

GCSE in Manufacturing (Double Award).

**Unit 1: Designing Products for Manufacture
(Graphics)**



Proposed marks for Unit 1 - Graphic Products

				Allocated mark	Location of evidence
a) produce a design specification from a given design brief. 0 1 2 3	a2 produce a detailed design specification, using customer feedback and associated information. 4 5 6	a3 justify the final design specification by explaining how customer feedback and associated information were used. 7 8 9		5	Page 1 shows a customer design brief and specification. Further information is gathered relevant to the project on pages 2, 3 and 4. However the findings have not been put to full use and there is a lack of evidence regarding feedback to the customer which prevents the specification from being reviewed.
b) use their design specification to produce ideas for a design solution. 0 1 2 3	b2 explain the use of their design specification in developing ideas for their final design solution. 4 5	b3 fully justify their choice of a final design solution from a range of ideas. 6 7		6	Pages 5 to 11 show a wide range of ideas for the package that include a range of images and different shapes that may be appropriate. Student annotation is relevant to the specification on pages 5, 6, 10 and 11. With reasons for selecting the shape to develop outlined on page 11.
c) identify health and safety issues that may arise in making their product. 0 1 2 3 4	c2 identify the quality control procedures that would be used in each stage of making their product. 5 6 7	c3 evaluate quality control, quality assurance and total quality management applied to making their product. 8 9		6	Quality control is talked about in general terms on page 12 and then specific to product on page 13, with procedures identified to be carried out at each stage. Page 14 also covers the manufacturing process and quality checks and teaches very lightly on health and safety issues. The health and safety aspect could have been developed a lot further.
d) use diagrams, sketches and other appropriate methods to present their design solution to the customer. 0 1 2 3 4 5	d2 use diagrams, sketches and other appropriate methods, including modelling, to explain their design solution to the customer. 6 7 8	d3 use diagrams, sketches, working drawings and other appropriate methods, including modelling, to justify their design solution to the customer. 9 10		9	Page 15 shows a range of packaging designs which have been computer generated the majority of which are based upon the cuboid selected for development, pages 16 and 17 give working drawings of two possible solutions. Modelling is carried out on pages 19 - 21 using a die cutter. However so far very little annotation by the student is evident. Pages 22 to 25 develop the selected product through to the final customer presentation sheet (page 26).
e) identify the manufacturing processes that would be used to produce their product in quantity. 0 1 2 3 4 5 6 7	e2 identify the stages and associated quality assurances that will be used to manufacture their product. 8 9 10 11	e3 evaluate and justify the stages and associated quality assurances they will be use in the manufacture of their product, with particular reference to "real world" situations. 12 13 14 15		9	Page 27 outlines the general printing processes that are used in industry with no reference to the product being manufactured. Printing effects are covered on page 28 however this time the candidate does try to identify methods of producing the product in quantity and basic quality control checks that would be carried out.
Total mark				35	

CUSTOMER DESIGN BRIEF

Brewsters is a restaurant chain that tries to cater for all ages and all tastes. Their on site facilities encourage families to visit as not only are they a place where people can eat and drink they also provide a supervised play area where young children can visit allowing adults to sit and enjoy a quiet chat. The food that is available at Brewsters takes account of the range of ages that may visit and menus are designed not only for adults but also for under 12's and under 7's.

As it is hoped that people will visit on a regular basis menus on offer need to be reviewed so that customers do not become tired of the same dishes. Brewsters would like to review the desert menu available to the under 12 age group. At present they offer a visit to their Ice Cream Factory where the children can create their own desert by selecting from a variety of toppings to be added to the ice cream in order to produce an Ice Cream Sundae. Using the existing Brewsters and Cadbury partnership produce a new package that will encourage the purchase of deserts by the under 12 group. The package should hold the items needed to produce a sundae as well as a toy for the child to play with.

Key features of the design brief

- Make use of Brewsters and Cadbury partnership.
- Shaped container.
- Hold items to make sundae.
- Hold toy.

SPECIFICATION

- The package should be safe to use with no sharp corners or edges so that the user will not injure themselves when using the item.
- The package should be easily to open by the target audience.
- The items should easily fit inside the package without as if they were squashed into position they may burst open or be damaged.
- The package should be attractive to look and encourage the young user to want it.
- The Brewsters and Cadbury logo should be clearly seen on the package to allow the companies to be advertised and so that the customer can identify a quality product.
- The contents of the package should be clearly seen so that the customer is aware of what is being purchased.
- Any print that is used on the outer surface of the package should be of such a quality that it will not come off on the users hands or run if the item becomes wet.

To find out what people want for desert I am going to carry out a survey.

