2.31 Life Cycle Assessment, Recycling and Corrosion: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A company is designing new packaging and wants to understand its environmental impact before it goes into full production.

(a) State two reasons why the company might carry out a life cycle assessment (LCA) before launching the new packaging. **(2)**

(Total for Question 1 is 2 marks)

2 A drinks manufacturer sells water in single-use plastic bottles.

(a) Give one way the environmental impact of the bottle could be REDUCED. **(1)**

(b) Give one way the bottle could be REUSED. **(1)**

(c) Give one way the bottle could be RECYCLED. **(1)**

(Total for Question 2 is 3 marks)

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3 Stainless steel is an alloy made by mixing iron with chromium and nickel. Pure iron is much softer and more easily bent than stainless steel.

Diagram 1: pure iron

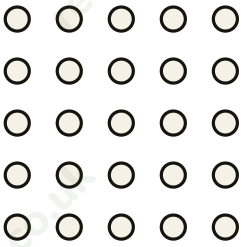
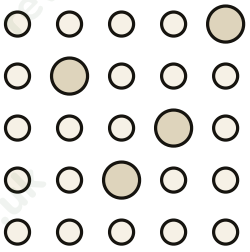


Diagram 2: stainless steel



(a) Using Diagram 1, explain why pure iron is soft and can be bent/shaped easily. **(2)**

(b) Using Diagram 2, explain why stainless steel is harder than pure iron. **(2)**

(Total for Question 3 is 4 marks)

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Mark scheme · 2.31 Life Cycle Assessment, Recycling and Corrosion: 10-minute Pack

Question 1

(a) to compare the environmental impact of different possible designs or materials oe **B1**

(a) to identify which stage of the product's life has the greatest environmental impact, so that stage can be targeted for improvement oe (accept: to support evidence-based environmental/marketing claims) **B1**

(a) Answer: Any two of: to compare the environmental impact of different designs/materials; to identify which life-cycle stage has the greatest impact so it can be improved; to support evidence-based environmental claims

Question 2

(a) use a thinner/lighter bottle design that needs less plastic oe (accept: sell water in larger bottles instead of several small ones) **B1**

(a) Answer: Use a thinner or lighter bottle design that needs less plastic (or sell water in larger bottles instead of several small ones)

(b) design the bottle so it can be refilled and used again, e.g. at a water fountain, rather than being thrown away after one use oe **B1**

(b) Answer: Design the bottle so it can be refilled and used again, for example at a water fountain, rather than thrown away after one use

(c) collect used bottles and melt/process the plastic to manufacture new bottles or other plastic products oe **B1**

(c) Answer: Collect used bottles and melt down and process the plastic to manufacture new bottles or other plastic products

Question 3

(a) pure iron consists of atoms that are all the same size, arranged in regular layers oe **B1**

(a) these layers can slide over each other relatively easily, allowing the metal to bend/be shaped oe **B1**

(a) Answer: Pure iron atoms are all the same size and arranged in regular layers, which can slide over each other easily, so the metal bends/shapes easily

(b) the chromium and nickel atoms are a different size to the iron atoms oe **B1**

(b) this distorts the regular layers of atoms, making it more difficult for the layers to slide over each other, so the alloy is harder oe **B1**

(b) Answer: The chromium and nickel atoms are a different size to the iron atoms, which distorts the regular layers and makes it harder for them to slide over each other, so the alloy is harder

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