

## **CI Revision Booklet**

*Try to complete all of the activities in the booklet – if you get stuck: use your exercise book, revision guides and the internet to help you. If you are still unable to find out then ask me.*

*Remember that YOU are responsible for your own revision – this booklet should be supplemented by other revision too. The more of this booklet you complete, the better prepared you will be for your exam.*

Name \_\_\_\_\_

# CI.I The fundamental Ideas in Chemistry

## CI.I.I Atoms

What is an atom?

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What is an element?

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Indicate where you would find metals and non-metals:

Periodic Table of the Elements

1 H 1.008																	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.20	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.61	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.0	45 Rh 102.9	46 Pd 106.4	47 Ag 107.8	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.7	52 Te 127.6	53 I 126.9	54 Xe 131.2
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.1	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr 223.0	88 Ra 226.0	89 Ac 227.0	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 Ds (281)	111 Rg (272)	112 Uub (285)	113 Uut (284)	114 Uuq (289)	115 Uup (288)	116 Uuh (292]		

58 Ce 140.1	59 Pr 141.0	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 153.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
90 Th 232.4	91 Pa 231.4	92 U 238.0	93 Np (237)	94 Pu (240)	95 Am (243)	96 Cm (247)	97 Bk (248)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (257)	102 No (259)	103 Lr (262)

Match the name of the element with the symbol

Element	Symbol
Oxygen	
Sodium	
	H
	Li
Copper	
Potassium	
	Ar
	Ca

Draw and label the structure of an atom. Ensure that you include the following

key words:

Nucleus    Protons    Neutrons    Electrons

Complete the table below

Name of Particle	Charge	Mass
Proton		
Neutron		
Electron		

Explain why atoms have no overall electrical charge.

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What does the atomic number tell you?

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What does the mass number tell you?

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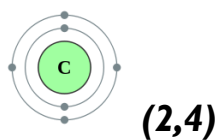
Complete the table

Element	Symbol	Atomic Number	Mass Number	Number of Protons	Number of Neutrons	Number of Electrons
Hydrogen						
	He					
		3				
			9			
				5		

Draw diagrams to show the electronic structure of the elements above. You should use 2 different methods of representing the electron arrangement.

**For example:**

**Carbon**





CI.1.2 The Periodic Table

Complete the table

<b>Group Number</b>	<b>Number of Electrons in Outer Energy Level (Shell)</b>
1	
2	
3	
4	
5	
6	
7	
0	

Using information in the table above, explain why elements in the same group of the periodic table have similar properties

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Label each of the group of the periodic table below. You may colour each group a different colour to show where they are.

Periodic Table of the Elements

1 H 1.008																	2 He 4.00
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The elements in group 0 (the noble gases) are very unreactive, explain why.

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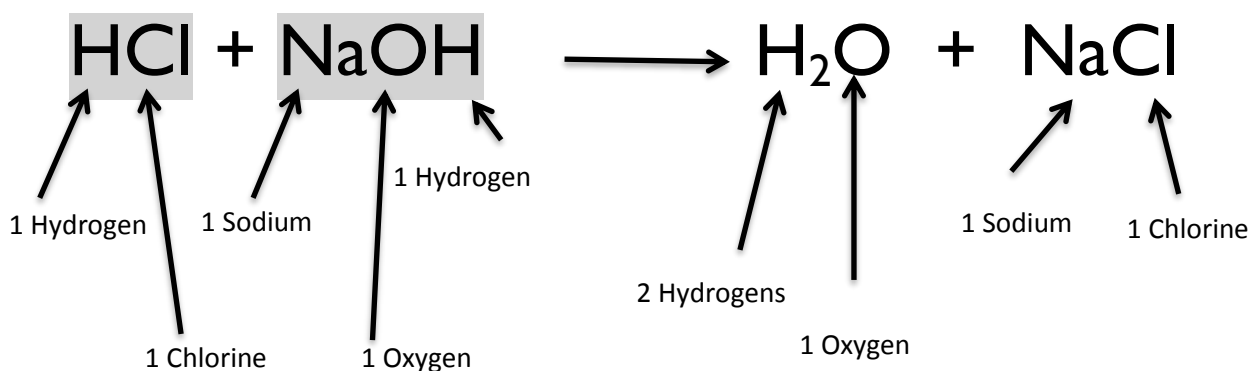


### Cl.1.3 Chemical Reactions

**For each chemical reaction:**

- Write the word equation**
- Colour the reactants in one colour and the products in another**
- Identify how many of each element there is in each compound**

**Example**



Word Equation:

**Hydrochloric acid + Sodium Hydroxide  $\longrightarrow$  Water + Sodium Chloride**



Word Equation:

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Word Equation:

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Word Equation:

---



Word Equation:

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d. **Extension: Balance the symbol equations (Higher tier only)**

What is a compound?

