

# **Design and Technology**

General Certificate of Secondary Education

Unit **A532**: Graphics: Sustainable Design

## **Mark Scheme for June 2012**

---

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

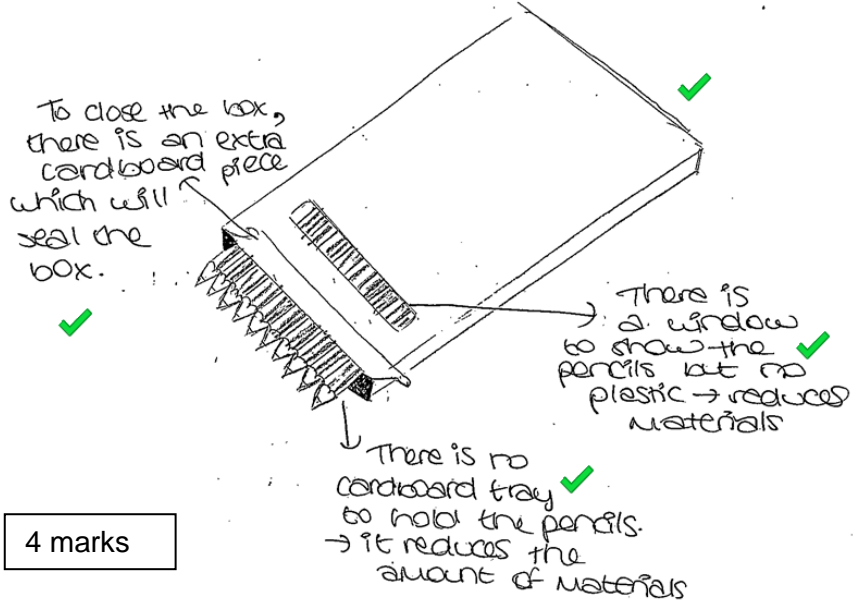
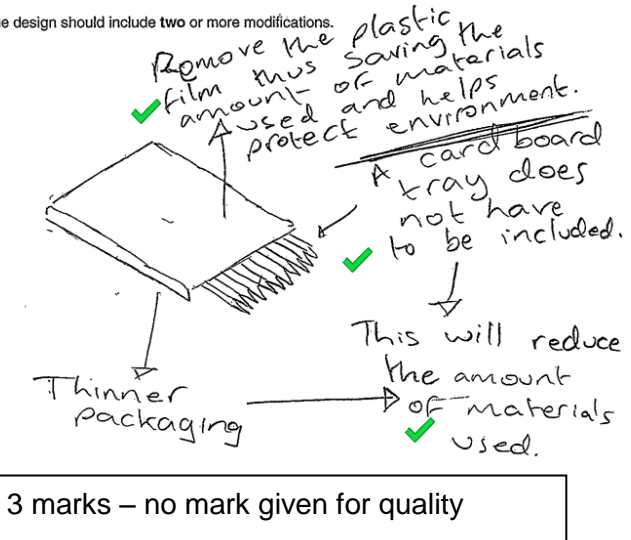
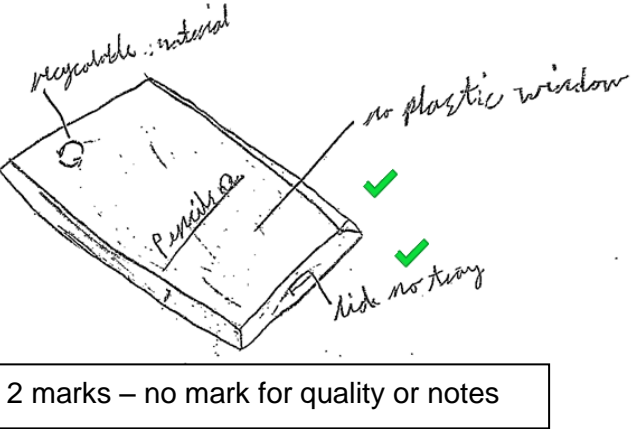
## Annotations

Annotation	Meaning
Green tick	Use for all correct answers and to show where marks are awarded
L1, L2, L3	Use to show the level of response in 18e
SEEN	Use to show you have seen the candidates answer when awarding 0 marks in 18e

