

Atomic structure

1 How do you work out the number of electrons, protons and neutrons in an atom?

A: The atomic number in the periodic table represents the number of protons which is equal to the number of electrons. Mass number - Atomic number = neutron number



Atomic structure

2 Why are few objects made of pure metals?

A: Pure metals often are too expensive. In a pure metal the atoms are arranged in layers. The layers can slide easily which means that the metal bends too easily.



Atomic structure

3 Why is there no overall charge on an atom?

A: because the number of positive protons and negative electrons is equal in an atom.



Atomic structure

4 Why do all atoms in the same group have similar chemical properties?

A: Because they all have the same number of electrons in their outer shell.



Atomic structure

5 Why are all group 0 atoms unreactive?

A: Because they all have a full outer shell.



Atomic structure

6 What are the differences in the atomic structure of hydrogen and helium atoms?

A: Hydrogen has 1 electron whereas helium has 2 electrons. Hydrogen has 1 proton and 0 neutrons, helium has 2 protons and 2 neutrons.



Atomic structure

7 How many electrons can you fit on each shell around the nucleus of an atom?

A: 2 electrons on the first (inner shell), then 8 on the second and third shell.



Atomic structure

8 Describe the following reaction in terms of the names of the substances and the number of atoms involved: $2\text{Al} + 3\text{Cl}_2 \rightarrow 2\text{AlCl}_3$

A: 2 aluminium atoms react with 3 chlorine molecules to form 2 aluminium chloride molecules.



Chemical Reactions

9 State and explain the trend in reactivity down Group 1

A: the reactivity increases. This is because as you go down Group 1, the size of the atom increases as there are more shells. The outer electron gets further away from the nucleus and is more shielded, it is lost more easily.



Chemical reactions

10 State and explain the trend in reactivity in group 7.

A: Reactivity down the group decreases. As you go down the group, the number of shells increases. This means that the outer shell is further from the nucleus and it is harder to attract another electron.



Chemical reactions

11 How do ions form?

A: Metal atoms lose their outer shell electrons forming positive ions. Non-metal atoms gain electrons forming negative ions. As a result metal atoms and non-metal atoms gain full outer shells.



Chemical reactions

12 What is a covalent bond?

A: A shared pair of electrons. Non-metal atoms share their electrons.



Chemical reactions

13 What is an ionic bond?

A: The electrostatic attraction between positive and negative ions. Formed when a metal reacts with a non-metal.



Chemical reactions

14 Why does Fe react with CuO but Cu does not react with FeO?

A: Because Fe is more reactive than Cu and can displace Cu from CuO. Cu is less reactive than Fe and cannot displace Fe from FeO.



Chemical reactions

15 What is produced when group 1 metals react with water?

A: Metal hydroxide + Hydrogen. For example Lithium + water → lithium hydroxide + hydrogen



Chemical reactions

16 Balance this equation:
 $\text{Ca} + \text{O}_2 \rightarrow \text{CaO}$

A: $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$



Chemical reactions

17 Balance this equation:
 $\text{Al} + \text{O}_2 \rightarrow \text{Al}_2\text{O}_3$

A: $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$



Chemical Reactions

18 Balance this equation:
 $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$

A: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$



Chemical reactions

19 Why must all equations be balanced?

A: Because you cannot create or destroy atoms.



Chemical reactions

20 Why is the total mass of reactants always equal to the total mass of products?

A: Because you cannot create or destroy atoms.



Chemical reactions

21 If 8.4g of MgCO_3 decompose on heating, what mass of MgO and what mass of CO_2 will be formed?

A: 4g of MgO and 4.4g of CO_2 . The formula mass of MgCO_3 is 84, MgO is 48 and CO_2 is 44. Therefore 8.4 is $1/10^{\text{th}}$ of 84, so $1/10^{\text{th}}$ of product will be formed.



Limestone

22 What is the formula for limestone?

A: CaCO_3



Limestone

23 What is produced when limestone is heated strongly?

A: $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$.



