

Life Cycle Assessment + Recycling

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Chemistry
Exam Board	AQA
Topic	5.10 Using Resources
Sub-Topic	Life Cycle Assessment + Recycling
Difficulty Level	Bronze Level
Booklet	Mark Scheme 1

Time Allowed: 27 minutes

Score: /26

Percentage: /100

Grade Boundaries:

M1.(a)	Carbon and hydrogen only	1
(b)	Methane has the lowest boiling point and decane has the highest melting point	1
	Octane is liquid over a larger temperature range than methane	1
(c)	heat / steam	1
	catalyst	1
(d)	<p>Level 3 (5–6 marks): A detailed and coherent evaluation is provided that considers a range of relevant points, quotes relevant data from the table and comes to a conclusion consistent with the reasoning.</p> <p>Level 2 (3–4 marks): An attempt to describe relevant points which comes to a conclusion. The logic and use of data may be inconsistent at times but builds towards a coherent argument.</p> <p>Level 1 (1–2 marks): Discrete, relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.</p> <p>0 marks: No relevant content.</p> <p>Indicative content</p> <ul style="list-style-type: none">• conclusion as to which bag is more environmentally friendly <p>Points that may be used in argument</p> <ul style="list-style-type: none">• Paper bags are made from a renewable resource (wood)• Paper bags more sustainable• Paper bags are biodegradable• Plastic bags are made from a finite resource (oil or gas)• Plastic bags not sustainable	

- Paper bags require more energy to manufacture (1.7 MJ compared with 1.5 MJ)
- Paper bags produce more waste (50 g compared with 14 g)
- Paper bags create less CO₂ than plastic bags
- So manufacture of plastic bags has more effect on global warming / climate change / environmental effects
- Plastic bags can be recycled
- Recycling reduces use of energy sources in manufacture
- justified

6

[11]

M2.(a) gold

1

(b) atom (s)

1

(c) (i) protons

any order

allow proton

1

neutrons

allow neutron

1

(ii) 3 / three

1

(d) (i) Al

ignore any numbers / charges

1

(ii) any **two** from:

- limited resource
 - expensive in terms of energy / mining
 - effects on the environment, such as, landfill, atmospheric pollution, quarrying
- allow uses a lot of energy to extract.*

2

	(e)	resistant to corrosion	1	
		does not react (with water or food)		
		<i>allow one mark for low density with a suitable reason given</i>	1	[10]
M3.	(a)	(i)	monomers	1
		(ii)	crude oil	1
	(b)	any three from:		
		• metal may not corrode away / remains		
		• plastic remains / does not break down (decay) / not affected by microorganisms		
		<i>accept non-biodegradable</i>		
		• should recycle / conserve resources / mend the kettle / burn (plastic) as a fuel		
		<i>accept it is a waste of materials / resources</i>		
		• landfill sites are limited / filling up		
		• water pollution		
		<i>ignore harms wildlife / habitats or problems caused by burning the kettle</i>	3	[5]