Question		Answer	Marks	Guidance
1		(d) Break down and reuse materials	1	These are the only acceptable answers. No mark awarded if more than one answer ringed or if a candidate's response is not clear. Accept any other method of indicating a response, eg tick
2		(a) Sea	1	
3		(c) Bubble wrap	1	
4		(b) To use it again	1	
5		(d) Recycled	1	
6		That the producer/manufacturer has made a <b>financial</b> contribution towards recycling	1	Do not accept: It can be recycled.
7		Repair	1	This is the only acceptable answer. Do not accept if candidate has written a list of the 6Rs, eg Reuse...Recycle...Repair
8		Globalisation	1	This is the only acceptable answer. Do not accept: Global.
9		It can be broken down into the earth, rots into the earth, degrades/decomposes into the ground/naturally breaks down/composts down into the ground/disintegrates over time	1	Accept variations on this answer as long as candidate's answer refers to the 'breaking down' of the product into the earth / ground / soil.  Do not accept: It biodegrades, 'breaks down', 'disintegrates' or 'composts' on its own.
10		Small, tiny, extremely small, microscopic	1	<i>Nanotechnology is the science of the extremely small, it is used in smart/modern materials to change properties &amp; make materials behave differently.</i>

Question		Answer	Marks	Guidance
11		False	1	These are the only acceptable answers. No mark awarded if more than one answer ticked or if a candidate's response is not clear. Accept any other method of indicating a response, eg box shaded in.
12		True	1	
13		True	1	
14		False	1	
15		True	1	
			<b>Total</b>	<b>15</b>

Question			Answer	Marks	Guidance
16	(a)	(i)	<p><b>4 benefits to the environment:</b>            Less material to be thrown away/less waste going to landfill            Less energy used in the manufacture/recycling of the product            Reduction in harmful chemicals released during manufacture/recycling            Smaller packages can be stacked &amp; transported more easily reducing the need for lots of lorries/journeys            Less congestion &amp; fumes caused by reduced transport to outlets            Less use of fossil fuels for transport reasons            Reduces carbon footprint            Noise pollution reduced as less transportation/lorries            Helps to reduce using earth's natural resources (eg trees cut down or oil used for plastic)/reduces the use of virgin materials            Plastic not used reduces energy/harmful chemicals during manufacture /recycling</p>	4	<p>Do not accept answers relating to cost or manufacture/transport/pollution unless qualified and linked to the environment.</p> <p>Do not accept: Easier to recycle/biodegrade, smaller so takes up less room in a shop.</p> <p>Do not accept: better for the environment or more sustainable unless qualified.</p> <p>Do not credit repeat answers or vague/unclear answers.</p>
		(ii)	<p><b>One benefit to the Manufacturer</b>            Cheaper for the manufacturer as they will not need to buy as much material such as card and plastic.            Less complicated to manufacture as there is a lower number of parts to produce            Manufacturer gains a better reputation and is seen to be environmentally friendly/customers are encouraged to buy the product            Manufacturer can maximise the material used/can tessellate design to produce more from material            May make the manufacturing more cost-effective as design can be tessellated to reduce the material used</p>	2	<p>Do not accept 'cheaper' on its own unless qualified as a benefit to the manufacturer.</p> <p>Up to 2 marks for a well-explained answer.</p>

Question	Answer	Marks	Guidance
(b)	<ul style="list-style-type: none"> <li>• Sketch and notes show a design that clearly shows <b>one</b> way of reducing the amount of material used, eg No plastic Window <u>OR</u> no tray <u>OR</u> made from one material(1)</li> <li>• Sketch and notes show a design that clearly shows <b>two</b> or more ways to reduce the amount of material used, eg No plastic Window <u>AND</u> no tray (1)</li> <li>• Quality of communication of the sketch(es) must be a well-drawn <b>3 dimensional</b> container for pencils that shows at least <b>one</b> clear modification - look for accurate/straight lines, <u>design of container is complete and will hold the crayons, pencils</u> (if drawn) look in proportion (1)</li> <li>• Detailed and <b>clear</b> notes to explain design, must show at least <b>one</b> workable modification (1)</li> </ul> 	4	<p><b>If more than one design is shown record marks for best solution.</b></p> <p>The design should include <b>two</b> or more modifications.</p>  <p><b>3 marks – no mark given for quality</b></p>  <p><b>2 marks – no mark for quality or notes</b></p>
(c)	Compostable plastic, Compostable, biodegradable plastic, biodegradable	1	These are the only acceptable answers.

Question	Answer	Marks	Guidance
(d)	<p><b>Primary recycling:</b> reusing the product for the same purpose</p> <p>Examples for the pencil crayon box:</p> <ul style="list-style-type: none"> <li>• Reusing the empty box for other pens/pencils/bits</li> <li>• Giving the box &amp; crayons to someone else or to a charity shop</li> </ul> <p><b>Tertiary recycling:</b> completely breaking down the product (taking apart) and reformulating it (chemical recycling) into a new product</p> <p>Examples for the pencil crayon box;</p> <ul style="list-style-type: none"> <li>• Pencil crayon box recycled into pulp then processed (and possibly bleached) and pressed to make new card/paper</li> <li>• Leaving the pencil crayon box to biodegrade before regenerating it into something else (ie, to make compost)</li> </ul>	4	<p>Explanation of the term Primary recycling (1)</p> <p>A suitable example given for the pencil crayon box (1)</p> <p>Explanation of the term Tertiary recycling (1)</p> <p>A suitable example given for the pencil crayon box (1)</p> <p>Answers must be written under the correct heading, do not credit responses where the candidate has mixed up the answers.</p>
	<b>Total</b>	<b>15</b>	



