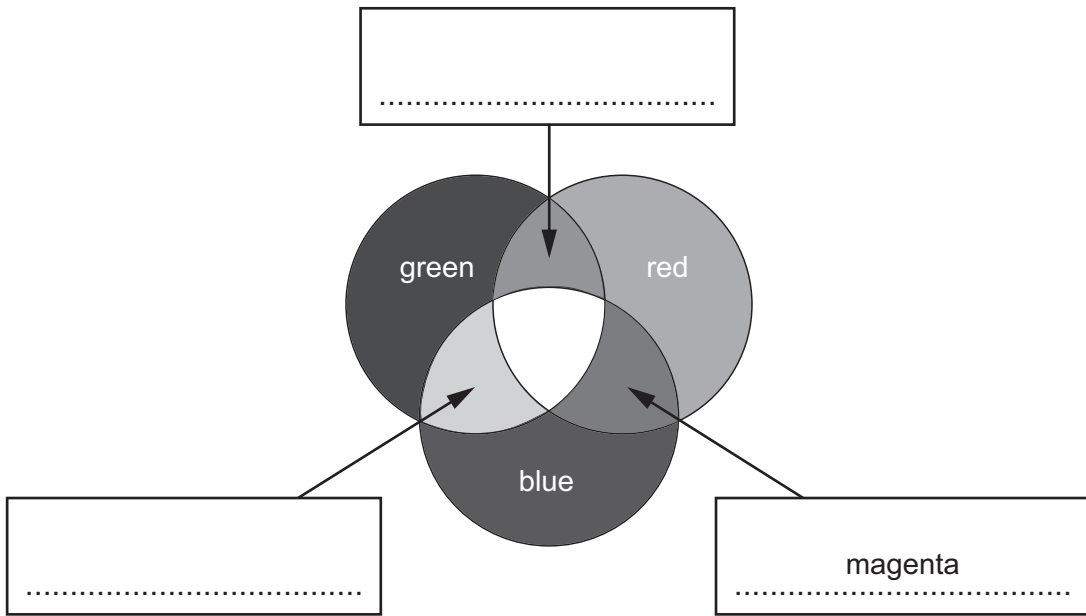
particle	electrical charge
proton	
neutron	
electron	

[2]

(b) What is the name of the part of the atom that contains the protons and neutrons?

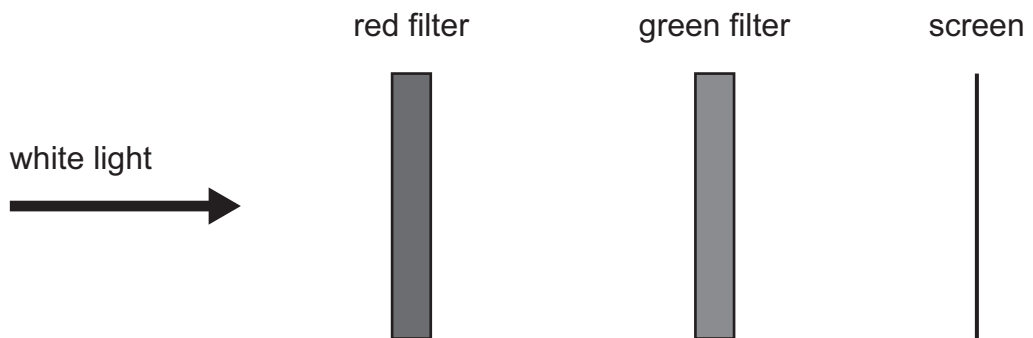
..... [1]

3 Look at the diagram. It shows the addition of different colours of light.



(a) Complete the diagram by writing the correct colour in each box. [2]

(b) Lily investigates two filters. Look at the diagram.



What does Lily see on the screen?

Circle the correct answer.

- blue light** **no light** **white light** **yellow light**

[1]

4 European rabbits were introduced into Australia as a source of food for humans in the late 1700s. The number of rabbits increased rapidly. They became pests and damaged the ecosystems in large parts of Australia.