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.....

What is an ion?

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.....

What type of bonding occurs between:

Metal and non-metals?

.....

Two non-metals?

.....

Complete the table about forming ions:

<b>Metal/Non-metal</b>	<b>Gain/Loose Electrons?</b>	<b>Positive/Negative Ion?</b>
Metal		
Non-Metal		

Draw a diagram showing the bonding between sodium and chlorine to form sodium chloride.

Draw a diagram to show how hydrogen and chlorine bond together to form HCl.

Complete the table, calculate the mass in each case.

Reactants		Products	
Hydrochloric acid 20g	Sodium Hydroxide 20g	Sodium Chloride 10g	Water .....g
Calcium Carbonate .....g		Calcium Oxide 10g	Carbon dioxide 15g
Zinc 10g	Sulfuric Acid .....g	Hydrogen 20g	Zinc Sulfate 10g
Magnesium 12g	Hydrochloric Acid 17g	Hydrogen .....g	Magnesium Chloride 15g
Lead Oxide .....g	Carbon 14g	Carbon Dioxide 23g	Lead 12g

## **CI.2 Limestone and Building Materials**

### **CI.2.1 Calcium Carbonate**

What is limestone made from?

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How do you get limestone out of the ground?

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What is limestone used for?

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What is thermal decomposition?

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Write the word and symbol equations for the thermal decomposition of calcium carbonate.

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What happens to magnesium carbonate, copper carbonate, zinc carbonate and calcium carbonate when they are heated?

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.....  
.....

Give a reason why not all of the above reactions could be observed in a classroom?

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

Write word and symbol equations to show what happens when calcium oxide reacts with water. What can the product be used for?

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.....  
.....

How do you test for the presence of carbon dioxide? Draw a diagram and write a description.

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.....  
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What is the chemical name and formula for lime water?

.....  
.....

Describe the reaction that occurs when limewater reacts with carbon dioxide.

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.....  
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What are the products produced when a carbonate reacts with an acid?

- .....
- .....
- .....

What happens to limestone statues when exposed to acid rain?

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

Complete the following:

Limestone + Heat + Clay = .....

Cement + Sand = .....

Cement + Sand + Aggregate = .....



## CI.3 Metals and Their Uses

### CI.3.1 Extracting Metals

What is an ore?

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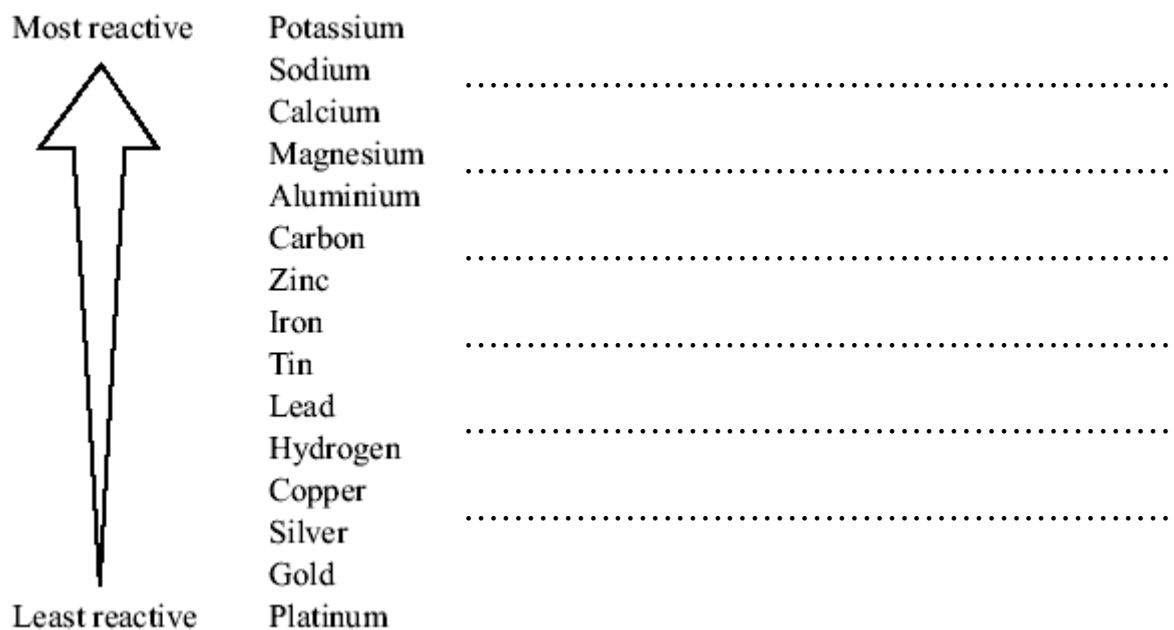
Explain why it is possible to find gold in the Earth as a metal.

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What does the reactivity series show us?



