

Name:
Science Class:
Teacher:
Hand in day:

Y9 Science

Term 2 Homework Booklet

Chemistry

	Hand in Date	Parents Signature
Earth's Resources and Climate		
Homework 1		
Homework 2		
Homework 3		
Homework 4		
Homework 5		

Earth Resources and Climate Homework 1:

Comprehension Task - Evolution of the Atmosphere

During the first billion years of the Earth's existence there was intense volcanic activity. This activity released the gases which then formed the early atmosphere and water vapour which condensed to form the oceans.

During this period the Earth's atmosphere was probably mainly carbon dioxide and there would have been little or no oxygen gas (like the atmospheres of Mars and Venus today). There would also have been water vapour, and small proportions of methane and ammonia.

Volcanoes also produced nitrogen which gradually built up in the atmosphere.

When the oceans formed, lots of the carbon dioxide in the atmosphere dissolved in the water, reducing the amount in the atmosphere.

When green plants like algae evolved...

- photosynthesis ensured that more oxygen gas was produced, and that carbon dioxide was taken out of the atmosphere by the green plants. Animals were then able to evolve once the oxygen level was high enough in the atmosphere
- most of the carbon from the carbon dioxide in the air gradually became locked up in sedimentary rocks as carbonates and fossil fuels
- the methane and ammonia in the atmosphere reacted with the oxygen
- the oxygen in the atmosphere resulted in the development of an ozone layer. This filters out harmful ultraviolet radiation from the Sun allowing the evolution of new living organisms.

Carbonate rocks are sometimes moved deep into the Earth by geological activity. They may then release carbon dioxide back into the atmosphere via volcanoes.

The release of carbon dioxide by burning the carbon locked up in fossil fuels increases the level of carbon dioxide in the atmosphere (and creates problems with global warming increasing).

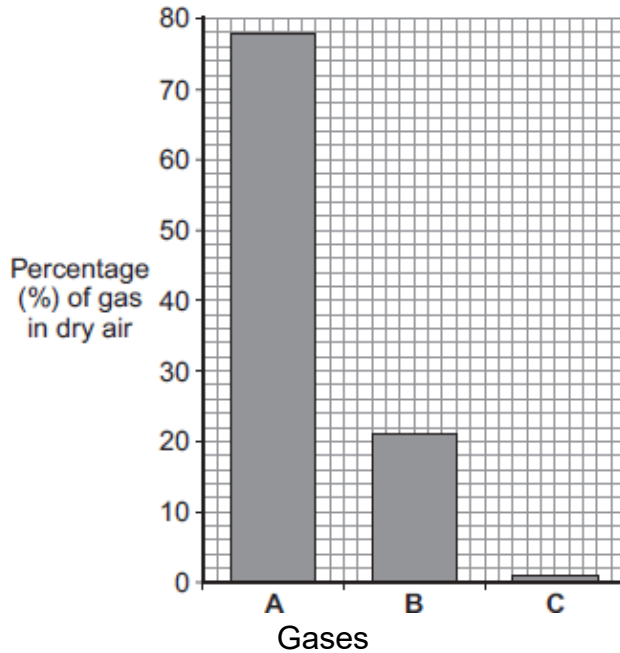
Questions

1. What released the gases that formed the early atmosphere?
2. What happened to the water vapour released?
3. Which gas made up most of the Earth's early atmosphere?
4. Which planets was this early atmosphere similar to?
5. What happened to lots of the carbon dioxide once the oceans had formed?
6. When green plants evolved, which reaction started to change the atmosphere?
7. What did green plants do to the amount of carbon dioxide and oxygen in the atmosphere?
8. What eventually happened to most of the carbon from the carbon dioxide in the air?
9. What does the ozone layer protect us from?
10. How does carbon dioxide get released back into the atmosphere?

Earth Resources and Climate Homework 3:

This question is about the Earth's atmosphere today.

(a) The bar chart shows the percentage by mass of the gases in dry air from the atmosphere.