Limestone

24 What are the chemical and everyday names of CaO and $\text{Ca(OH)}_{2(s)}$ and $\text{Ca(OH)}_{2(aq)}$?

A: CaO is calcium oxide or quicklime. $\text{Ca(OH)}_{2(s)}$ is calcium hydroxide or slaked lime, $\text{Ca(OH)}_{2(aq)}$ is calcium hydroxide or limewater.



Limestone

25 What type of reaction is $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$?

A: Thermal decomposition (heat is used to break down a compound)



Limestone

26 What is limestone used for?

A: Building material, statues, abrasive in toothpaste, cement, and mortar and concrete.



Limestone

27 Limestone is thermally decomposed inside a rotatory kiln. Explain why large amounts of CO_2 are produced in this process.

A: Thermal decomposition of limestone releases CO_2 . The fuel that is combusted to produce the high heat required (methane), releases CO_2 .



Limestone

28 One of the waste gases leaving the limekiln is nitrogen. Where does this gas come from?

A: From the hot air that is blast into the kiln to provide the heat needed for thermal decomposition. Air contains 78% nitrogen.



Limestone

29 Not all metal carbonates decompose when heated with a Bunsen flame. Give a reason for this.

A: They require a higher temperature to break the bonds present in the compound.



Limestone

30 How do you test for carbon dioxide?

A: Bubble the gas through limewater. If carbon dioxide is present, the limewater will turn cloudy as finely suspended calcium carbonate precipitate is produced.



Limestone

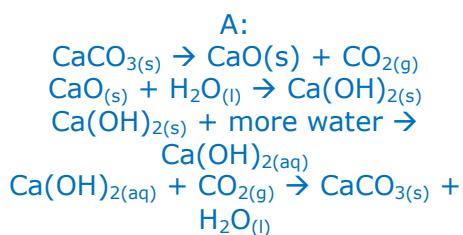
31 What is produced when metal carbonates such as calcium carbonate react with acids?

A: Salt, water and carbon dioxide; for example magnesium carbonate + hydrochloric acid \rightarrow magnesium chloride + water + carbon dioxide



Limestone

32 Write equations for the limestone cycle



Metal carbonates

33 When green copper carbonate is heated, a gas is given off and a black solid is formed. Identify the black solid.

A: Copper oxide



Metal carbonates

34 How can you use limewater to find how long it takes for a metal carbonate to decompose?

A: Time how long it takes for limewater to turn cloudy. Start the stopwatch when you start heating the metal carbonate and stop timing when the limewater begins to turn cloudy.



Metal carbonates

35 When you heat a substance inside a test tube, no reaction takes place, yet a gas leaves the test tube. What is this gas?

A: Air that was present inside the test tube.



Limestone

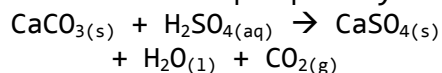
36 Buildings made from limestone are affected by burning fossil fuels containing sulfur. Explain why.

A: The sulphur reacts with oxygen when the fuel is burnt. This produces sulphur dioxide which dissolves in rain water producing acid rain which reacts with limestone.



Limestone

37 Calcium carbonate reacts with sulphuric acid. Use the equation to explain why the reaction stops quickly:



A: A layer of CaSO_4 forms around the CaCO_3 . This layer prevents the acid from reacting further with the CaCO_3 , so the reaction stops.



Limestone

38 Plaster is made by mixing slaked lime with water. Why does plaster become hard over time?

A: Plaster is $\text{Ca}(\text{OH})_{2(aq)}$. When it is exposed to air, it reacts with CO_2 in the air and forms solid CaCO_3 and H_2O . The water evaporates.



Limestone

39 How do you produce mortar?

A: By mixing cement with water and sand.



Limestone

40 Why does mortar hold bricks together?

A: The calcium hydroxide reacts with the carbon dioxide in the air, forming solid limestone which holds the bricks together.



Limestone

41 What are the disadvantages of mortar and cement?

A: Large amounts of CO_2 are produced when making cement and mortar.



Limestone

42 How do you make cement?

A: Heat limestone with clay in a kiln.



Limestone

43 How do you make concrete?

A: Add water, cement, sand and small stones or crushed rock.



