



*Rewarding Learning*

**General Certificate of Secondary Education  
2012**

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**Science: Single Award (Modular)**

Materials and their Management

Module 4

Foundation Tier

[GSC41]

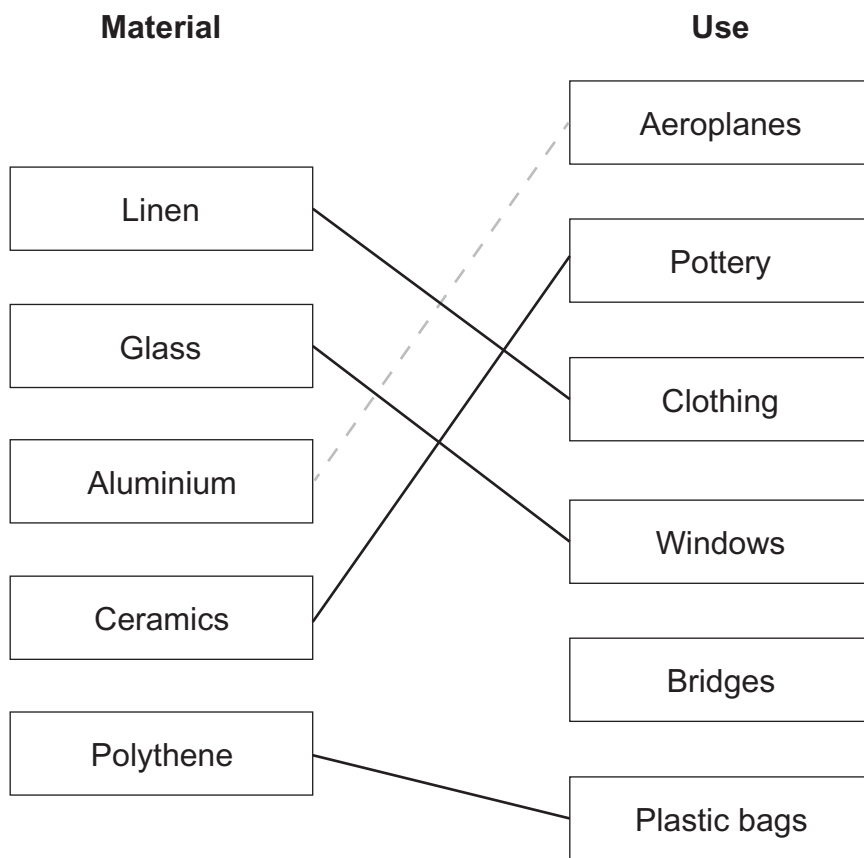
**TUESDAY 13 NOVEMBER 2012**

**10.15 am–11.00 am**

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**MARK  
SCHEME**

1 (a)



[4]

(b) Any *two*:

- Lighter [1]
- Does not break/shatter [1]
- Cheaper [1]
- Any other suitable property [1]

[2]

6

2 (a)  $100 - (35 + 10 + 29 + 6 + 5)$  [1]  
15% [1]

[2]

(b) £76

[1]

(c) Breaks down/decays [1]  
By microbes/decomposers/micro organism/bacteria/fungus [1]

[2]

5

AVAILABLE  
MARKS

- 3 (a) All bars drawn correctly [2], 3 bars [1] [2]
- (b) 5% [1]
- (c) Difficult to lather [1]  
With soap [1]  
(Leaves scum [1]) [2]

(d)

Tastes good	✓	[1]
Gives kettle fur		
Wastes soap		
Good for strong teeth and bones	✓	[1]
Stains clothes during washing		

[2]

7

4

Use	Process
Detecting for alcohol and drugs	IR Spectroscopy [1]
Creating heat energy by burning a fuel	Combustion [1]
Softening hard water	Ion Exchange [1]
Producing long chain molecules such as polythene	Polymerisation [1]

[4]

4

- 5 (a) B D C A [2]  
(Any **two** in correct position [1]) [2]

- (b) Wear safety goggles (or other suitable) [1]

(c)

Metal chloride	Flame colour
Calcium	Brick red
Potassium	Lilac [1]
Sodium	Orange/Yellow [1]
Copper [1]	Blue/green
Lead [1]	Pale blue

[4]

- (d) Calcium chloride [1]

8

			AVAILABLE MARKS
6	(a) (i)	3 [1]	
	(ii)	Different number of dyes in each ink sample/dyes do not match [1]	
	(iii)	<p><i>Any three</i></p> <ul style="list-style-type: none"> <li>• Dissolve a small sample of each ink from the cheque in water [1]</li> <li>• Place a sample of each ink on the pencil line [1]</li> <li>• Place the paper in a tank with the bottom dipping into the solvent [1]</li> <li>• Wait for the solvent to travel up the paper and compare results [1]</li> </ul>	[3]
	(b) (i)	Carbon (black) [1]	
	(ii)	Fingerprints are unique [1] Compare suspect's fingerprints to those found at the scene of a crime [1]	[2]
7	(a)	Fluorine [1]	
	(b) (i)	3 [1]	
	(ii)	Hydrocarbons contain carbon and hydrogen [1] only/Ethanol contains oxygen as well [1]	[2]
	(c)	<p><i>Any three</i></p> <ul style="list-style-type: none"> <li>• Heat the mixture</li> <li>• Each hydrocarbon/fraction has a different boiling point [1]</li> <li>• Each fraction contains hydrocarbons with similar number of carbon atoms/similar sized hydrocarbons [1]</li> <li>• Each fraction separates at a different level [1]</li> <li>• Fractions are condensed and collected [1]</li> </ul>	[3]
		<b>Total</b>	<b>45</b>