THE ATMOSPHERE 5
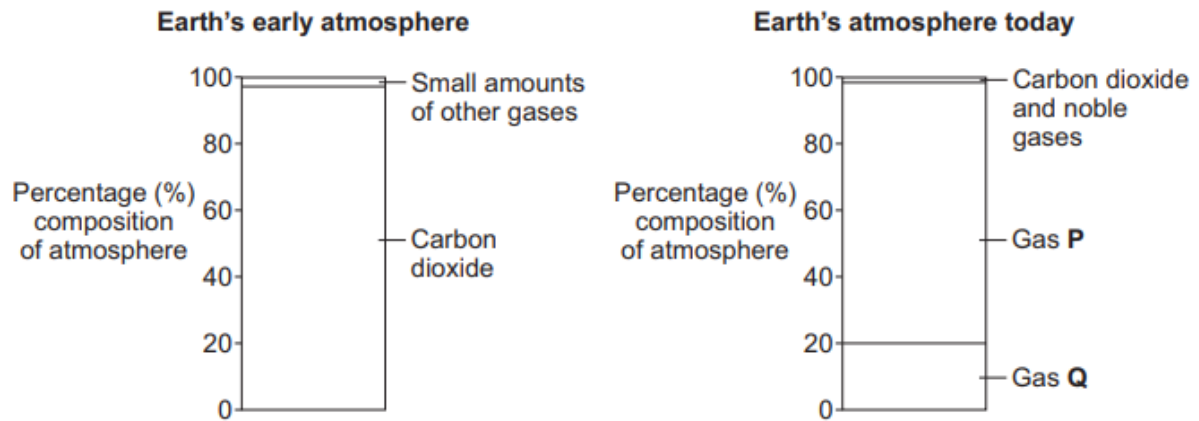
Q1. The bar charts show the composition of Earth's early atmosphere and the composition of the Earth's atmosphere today.

(a) What is gas P?

1   carbon dioxide

2   oxygen

3   nitrogen

4   sulfur dioxide

(1 mark)

(b) The Earth's early atmosphere is thought to have contained a small amount of a hydrocarbon gas. This gas is . . .

1   ammonia.

2   methane.

3   hydrogen.

4   helium.

(1 mark)

(c) Fossil fuels consist mainly of carbon compounds. What was the initial source of the carbon to form these compounds?

1   the skeletons of dead animals

2   carbonate rocks

3   the atmosphere

4   the oceans

(1 mark)

(d)   There was no oxygen in the Earth's atmosphere until 2 billion years ago because . . .

1   it had been locked up in sedimentary rocks as carbonates.

2   it had been used in the formation of fossil fuels.

3   there were no plants on the Earth's surface.

4   it had reacted with the ammonia to form nitrogen.

(1 mark)

Q2.   This question is about gases.

Match gases, A, B, C and D, with the numbers 1– 4 in the table.

A   oxygen

B   nitrogen

C   carbon dioxide

D   helium

1	It makes up about 20% of the Earth's atmosphere today.
2	It is locked up as carbonates in sedimentary rocks.
3	It is found in Group 0 of the periodic table.
4	It makes up about 80% of the Earth's atmosphere today.

(4 marks)

Q3.   The Earth's atmosphere is made up of 78 % nitrogen.

The table shows the next four most abundant gases, two of which are noble gases.

	Gas	Percentage (%) in the atmosphere by volume	Boiling point in ºC
A	Oxygen	21.0	−183
B	Argon	0.930	−185
C	Carbon dioxide	0.030	−78
D	Neon	0.005	−246

Match gases, A, B, C and D, with the numbers 1– 4 in the table below.

1	It is the gas that is a compound.
2	It is the most abundant noble gas.
3	It is the gas with the lowest boiling point.
4	It is the gas needed for fuels to burn.