(i) What percentage of the atmosphere is gas **A**?..... % (1)

(ii) Name gas **A** and gas **B** shown on the bar chart.

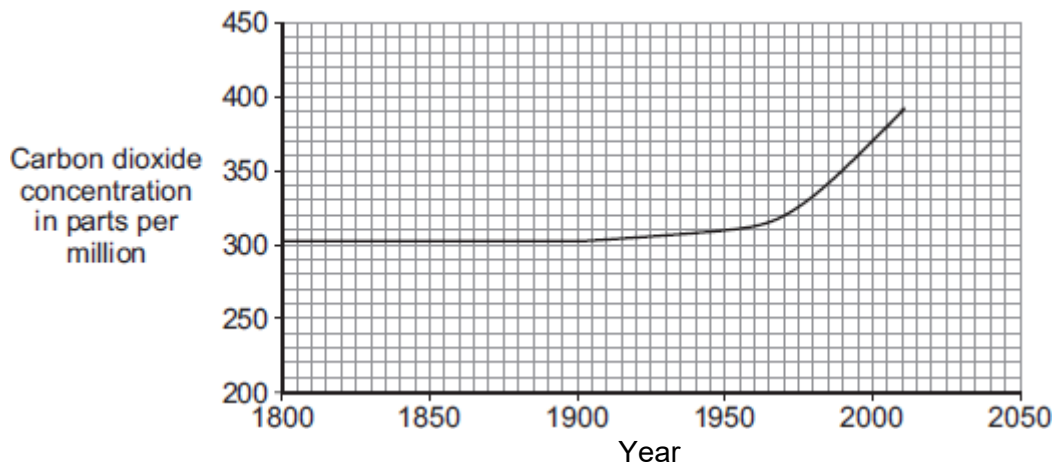
Gas **A**:

Gas **B**:

(2)

(b) The concentration of carbon dioxide in the atmosphere has changed.

The graph shows how the concentration of carbon dioxide has changed since 1800.



(i) Describe how the concentration of carbon dioxide has changed since 1800.

.....
.....
.....
.....

(2)

(ii) Complete the following sentence.

The main cause of the change in carbon dioxide is the burning of

(1)

(c) The exhaust gases of a car with a petrol engine are analysed during its 'MOT test'.
The results are shown below.

(i) The air going into the engine contains about 21 % of oxygen.

Explain why there is only 0.4 % of oxygen in the exhaust gases coming out of the car engine.

gas	% volume
carbon monoxide	3.0
carbon dioxide	13.0
oxygen	0.4
other gases	83.6

.....
.....

(1)

(b) (i) Petrol is a mixture of compounds which contains only carbon and hydrogen. Complete combustion of petrol produces carbon dioxide and **one** other substance. What is this other substance?

.....

(1)

(ii) When petrol is burned in the car engine, carbon monoxide is produced as well as carbon dioxide. Explain why carbon monoxide is dangerous and may kill you.

.....

(1)

(ii) Some fuels contain traces of sulfur. This creates sulfur dioxide when the fuel burns. What environmental problem does the release of sulfur dioxide cause?

.....

(1)

(Total 10 marks)

Earth Resources and Climate Homework 4:

Some metals can be extracted by heating with carbon. Others need to be extracted using electrolysis.

Use your knowledge organiser to make sure you know how to complete each of the equations below.

If the reaction will not work, write 'no reaction'



8. When a compound loses oxygen, what name is given to the reaction?

.....

9. When a metal oxide is extracted by heating with carbon, carbon dioxide gas is released. What environmental problem does the release of carbon dioxide cause?

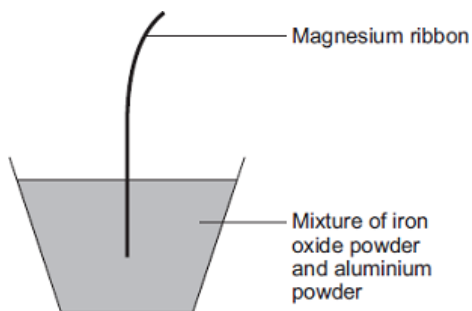
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10. Explain why extracting metals using electrolysis is usually very expensive.