(a) (i) What is an ecosystem?

.....
..... [1]

(ii) Suggest **two** reasons why the number of rabbits increased so rapidly.

1
2
..... [2]

(iii) Rabbits are herbivores.

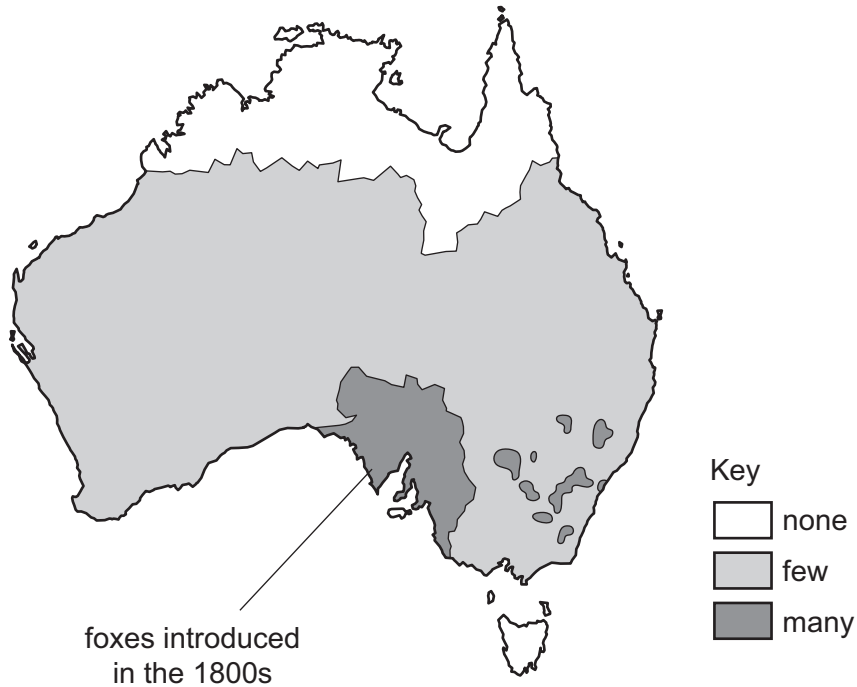
Suggest how a large number of rabbits damage an ecosystem.

..... [1]

(b) Foxes are predators and eat rabbits.

Foxes were released in Southern Australia in the 1800s.

Look at the map. It shows the distribution of foxes in Australia in 2006.



(i) Suggest how the data needed to make this map was collected.

.....
..... [1]

(ii) In many parts of Australia, foxes are an invasive species.

What is meant by an invasive species?

