GRADEUP

AQA (GCSE Notes)

Chapter 10: Using Resources

Q1. What are the main ways humans use the Earth's natural resources?

Q2. Give two examples of natural resources used to provide shelter.

Q3. How does agriculture supplement natural resources?

Q4. What is the difference between renewable and finite resources?

Q5. Name two examples of renewable resources used in everyday life.

Q6. Give two examples of finite resources obtained from the Earth.

Q7. Explain how chemistry contributes to sustainable development.

Q8. What is meant by the term "sustainable development"?

Q9. Why is it important to reduce the use of finite resources?

Q10. How can the use of energy in manufacturing be made more sustainable?

Q11. What kind of products can be made using natural resources?

Q12. Give an example of a natural resource that has been replaced by a synthetic product.

Q13. What role does chemistry play in food production?

Q14. How can chemistry help reduce environmental impact from industry?

Q15. What is meant by environmental impact in the context of chemistry?

Q16. How can chemists help reduce pollution from manufacturing processes?

Q17. What is a key challenge when disposing of waste materials from products?

Q18. What is meant by ‘stored energy’ in used products?

Q19. How can chemists reduce waste during the manufacturing process?

Q20. Why is changing land use a concern for environmental chemists?

Q21. What are some ways chemists can study the effects of human activity on the Earth?

Q22. Give an example of a chemical process that uses less energy than traditional methods.

Q23. Why is it important to recycle materials from end-of-life products?

Q24. What types of graphs or charts can be used to show data about natural resources?

Q25. What skills are needed to interpret information from graphs or charts?

Q26. How does using orders of magnitude help in understanding environmental data?

Q27. What does the term "finite resource" mean?

Q28. How does timber as a resource fit into the idea of sustainability?

Q29. Why are fuels considered finite resources?

Q30. How can comparing renewable and non-renewable resources help in planning for the future?

Q31. What is potable water?

Q32. Why is potable water not considered pure water in a chemical sense?

Q33. What are the key qualities of potable water?

Q34. What are the sources of fresh water in the UK?

Q35. What is the first step in producing potable water from fresh water?

Q36. How does filtration help in producing potable water?

Q37. Why is sterilisation necessary in water treatment?

Q38. Name two agents used to sterilise potable water.

Q39. How does chlorine sterilise water?

Q40. What is the role of ultraviolet light in water treatment?

Q41. Why might some areas need to use salty water for drinking purposes?

Q42. What is desalination?

Q43. Name one method used to desalinate seawater.

Q44. How does reverse osmosis work to remove salt from water?

Q45. Why is desalination considered energy-intensive?

Q46. What are the advantages and disadvantages of using ozone for sterilising water?

Q47. What problems might occur if drinking water contains too much salt?

Q48. Why is it important to remove microbes from drinking water?

Q49. What is the difference between treating ground water and treating salty water?

Q50. How does local climate affect the methods used to produce drinking water?

Q51. What is the main reason for treating wastewater before releasing it into the environment?

Q52. Why must organic matter be removed from sewage and agricultural wastewater?

Q53. Explain why harmful microbes in sewage must be treated before the water is released.

Q54. What is the purpose of screening in sewage treatment?

Q55. Describe what happens during the grit removal stage of sewage treatment.

Q56. What is produced during sedimentation in the sewage treatment process?

Q57. What are the two main products of sedimentation in sewage treatment?

Q58. Explain the role of anaerobic digestion in treating sewage sludge.

Q59. What conditions are required for anaerobic digestion to occur?

Q60. Describe how aerobic biological treatment is used in wastewater treatment.

Q61. Why is oxygen important in the aerobic treatment of effluent?

Q62. Compare the processes of anaerobic digestion and aerobic treatment in sewage systems.

Q63. How is potable water different from pure water?

Q64. What are the key challenges in obtaining potable water from salt water?

Q65. Explain why it is easier to obtain potable water from groundwater than from wastewater.

Q66. What are the main steps in treating industrial wastewater?

Q67. Why does industrial wastewater sometimes require removal of harmful chemicals?

Q68. Describe one environmental benefit of treating wastewater properly.

Q69. What are the potential consequences of not treating sewage before releasing it?

Q70. Explain the importance of sedimentation in separating solids from wastewater.

Q71. Why are the Earth's resources of metal ores considered limited?

Q72. What is meant by low-grade copper ores?

Q73. Describe how phytomining helps extract copper from low-grade ores.

Q74. Explain why phytomining is considered more environmentally friendly than traditional mining.

Q75. What is bioleaching and how does it work to extract metal compounds?

Q76. What role do bacteria play in the process of bioleaching?