Question		Answer	Marks	Guidance
17	(a) (i)	Volatile Organic Compound	1	All three words are needed
	(ii)	<p><b>Any 2 explanations from:</b></p> <p>Less harmful to the environment than solvent-based inks  Workers will not be exposed to harmful fumes during manufacture/printing  Can make paper easier to recycle after use so more appealing to manufacturers/consumers and is better for the environment  Vegetable/soy inks can be from renewable/sustainable sources which help to stop the depletion of the Earth's natural resources  Low VOC inks have a lower carbon footprint than solvent-based inks  Not poisonous to animals / plants / humans <b>when disposed of / recycled</b>  Using Low VOC inks means the product can biodegrade safely as they are non-toxic/not harmful to the earth  Low VOC inks do not harm the atmosphere when manufactured</p>	4	<p>There are two parts to this answer:</p> <ol style="list-style-type: none"> <li>Understanding that Low VOC inks are non-toxic</li> <li>They do not harm the environment <b>during manufacture / disposal / recycling.</b></li> </ol> <p>Do not accept: low quality, cheap, less ink needed.</p> <p>Do not accept: 'It's environmentally friendly', 'Eco friendly' or 'it's better for the environment' unless explained with a link to manufacture / disposal / recycling.</p> <p>Do not credit repeat answers.</p> <p><i>Low VOC inks are typically soya, vegetable or water based inks – they are not made from solvents or unsustainable sources.</i></p>
	(b)	<p>COSHH regulations: Control of substances hazardous/harmful to health.  A law that requires employers to control the exposure of hazardous substances in order to prevent ill health.</p> <p>Examples:  Extracting or removing fumes, dust, bacteria, toxic substances from workplaces to prevent asthma/allergies/cancer/skin irritation/infection to promote productivity and employee morale.</p>	4	<p>Up to 2 marks for an explanation of the COSHH regulations.</p> <p>Up to 2 marks for 1 example explained well  Or  2 examples given.</p>

Question	Answer	Marks	Guidance				
(c)	<p>Possible Hazards and solutions for a manufacturer/manufacturing environment:</p> <p>The first one has been done for you.</p> <table border="1" data-bbox="385 359 1256 667"> <thead> <tr> <th data-bbox="385 359 819 403">Potential Hazard</th> <th data-bbox="819 359 1256 403">Solution</th> </tr> </thead> <tbody> <tr> <td data-bbox="385 403 819 628"><i>Poisoning from spilt toxic solutions and chemicals</i></td> <td data-bbox="819 403 1256 628"><i>No eating or drinking in the workshop to prevent contamination</i></td> </tr> </tbody> </table> <p>Breathing in toxic fumes from printing inks – wear a mask/extraction system                      Cutting hands on guillotine – Laser beam to control guillotine                      Damage to skin/ clothing from inks – protective overalls to be worn                      Hair getting caught in machinery – tie loose/long hair back or up                      Machinery/boxes falling on feet – steel toe capped boots                      Machinery/boxes falling on head – hard hat to be worn                      Cuts to hands from card/paper – wear gloves                      Injury from machinery - Hazard/instruction signs                      Injury from trip hazards - ensure pathways are clear</p>	Potential Hazard	Solution	<i>Poisoning from spilt toxic solutions and chemicals</i>	<i>No eating or drinking in the workshop to prevent contamination</i>	6	<p><b>Do not credit a repeat of the example given eg, Poisoning from spilt toxic solutions and chemicals – no eating and drinking in the workshop to prevent contamination.</b></p> <p>1 mark for each suitable hazard.</p> <p>1 mark for each suitable corresponding solution.</p> <p>Do not credit repeat answers, do not accept answers relating to the consumer.</p>
Potential Hazard	Solution						
<i>Poisoning from spilt toxic solutions and chemicals</i>	<i>No eating or drinking in the workshop to prevent contamination</i>						
	<b>Total</b>	<b>15</b>					