Limestone

44 Why do builders use concrete rather than pure cement?

A: Pure cement would be too expensive.



Limestone

45 Give reasons for using concrete rather than limestone as a building material.

A: Can be poured into shapes, weather and corrosion resistant, stronger.



Limestone

46 Give reasons against building with concrete.

A: Ugly; production releases carbon dioxide which adds to the greenhouse effect.



Limestone

47 Give reasons for mining limestone.

A: Many uses, especially as a building material; mining provides jobs, workers will move to local area improving the local economy.



Limestone

48 Give reasons against mining limestone.

A: Destruction of habitats; air pollution (CO_2) from lorries driving to and from the mine; noise and dust pollution; tourists stay away.



Metals

49 What is an ore?

A: Rocks that contain enough metal compounds that make it economically viable to extract the metal compound.



Metals

50 What is a native metal?

A: A metal that can be found uncombined in the Earth's crust.



Metals

51 What is smelting?

A: Heating a metal ore to extract the metal.



Metals

52 Why is copper extracted from low-grade ores?

A: Copper ores are running out and there are no high-grade ores left.



Metals

53 Describe bioleaching.

A: Bacteria feed on low grade ores. A leachate is produced (this is a solution of copper ions). The leachate is either electrolysed or scrap iron is added to it.



Metals

54 Why is scrap iron used to extract copper from leachate?

A: Scrap iron is cheap. Iron is more reactive than copper and will displace the copper ions from the leachate.



Metals

55 Why is oxygen used to produce low-carbon steels?

A: Oxygen reacts with the carbon in pig iron to make carbon dioxide. This removes the carbon from the steel.



Metals

56 Why is it more expensive to extract titanium than iron?

A: Extracting titanium involves more steps than extracting iron. Larger amounts of energy are also needed. Argon is used in the process which is expensive.



Metals

57 Iron oxide is heated with carbon inside the blast furnace. What type of reaction takes place?

A: Reduction. Carbon removes the oxygen from iron oxide.



Metals

58 What is the equation for iron oxide reacting with carbon monoxide to make iron and carbon dioxide?



Metals

59 Describe how aluminium is extracted from bauxite.

A: Bauxite is mixed with cryolite to lower the melting point. The mixture is heated and electrolysed. Aluminium is produced as well as carbon dioxide.



Metals

60 Why is it important to recycle aluminium cans?

A: To preserve aluminium ores, save 95% of energy compared to extracting it from bauxite. Reduce CO₂ emissions.



Metals

61 What is phytomining?

A: Plants absorb copper ions from low-grade copper ores. The plants are harvested and burnt. The ash left behind is dissolved in sulphuric acid to produce copper sulphate solution. The copper sulphate solution is either electrolysed or scrap iron is added to displace the copper ions.



Metals

62 What are the pros and cons of phytomining?

A: Pro: heat released during burning of plants can be used to heat houses or produce electricity. Plants absorb CO₂ during photosynthesis.
Cons: not continuous/Batch process so it takes a long time.



Metals

63 Describe the electrolysis of copper sulphate.

A: Copper sulphate is used as the electrolyte. Positive copper ions in the copper sulphate solution are attracted to the negative electrode where they take on 2 electrons and form copper atoms.



Metals

64 Why is it expensive to extract metals from metal ores?

A: Large amounts of energy are needed, large amounts of rocks/ores have to be mined, many steps are needed to process the ores.



Metals

65 Where in the periodic table are the transition metals?

A: In the middle of the periodic table.



Metals

66 Why are alloys used instead of pure metals?

A: Alloys are stronger and have different properties.



Metals

67 Give two examples of copper alloys.

A: Brass (copper and zinc) used to make musical instruments; Bronze (copper and tin) used to make statues.



Metals

68 Give a use for titanium alloys.

A: Hip replacements. Titanium alloys are light weight and corrosion resistant.



Metals

69 Explain why titanium alloys are used to build fighter jets.

A: Low density, high melting point which means during supersonic flight the alloy does not melt.