1. Do you visit Brewsters?
 YES
 NO

2. Do you have young children?
 YES
 NO

3. What age are your children?
 Under 7
 8 - 12
 Over 12

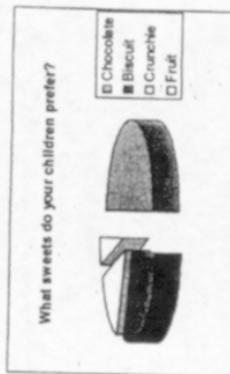
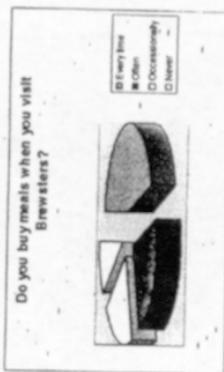
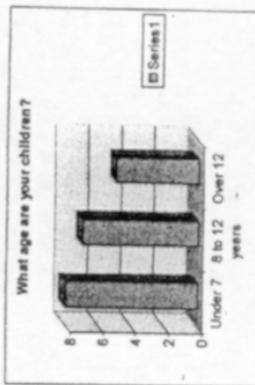
4. When you visit Brewsters do you have a meal?
 Every visit
 Often
 Occasionally
 Never

5. Do you buy your children a desert when you visit?
 YES
 NO

6. What sweets do your children prefer?
 Chocolate
 Biscuit
 Crunchie
 Fruits

RESULTS OF SURVEY

I carried out my survey by asking 20 people their opinions. The people that I asked covered a wide age range from some of my friends at school to people who are my neighbours. The results from my survey are shown below.



From my survey I have found that the majority of people asked did visit Brewsters and they had young children. The majority of children were aged under 12 years old. When families visited Brewsters they did buy meals and the vast majority bought a desert for their children. The favourite sweet of the children was chocolate but they also liked crunchie and biscuit type products.

Existing products used by Brewsters.

The under 7 menu is bright and has a happy friendly bear image on the front to appeal to young children. The products inside the menu are named to encourage the youngster "smiley potatoes" and have drinks that will appeal to this age group. Prices are kept low to tempt parents to bring their children for a meal.

The under 12 menu makes use of a theme that will appeal to this age group and has a menu that is slightly more grown up than the under 7's choice. The menu does have a visit to the Ice Cream Factory but also a magazine is given aimed at this age group.



Kids' Birthday Parties at Brewsters???



Maximum fun... Minimum hassle
ONLY £5.99 PER CHILD

3

Existing products used by Brewsters.

The packaging used by Brewsters is shown, it is a pyramid shape so that it will fit inside the sundae glass given to each child when they go pay to visit the Ice Cream Factory. The contents of the package are clearly shown. The package is decorated to highlight the sweets that it contains.

I feel that the colours used are functional in that they are Cadbury chocolate wrapper colours but they are not very bright and may not appeal to young children.

Existing products used by Brewsters.

Size of package - base 75 x 75 mm
height 150 mm



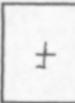
Contents of package -

Packet of flavoured sauce 100 x 45 x 5 mm.

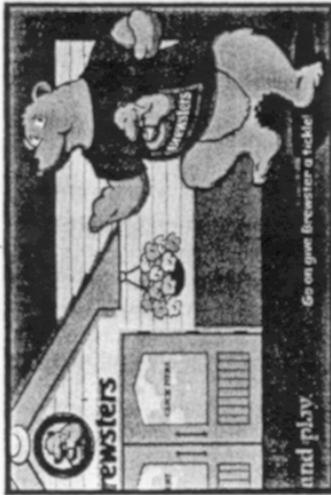
Packet of pieces to decorate the ice cream

80 x 80 x 5 mm.

Sweet 70 x 15 15 mm.



Logos and Images that are used by Brewsters and Cadbury



Cadbury sweets are included in the Brewsters gift package and it is important that this is identified on the packet.
The Cadbury style of writing and the colours of blue and purple should be included on the new package.
However as the gift is from Brewsters the Cadbury information should not be too dominant on the packaging.



The Brewster bear appears on all of the labels and therefore it is important that this continues on whatever package is designed. Lots of different costumes are used by the bear but his friendly expression remains on all the labels.
The colours that are used are very similar on each label and once again this style should continue on new designs.



The Brewster Bear is always seen from the side view and has a happy, smiling and friendly face. He is a character that the younger children can relate to. This image appears on many items throughout the Dining and Play area, it is an attempt to encourage young children to enjoy their visit and to encourage them to want to return on some future occasion.
It is therefore vital that this image continues onto any design that is added to the packaging as it will fit in with and promote the theme already in existence in the Family Diner.
As Cadbury is a very popular sweet manufacturer, who produces a range of products, it is therefore a good selection by Brewsters to use such a product inside the gift. Brewsters and Cadburys both strive for perfection and together parents can be assured that the product that they are buying for their children will be of good value and the quality can be guaranteed.
Therefore as previously suggested with the Brewsters image it is important that the Cadbury symbol is featured on the package, so that customers can identify the contents and the manufacturers.

BREWSTER BEAR IMAGES THAT CAN BE USED ON THE CONTAINER

THE BEAR NEEDS TO BE SHOWN AS A HAPPY, FRIENDLY CHARACTER THIS WILL APPEAL TO THE CHILD AND MAKE THEM WANT THE PRODUCT.

OTHER IMAGES THAT COULD APPEAR ON THE PACKAGE COULD INCLUDE POP IMAGES FOR MUSIC THEMES, BALLOONS, PARTY CAKE, CANDLES.