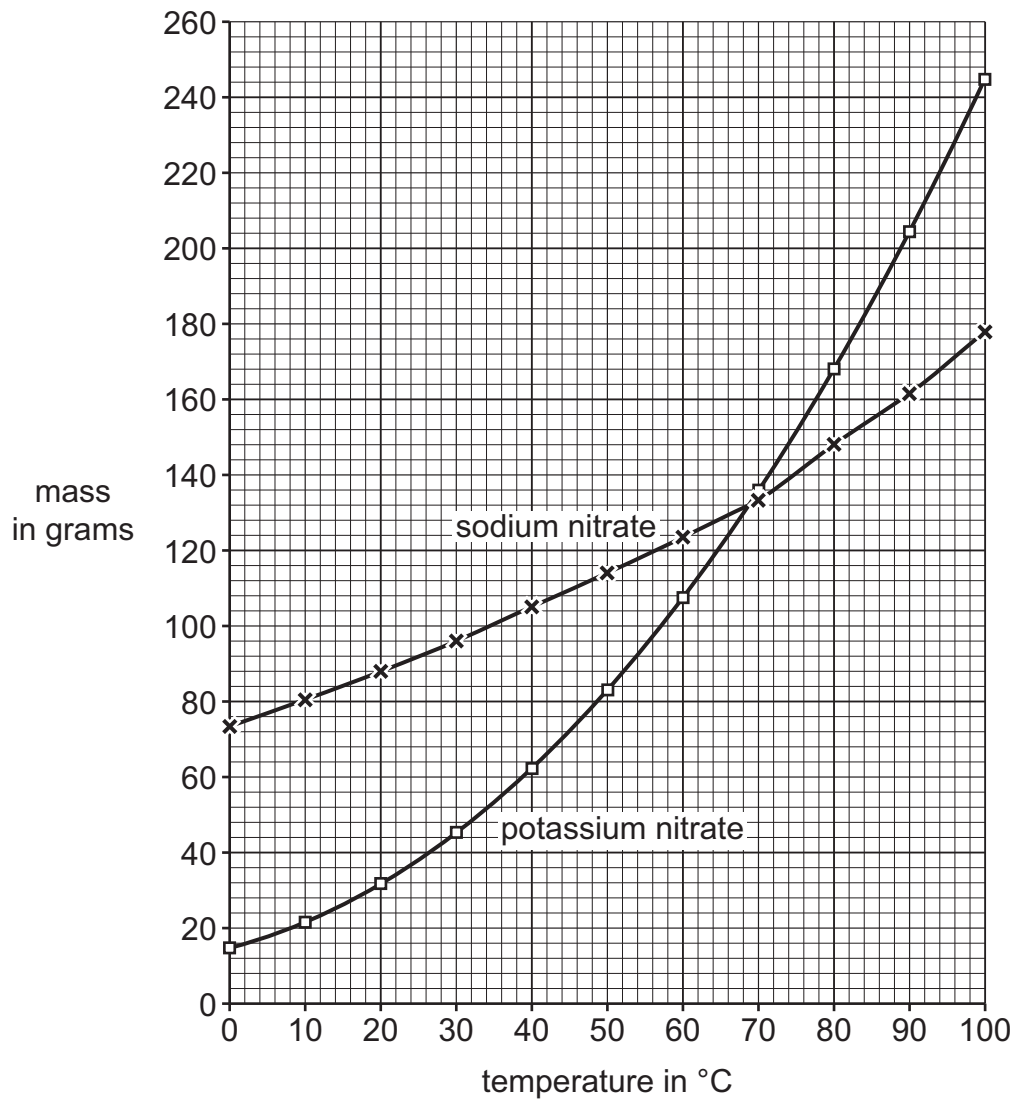
.....
..... [1]

(iii) Describe how the evidence in the map supports the idea that foxes are an invasive species.

.....
..... [1]

5 Look at the graph.

It shows the mass of sodium nitrate and potassium nitrate that dissolves in 100 cm^3 of water at different temperatures.



(a) Describe how the mass of potassium nitrate that dissolves in 100 cm^3 of water changes as the temperature increases.

.....
 [1]

(b) What mass of sodium nitrate dissolves in 100 cm^3 of water at 40°C ?

mass g [1]

(c) At what temperature is the mass of sodium nitrate and the mass of potassium nitrate that dissolves in 100 cm^3 of water the same?

..... $^\circ\text{C}$ [1]

6 This question is about magnetic field lines.

(a) The north pole of one bar magnet attracts the south pole of another bar magnet.

Look at the diagram. It shows two bar magnets.

Draw **two** magnetic field lines between the magnets.

Include the arrows.



[2]

(b) The north pole of one bar magnet repels the north pole of another bar magnet.

Look at the diagram. It shows two bar magnets.

Draw **two** magnetic field lines between the two magnets.