Question		Answer	Marks	Guidance
18	(a)	CDs have a metallic coating inside that cannot be removed easily, made from multiple materials that cannot be separated, made from mixed materials, has a magnetic/silver coating that's hard to remove	1	Do not accept 'made from plastic' unless explained that they are multiple types of plastic/material.
	(b)	Any 3 from; Only burn files to disc when needed Use rewritable CDs/DVDs Use internet storage/send as e-mail instead of CDs Use USB pen / Flash drive / external memory drive / memory sticks instead of CDs Download/buying online Using an mp3 / ipod / mobile phone / digital tablet Fill the CD to maximum capacity each time Listening through a website / online / tv / radio Share CDs with friends/family Borrow CDs from the library.	3	Do not accept: Don't listen to music, reusing CDs (unless rewritable).  <b>Be careful not credit repeat answers.</b>  Do not accept vague, confusing or unexplained answers eg computers.
	(c)	Any 2 suitable reuses; Bird scarer, decoration, mirror, coasters, circle to draw around	2	There will be many answers; accept suitable variations on this answer – answer should be a reuse but CD may have been cut or bent, shaped or joined. <u>Do not accept 'for another CD/DVD' or storage media as the question states 'unplayable CD'</u> Do not accept vague answers

Question	Answer	Marks	Guidance
(d)	Provides work/jobs/ creates employment More money for the family Improved standard of living Better education Better transport Develop/broaden skills Develops the country's economy	3	Social benefits to the local people of that country NOT cheaper materials / labour / resources.  Up to 2 marks for each point identified. 1 mark available for a well-explained answer.  Example of where 3 marks can be awarded:  <i>'Social benefits could include creating more jobs so that workers earn money and are able to have a better standard of life. The whole country would benefit from people being employed.'</i>
(e)	Read through candidate's answer, decide on the level of response, then decide whether it just meets that level or clearly meets that level.  <b>Maximum of 2 marks for a list of separate points</b>  Discussion could include: <ul style="list-style-type: none"> <li>• Consumers can identify the symbols</li> <li>• Mobius loop, mobius loop with percentage, SPI symbols, Recycle aluminium, Recyclable steel, Tidyman symbol, the recycle mark, the green dot, dispose of glass, compostable/biodegradable symbol, National association of paper merchants mark (NAPM) are all examples of recycling symbols found on graphic products.</li> <li>• Consumers take responsibility for recycling</li> <li>• Consumers can separate products into different materials before recycling</li> <li>• Consumers can choose to buy/ or not to buy products that cannot easily be recycled</li> </ul>	6	<b>0 = no response worthy of credit, if awarding 0 marks for a question, Level 1 should not be used but put in the word SEEN from the annotation list.</b>  Level 1 (1-2 marks) <b>Basic discussion</b> , showing some understanding of why recycling signs and symbols can be of benefit to the environment. Can provide a limited discussion of some of the issues. There will be <b>little or no</b> use of <b>specialist terms</b> . Answers may be <b>ambiguous</b> or <b>disorganised</b> or ' <b>list-like</b> '. <b>Errors</b> of grammar, punctuation and spelling may be intrusive.  Level 2 (3-4 marks) <b>Adequate discussion</b> , showing an understanding of why recycling signs and symbols can be of benefit to the environment. Can provide a <b>reasonable discussion</b> of the issues with <b>some examples</b> . There will be <b>some</b> use of <b>specialist terms</b> , although these may not always be used appropriately. The information

Question			Answer	Marks	Guidance
			<ul style="list-style-type: none"> <li>Recycling centres and staff can identify different types of products (eg, plastics)</li> <li>Symbols can be understood by different cultures</li> <li>Manufacturers can encourage consumers to recycle more</li> <li>Manufacturers' image is improved if they use signs and symbols to encourage recycling</li> </ul>		<p>presented will be for the most part in a <b>structured</b> format. There may be <b>occasional</b> errors in spelling, grammar and punctuation.</p> <p>Level 3 (5-6 marks)  <b>Thorough discussion</b>, showing clear understanding of why recycling signs and symbols can be of benefit to the environment. Can provide clear examples of issues <b>with examples</b>. <b>Specialist terms</b> will be <b>used appropriately and correctly</b>. The information will be presented in a <b>structured</b> format. The candidate will demonstrate the <b>accurate</b> use of spelling, punctuation and grammar.</p>
			<b>Total</b>	<b>15</b>	
			<b>Paper Total</b>	<b>60</b>	

**OCR (Oxford Cambridge and RSA Examinations)**  
**1 Hills Road**  
**Cambridge**  
**CB1 2EU**

**OCR Customer Contact Centre**

**Education and Learning**

Telephone: 01223 553998

Facsimile: 01223 552627

Email: [general.qualifications@ocr.org.uk](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://www.ocr.org.uk)**

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

**Oxford Cambridge and RSA Examinations**  
**is a Company Limited by Guarantee**  
**Registered in England**  
**Registered Office; 1 Hills Road, Cambridge, CB1 2EU**  
**Registered Company Number: 3484466**  
**OCR is an exempt Charity**

**OCR (Oxford Cambridge and RSA Examinations)**  
**Head office**  
**Telephone: 01223 552552**  
**Facsimile: 01223 552553**

© OCR 2012