(4 marks)

Q4. The pie charts show the gases in Earth's early atmosphere and in Earth's atmosphere today.
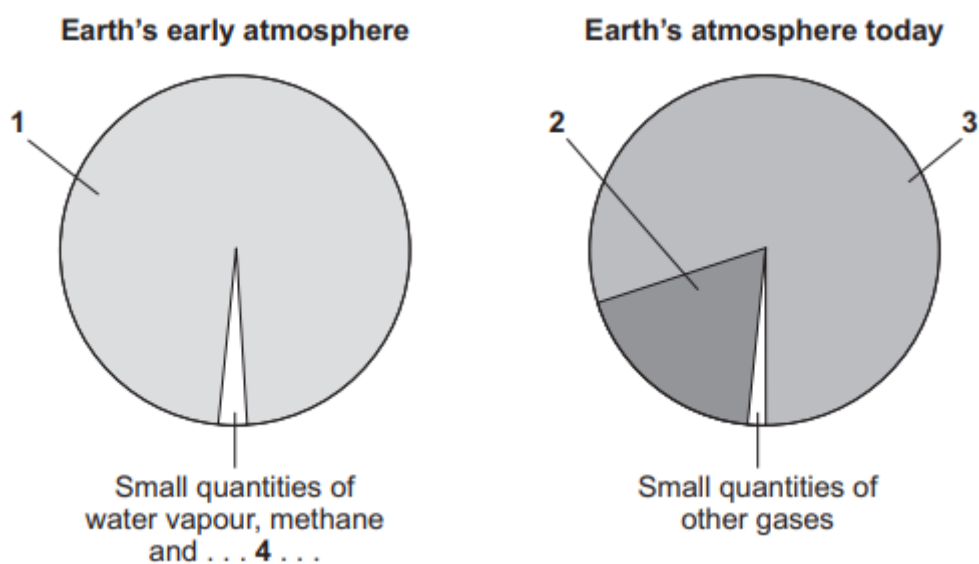
Match gases, A, B, C and D, with the labels 1– 4 on the pie charts.

A   ammonia

B   carbon dioxide

C   nitrogen

D   oxygen

(4 marks)

Q5. This question is about changes in the Earth's atmosphere that have occurred over time.

The Earth's early atmosphere was mainly carbon dioxide with small amounts of methane and ammonia.

The graph shows how the percentages of carbon dioxide, nitrogen and oxygen may have changed over time.
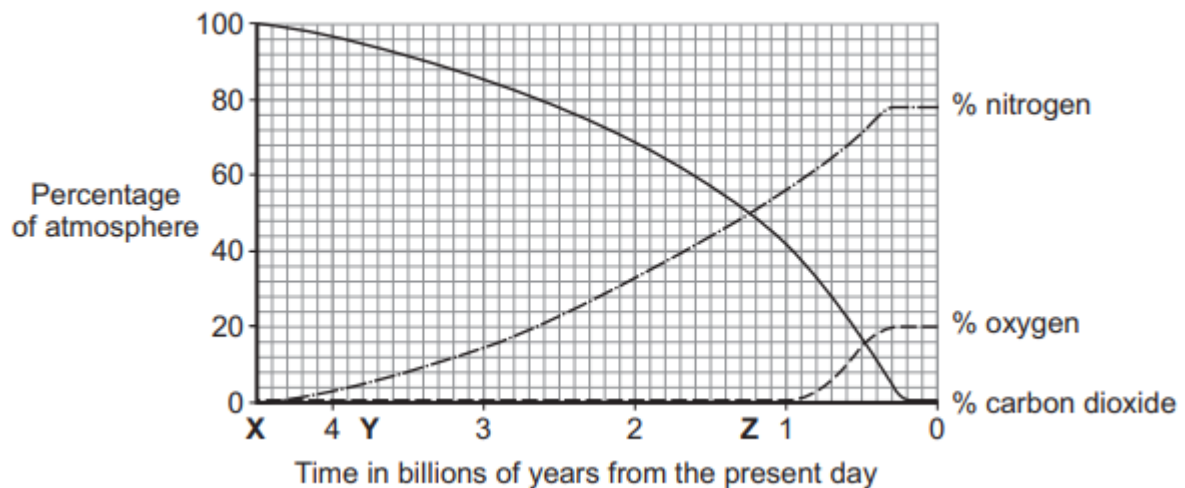
(a) About how many years after the Earth was formed (X) did the percentage of carbon dioxide in the atmosphere fall to 60%?