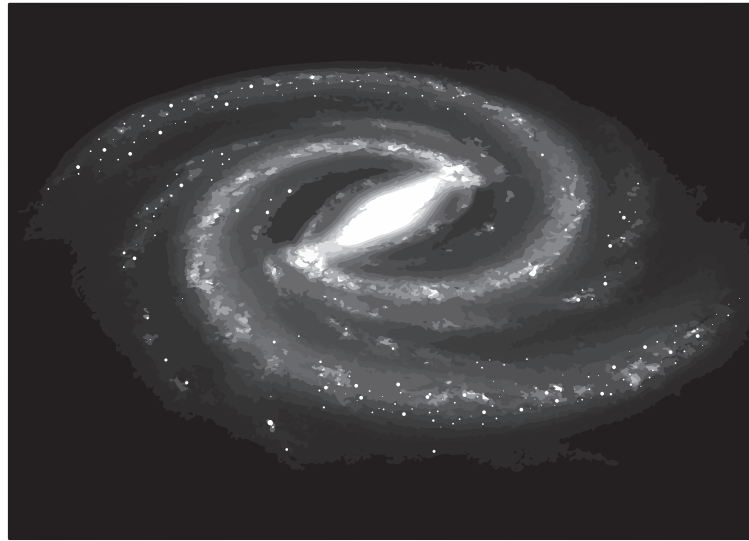
Include the arrows.



[1]

7 The Milky Way contains a large number of stars and other matter.

The diagram shows what the Milky Way looks like from outer space.



(a) What name is given to a large number of stars such as the Milky Way?

..... [1]

(b) The Milky Way contains stars and planets.

Name one **other** type of matter found in the Milky Way.

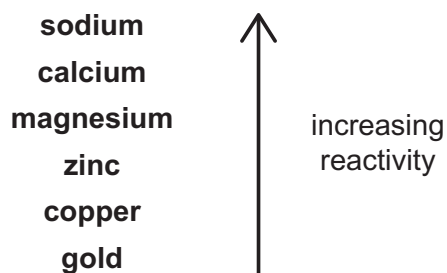
..... [1]

(c) The Sun is a star in the Milky Way.

What name is given to the Sun and its orbiting planets?

..... [1]

8 The chart shows part of the reactivity series of metals.



Many metals react with oxygen and water.

(a) Magnesium reacts with oxygen to make magnesium oxide.

Write the word equation for this reaction.

..... [1]

(b) Gold is unreactive and does **not** react with oxygen.

Explain why.

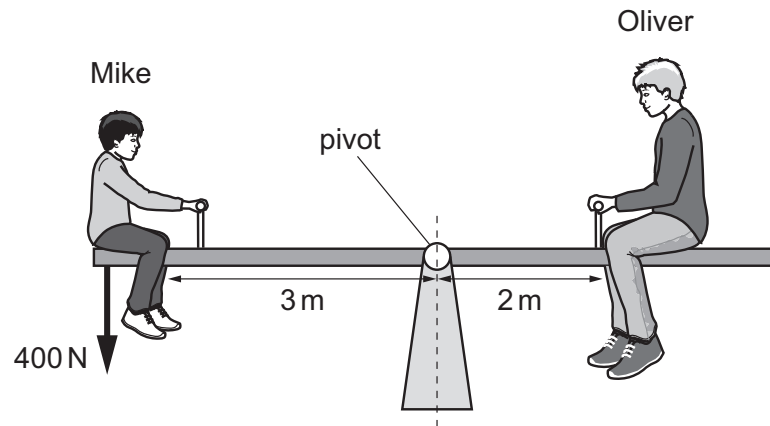
..... [1]

(c) Calcium reacts with cold water.

Write down the names of the **two** substances made in this reaction.

..... and [2]

- 9 Mike and Oliver are on a see-saw.



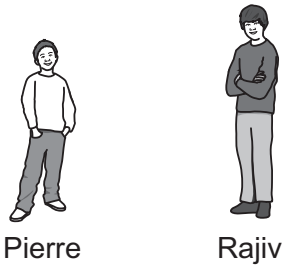
The see-saw is balanced.

- (a) Mike has a weight of 400 N.

Calculate Oliver's weight. Use the principle of moments.

Oliver's weight = N [2]

(b) Pierre and Rajiv stand upright.



Look at the table. It shows some information about Pierre and Rajiv.

