



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

---

## GCSE

### Design and Technology Product Design

3544

### Foundation

Copyright © 2003 AQA and its licensors. All rights reserved.

**Design and Technology: Product Design**

## Foundation Tier

Question 1

Any sensible research method:

Questionnaire/Survey	(1 mark)
Word process/ photocopy	(1 mark)
To identify the target market for the products. To identify suitable products for sale in the charity shop.	(1 mark)
Visit other charity shops.	(1 mark)
Search the yellow pages or the Internet	(1 mark)
To find out what existing shops sell or what existing charities do.	(1 mark)
Write to charities that are experts in the field.	(1 mark)
Word process or e-mail experts.	(1 mark)
To gather information about existing charities and their products.	(1 mark)

Internet or library search

Using computer

To gather information about health issues.

**Total 9 marks**

Question 2

(a) Food product answers as follows:

<p>Materials/Ingredients</p> <p><b>Salad.</b> Cheese, Lettuce, tomatoes, corn, dressing.</p> <p>(2 marks)</p>	<p>Materials/Ingredients</p> <p><b>Spicy hot and sour soup.</b> Pork, or chicken, chicken stock, mushrooms, sesame oil, soy sauce, salt, chilli oil, vinegar, coriander, and pepper. Tofu. Stock and named spices.</p> <p>(2 marks)</p>
<p>Properties</p> <p>Vegetable fibre content. Variety and freshness of ingredients leads to high nutritional values including protein and fat in the cheese, vitamins and minerals in the salad.</p> <p>(3 marks)</p>	<p>Properties</p> <p>Variety and freshness of ingredients leads to high nutritional values including protein, vitamins and minerals.</p> <p>(3 marks)</p>
<p>Production</p> <p>Individual or Batch</p> <p>(1 mark)</p>	<p>Production</p> <p>Individual or craft scale of production Accept batch</p> <p>(1 mark)</p>

Oil burner or Plant pot answers as follows:

<p>Materials/Ingredients</p> <p><b>Oil burner</b> Stoneware Clay. Colour achieved by using dipping in natural glaze.</p> <p>Accept Earthenware, Glost</p> <p>(2 marks)</p>	<p>Materials/Ingredients</p> <p><b>Earthenware plant pot.</b> Decorative glazed design on outside of pot only. Slip</p> <p>(2 marks)</p>
<p>Properties</p> <p>Stoneware tends to be robust and readily available. It is relatively stable and strong. Stoneware is fired at a higher temperature and is less likely to fail during firing, because of its strength.</p> <p>(3 marks)</p>	<p>Properties</p> <p>Earthenware clay is inexpensive and easy to work with. Inside of pot unglazed to enable water to be absorbed and held by the clay. Readily available. Fired at a lower temperature.</p> <p>(3 marks)</p>
<p>Properties</p> <p>This oil burner is hand thrown as can be seen by the rings going around it. This is a craft or individual method of production for items produced in small batches.</p> <p>(1 mark)</p>	<p>Properties</p> <p>A batch produced item that is decorated by hand.</p> <p>(1 mark)</p>

**Question 2 (a) (Continued)**

Book ends and CD rack answers as follows:

<p><b>Materials/Ingredients</b> <b>Book ends</b></p> <p>Sandalwood is specific wood but credit any suitable hardwood. Finish by painting, using wax or varnish. Stains. Mahogany / Ash / Beech / Oak / Teak.</p> <p>(2 marks)</p>	<p><b>Materials/Ingredients</b> <b>CD Rack</b></p> <p>Thermoplastics, such as polyethylene are used for injection moulding. Fixings may include steel screws. Shelves laser cut. Cutting / Engraving machine.</p> <p>(2 marks)</p>
<p><b>Properties</b></p> <p>Real woods when well finished are warm and smooth to touch. They are expensive looking. The wood used for carving needs to be dense. Sandalwood grows in Burundi and carving provides employment for many people. It requires skill and attention to detail. Strong and durable.</p> <p>(3 marks)</p>	<p><b>Properties</b></p> <p>Plastic can be used clear or coloured so give a modern appearance. It can scratch or discolour. May look cheap though it is easily cleaned. Fumes that are harmful may be produced during manufacture. Lightweight. Recycled.</p> <p>(3 marks)</p>
<p><b>Production</b></p> <p>The bookends are hand carved individually. Accept batch</p> <p>(1 mark)</p>	<p><b>Production</b></p> <p>CD racks are a mass production item. Flow production</p> <p>(1 mark)</p>