Metals

70 What are the physical properties of metals?

A: Good conductors of heat and electricity, malleable, ductile.



Metals

71 Why is pig iron too brittle?

A: It contains too much carbon from the reduction process inside the blast furnace.



Metals

72 Describe the blast furnace process.

A: Limestone, coke and iron ore are added at the top. Hot air is blasted in from the bottom. The hot air burns the coke and makes carbon dioxide. Carbon dioxide reacts with more coke to form carbon monoxide. Carbon monoxide reacts with iron oxide and forms molten iron and carbon dioxide. The molten iron sinks to the bottom. Limestone reacts with impurities and forms slag which floats on top of the molten iron.



Crude oil

73 What is combustion?

A: A reaction between oxygen and a fuel that releases energy.



Crude oil

74 Which pollutant gases are produced during the combustion of fossil fuels?

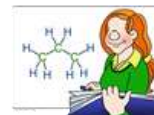
A: Particulates, carbon dioxide, carbon monoxide, sulphur dioxide, nitrogen oxides, water.



Crude oil

75 What are the environmental effects of particulates, carbon dioxide, carbon monoxide, nitrogen oxides, sulphur

A: Global dimming (particulates travel into the atmosphere and reflect light back into space), global warming, suffocation, acid rain/asthma, acid rain.



Crude oil

76 Why are particulates and carbon monoxide produced when petrol burns?

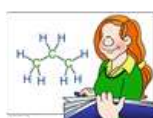
A: Sometimes insufficient oxygen is available which means incomplete combustion occurs inside the engine.



Crude oil

77 Why are nitrogen oxides produced during the combustion of petrol?

A: Nitrogen and oxygen from the air react inside the combustion engine due to the very high temperatures inside the engine.



Crude oil

78 How are carbon dioxide and sulphur dioxide produced when fossil fuels burn?

A: Carbon dioxide is produced from complete combustion of hydrocarbons. Some fossil fuels contain sulphur. This reacts with oxygen during combustion to form sulphur dioxide.



Crude oil

79 How are harmful substances removed from car exhaust fumes?

A: By fitting cars with catalytic converters. Carbon monoxide is converted to carbon dioxide, nitrogen oxides are converted to nitrogen and oxygen, and particulates are converted to carbon dioxide and water.



Crude oil

80 How is sulfur dioxide removed from industrial waste gases?

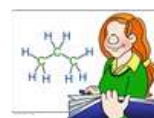
A: Chimneys are lined with calcium oxide or calcium hydroxide which neutralises the sulphur dioxide. This is called flue gas desulphurisation.



Crude oil

81 What are biofuels?

A: Fuels that are made from plant or animal products. Biodiesel is made from old cooking oil and plant oils. Biogas is made from fermenting animal waste.



Crude oil

82 What is crude oil?

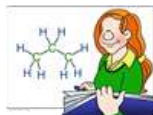
A: A mixture of different hydrocarbons.



Crude oil

83 What is a hydrocarbon?

A: A compound made of hydrogen and carbon ONLY.



Crude oil

84 Describe how the different hydrocarbons in crude oil are separated.

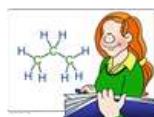
A: Crude oil is heated to 350°C. Some of the hydrocarbons turn into vapour while others remain a liquid. The liquid flows to the bottom of the fractionating tower, the vapours rise up the tower. The temperature decreases as you rise up the tower. As the vapours cool they condense and are piped off. Some vapours don't condense and rise out of the top of the tower.



Crude oil

85 What is a fraction?

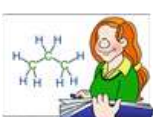
A: A mixture of hydrocarbons with similar chain length and boiling points.



Crude oil

86 What are the products of fractional distillation of crude oil?

A: Refinery gases, petrol, naphtha kerosene, diesel oil, fuel oil, lubricating oil, bitumen



Crude oil

87 What are the products of fractional distillation of crude oil used for?

A: Refinery gases for camping gas, petrol as car fuel, naphtha as a chemical feedstock, kerosene as jet fuel, diesel oil as lorry fuel, fuel oil to heat houses, lubricating oil as engine oil, bitumen for road surfacing.