Q77. How is the copper compound obtained from phytomining converted into pure copper?

Q78. Describe the process of burning plants in phytomining and what is produced.

Q79. How does displacement using scrap iron extract copper from copper compounds?

Q80. Why is scrap iron used in the displacement of copper from copper salt solutions?

Q81. Describe how electrolysis is used to obtain copper from copper compounds.

Q82. Compare the use of displacement and electrolysis in copper extraction.

Q83. What are the advantages of using biological methods like bioleaching over traditional mining?

Q84. What are the disadvantages of using phytomining for copper extraction?

Q85. How long does bioleaching typically take to produce usable metal compounds?

Q86. Why is it important to develop alternative methods for metal extraction?

Q87. Explain how phytomining reduces the need to dig and move large amounts of rock.

Q88. What is a leachate solution in the context of bioleaching?

Q89. Why might biological methods of metal extraction be more suitable for poorer countries?

Q90. How does the use of bacteria in metal extraction help reduce environmental damage?

Q91. Why might phytomining be considered a renewable method of metal extraction?

Q92. What type of plants are commonly used in phytomining and why?

Q93. What happens to the metal compounds in ash produced from burning plants in phytomining?

Q94. Describe how copper ions are displaced by iron in solution.

Q95. Why is electricity required in the process of electrolysis?

Q96. How can students evaluate the effectiveness of bioleaching and phytomining?

Q97. What safety precautions are needed during the phytomining process?

Q98. Describe one limitation of using bioleaching in large-scale copper extraction.

Q99. How do scientists test the quality of copper obtained by biological methods?

Q100. How can phytomining and bioleaching support sustainable development goals?

Q101. What is meant by a life cycle assessment?

Q102. Name the four main stages included in a life cycle assessment.

Q103. Why is it important to assess the use of energy during a product's life cycle?

Q104. Give an example of a product where transport has a big impact on its life cycle assessment.

Q105. Why is it difficult to give exact numerical values to pollutant effects in a life cycle assessment?

Q106. What are selective life cycle assessments?

Q107. How can selective life cycle assessments be misused?

Q108. What kind of value judgements might affect the results of a life cycle assessment?

Q109. Why is it important to include disposal in a life cycle assessment?

Q110. How is water usage included in a life cycle assessment?

Q111. Give two ways in which raw material extraction impacts the environment.

Q112. What is meant by the term 'limited resource'?

Q113. Why is energy use a concern during the manufacturing stage of a product?

Q114. How could the use of renewable energy improve a product's life cycle assessment?

Q115. Why might a product that lasts a long time have a better life cycle assessment?

Q116. How can using recycled materials reduce environmental impact?

Q117. In a simple LCA comparison, what might make a plastic bag seem better than a paper bag?

Q118. Why is the number of times a product is used important in a life cycle assessment?

Q119. How can the use of ratios help compare environmental impacts in life cycle assessments?

Q120. Describe one limitation of carrying out a full life cycle assessment.

Q121. What are the advantages of using recycled materials instead of new raw materials?

Q122. Why is recycling metals considered better than extracting new metals?

Q123. How does mining contribute to environmental damage?

Q124. Give two examples of products that can be reused.

Q125. What happens to glass bottles when they are recycled?

Q126. Explain how scrap steel can reduce the need for extracting iron.

Q127. What is meant by the term ‘reforming’ in recycling?

Q128. How does recycling reduce energy use?

Q129. Why is separation needed before recycling materials?

Q130. How does the type of material affect how it is recycled?

Q131. What is the environmental impact of disposing of non-recycled plastics?

Q132. How can using reusable items help reduce waste?

Q133. Why are building materials considered limited resources?

Q134. What is the benefit of crushing and melting glass for recycling?

Q135. Why might some materials not be reused directly?

Q136. How can using recycled metal reduce carbon emissions?

Q137. What factors should be considered when evaluating ways to reduce resource use?

Q138. What role does consumer behaviour play in reducing resource use?

Q139. Give an example of a product where recycling requires more energy than reuse.

Q140. Why is transportation considered in a product's life cycle?

Q141. How can packaging affect a product’s life cycle assessment?

Q142. Describe how recycling can reduce landfill use.

Q143. Why might some materials be more difficult to recycle than others?

Q144. How does the quality of recycled materials affect product performance?

Q145. What are the benefits of using local materials instead of imported ones?

Q146. How can governments encourage more recycling of materials?

Q147. Why might recycling processes still have environmental impacts?

Q148. What is one way of comparing the environmental impact of two similar products?

Q149. Explain the importance of using significant figures in life cycle data.

Q150. How can graphical data be used to compare different products in a life cycle assessment?