How can carbon be used to extract a metal from its ore?

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What method do we use to extract more reactive metals such as aluminium?

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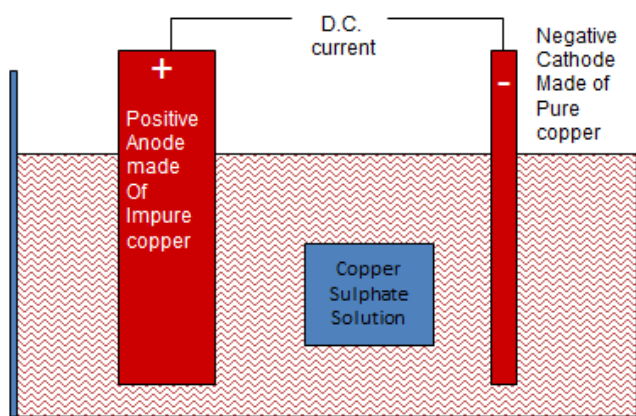
Why is aluminium expensive?

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## Refining copper



Add the following statements to the correct place on the diagram above

1. Copper atoms lose electrons and become copper ions.
2. The positive ions drift away from the anode
3.  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
4. Positive copper ions drift to the cathode.
5. The cathode is electroplated
6.  $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$
7. The anode dissolves
8. Copper atoms gain electrons and become copper atoms

Define the following words:

Phytomining

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Bioleaching

.....  
.....

Why are these processes important?

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.....  
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List methods of extracting copper:

- .....
- .....
- .....
- .....

Why is it important that we recycle metals?

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CI.3.2 Alloys

What impact do impurities have on the properties of iron when it comes from the blast furnace?

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What is steel?

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Complete the table

<b>Properties of high carbon steel</b>	Properties of low carbon steel



Why do we convert copper, gold, iron and aluminium into alloys?

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### CI.3.3

#### Colour in the transition metals

Periodic Table of the Elements

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55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.1	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)
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#### List properties of transition metals

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Complete the table

<b>Metal</b>	<b>Properties</b>	<b>Uses</b>
Copper		
Aluminium		
Titanium		

## **CI.4 Crude Oil and Fuels**

### **CI.4.1 Crude Oil**

What is crude oil?

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Use diagrams to show how crude oil was formed.

What is a mixture?

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What is a hydrocarbon?

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Name a saturated hydrocarbon

.....

Give the general formula of an alkane

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## CI.4.2 Hydrocarbons

Complete the following table

Alkane	Number of Carbons	Number of Hydrogens	Formula	Structure
	1			
		6		
			$C_3H_8$	
Butane				$\begin{array}{ccccccc} & H & H & H & H & & \\ &   &   &   &   & & \\ H & -C & -C & -C & -C & -H & \\ &   &   &   &   & & \\ & H & H & H & H & & \end{array}$
Pentane	5			

What is fractional distillation?

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What method can you use to separate liquids with different boiling points?

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What is a boiling point?

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Draw a diagram of a fractionating column

Where do substances with high boiling points condense in the fractionating column?

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.....  
.....

Where do substances with low boiling points condense in the fractionating column?

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

Define the following words:

Viscosity

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.....  
.....

Flammability

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



How does the length of the carbon chain affect the following:

Boiling point

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

Viscosity

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

Flammability

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

### CI.4.3 Hydrocarbon Fuels

Complete the following equation for the combustion of hydrocarbons

Hydrocarbon + ..... = .....+.....

The following substance can be released when fossil fuels are burnt. Explain where they come from and the impact that they have on the environment

#### **Carbon dioxide**

Produced due to

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

Impact on the environment

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.....  
.....

## **Sulfur Dioxide**

Produced due to

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

Impact on the environment

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.....  
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## **Carbon Monoxide**

Produced due to

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

Impact on the environment

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.....  
.....

## **Oxides of Nitrogen**

Produced due to

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.....  
.....

Impact on the environment

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.....  
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## **Particulates**

Produced due to

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.....  
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Impact on the environment

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Describe the causes and effects of global dimming

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How are biofuels produced?

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## CI.5 Other Useful Substances from Crude Oil

### CI.5.1 Obtaining useful substances from crude oil

What is cracking and why is it necessary?

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Describe the process of cracking?

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What is the general formula for an alkene?

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What happens when alkenes react with bromine water?

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Alkene	Number of Carbons	Number of Hydrogens	Formula	Structure
	1			
		4		
			$C_3H_6$	
Butene				$  \begin{array}{cccc}  & H & H & H & H \\  &   &   &   &   \\  H & - C & - C & - C & = C \\  &   &   & &   \\  & H & H & & H  \end{array}  $
Pentene	5			



CI.5.2 Polymers

Draw a diagram representing the process of polymerisation of ethene. Label the following:

**Monomer**

**Polymer**

**Ethene**

**Poly(ethene)**

Describe the process of polymerisation.