Textile product answers as follows:

<p><b>Materials/Ingredients</b></p> <p><b>Sarong</b> made from silk which is a natural but expensive fabric. It needs to be handled with care. Must be hand washed. Accept cotton, wax, dye, thread</p> <p>(2 marks)</p>	<p><b>Materials/Ingredients</b></p> <p><b>Shorts</b> made from 100% manufactured fibre including lycra and nylon. CAD/CAM processes may be mentioned. Easy to wash and dry quickly. Logos ironed/sewn on.</p> <p>(2 marks)</p>
<p><b>Properties</b></p> <p>Pure silk can shrink if not washed by hand and dries slowly. Gets heavy when wet. Dye colours may fade or wash out in hot water. Material will fray if not well finished. Not easy to work with. Takes dye well. Cool, lightweight.</p> <p>(3 marks)</p>	<p><b>Properties</b></p> <p>Nylon is a hard-wearing material that dries easily when washed; it is light and when mixed with lycra (elastane) makes a very flexible fabric. Can be machine-washed. Holds shape/muscle support</p> <p>(3 marks)</p>
<p><b>Production</b></p> <p>Batik is a handcraft. These items are made individually to form small batches.</p> <p>(1 mark)</p>	<p><b>Production</b></p> <p>Sports shorts are in demand and are mass-produced.</p> <p>(1 mark)</p>

(12 marks)

One mark per box for a partially correct answer.

Full marks per box for full answer showing understanding.

- (b) Ceramic material is **non combustible**.  
Materials must be strong, durable, inexpensive and not seriously discoloured by burning oils.  
Ceramic is also attractive when glazed and easy to shape.
- 2 marks for full well explained answers (2 marks)  
1 mark if full reasons not given.
- (c) (i) The CE symbol means ‘where products are marketed across the European community, common legal, technical and safety standards are required’.
- 2 marks for an answer showing understanding of the above. (2 marks)  
1 mark for partial understanding.
- (ii) To increase: Customer confidence  
To widen the market throughout Europe  
To show the product reaches a standard of quality and safety.
- 2 marks for an answer showing understanding of the above. (2 marks)  
1 mark for partial understanding.
- (iii) BSI stands for British Standards Institution.
- 1 mark if one element correct.  
2 marks for fully correct answer. (2 marks)
- (d) (i) The care label should be attached to clothing to conform to European and British standards though they are voluntary. They are used to inform customers as to how to look after or wash and iron clothing. They are also included on washing powder/liquid packaging.
- 3 marks for a fully detailed correct answer. (3 marks)  
2 marks for a correct answer including most points correct but lacking detail.  
1 mark for basic explanation.
- (ii)
- The label gives washing instructions with a maximum temperature of 40C with reduced mechanical action,
  - the item should not be bleached,
  - not tumble dried,
  - not ironed.
- 2 marks for a correct answer including both points correct. (2 marks)  
1 mark for saying ‘washing instructions’.

**Total 25 marks**

Question 3

- (a) Materials correctly prepared or if appropriate named.  
additional materials used for processes (moulds ect.)

