# The Ambassadors College, Ota

## Cambridge Lower Secondary Checkpoint

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | |

**SCIENCE** **0893/01**

**February 2025**

# Holiday Assignment

**45 minutes**

You must answer on the question paper.

No additional materials are needed.

**INSTRUCTIONS**

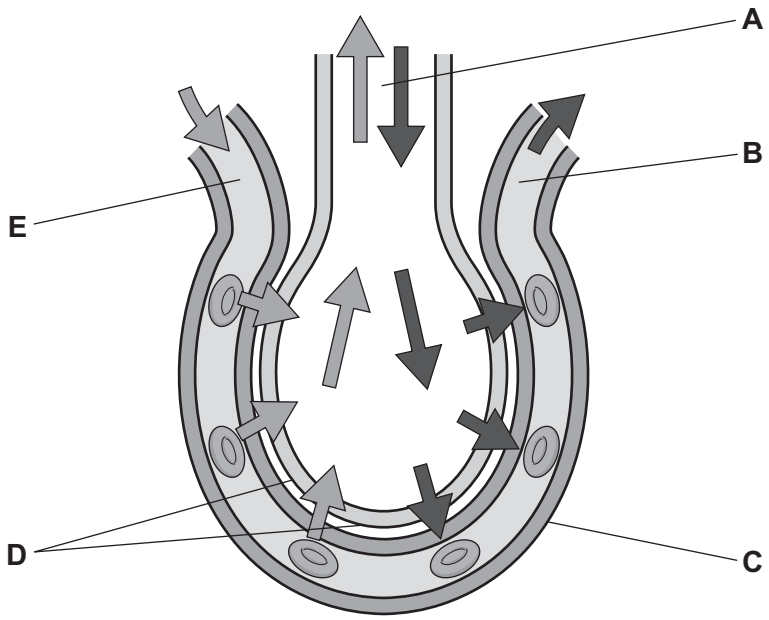
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should show all your working in the booklet.
- You may use a calculator.

**INFORMATION**

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

**1** Alveoli are air sacs found at the end of the bronchioles in the lungs.

**(a)** The diagram shows how gas is exchanged in alveoli.




Match the **description** to the correct **letter** shown in the diagram.

Write your answers in the table.

| description | letter |
|---|---|
| place where the blood has the highest oxygen concentration | |
| blood capillary wall | |
| a surface where gas exchange happens | |

[3]

**(b)** Alveoli are adapted to maximise gas exchange.

Describe **one adaptation** of the alveoli and explain how this helps to maximise gas exchange.

adaptation .....

.....

explanation .....

.....

[2]

**(c)** Red blood cells transport oxygen around the body.

Which mineral in the diet is needed to make red blood cells?

..... [1]

**2** This question is about reactions of magnesium.

**(a)** Mia heats a piece of magnesium over a blue Bunsen flame.

**(i)** The magnesium reacts with a gas in the air.

Write down the name of this gas.

.....

[1]

**(ii)** Describe one **safety risk** in this investigation and how to control the risk.

safety risk .....

how to control risk .....

.....

[2]

**(b)** Magnesium reacts with dilute hydrochloric acid.

Circle **all** the products of this reaction.

| | | |
|---|---|---|
| **carbon dioxide** | **chlorine** | **hydrogen** |
| **magnesium chloride** | **magnesium hydroxide** | **water** |

[2]

**3** Safia uses an electromagnet to pick up steel pins.

She changes the current in the wire and records her results in the table.

| current in A | number of pins |
|---|---|
| 0.25 | 1 |
| 0.50 | 2 |
| 0.75 | 3 |
| 1.00 | 1 |
| 1.25 | 5 |

**(a)** Circle the anomalous result in the table. [1]

**(b)** The current in the wire changes the strength of the electromagnet.

Suggest **one other** factor that changes the strength of the electromagnet.

..... [1]

**4** Space has many parts.

Draw a straight line from each **part** to its correct **description**.

| part | description |
|---|---|
| | clouds of particles in space |
| galaxy | |
| | object orbiting a planet |
| solar system | large group of stars |
| | small planets |
| stellar dust | |
| | planets orbiting around a star |

[3]

**5** Some industries produce toxic substances.

These toxic substances sometimes enter food chains.

Look at the food chain.

