Science Knowledge Organiser

Year:	**10**
Term:	**Su2**

	Topic:	**The Earth's Early Atmosphere (C.20)**
1	When did the Early Atmosphere form?	4.6 billion years ago
2	State the four gases present in the Early Atmosphere?	Carbon dioxide (70%), methane (10%), ammonia (10%) and water vapour (10%)
3	Where did the gases in the early atmosphere come from?	Volcanic activity
4	What are the 2 most prevalent gases in the atmosphere today?	Nitrogen (78%) and Oxygen (21%)
5	How much carbon dioxide is there in the Earth's atmosphere today?	0.0004
6	State the substances that have trapped carbon dioxide under the ground	Fossil Fuels and Sedimentary rocks
7	Name the process by which the oceans are thought to have formed	Condensation of water vapour
8	Where do our current levels of nitrogen come from?	Volcanoes
9	Name the process that converts carbon dioxide into oxygen.	Photosynthesis
10	Which organism is responsible for releasing nitrogen from plants?	Bacteria
11	State the naturally occurring phenomenon that is believed to have converted gases into nitrogen?	Lightening
12	State the process that releases nitrogen from organisms on death	Decomposition
13	State the 4 processes that lead to a reduction in CO2 between the Early Atmosphere and today.	1) Dissolved in seas
14	Name the process that caused an increase in oxygen levels	Photosynthesis
15	Which two organisms caused an increase in oxygen levels?	Algae and green plants

	Topic:	**Global warming and air pollution (C.21)**
1	Name the 3 greenhouse gases	Water, Methane, carbon dioxide
2	Name the greenhouse gas produced by rice fields	Methane (CH4)
3	Name the three types of radiation emitted by the sun	Infrared (long wave), visible light (short wave) and UV (short wave)
4	Name the one type of radiation emitted by the Earth	Infrared radiation (long wave)
5	What happens to the majority of radiation emitted by the sun when it gets to the Earth's atmosphere?	It passes through (is transmitted)
6	What happens to the majority of radiation emitted by the Earth when it reaches the atmosphere?	It is absorbed
7	State 2 human activities that increase the amount of carbon dioxide in the atmosphere	Burning fossil fuels, deforestation
8	State 3 human activities that increase the amount of methane in the atmosphere	Decaying organic matter, growing rice, cattle farming
9	Why is global climate change difficult to model?	Involves many factors
10	What is the main cause of global climate change?	Increase in average global temperature
11	State 6 potential effects of global climate change	1) Ice caps melting 2) Sea level rising 3) Loss of habitats 4) Desertification 5) Changes in migratory
12	Define 'carbon footprint'	The total amount of CO2 and other greenhouse gases emitted over the full life cycle of a produce.
13	State three ways we can reduce our carbon footprint?	1) recycle 2) take public transport 3) use renewable energies
14	State two effect of carbon particulates (soot) being released into the atmosphere	Global dimming & asthma
15	State the effect of sulphur dioxides and nitrogen oxides being released into the atmosphere	Acid rain & respiratory problems

	Topic:	**Finite resources, water and waste (C.22)**
1	State 4 factors that humans use the Earth's resources for	Warmth, Shelter, Food, Transport
2	State 4 products gained from the Earth	Food, Timber, Clothing, Fuel
3	Define "finite"	Will run out
4	Define "sustainable development"	Development that meets the needs of the current generation without compromising the ability to meet
5	State two examples of synthetic materials that are replacing natural materials	Artificial leather, Synthetic rubber
6	What is the name given to water that is safe to drink?	Potable
7	State the two stages of making potable water from a lake or river	1) Filter bed
8	Why is fluoride added to drinking water?	Reduce tooth decay
9	State three things that can be used to sterilise water	UV, ozone, chlorine
10	State two ways that desalination can be carried out	Reverse osmosis or distillation
11	State one disadvantage of desalination.	Requires large amounts of energy
12	Is potable water pure?	No, it contains lots of minerals
13	Describe the two steps in desalination	1) Heat water (evaporation)
14	State the 4 stages of waste water treatment	1) Screening, 2) Sedimentation, 3) Anaerobic digestion (sewage), 4) Aerobic biological treatment
15	What are the 4 stages of an LCA?	1) Extracting & processing raw materials