Q151. What is corrosion and how does it affect materials?

Q152. Explain why rusting is considered a type of corrosion.

Q153. What two conditions are needed for iron to rust?

Q154. Describe a simple experiment to show that both air and water are needed for rusting.

Q155. How can painting a metal help to prevent corrosion?

Q156. What is the purpose of greasing a metal surface?

Q157. How does electroplating protect a metal from corrosion?

Q158. Why does aluminium not corrode easily?

Q159. What is meant by sacrificial protection?

Q160. Why is zinc used to protect iron from rusting in galvanising?

Q161. Explain how zinc protects iron in terms of reactivity.

Q162. What happens to the zinc during sacrificial protection?

Q163. Why does the presence of salt increase the rate of rusting?

Q164. Describe how sacrificial protection can be used to protect a ship’s hull.

Q165. Why is iron more likely to rust than aluminium?

Q166. What does the term “galvanising” mean?

Q167. How would you test whether a metal has rusted?

Q168. Explain the role of oxygen in rusting.

Q169. Explain the role of water in rusting.

Q170. Why is it important to protect iron from rusting?

Q171. What are the advantages of using grease to prevent rusting?

Q172. What are the limitations of using paint to protect against rust?

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Q173. What is an alloy?

Q174. Why are alloys often used instead of pure metals?

Q175. What two metals are used to make bronze?

Q176. What two metals are used to make brass?

Q177. Name three metals commonly used to make jewellery-grade gold alloys.

Q178. What does 24 carat gold mean?

Q179. What percentage of gold is in 18 carat gold?

Q180. Describe the properties of high carbon steel.

Q181. What are the properties of low carbon steel?

Q182. Why is stainless steel useful for making kitchen utensils?

Q183. Which metals are added to iron to make stainless steel?

Q184. Why is stainless steel resistant to corrosion?

Q185. What is the main advantage of using aluminium alloys?

Q186. Give one use of bronze and explain why it is suitable.

Q187. Give one use of brass and explain why it is suitable.

Q188. Why are aluminium alloys used in aircraft manufacture?

Q189. How does adding carbon to iron change its properties?

Q190. Which alloy would you use to make a spring: high or low carbon steel? Why?

Q191. A metal is 75% gold. How many carats is it?

Q192. Why is pure gold not used for making jewellery?

Q193. What is meant by the density of a metal?

Q194. Why is low density an important property for aluminium alloys?

Q195. Describe one benefit of using an alloy over a pure metal.

Q196. What is the role of tin in bronze?

Q197. What is the role of zinc in brass?

Q198. How would you work out the percentage of gold in a given carat value?

Q199. Explain why alloying metals can improve their strength.

Q200. Describe how you would evaluate whether a new alloy is suitable for building materials.

Q201. What are the raw materials used to make soda-lime glass?

Q202. Why does borosilicate glass melt at a higher temperature than soda-lime glass?

Q203. Describe the process of making clay ceramics such as pottery and bricks.

Q204. What is the role of sodium carbonate in the production of soda-lime glass?

Q205. How does the structure of thermosetting polymers differ from thermosoftening polymers?

Q206. What monomer is used to make both low density and high density poly(ethene)?

Q207. How does changing the conditions affect the type of poly(ethene) formed?

Q208. Why do thermosetting polymers not melt when heated?

Q209. What allows thermosoftening polymers to be reshaped after heating?

Q210. How does cross-linking in thermosetting polymers affect their properties?

Q211. What are the main differences in the structure of LD poly(ethene) and HD poly(ethene)?

Q212. What type of polymer would you use for making plastic bottles and why?

Q213. What is the function of a matrix in a composite material?

Q214. What is the function of the reinforcement in a composite?

Q215. Give two examples of composite materials used in daily life.

Q216. How does the structure of a composite affect its overall properties?

Q217. Compare the properties of soda-lime glass and borosilicate glass.

Q218. Compare the properties of glass and clay ceramics in terms of strength and thermal resistance.

Q219. In what situation would clay ceramics be a better choice than metal?

Q220. What properties make polymers suitable for food packaging?

Q221. Why are metals often used in electrical wiring instead of polymers?

Q222. Describe how the properties of a composite can be tailored by changing the matrix and reinforcement.

Q223. What is one disadvantage of using thermosoftening polymers in high-temperature environments?

Q224. Why are thermosetting polymers used in plug sockets and electrical casings?

Q225. How does the flexibility of LD poly(ethene) make it useful in certain products?

Q226. What does the density of a polymer tell you about its molecular structure?

Q227. Why do thermosoftening polymers have lower melting points than thermosetting polymers?

Q228. What property of thermosetting polymers makes them ideal for use in frying pan handles?