Crude oil

88 What are alkanes?

A: Saturated hydrocarbons with the general formula C_nH_{2n+2} .



Crude oil

89 Name the first 5 alkanes and give their formula.

A: Methane CH_4 , Ethane C_2H_6 , Propane C_3H_8 , Butane C_4H_{10} , Pentane C_5H_{12}



Crude oil

90 What is a homologous series?

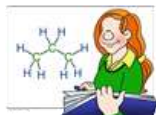
A: A group of compounds with the same general formula that differ by a CH_2 group from one member to the next.



Crude oil

91 What are alkenes?

A: Unsaturated hydrocarbons with the general formula C_nH_{2n} .



Crude oil

92 What is the difference between saturated and unsaturated hydrocarbons?

A: Saturated hydrocarbons have only C-C single bonds. Unsaturated hydrocarbons have C=C double bonds as well as C-C single bonds..



Crude oil

93 What are the similarities between alkanes and alkenes?

A: Both are hydrocarbons.



Crude oil

94 What are the differences between alkanes and alkenes?

A: Alkanes are saturated and do not decolourise bromine water. Alkenes are unsaturated and decolourise bromine water. Alkanes have 2 extra hydrogen atoms than an alkene with the same number of carbon atoms.



Crude oil

95 Name the first 4 alkenes and give their formula.

A: Ethene C_2H_4 , Propene C_3H_6 , Butene C_4H_8 , Pentene C_5H_{10} .



Crude oil

96 What is a displayed formula?

A: The drawn out formula that shows the each atom and each bond present in a molecule.



Crude oil

97 State and explain the trend in boiling point, viscosity and volatility of alkanes.

A: As the number of carbon atoms increases, boiling points and viscosity increase and volatility decreases. This is because there are more intermolecular forces between the molecules which makes it harder to separate them.



Crude oil

98 What is cracking?

A: The thermal decomposition of long alkanes into shorter alkanes and alkenes.



Crude oil

99 Why are long hydrocarbons cracked?

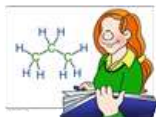
A: There is a high demand for short chain alkanes but a low supply. There is a high supply but low demand of long chain hydrocarbons. Cracking ensures that there is a good supply of short chain alkanes. The alkenes are used to make plastics.



Crude oil

100 What are the conditions for catalytic cracking?

A: High temperatures and a catalyst of broken porous pot/Aluminium oxide.



Crude oil

101 How is cracking carried out in the lab?

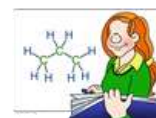
A: Alkane vapours are passed over a hot catalyst made of broken porous pot or aluminium oxide. The vapours can also be mixed with steam at very high temperatures.



Crude oil

102 What is a monomer?

A: An alkene used to make a polymer.



Crude oil

103 What is a polymer?

A: A large molecule made from many monomers.



Crude oil

104 How are polymers formed?

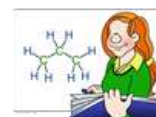
A: Many monomers join by breaking their double bond and forming single bonds to make a long chain.



Crude oil

105 What is the polymer formed from propene?

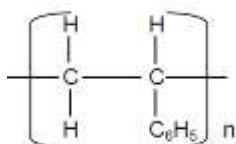
A: Polypropene.



Crude oil

106 How do you draw the repeating unit of a polymer from the monomer?

A: replace the double bond with a single bond, add a single bond on either end of the monomer, draw square brackets around the molecule and add an n at the



bottom.

Crude oil

107 Why is polythene used to make plastic shopping bags?

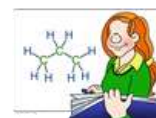
A: They are strong, light and water proof. They can be reused or recycled.



Crude oil

108 What is the disadvantage of using plastics made from crude oil?

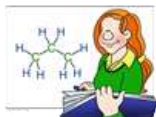
A: They are non-biodegradable (cannot be broken down by micro-organisms. They take up valuable landfill space, their production requires large amounts of energy which releases CO₂ gas. Crude oil is non-renewable. They contribute to litter.