**algae → mayfly → small fish → big fish → otter**

**(a)** Suggest a habitat where this food chain is found.

..... [1]

**(b)** The table shows how the amount of toxic substance increases along the food chain.

| organism | relative concentration of toxic substance |
|---|---|
| algae | 1 |
| mayfly | 12 |
| small fish | 50 |
| big fish | 320 |
| otter | 5000 |

**(i)** Explain why the relative concentration of toxic substance is **much higher** in an otter than a big fish.

.....

..... [1]

**(ii)** The amount of toxic substance increases along the food chain.

What is this process called?

..... [1]

**(c)** Write down **one impact** of increasing the concentration of toxic substances on an ecosystem.

.....

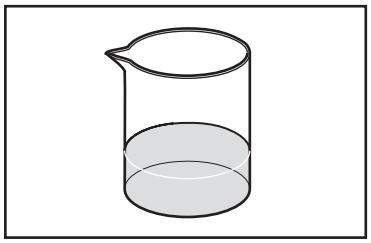
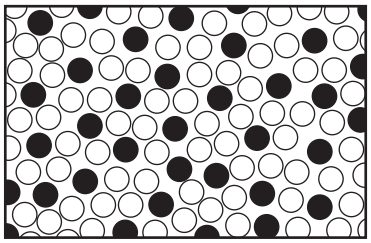
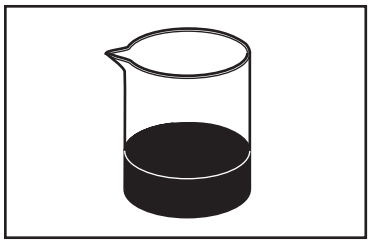
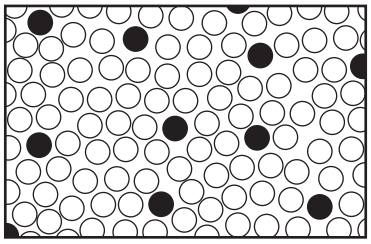
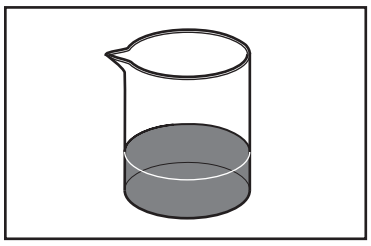
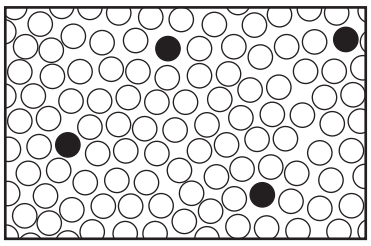
..... [1]

**6** This question is about dissolving.

**(a)** When a blue food colour dissolves in water the solution turns blue.

As the concentration of the blue food colour increases the solution becomes darker.

Draw a straight line from each **solution** to the correct **particle diagram** representing the solution.

| **solution** | **particle diagram** |
|---|---|
|  |  |
|  |  |
|  |  |

● = particle of blue food colour
○ = particle of water

[1]

**(b)** Circle the word in **bold** that makes each sentence correct.

Blue food colour dissolves in water.

The blue food colour is the **solute / solvent / soluble**.

Water is the **solute / solvent / soluble**.

[1]

**7** Ahmed investigates primary and secondary colours.

**(a)** Which colour of light is produced when red light and green light are mixed?

Circle the correct answer.

**yellow** **blue** **cyan** **magenta** **white**

[1]

**(b)** Ahmed wears a magenta and green striped shirt.

Complete the sentences to explain how Ahmed's shirt looks in **blue light**.

In blue light, the magenta stripes look the colour ..... .

This is because magenta .....

..... .

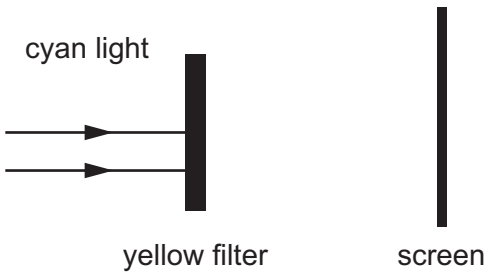
In blue light, the green stripes look the colour ..... .

This is because green .....

..... .

[2]

**(c)** Ahmed passes cyan light through a yellow filter.




Explain which colour light is seen on the screen.