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.....

.....



### CI.5.3 Ethanol

What are the two methods of producing ethanol?

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.....

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What are the advantages and disadvantages of each method?

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## **CI.6 Plant Oils and Their Uses**

### **CI.6.1 Vegetable Oils**

What steps are required to extract oils from fruits, seeds and nuts?

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How is olive oil extracted?

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Why are vegetable oils important foods?

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### CI.6.3 Emulsions

What is an emulsifier?

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What is an emulsion?

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Why are emulsions useful?

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**Higher Tier – What is meant by hydrophobic and hydrophilic?**

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CI.6.3 Saturated and Unsaturated Oils

How do you test for the presence of a double bond?

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.....  
.....

The presence of a double bond means that oil is Saturated/unsaturated. (*Delete as appropriate*)

**Higher Tier – How can unsaturated oils be hardened? Describe the properties of the product.**

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.....  
.....  
.....  
.....  
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# CI.7 Changes in the Earth and its Atmosphere

## CI.7.1 The Earth's Crust

**The structure of the Earth**

Draw and colour in:

- The inner core
- The outer core
- The mantle
- The crust

Key:


Using your key, colour in the boxes below to show which part of the structure they are referring too.

**Very thin**   **Liquid**   **Magnetic**   **Very thin**   **Radius of 3500km**   **Behaves like a solid, but does flow**

How do earthquakes and volcanoes occur?

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Explain why Wegener's theories of crustal movement were not accepted for many years?

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Explain why scientists cannot accurately predict when earthquakes and volcanic eruptions will occur?

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**Higher Tier – Describe why we do not know how life was first formed?**

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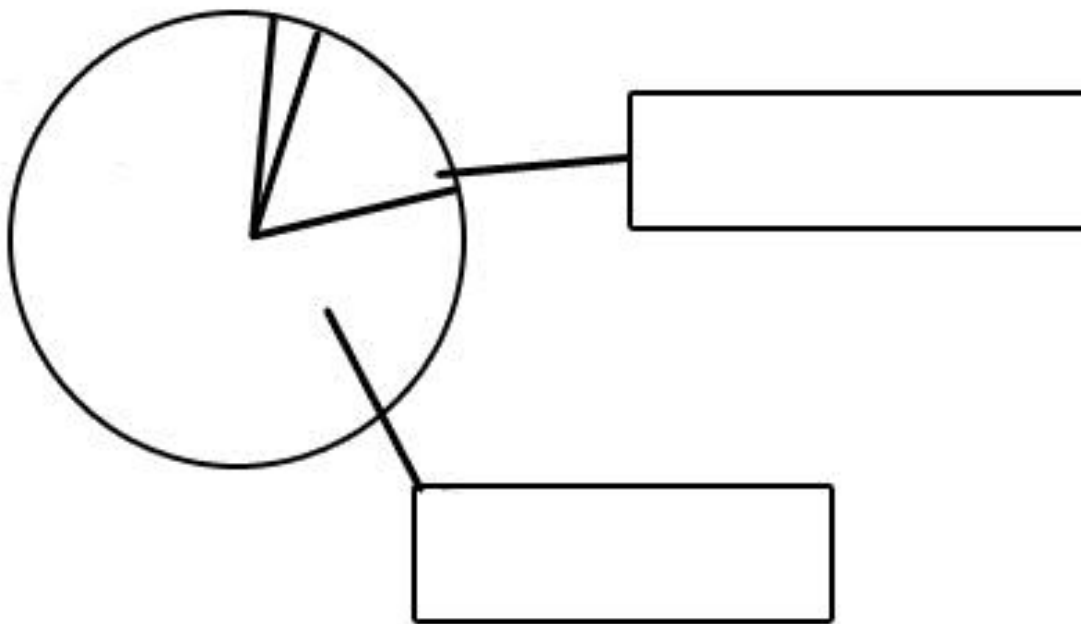
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CI.7.2 The Earth's Atmosphere

Label the diagram to show the proportions of different gases in the atmosphere:



What was responsible for the formation of the Earth's early atmosphere and provided the water that formed the oceans?

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What process produced the oxygen that is now in the atmosphere?

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.....  
.....

What happened to a lot of the carbon dioxide that was in the air?

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.....  
.....

What human activities have caused a change in our atmosphere?

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

**Higher Tier – What process could be used to separate the mixture of gases that makes up air?**

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

## **Self-Assess**

The topics that I know in detail are:

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- 
- 

The topics that I know but need to do some revision for are:

- 
- 
- 

The topics that I do not understand and need to ask for help with are:

- 
- 
-

Other revision activities that you can now do are:

- Attend revision sessions on Friday
- Complete BBC bitesize activities
- Make revision cards
- Draw mind-maps
- Use AQA website to find practice questions
- 
- 
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