Crude oil

109 What are smart polymers?

A: Polymers that have their properties changed by light, water or temperature changes.



Crude oil

110 Give examples of smart polymers.

A: Hydrogels used in nappies to absorb liquids, light-sensitive plasters that stop being sticky when exposed to light, shape memory polymers used to stitch wounds loosely. When warmed the polymer tightens and closes the wound.



Crude oil

111 What are the problems with recycling polymers?

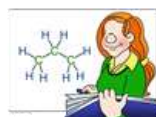
A: Recycling requires specialist facilities which are expensive to build. Workers are needed to sort the different plastics. It does not save as much energy as recycling other materials.



Crude oil

112 What is cornstarch?

A: A substance that can be used to make a biodegradable polymer.



Crude oil

113 What are the disadvantages of biodegradable polymers?

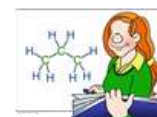
A: Land is used to grow corn instead of food. The plastic breaks down when exposed to light which means the bag won't last as long.



Crude oil

114 Plastics can be burned to release energy. What are the problems associated with this disposal method?

A: It does not preserve crude oil reserves; CO₂ released which could cause global warming; might release toxic gases.



Plant oils

115 How does an emulsifier work?

A: The hydrophilic head bonds with water, the hydrophobic tail bonds with the oil which stops the oil droplets from joining back up.



Plant oils

116 How do you harden vegetable oils?

A: Add hydrogen at 60°C, with a nickel catalyst. This reaction is called hydrogenation.



Plant oils

117 Does hardening fats make them healthier or less healthy?

A: Less healthy as the number of C=C double bonds is removed and the fat becomes less polyunsaturated and more saturated.



Plant oils

118 What is an emulsion? Give examples.

A: A mixture of two immiscible liquids. Milk, cream, ice cream, mayonnaise, paint, nail varnish, face creams, body lotions, lipstick.



Plant oils

119 How do you test for unsaturation?

A: Add bromine water or iodine water. If the bromine/iodine decolourises, C=C double bonds were present.



Plant oils

120 What are the pros and cons of cooking with fats/oils?

A: Pro: food cooks quicker as oil has a higher boiling point than water; food looks more appetising as it turns brown and crispy in oil and smells better. Oils add nutrients (vitamins) to food.

Cons: Energy content is increased, unknown chemical reactions happen.



Plant oils

121 Give a use for hydrogenated oils.

A: Spreads and cake, biscuit and pastry making. This is due to hydrogenated oils having a higher melting point than the original oils.



Plant oils

122 How are plant oils extracted during distillation?

A: Fractional distillation: boil water. The steam will pass through plant material and evaporate the oil. The vapours are condensed. Oil will float on top of water. The water is run off, leaving the oil behind.



Plant oils

123 How are plant oils produced during pressing?

A: Plants are harvested and crushed to break open the cell structures. The plant material is pressed to remove the oil. The oil is dissolved in solvents to remove impurities. The solvent is then evaporated.



Ethanol

124 Describe fermentation.

A: Glucose from renewable plants is dissolved in water. Yeast is added at 37°C and 1atm pressure; the conditions are anaerobic. The enzyme in yeast turns glucose into ethanol and carbon dioxide. The process is a Batch process; it is slow and produces impure ethanol used mainly for alcoholic drinks.
 $C_6H_{12}O_6 \rightarrow 2CO_2 + 2C_2H_5OH$



Ethanol

125 Describe how ethanol can be made from octane.

A: Octane comes from non-renewable crude oil. Octane is cracked to produce ethene and hexane. Octane vapours are passed over a hot catalyst. Ethene is then reacted with steam. This is a hydration reaction that requires a phosphoric acid catalyst. This method is continuous and quick but requires a lot of energy. The ethanol is pure.



Atmosphere

126 How can nitrogen, hydrogen, carbon monoxide and form amino acids?

A: nitrogen and hydrogen can form ammonia; carbon monoxide and hydrogen can form methane and water; methane, ammonia and water formed amino acids in the Urey-Miller experiment.