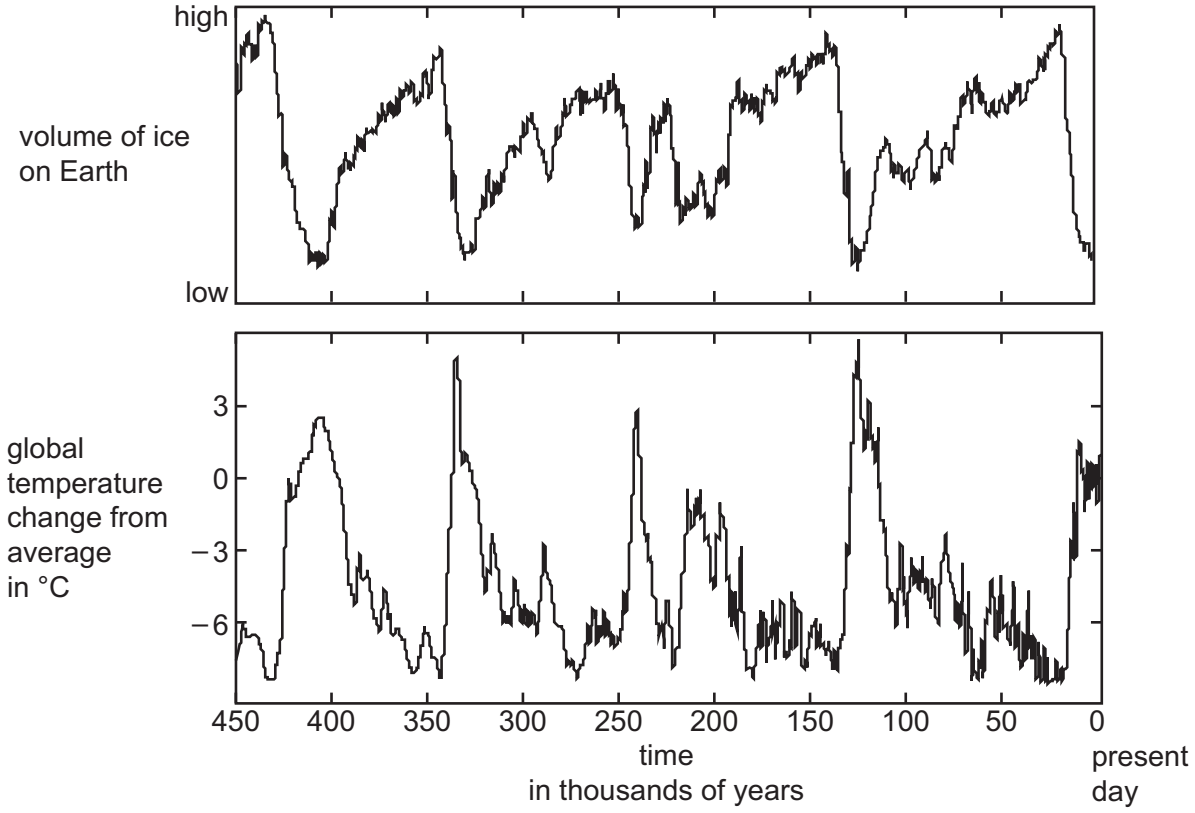
colour light .....

reason .....

.....

[1]

**8** Look at the graphs about the volume of ice on Earth and global temperature change.




**(a)** Use information from the graphs to answer these questions.

**(i)** When was the **highest** global temperature?

..... thousand years ago [1]

**(ii)** Describe the relationship between the global temperature and the volume of ice on Earth.

.....

..... [1]

**(b)** Climate and weather are two different things.

Which statements are about **climate**?

Tick (✓) **all** the correct boxes.

| | |
|---|---|
| average rainfall for a particular region | |
| changes in the atmosphere during a 24-hour period | |
| highest temperature recorded in a week | |
| long-term temperature pattern in a given area | |
| predicting when the next thunderstorm will happen | |

[2]

**9** Gold metal is used to make jewellery.

The purity of gold mixed with other metals is measured using a system called the carat rating.

The table shows the percentage of gold and the percentage of other metals in different carat ratings.

| carat rating | minimum percentage of gold in the metal | maximum percentage of other metals mixed with the gold |
|---|---|---|
| 24 | 100.0 | 0.0 |
| 22 | 91.6 | 8.4 |
| 18 | 75.0 | 25.0 |
| 14 | 58.5 | 41.5 |
| 10 | 41.7 | 58.3 |

A piece of gold mixed with other metals has a mass of 200 g.

The mass of gold in this mixture is 86.5 g.

**(a)** Calculate the percentage of gold in the mixture.

percentage of gold ..... % [1]

**(b)** What is the carat rating for this mixture of gold and other metals?

carat rating ..... [1]

**10** Complete the sentences about diffusion.

Diffusion occurs in gases and ..... .