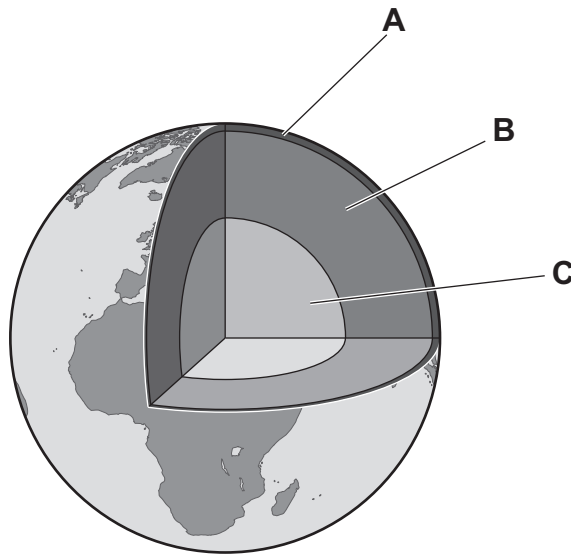
name	weight in N	area of shoes in m²
Pierre	440	0.04
Rajiv	500	0.05

Pierre exerts a greater pressure on the ground than Rajiv.

Use calculations to explain why Pierre exerts a greater pressure on the ground than Rajiv.

[3]

10 The diagram shows the internal structure of the Earth.



(a) Which layer **A**, **B** or **C** is responsible for making the Earth's magnetic field?

..... [1]

(b) Write down the part of the Earth that acts as a magnet.

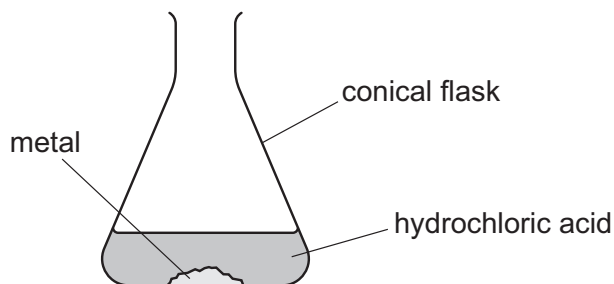
..... [1]

(c) Circle the equipment that finds the direction of the Earth's magnetic field.

compass **electromagnet** **forcemeter** **voltmeter**

[1]

11 Blessy reacts each of the metals calcium, magnesium and iron with dilute hydrochloric acid. She wants to find out which reaction releases the most heat.



(a) Blessy decides to use 20 cm³ of dilute hydrochloric acid and 0.1 g of each metal.

Explain why she uses the same volume of dilute hydrochloric acid each time.

..... [1]

(b) What measurements does Blessy take to find out which reaction releases the most heat?

.....
 [2]

12 Priya makes an electromagnet.

She chooses from this list of equipment.

- | | | | |
|-----------------|---------------|----------------------|-------------------------|
| ammeter | buzzer | electric cell | electrical wires |
| iron rod | lamp | switch | voltmeter |

Draw a circuit diagram for the electromagnet she makes.

[3]

13 People are concerned that increased global warming is causing climate change.

Evidence for increased global warming includes:

- the increase in the rate of melting of glaciers and polar ice caps
- a rise in mean sea levels.

(a) Explain why it is important to keep records of data over a period of time.

..... [1]

(b) Satellites have sensors that can accurately measure the height of the sea.

They can also take detailed photographs of the surface of the Earth.

(i) Suggest **one** reason why it is important to make a large number of observations of the Earth.

.....
..... [1]

(ii) Give **one** reason why it is important to make accurate and detailed observations over time.

.....
..... [1]

The Periodic Table of Elements

Group																																																																																																							
I	II	III										IV	V	VI	VII	VIII																																																																																							
3 Li lithium 7	4 Be beryllium 9	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px;"> 1 H hydrogen 1 </div> <div style="border: 1px solid black; padding: 5px;"> Key atomic number atomic symbol name relative atomic mass </div> </div>																5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20	11 Na sodium 23	12 Mg magnesium 24	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40	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 —	113 Nh nihonium —	114 Fl flerovium —	115 Mc moscovium —	116 Lv livermorium —	117 Ts tennessine —	118 Og oganeson —
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 —																																																																										

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