Q229. Explain how the structure of a polymer affects whether it is thermosetting or thermosoftening.

Q230. Which type of polymer would be more suitable for injection moulding and why?

Q231. What is the difference between the bonding in thermosoftening and thermosetting polymers?

Q232. How do intermolecular forces affect the properties of thermosoftening polymers?

Q233. How does adding plasticisers to polymers change their properties?

Q234. What property of clay allows it to be shaped before heating?

Q235. Why does wet clay become hard when heated?

Q236. What is one limitation of using clay ceramics compared to metals?

Q237. What are the advantages of using composites in construction?

Q238. What property of borosilicate glass makes it suitable for laboratory glassware?

Q239. Why are composites often more expensive to produce than single-material products?

Q240. Give an example of a composite used in aerospace engineering and explain its benefit.

Q241. What is meant by the term “matrix” in the context of composite materials?

Q242. Why might a manufacturer choose a polymer over a metal for a specific product?

Q243. Why are clay bricks used for building rather than soda-lime glass?

Q244. How can the thermal resistance of a material affect its application?

Q245. Why is high-density poly(ethene) less flexible than low-density poly(ethene)?

Q246. What does the arrangement of polymer chains tell you about its density?

Q247. What makes glass transparent, and why is this property useful?

Q248. How are the physical properties of composites better than the individual materials?

Q249. What type of structure does thermosetting plastic have that prevents melting?

Q250. Describe one situation where a composite is better than a polymer.

Q251. What is the Haber process used to manufacture?

Q252. Name the two raw materials required for the Haber process.

Q253. What is the source of nitrogen for the Haber process?

Q254. What is the source of hydrogen for the Haber process?

Q255. What catalyst is used in the Haber process?

Q256. What temperature is used in the Haber process?

Q257. What pressure is used in the Haber process?

Q258. Write the balanced word equation for the Haber process.

Q259. Why is the Haber process described as a reversible reaction?

Q260. What happens to ammonia when the gases are cooled?

Q261. What happens to the unreacted nitrogen and hydrogen after cooling?

Q262. Why is iron used as a catalyst in the Haber process?

Q263. Why is 450°C used instead of a lower temperature to favour ammonia production?

Q264. Why is high pressure used in the Haber process?

Q265. Why is pressure not increased further than 200 atmospheres?

Q266. How does increasing temperature affect the position of equilibrium in the Haber process?

Q267. How does increasing pressure affect the position of equilibrium in the Haber process?

Q268. What is the effect of a catalyst on the rate of the Haber process?

Q269. Explain the trade-off between yield and rate in the Haber process.

Q270. Why is ammonia removed as a liquid during the Haber process?

Q271. What is meant by dynamic equilibrium?

Q272. What would happen to the equilibrium position if the temperature in the Haber process was reduced?

Q273. How is ammonia used to produce fertilisers?

Q274. Name three elements found in NPK fertilisers.

Q275. What is the role of fertilisers in agriculture?

Q276. What does NPK stand for in NPK fertilisers?

Q277. Name one compound of nitrogen used in NPK fertilisers.

Q278. Name one compound of phosphorus used in NPK fertilisers.

Q279. Name one compound of potassium used in NPK fertilisers.

Q280. How is nitric acid made from ammonia?

Q281. Why can’t phosphate rock be used directly as a fertiliser?

Q282. What acid is used to treat phosphate rock to make ammonium nitrate?

Q283. What is formed when phosphate rock reacts with nitric acid?

Q284. What is formed when phosphate rock reacts with sulfuric acid?

Q285. What is formed when phosphate rock reacts with phosphoric acid?

Q286. What is the purpose of treating phosphate rock with acids?

Q287. Compare the production of fertilisers in the lab and in industry in terms of scale.

Q288. Compare the purity of fertilisers made in the lab and in industry.

Q289. Describe one safety precaution taken when preparing fertilisers in a laboratory.

Q290. Why are formulations used in fertilisers?

Q291. What is meant by the term "formulation"?

Q292. Name a salt that can be made by reacting ammonia with nitric acid.

Q293. Why is ammonium nitrate a useful fertiliser?

Q294. Why are integrated processes used in the production of NPK fertilisers?

Q295. What are the advantages of recycling unreacted nitrogen and hydrogen in the Haber process?

Q296. Why is ammonia removed from the reaction mixture in the Haber process?

Q297. Why is ammonia stored as a liquid in industry?

Q298. What type of reaction is ammonia reacting with an acid to form a salt?

Q299. Why is the reaction between ammonia and nitric acid exothermic?

Q300. Explain how the availability and cost of energy affects the conditions used in the Haber process.