



*Rewarding Learning*

**General Certificate of Secondary Education  
2011– 2012**

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**Science: Single Award (Modular)**  
Chemical Patterns and our Environment  
Module 3  
Higher Tier  
[GSC32]

**TUESDAY 28 FEBRUARY 2012  
11.00 am–11.45 am**

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**MARK  
SCHEME**

			AVAILABLE MARKS
1	(a) protons/neutrons	[2]	7
	(b) 2, 6 arrangement – 1 mark for each correct shell	[2]	
	(c) 20 protons, 20 electrons, 20 neutrons	[3]	
2	(a) displacement	[1]	7
	(b) 3/none	[1]	
	(c) copper metal	[1]	
	(d) copper came out of the solution	[1]	
	(e) zinc	[1]	
	(f) copper displaced the silver the silver was deposited on the strip	[2]	
3	(a) heat the sugar and syrup until the sugar has dissolved add the baking soda and stir allow the mixture to rise pour onto a cooling tray/allow to cool      any 3	[3]	6
	(b) sodium hydrogencarbonate $\longrightarrow$ sodium carbonate + water + carbon dioxide      [3] (1 mark awarded for each product)	[3]	
4	(a) theory of continental drift continents moving apart [2] shapes of continents fit like a jigsaw/ same rocks with fossils appear on both continents } [1]	[3]	4
	(b) some scientists did not believe it was possible	[1]	
5	(a) flavouring – improves taste anti-oxidants – stops fats – rancid/off emulsifiers – stabilises oil/water mixtures acidity regulators – keeps correct pH	[4]	9
	(b) may cause allergies/migraines/hyperactivity	[2]	
	(c) animals are similar to humans may avoid harm to humans may cause suffering to animals animals have no say animals may react differently      any 3	[3]	

			AVAILABLE MARKS	
6	(a) (i)	violent reaction/explosive catch fire/burn disappear/dissolve completely accept float – stay on surface give off a gas/hydrogen any 3 correct	[3]	7
	(ii)	1	[1]	
	(iii)	storing under oil	[1]	
	(b)	$2\text{NaOH} + \text{H}_2$	[2]	
7	(a)	neutralisation	[1]	
	(b)	sodium hydrogen carbonate/magnesium hydroxide	[1]	
	(c)	$2\text{HCl}$ $\text{CO}_2$ 1 mark for each formula 1 mark for balancing	[3]	5
			<b>Total</b>	<b>45</b>