Atmosphere

127 Why don't scientists know for sure how life began?

A: Because no one was around when the first organisms formed.



Atmosphere

128 What causes the amount of carbon dioxide to increase rapidly?

A: Increased burning of fossil fuel, deforestation.



Atmosphere

129 What do we mean by 'locked up carbon'?

A: Carbon dioxide that was used to form fossil fuels or carbonate rocks.



Atmosphere

130 What causes carbon dioxide to be removed from the atmosphere?

A: photosynthesis, formation of carbonate rocks and marine shells, dissolving in the oceans, locked up in fossil fuels.



Atmosphere

131 What causes carbon dioxide to be released into the atmosphere?

A: Respiration, combustion of fossil fuels, warming of oceans releases dissolved carbon dioxide.



Atmosphere

132 Why is the Urey-Miller experiment not fully reliable?

A: Because they only selected the gases that are needed to produce amino acids. There might not have been any lightning and other gases might have been present.



Atmosphere

133 What is the composition of the atmosphere?

A: 78% Nitrogen, 21% oxygen, 0.03% carbon dioxide, 1% argon



Atmosphere

134 The early atmosphere contained mainly carbon dioxide (95%), methane, ammonia and water vapour. Where did these gases come from?

A: Volcanic activity



Atmosphere

135 Describe what happened to the gases that made up the early atmosphere (ammonia, methane, carbon dioxide).

A: Plants absorbed CO_2 during photosynthesis. CO_2 dissolved in the oceans. Plants released O_2 which reacted with the methane to form more CO_2 and H_2O . O_2 also reacted with ammonia to form N_2 and H_2O



Atmosphere

136 How did the oceans form?

A: As the atmosphere cooled, water vapour condensed.



Atmosphere

137 Nitrogen boils at -196°C , methane at -169°C . If the temperature is -179°C , what is the state of nitrogen and methane?

A: Nitrogen will be a gas because its boiling point is lower than -179°C , methane a liquid because its boiling point is higher than -179°C .



Atmosphere

138 Describe fractional distillation of air.

A: Filter air to remove water vapour and dust. Cool air to remove water and carbon dioxide as these would freeze and block the pipes of the fractionating tower. Cool air to -200°C to liquefy it. Liquid air enters the tower and gradually warmed up. Nitrogen gas boils off first and rises to the top of the tower. Liquid oxygen and argon are left behind and tapped off at the bottom of the tower. To separate the oxygen and argon, a second fractionating column is used.



Earth Science

139 Where do earthquakes happen?

A: At plate boundaries.



Earth Science

140 How do new islands form?

A: when plates move apart, magma rises from the mantle to fill the gap. Magma rises due to convection currents inside the mantle.



Earth Science

141 How do earthquakes form?

A: Plates rub against each other. The friction forces build up until the force becomes too big and the plates move suddenly.



Earth Science

142 What is the name of the super continent?

A: Pangaea



Earth Science

143 What causes continental drift?

A: Convection currents inside the mantle caused by radioactive processes inside the core.



Earth Science

144 Why did no one believe Alfred Wegener?

A: He had no evidence that continents moved.



Earth Science

145 Describe Alfred Wegener's idea of how continents formed.

A: All continents once were joined together but moved apart over time.



Earth Science

146 How did other scientists explain matching fossils in Africa and South America?

A: Continents were joined by land bridges. Animals walked over these which were later flooded and disappeared which cut the animals off from each other.



Earth Science

147 What evidence do we have that continental drift is happening?

A: Volcanoes, earthquakes, tsunamis, ocean ridges, new mountains and islands form.



Earth Science

148 How did scientists before 1900 explain mountain formations?

A: As the Earth cooled, the crust shrank which caused it to form wrinkles.



Earth Science

149 Why is it difficult to predict earthquakes?

A: Scientists cannot see what is going on below the crust and cannot measure the forces that build up and say when the forces become too big.



Earth Science

150 Why are not all earthquakes reported in newspapers?

A: Because the effects cannot be felt or the damage done is not big enough.