No marks for generalised materials e.g. Metal, Plastic, wood,  
Clay. Maximum 4  
marks

---

Names of tools and equipment,  
1 mark for each suitable tool or item of equipment. Maximum 4  
marks

---

Clear understanding of manufacturing processes and sequence  
correct.  
1 mark for each stage Maximum 6  
marks

---

Finishing techniques and processes clearly explained,  
1 mark for each material, technique or process named. Maximum 4  
marks

---

SEE NEXT PAGE FOR TABLE

	<b>Shorts</b>	<b>Sarong</b>	<b>Salad</b>	<b>Soup</b>
<b>Preparation of materials</b>	Iron material, check pattern, cut and pin to fabric.	Wash material, measure and cut to size, mix dye, prepare wax.	Wash all salad ingredients, weigh out cheese.	Wash meat, wash vegetables, weigh ingredients, slice meat, chop vegetables.
<b>Naming tools and equipment</b>	Scissors, needle, pins, sewing machine, over locker.	Scissors, needle, pins, sewing machine, dye bath, Batik wax pot.	Scales, knives, chopping board, bowl.	Scales, knives, chopping boards, wooden spoon, metal pot with lid.
<b>Description of processes</b>	Cut out fabric, pin and tack, remove pins, machine together.	Dye material orange, apply black design, fix machine hems.	Slice cheese, chop salad ingredients, mix in a bowl.	Fry meat, mushrooms, onions, herbs, add stock and simmer.
<b>Finishing techniques and processes</b>	Cut loose threads, iron.	Cut loose threads, iron.	Mix dressing and toss salad. Serve on plates.	Garnish with herbs/fried bread.
<b>Safety precautions</b>	Care in using sewing machine, scissors etc. Heat of iron.	Care in using the sewing machine, needles, scissors, heat of iron and wax pot.	Clean all equipment, care in chopping ingredients.	Care in chopping ingredients, all equipment must be clean, care with heat and hot liquid.
<b>Quality control checks</b>	Check all seams. No loose threads.	Check dye is fast. All wax is removed. No loose threads, seams are straight.	Cheese sliced equally. Check sell by dates. Equal servings. Check moisture content of cheese.	Check sell by dates. Ingredients well chopped (equal size). Ingredients well cooked. Taste test.

	<b>Book ends</b>	<b>CD rack</b>	<b>Accept Slip Casting or Throwing</b>	
			<b>Oil burner</b>	<b>Plant pot</b>
<b>Preparation of materials</b>	Cut sections to size. Mark out design to cut.	Heat plastic granules. Turn on machines. Prepare mould.	*Clean and check mould fasten mould together, mix slip. *Wedge clay, roll into ball, throw into centre of wheel.	
<b>Naming tools and equipment</b>	Mallet, chisels, marking knife, band saw/scroll saw, ruler, pencil, try square.	Mould, hack saw, files, *injection moulder, *oven (plastics oven), *vacuum former.	*Mould, leather strap or rope, sponge, fettling tool, wooden tool. *Potters wheel, cutting wire, metal turning knife, glaze bucket, kiln.	
<b>Description of processes</b>	Cut outline, of design, shape detail with chisel, glue sections together.	*Heat plastic, force into mould, let cool, remove file off sprue, *cut frame supports.	Wheel turns, move clay and down shape, push hand into centre to shape, cut shape from wheel.	Pour slip into mould, check thickness with pin. Remove excess slip, leave to dry. Remove from mould.
<b>Finishing techniques and processes</b>	Sand rough edges, paint on design, wax or varnish.	File all rough edges, assemble frame and insert shelves.	Turn using metal tool.	Smooth with wooden tool.
			Biscuit fire to 1000°C, decorate or glaze, glaze fire 1060°C – 1160°C	
<b>Safety precautions</b>	Wear goggles when using machinery, keep hair and loose clothing tied safely.	Use protective gloves and face mask whilst heating plastic.	Wear protective clothing when using the kiln, glaze powder may contain toxic chemicals so wear a face mask, wear goggles when necessary.	
<b>Quality control checks</b>	All sections securely fixed together. No rough edges.	CD Shelves and frame must have no rough edges. All sections must fit together.	Visual check of shape, may use callipers to check size or diameter. Visual check of glaze or decoration. Kiln temperature, check clay has no air bubbles.	