When perfume is sprayed in a room, the perfume particles and air particles move and

..... .

Diffusion occurs more quickly if a gas is hotter because the gas particles move

..... .

[2]

**11** Yuri investigates the water content of potatoes.

Yuri:

step **1** - cuts a piece of potato with a sharp knife into a cube of mass 10.0 g

step **2** - heats the cube of potato in a microwave for 1 minute

step **3** - uses a balance to find the mass of the cube of potato

step **4** - repeats steps **2** and **3** until the cube of potato has been heated for a total of 10 minutes.

**(a)** Here are his results.

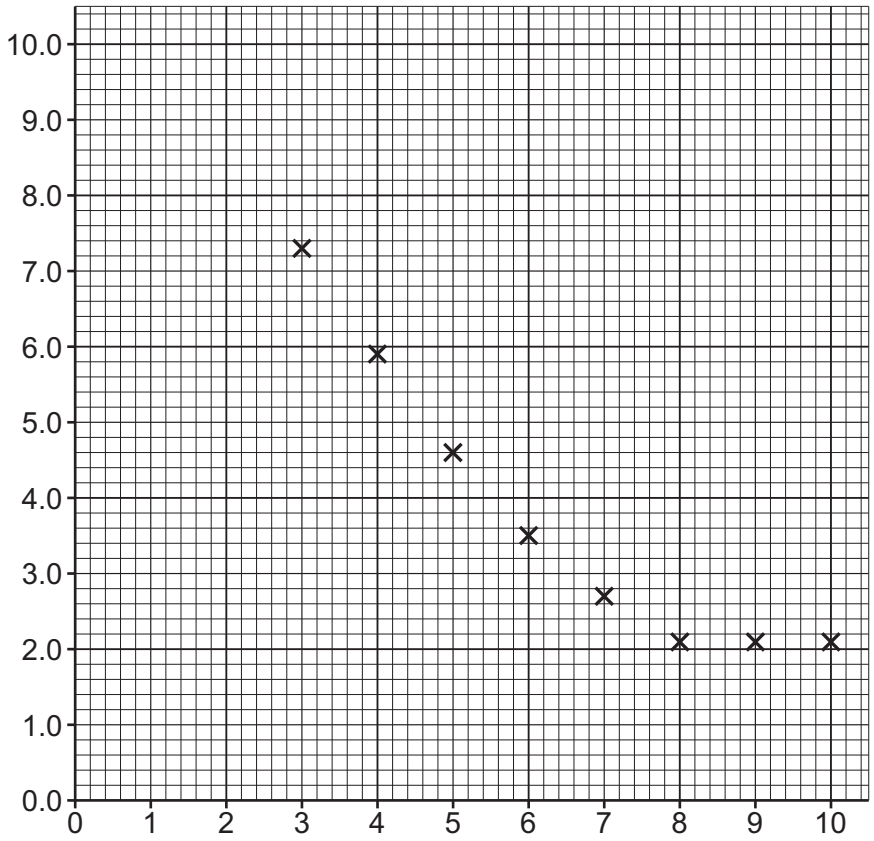
| **time in minutes** | **mass of cube of potato in g** |
|---|---|
| 0 | 10.0 |
| 1 | 9.4 |
| 2 | 8.5 |
| 3 | 7.3 |
| 4 | 5.9 |
| 5 | 4.6 |
| 6 | 3.5 |
| 7 | 2.7 |
| 8 | 2.1 |
| 9 | 2.1 |
| 10 | 2.1 |

Look at the graph of his results.

The last eight masses from the table have been plotted on the graph.

Complete the graph by:

- labelling the axes
- plotting the first three masses from the table on the graph
- drawing a curve of best fit.




.....

.....

.....

.....

[4]

**(b)** Yuri says,

**'I have read that vegetables are 90% water.**
**I predict 90% of this potato will be water.'**

Tick (✓) to show if the results support Yuri's prediction.

