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# **MARKING SCHEME**

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**SUMMER 2016**

**LEVEL 1/2 AWARD IN SCIENCE FOR WORK (IVQ)  
9851/01**

## **INTRODUCTION**

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

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**MARK SCHEME**

<b>Question</b>	<b>Marking Point</b>	<b>Additional Guidance</b>	<b>Mark</b>	
<b>1</b> (a)	Furnace - chemical to thermal		1	
	Turbine - Thermal to Kinetic Generator - kinetic to electrical		1 1	
(b)	heat/thermal, Sound	both needed (Do not accept noise)	1	
<b>2</b>	Combustion - factory to air		1	
	Respiration - cow to air		1	
	feeding - tree to cow		1	
	Photosynthesis - Air to tree		1	
<b>3</b> (a)	30(1)		1	
	51(1)		1	
	(b) (i)	2 x 25 (=50)	220 scores 2 marks Allow £2.2	1
		50 x 4.4 = 220p		1
	(ii)	new boiler = 149.6p per day, (1) 220-149.6 = 70.4p (1)	Allow 150p NOT 149p Any evidence of subtracting daily cost of new boiler from old-scores 1 Allow ecf from b (i)70.4p or 70p scores 2	1 1
(iii)	answer from b(ii) x 365 converted correctly = £256.96	expected answer 256.96 allow 257 / 256 (if 70p used)	1	
(c)	for - correct environmental reason/use less energy (fuel)/reliability		2	
	Against - will not recoup the cost over 3 years	NOT will save him money		

Question	Marking Point	Additional Guidance	Mark
4 (a)	carbon footprint is the <u>sum/total/all, of emissions of greenhouse gases / methane / carbon dioxide</u> (which are produced by an organisations activities in a given time frame.)		1
(b) (i)	25% is used usefully (1) rest is / 75% wasted (1)		2
(ii)	25/100 x 20 (1) = 5 MJ/s(1)		2
(c) (i)	manure, grass trimmings		2
(ii)	bacteria / fungi		1
(iii)	methane		1
(iv)	gives out the same amount of CO <sub>2</sub> as it takes in when it grows		1
(d)	any 2 of: <ul style="list-style-type: none"> <li>• reduce transport distance / use less transport</li> <li>• Use more recycled materials</li> <li>• use rail instead of road</li> <li>• carbon offsetting / plant more trees</li> <li>• better insulation</li> <li>• lower thermostats</li> <li>• use named renewable energy source</li> <li>• any other suitable suggestion</li> </ul>		2
5 (a)	any 2 x (1) global temperature increase (1) melting of polar ice caps (1) more extremes of weather (1) expanding deserts (1)	Do not accept 'getting warmer'	2
(b) (i)	oil/gas	allow methane / petrol / diesel / wood	1
(ii)	fuel is <u>burnt</u> (releases carbon dioxide), (1) carbon dioxide is a greenhouse gas (1)	2nd mark is dependent on first mark being obtained	2

Question	Marking Point	Additional Guidance	Mark
(c) (i)	lobbying politicians (AW) / raise awareness / protesting at lack of progress/lack of change		1
(ii)	Some countries will carry on using fuels; (1) because not all countries present/took part (1)	allow some countries have other priorities for 2nd mark	2

Question	Marking Point	Additional Guidance	Mark
6 (a)	5 820 000 000		1
(b) (i)	a measure of how much <u>more than</u> CO <sub>2</sub> a gas contributes to global warming / Effect of the gas on GW <u>compared to</u> CO <sub>2</sub>		1
(ii)	58 000 000 000, 5 820 000 000, 145 500 000 000	ecf from (a )	3
(c)	no, there has always been greenhouse gases in atmosphere, (so only extra gases produced by us are the problem) / we only have control over man-made gases.	no mark for yes Don't allow water vapour / methane for greenhouse gas  mark for reason	1
7 (a) (i)	Any 3 x (1) of: energy from sun absorbed by Earth (1) energy radiated out as IR (of lower frequency) (1) this is absorbed by the {greenhouse gases / CO <sub>2</sub> / water vapour / methane} in atmosphere (1) atmosphere warms up(1)		3
(ii)	Any 2 x (1) of: home insulation electric car grants new boilers changing laws e.g. only allowing energy saving bulbs, advertising public information giving preferential terms to companies producing 'green' energy introducing recycling schemes AVP		2

Question	Marking Point	Additional Guidance	Mark
(b) (i)	increase in carbon dioxide since 1770/ goes up at the end (1) almost flat before / slight dip around 1600 (1)	allow range 1750-1800	2
(ii)	8 plots with $\pm \frac{1}{2}$ sq tolerance (2) 7 plots with $\pm \frac{1}{2}$ sq tolerance (1) 6 plots with $\pm \frac{1}{2}$ sq tolerance (0)		3
	line 1 mark (point to point)	NOT best fit straight line	
(iii)	both graphs show similar trend/ both go up at end / As the carbon dioxide increases so does temperature		1
		<b>Total</b>	<b>54</b>