\* May accept either process



- (b) Understanding of Health and Safety issues with equipment named, with safe use clearly explained  
One mark for each safety issue raised
- Maximum 2 marks
- (c) Clear understanding of Quality control issues with 2 checks clearly explained  
One mark for each quality control check
- Maximum 4 marks  
Maximum 2 marks
- Total 24 marks**

Question 4

- (a) Two correct requirements relating to function or aesthetic functions Maximum 4 marks

2 marks each

	<b>Shorts</b>	<b>Sarong</b>	<b>Salad</b>	<b>Soup</b>
<b>Functional requirements</b>	Breathable fabric, comfort, easy to wash. Hard-wearing.	Look good-aesthetically pleasing. Quick to dry. Be comfortable.	Look good. Taste good. Nutriticially sound	Look good. Taste good. Not lumpy. Well cooked.
	<b>Book ends</b>	<b>CD rack</b>	<b>Oil burner</b>	<b>Plant pot</b>
	Withstand weight of books. Looks good – be aesthetically pleasing.	To be strong enough to hold CD’s – appropriate size. Look good.	To hold hot oil. Not porous or combustible. Aesthetically pleasing.	To contain soil/plants. Aesthetically pleasing. To retain moisture.
	<b>Shorts</b>	<b>Sarong</b>	<b>Salad</b>	<b>Soup</b>
<b>Tests</b>	Wear test see how long it lasts. Wash test. Consumer evaluation	Wash test to see if dye runs. Check customer opinions.	Taste test survey, visual test – look appealing Smell	
	<b>Book ends</b>	<b>CD rack</b>	<b>Oil burner</b>	<b>Plant pot</b>
	Try a number of books in it. Add weights survey opinions consumer evaluation	Fill with CDs. Weight test. Prototype test consumer reaction.	Heat test Survey customer opinion Prototype test Consumer reaction	Moisture test Customer opinion Frost test Consumer reaction Structural test

---

(b) Suitable test correctly named.	1 mark each	
Correct description of testing processes	2 marks	(4 marks)
(c) Names of materials or ingredients used	1 mark each	
	(Maximum 3 marks)	
Some attempt at sketch or written explanation of product	1 mark	
Recognisable attempt at sketch or written explanation of product	2 marks	
Sketch or written explanation of modified product	3 marks	
Clear sketch or written explanation showing a modified product	4 marks	
Good, clear sketch or written explanation showing a well modified product	5 marks	
The above, showing flair and imagination.	6 marks	(9 marks)
		<b>Total 17 marks</b>

Question 5

- (a) Packaging is to protect, advertise, contain and inform, transport. 1 mark for each  
Maximum 3 marks (3 marks)

- (b) 1 mark for correct answer

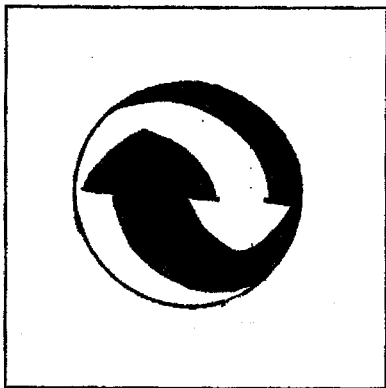
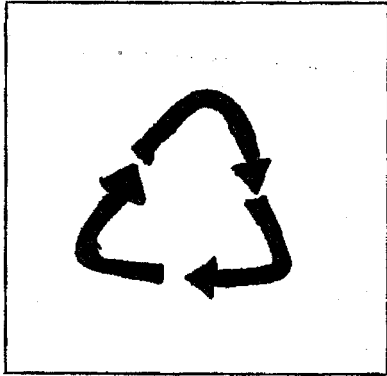
	<b>Advantage</b>	<b>Disadvantage</b>
Package A	Aluminium is light weight and cheap.	Relatively expensive to recycle and cannot be reused.
Package B	Glass is cheap and can be reused or recycled.	Is heavy in weight and breaks easily.
Package C	Plastic or foil backed card is light weight and cheap. Can be printed onto and manufactured easily.	Can be easily punctured and cannot be recycled.