yes ☐ no ☐

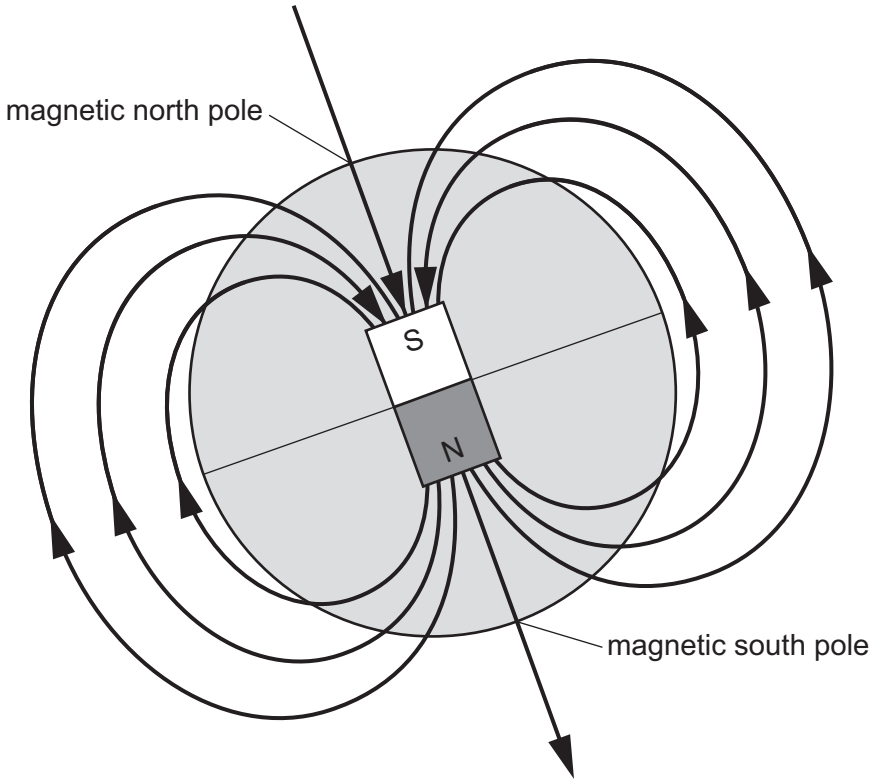
Explain your answer.

.....

.....

[1]

**12** The diagram shows an analogy to describe the Earth's magnetism.




**(a)** Which part of the Earth's structure is represented by the bar magnet?

.....  [1]

**(b)** What do the arrows represent?

.....  [1]

**13** Mike investigates reactions.

In his first experiment Mike:

- pours some water into a beaker
- measures the temperature of the water
- adds 1g of a solid to the water
- stirs the mixture until the temperature stops changing.

Mike repeats the experiment with four other solids.

Look at his results.

| solid | temperature at the start in °C | temperature at the end in °C |
|---|---|---|
| **A** | 20 | 20 |
| **B** | 21 | 28 |
| **C** | 19 | 15 |
| **D** | 18 | 19 |
| **E** | 21 | 27 |

**(a) (i)** How many solids have an endothermic reaction with water?

.....

[1]

**(ii)** Mike has **not** done a fair test.

Suggest **one** way Mike could improve his investigation to make it a fair test.

.....

.....

[1]

**(iii)** Mike describes solid **A** as being inert.

What is meant by the term inert?

.....

[1]

**(b)** One example of an exothermic reaction is adding calcium oxide to water.

The product is calcium hydroxide.

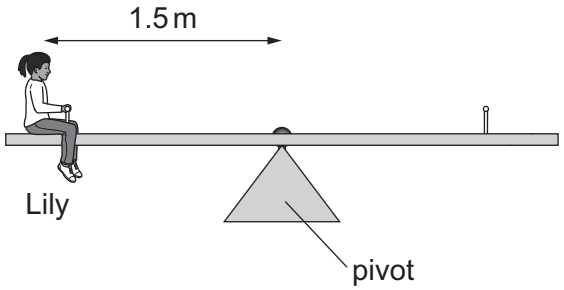
Write the word equation for this reaction.

.....

[1]

**14** Lily and Blessy play on a seesaw.

**(a)** Lily sits at a distance of 1.5 m from the pivot.




Lily weighs 500 N.

Calculate the moment of Lily's weight about the pivot.

Include the unit in your answer.

moment of Lily's weight = ..... unit ..... [3]

**(b)** Blessy sits on the seesaw with Lily.

Blessy weighs 600 N.

The seesaw is balanced.

Calculate the distance Blessy sits from the pivot.

Use ideas about the principle of moments.

distance from pivot ..... m [2]

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## The Periodic Table of Elements

| Group | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | | | | | | | | | | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | 1 H hydrogen 1 | | | | | | | | | | | 2 He helium 4 |
| 3 Li lithium 7 | 4 Be beryllium 9 | | | | | | | | | | 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 oganesson – |

**Key**

atomic number
**atomic symbol**
name
relative atomic mass

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| lanthanoids | 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 |
| actinoids | 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 – |