1   1.3 billion years

2   1.6 billion years

3   2.4 billion years

4   2.9 billion years

(1 mark)

(b) At a particular stage in the Earth's formation, some of the iron on its surface was oxidised. What gas in the atmosphere could not have caused this change?

1   nitrogen

2   carbon dioxide

3   oxygen

4   water vapour

(1 mark)

(c) Between times Y and Z, the amount of carbon dioxide in the atmosphere was reduced. Which of the following statements could explain this reduction?

Most of the carbon dioxide . . .

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1   dissolved in the oceans.

2   was absorbed by plants.

3   was absorbed to form carbonate rocks in the mantle.

4   became locked up in coal, oil and natural gas.

(1 mark)

(d)   The graph showing the percentages of the various gases has . . .

1   categoric variables plotted against a discrete variable.

2   discrete variables plotted against a continuous variable.

3   continuous variables plotted against a continuous variable.

4   continuous variables plotted against a discrete variable.

(1 mark)

Q6.   The table shows the percentages of some gases in the exhaust from a petrol engine.

Name of gas	Percentage (%)
nitrogen	68
carbon dioxide	15
carbon monoxide	1.0
oxygen	0.75
nitrogen oxides	0.24
hydrocarbons	0.005
sulfur dioxide	0.005
other gases	

(a)(i)   What is the percentage of the other gases in the table?

_____

(1 mark)

(ii)   What is the name of the compound that makes up most of the other gases?

_____

(1 mark)

(iii) Give a reason why sulfur dioxide is produced in a petrol engine.

_____

_____

(1 mark)

(iv) State how nitrogen oxides are produced in a petrol engine.

_____

_____

_____

_____

_____

(2 marks)

(b) Many scientists are concerned about the carbon dioxide released from burning fossil fuels such as petrol. Explain why.

_____

_____

_____

_____

_____

(2 marks)

Q7. Aluminium is used to make many things including cans.
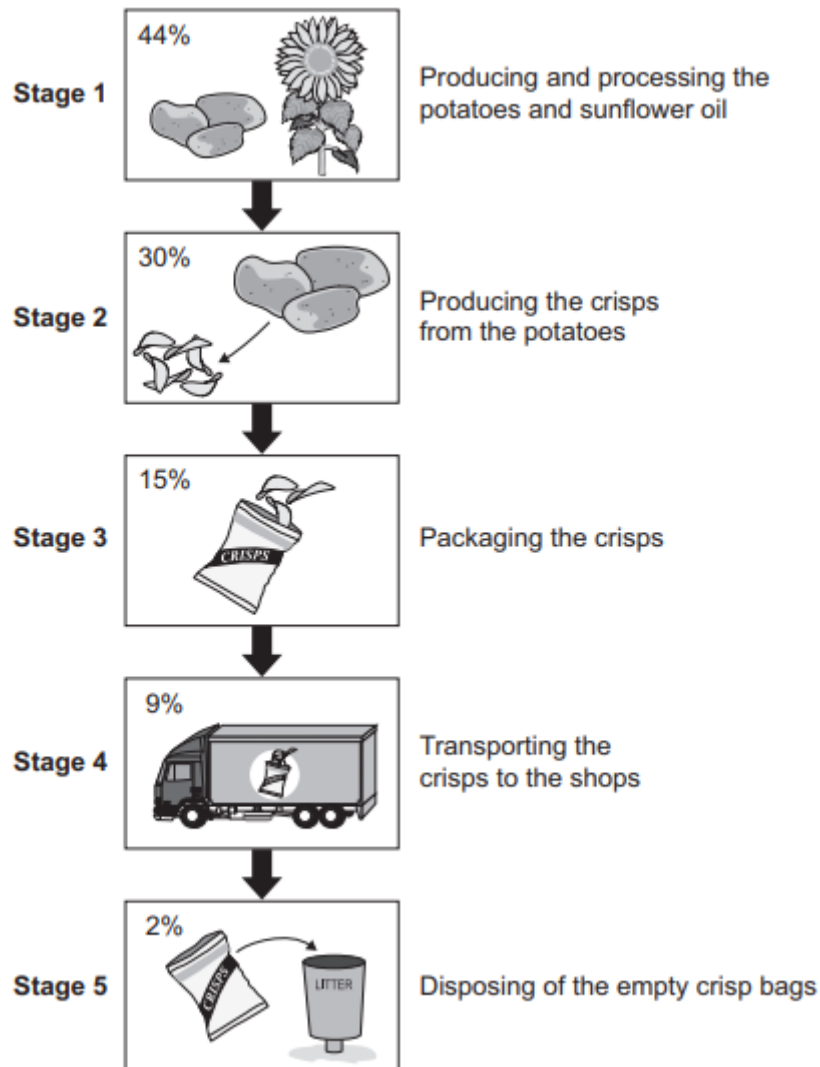
During one year in the USA:

- 100 billion aluminium cans were sold
- 55 billion aluminium cans were recycled.

Give one environmental impact of recycling aluminium cans and one ethical or social impact of recycling aluminium cans.

_____

_____

_____

_____

(2 marks)

Q8. The carbon footprint of a food product is the amount of carbon dioxide produced in its preparation, transportation and disposal.

The diagram shows the percentage (%) of the carbon footprint for each stage for a bag of crisps.

Stage 1	44%	Producing and processing the potatoes and sunflower oil
Stage 2	30%	Producing the crisps from the potatoes
Stage 3	15%	Packaging the crisps
Stage 4	9%	Transporting the crisps to the shops
Stage 5	2%	Disposing of the empty crisp bags

(a) How is most of the carbon dioxide produced in Stage 4?

1   It is produced when the lorries use fuel.

2   It is breathed out by the driver.

3   It escapes from the crisp bags.

4   It escapes from the tyres of the lorries.

(1 mark)

(b)   Which stage on the diagram is shown by the shaded area on the pie chart?

Percentage (%) of carbon footprint for a bag of crisps
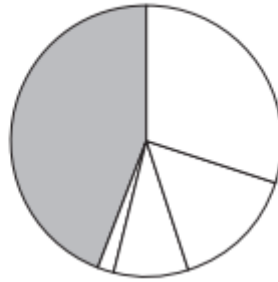
1   Stage 1

2   Stage 2

3   Stage 3

4   Stage 4

(1 mark)

(c)   If the company reduces the carbon footprint for a bag of crisps, this will help to . . .

1   reduce the acid rain that it causes.

2   meet government targets on global warming.

3   reduce the sale of crisps which contribute to obesity.

4   reduce the use of sunflower oil.

(1 mark)

(d)   Which of the following changes would reduce the carbon footprint for the bag of crisps?

1   increase the sales of the crisps

2   change the colour of the crisp bags

3   pack many more bags of crisps into each lorry

4   increase the number of lorries used for transporting the crisps

(1 mark)

Q9. In Britain, we drink about 2 billion litres of bottled water per year.

Use the following information to answer the questions.

Manufacturing the bottles
Many of the bottles are made from a plastic called PET. PET takes about 450 years to biodegrade. PET is made from substances obtained from crude oil.

Getting bottled water to our homes
About 25% of the bottled water is imported. Lorries that deliver bottled water travel up to 2000 km.

The used empty bottles
About 4.5% of household waste is plastic bottles, of which 10% is PET water bottles. The majority of this ends up in landfill sites or is burned.

(a) One problem the information suggests is that the substances used to make PET . . .

1   are obtained from a non-renewable raw material.

2   are obtained from a renewable raw material.

3   are dangerous to use.

4   are too expensive.

(1 mark)

(b) What percentage of household waste is made up of PET water bottles?

1   0.045%

2   0.45%

3   14.5%

4   45.0%

(1 mark)

(c) An important reason for not putting PET bottles in landfill sites is that . . .

1   landfill sites are only used for glass bottles.

2   PET biodegrades very slowly.

3   PET has a low density and is blown over the countryside.

4   PET kills wildlife.

(1 mark)

(d) An environmental problem with importing bottled water by road is that . . .

1   it increases the amount of carbon dioxide in the atmosphere.

2   it increases the amount of oxygen in the atmosphere.

3   it takes a long time for the water to get to British households.

4   water from European countries is of poor quality.

(1 mark)

Total marks (37)