.....

Earth Resources and Climate Homework 5:

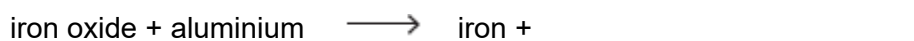
The diagram shows one way of producing iron.



Iron oxide reacts with aluminium to produce iron.



(a) (i) Complete the word equation for this reaction.



(1)

(ii) The magnesium ribbon is lit to start the reaction.

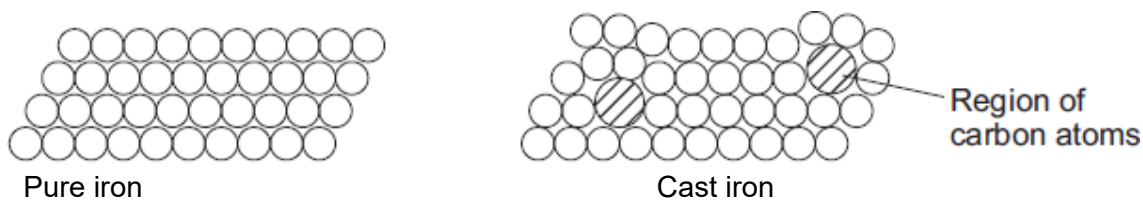
Why does the burning magnesium ribbon start the reaction?

(1)

(b) In industry, iron is produced in the blast furnace when iron oxide is heated with carbon.

The iron from the blast furnace is called cast iron. Cast iron contains carbon.

The diagrams show the structure of pure iron and cast iron.



Use the diagrams to help you answer the questions.

(i) Draw a ring around the correct answer to complete the sentence.

Pure iron is an element because pure iron

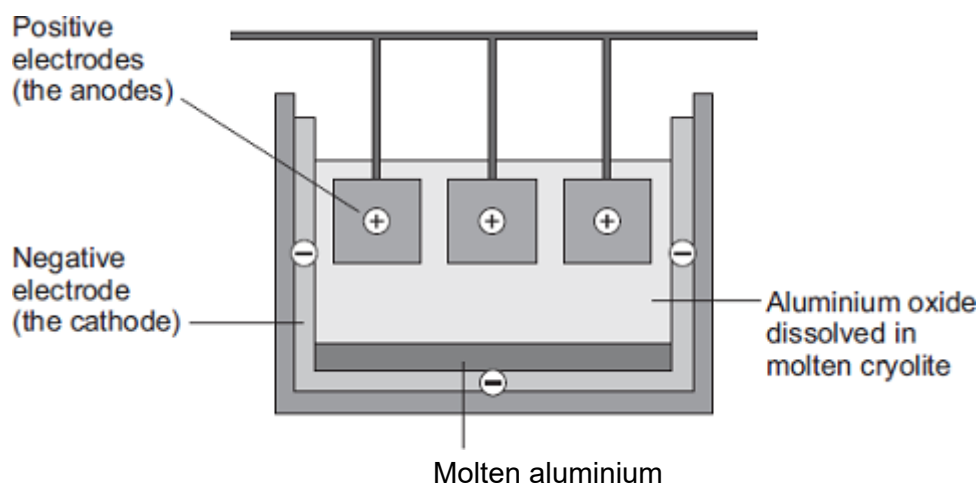
- | |
|---------------------------------|
| contains only one sort of atom. |
| is magnetic. |
| is a metal. |

(1)

(ii) Use the diagrams to suggest why cast iron is harder than pure iron.

(2)

(c) Aluminium is extracted by electrolysis using the compound aluminium oxide.



(i) Aluminium **cannot** be extracted by heating aluminium oxide with carbon. Suggest why.

(1)

(ii) Why is aluminium oxide dissolved in molten cryolite?

(1)

(iii) During electrolysis, aluminium and oxygen are made. Explain why the positive electrodes (anodes) burn away and need replacing regularly.

(3)

(Total 10 marks)