C10 Using Resources

Can you…?	☺	😐	☹
10.1.1 Using the Earth's resources and sustainable development			
Recall that humans use the Earth’s resources to provide warmth, shelter, food and transport.			
Recall that natural resources, are supplemented by agriculture, provide food, timber, clothing and fuels.			
Recall that finite resources from the Earth, oceans and atmosphere are processed to provide energy and materials.			
State the definition of sustainable development.			
State examples of natural products that are supplemented or replaced by agricultural and synthetic products.			
Distinguish between finite and renewable resources given appropriate information.			
Extract and interpret information about resources from charts, graphs and tables.			
Use orders of magnitude to evaluate the significance of data.			
10.1.2 Potable water			
Recall that potable water is water that is safe to drink.			
Distinguish between potable water and pure water.			
State the important features of potable water.			
Recall that the methods used to produce potable water depend on available supplies of water and local conditions.			
Describe how potable water is produced in the UK and give reasons for the steps.			
State sterilising agents used to produce potable water.			
State what is meant by desalination and why it may be used in some countries.			
Outline the processes that can be used for desalination and the disadvantage of these processes.			
Describe the differences in treatment of ground water and salty water.			
10.1.3 Waste water treatment			
Recall that urban lifestyles and industrial processes produce large amounts of waste water that require treatment before being released into the environment.			
State what may need to be removed from sewage and agricultural waste water.			
State what may need to be removed from industrial waste water.			
Describe how sewage is treated.			
Comment on the relative ease of obtaining potable water from waste, ground and salt water.			

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10.1.4 Alternative methods of extracting metals (HT only)			
State why new ways of extracting copper are required.			
Outline the process of phytomining.			
Outline the process of bioleaching.			
Recall that these processes avoid traditional mining methods of digging, moving and disposing of large amounts of rock.			
Describe how the metal compounds from these processes can be processed to obtain the metal.			
Evaluate alternative biological methods of metal extraction, given appropriate information.			
4.10.2.1 Life cycle assessment			
State what a life cycle assessment is.			
State the stages of a products life cycle that are assessed.			
Recall that the use of water, resources, energy sources and production of some wastes can be fairly easily quantified.			
Recall that allocating numerical values to pollutant effects is less straightforward and requires value judgements, so LCA is not a purely objective process.			
Explain how selective or abbreviated LCAs can be misused.			
Carry out simple comparative LCAs for shopping bags made from plastic and paper.			
10.2.2 Ways of reducing the use of resources			
Recall that the reduction in use, reuse and recycling of materials by end users reduces the use of limited resources, use of energy sources, waste and environmental impacts.			
Metals, glass, building materials, clay ceramics and most plastics are produced from limited raw materials. Much of the energy for the processes comes from limited resources. Obtaining raw materials from the Earth by quarrying and mining causes environmental impacts.			
Describe how glass can be recycled and reused.			
Describe how metals can be recycled and reused.			
Recall that the amount of separation required for recycling depends on the material and the properties required of the final product.			
Recall that some scrap steel can be added to iron from a blast furnace to reduce the amount of iron that needs to be extracted from iron ore.			
Evaluate ways of reducing the use of limited resources, given appropriate information.			
10.3.1 Corrosion and its prevention (chemistry only)			
State what corrosion is.			

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Describe what rusting is and what is required for it to occur.			
Describe ways in which corrosion can be prevented.			
Explain why aluminium does not corrode like other metals.			
Explain sacrificial protection in terms of relative reactivity.			
Recall that zinc is used to galvanise iron.			
Describe experiments and interpret results to show that both air and water are necessary for rusting.			
10.3.2 Alloys as useful materials (chemistry only)			
Recall that most metals in everyday use are alloys.			
State what bronze is made from.			
State what brass is made from.			
State the metals used in alloys with gold for jewellery.			
Describe how the proportion of gold of alloys is measure in carats.			
State what steel is made from.			
Describe the composition and properties of different types of steel.			
State the properties of aluminium alloys.			
Recall a use of each of the alloys above.			
Interpret and evaluate the composition and uses of alloys other than those above given appropriate information.			
10.3.3 Ceramics, polymers and composites (chemistry only)			
Describe how soda-lime glass is made.			
Describe how borosilicate glass is made and how its properties differ from those of soda-lime glass.			
Describe how clay ceramics are made.			
Recall that the properties of polymers depend on what monomers they are made from and the conditions under which they are made.			
Explain how low density poly(ethene) is made from ethene.			
Explain how high density poly(ethene) is made from ethene.			
Describe and explain the difference between thermosoftening and thermosetting polymers in terms of their structures.			
Describe what composites are made from and their structure.			

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Describe some examples of composites.			
Compare quantitatively the physical properties of glass and clay ceramics, polymers, composites and metals when given appropriate information.			
Explain how the properties of materials are related to their uses and select appropriate materials when given appropriate information.			
10.4.1 The Haber process (chemistry only)			
Recall that the Haber process is used to manufacture ammonia, which can be used to produce nitrogen-based fertilisers.			
State a source for the nitrogen and a source for the hydrogen used in the Haber process.			
Describe the Haber process, with reference to the reaction conditions, catalyst used, removal of ammonia and recycling of hydrogen and nitrogen.			
Interpret graphs of reaction conditions versus rate.			
Apply the principles of dynamic equilibria to the Haber process.			
Explain the trade-off between the rate of production and the position of equilibrium.			
Explain how the commercially used conditions for the Haber process are related to the availability and cost of raw materials and energy supplies, control of equilibrium position and rate.			
10.4.2 Production and uses of NPK fertilisers (chemistry only)			
Describe that an NPK fertiliser is.			
Recall that ammonia can be used to manufacture ammonium salts and nitric acid.			
Recall that potassium chloride, potassium sulfate and phosphate rock are obtained by mining, but phosphate rock cannot be used directly as a fertiliser.			
Recall that phosphate rock is treated with nitric acid or sulfuric acid to produce soluble salts that can be used as fertilisers.			
State the names of the salts produced when phosphate rock is treated with nitric acid, sulfuric acid and phosphoric acid.			
Compare the industrial production of fertilisers with laboratory preparations of the same compounds, given appropriate information.			