(6 marks)

- (c) 1 mark for each:  
Reduce, Reuse, Recycle (3 marks)
- (d) (i) C cannot be recycled (1 mark)
- (ii) It is made from a mixture (composite) of materials that would need to be separated for recycling. (1 mark)

- (e) 1 mark for basic rough sketch  
2 marks for well drawn symbol

(2 marks)



**Total 16 marks**

**Question 6****(a) Quality of the idea**

One vague idea	(1 mark)
One simple idea	(2 marks)
One effective quality idea	(3 marks)

(More than one idea circle one taken to final idea)

**Quality of notes**

Evidence of labelling	(1 mark)
An explanation of the idea	(2 marks)
Full explanation of the idea including reference to materials	(3 marks)
All of the above with evidence of analytical thinking	(4 marks)

**Quality of sketches**

Simple line drawing	(1 mark)
Quality line drawing or an attempt at 3D representation	(2 marks)
Quality 3D drawing	(3 marks)

**(b) Quality of sketch**

Little evidence of a workable solution	(1 mark)
Some evidence of a workable solution	(2 marks)
Workable solution	(3 marks)
Very good workable solution	(4 mark)
Excellent accurately drawn workable solution	(5 marks)

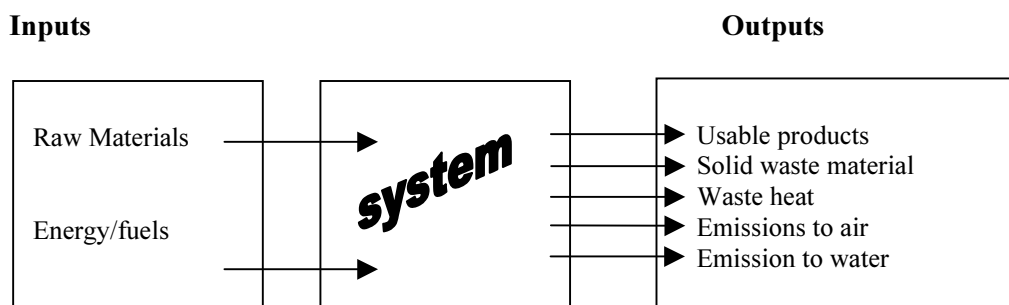
**Important information**

Only one piece of vital information included.	(1 mark)
Two or three pieces of vital information included.	(2 marks)
Some vital information included with more than one significant omission.	(3 marks)
Most vital information included but with a significant omission.	(4 mark)
Bar code, recycling symbol, indication of age or weight, A relevant BSI symbol: all included with annotation regarding manufacturing material.	(5 marks)

**Total 20 marks**

Question 7

- (a) (i) CAD means Computer aided design (1 mark)  
(ii) CAM means Computer aided manufacture (1 mark)
- (b) (i) Explanation of how CAD is used in the design of packaging, e.g.  
Using CAD means that designs can be tested before they are made. (1 mark)  
Different elements of a design can be brought together,  
(Pictures, photographs, bar codes and printed information). (1 mark)  
Designs are produced on computer and then sent directly to a machine to be made. (1 mark)
- Maximum of 3 marks
- (ii) Explanation of how CAM is used in the production of packaging, e.g.  
The computer tells the machine what shapes to cut and print. (1 mark)  
Machines can fold card packages (1 mark)  
And put tops and labels on plastic ones after the packaging has been filled (1 mark)
- Maximum of 3 marks
- (c) Any three from the following:
- Wind energy (1 mark)  
Solar power (1 mark)  
Biomass (1 mark)  
Water or hydroelectric power (1 mark)  
Geothermal (1 mark)  
Tidal (1 mark)
- Maximum of 3 marks
- (d) Both inputs correct (2 marks)  
One correct output (1 mark)
- Maximum of 3 marks

**Total 14 marks****Total marks for paper: 125**