	Topic:	**Alternative methods of extracting metals (HT only) (C.24)**
1	Define high-grade and low-grade ore.	High-grade ore is a rock containing lots of a metal, low-grade ore is a rock containing a small amount
2	State three reasons why copper is a useful metal (HT only)	1) Good conductor, 2) Easily bent, 3) Unreactive with water
3	How can copper be extracted from copper-rich ores? (HT only)	Smelting = heating the copper ore with carbon in a furnace
4	How can copper be purified after smelting? (HT only)	Electrolysis
5	Name the method for extracting copper from a salt. (HT only)	Electrolysis
6	Where do copper ions move to during electrolysis? (HT only)	The cathode
7	Name the method used to extract copper using scrap iron. (HT only)	Displacement
8	Which metal is used in reduction of low grade copper extraction? (HT only)	Iron
9	Why are we running out of copper-rich ores? (HT only)	Because of extensive mining of copper in the past.
10	State two alternative methods of extracting copper rather than using copper-rich ores. (HT only)	Phytomining (using contaminated land), Bioleaching (using low-grade ores)
11	Why are phytomining and bioleaching more environmentally friendly? (HT only)	They don't involve digging up and moving large quantities of rock, or produce lots of waste.
12	State the 3 steps in phytomining (HT only)	1) Grow plants on low grade ore, 2) Plants absorb and store copper, 3) Burn plants to produce ash
13	State the organism used in bioleaching and the solution produced (HT only)	Bacteria, Leachate
14	State the two steps in removing copper from the copper filled ash produced in phytomining (HT only)	1) Dissolve in water, 2) displacement/electrolysis
15	State how copper is removed from the leachate produced in bioleaching (HT only)	Displacement or electrolysis

	Topic:	**Making materials (ceramics, polymers and glass) (C.26)**
1	What is the name of household glass? (separate only)	Soda-lime glass
2	How is soda-lime glass made? (separate only)	Heating sand, sodium carbonate and limestone
3	What is the advantage of borosilicate glass? (separate only)	Melts at a higher temperature
4	What is borosilicate glass made from? (separate only)	Sand and boron trioxide
5	How are pottery, bricks and clay ceramics made? (separate only)	Shape wet clay and heat in furnace
6	Which monomer are low density and high density polyethene made from? (separate only)	Ethene
7	State one use of LD polyethene (separate only)	Plastic bags
8	State one use of HD polyethene (separate only)	Plastic bottles
9	State the name of the type of polymer that can be melted and reshaped (separate only)	Thermosoftening polymers
10	State the name of the type of polymer that can NOT be melted and reshaped (separate only)	Thermosetting polymers
11	What is the difference between the structure of thermosetting polymers and the structure of thermosoftening polymers? (separate only)	Thermosetting polymers have crosslinks
12	What is it called if a material is has a binder holding together fibres of other materials (separate only)	Reinforcement
13	Give two examples of composites (separate only)	Fibreglass and concrete
14	Give three properties of high density polyethene (separate only)	High melting point, strong, inflexible
15	Give three properties of low density polyethene (separate only)	Low melting point, not strong, flexible

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	Topic:	**The Haber Process (C.27)**
1	Which elements do NPK fertilisers contain? (separate only)	Nitrogen, phosphorous, potassium
2	How is the nitrogen part of the fertiliser made? (separate only)	Reacting ammonia with acid
3	What is the word equation for the Haber process? (separate only)	nitrogen + hydrogen --> ammonia
4	Complete the word equation	Ammonium sulphate + hydrogen
5	What is the symbol equation for the Haber process? (separate only)	$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$
6	What is used to create the phosphate part of NPK fertilisers? (separate only)	Phosphate rock + acid
7	What is used to create the potassium part of the NPK fertiliser? (separate only)	Potassium chloride and potassium sulphate are mined from the ground
8	What is ammonia used for? (separate only)	To make fertiliser, nitric acid, ammonium salts
9	Is the forward reaction in the Haber process endothermic or exothermic? (separate only)	Exothermic
10	Which three conditions are required for the Haber process? (separate only)	450ºC
11	Complete the word equation	Calcium phosphate
12	What must the elements in NPK fertilisers form for them to be used effectively? (separate only)	Compounds
13	What is the Haber process used to manufacture? (separate only)	Ammonia
14	What are the raw materials for the Haber process? (separate only)	Nitrogen & hydrogen
15	How do we obtain hydrogen for the Haber process? (separate only)	Reacting methane with steam

	Topic:	**RP: Water purification (C8) (C.42)**
1	What is the aim of experiment 1?	To determine if a sample of water is pure
2	What is the independent variable?	The sample of water
3	What is the dependent variable?	pH and mass of dissolved solids
4	Name the control variable	Volume of water
5	How is the pH of the samples tested?	Using universal indicator
6	What should the pH be?	7 (green)
7	How do we test for dissolved solids?	1) Weigh an empty evaporating basin
8	If water contains dissolved solids (is impure) what would we see?	The mass of the basin would increase
9	What is the aim of experiment 2?	To purify a sample of water to make it potable
10	What process can be used to purify water?	Distillation
11	Name the changes in state that occur during distillation	Evaporation --> condensation
12	How is the water evaporated?	Heating the conical flask gently
13	How is evaporated water collected?	Using a delivery tube and bung
14	How is the water condensed back into a liquid?	Placing the test tube in a beaker of iced water
15	How can we test if the water is pure?	Use cobalt chloride paper to test whether the substance is water (it will turn blue -> pink).

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