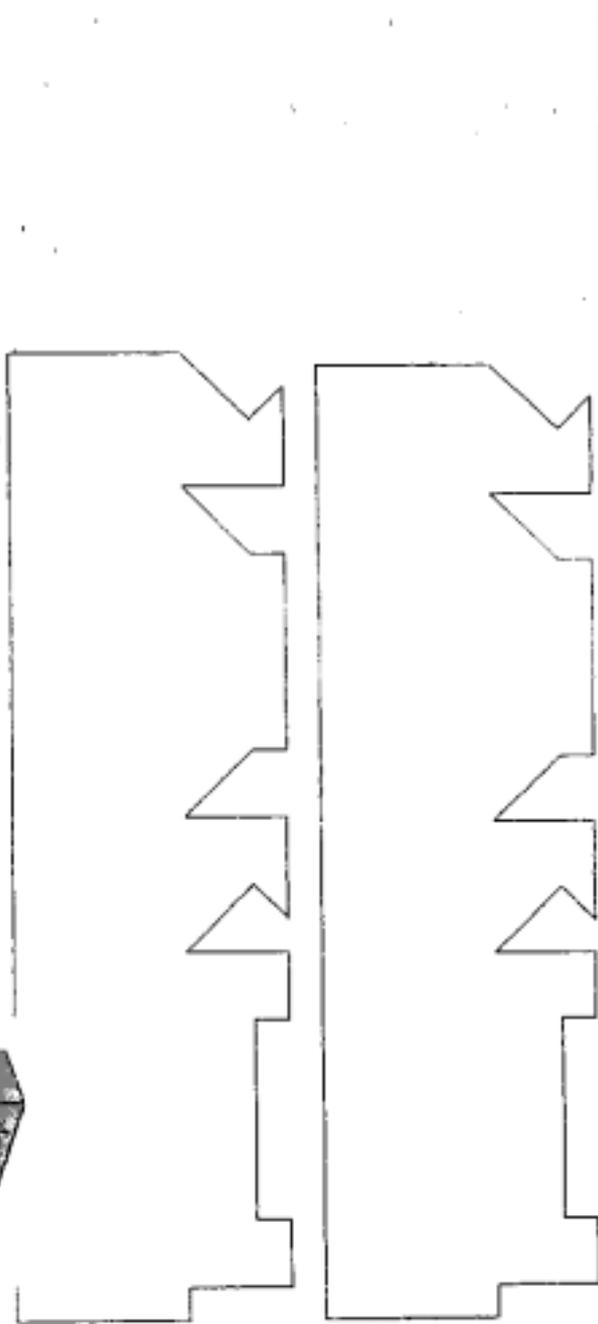
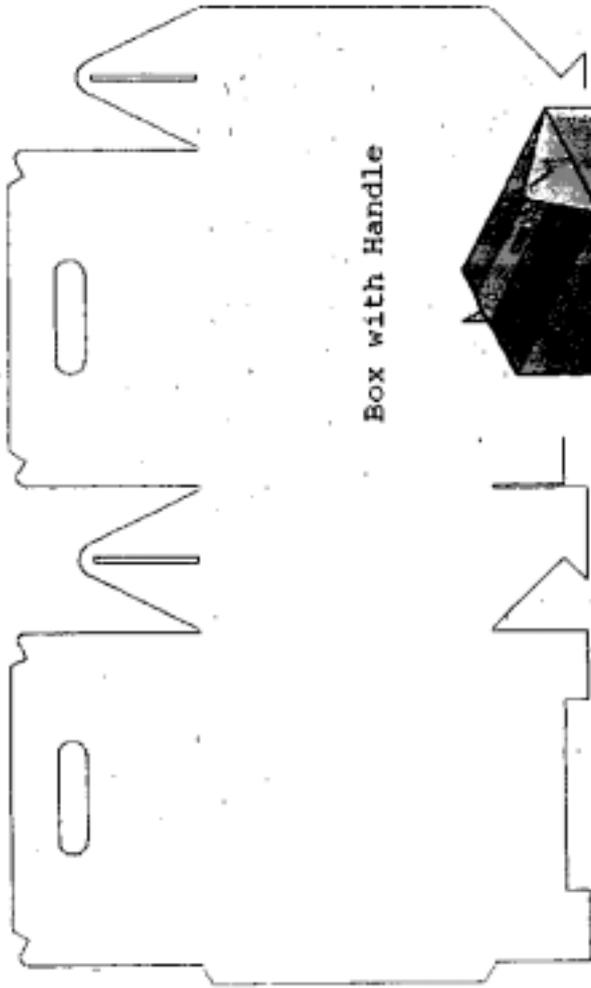
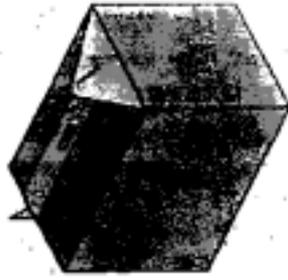


Examples of box designs and surface developments of boxes.

Lid & Base



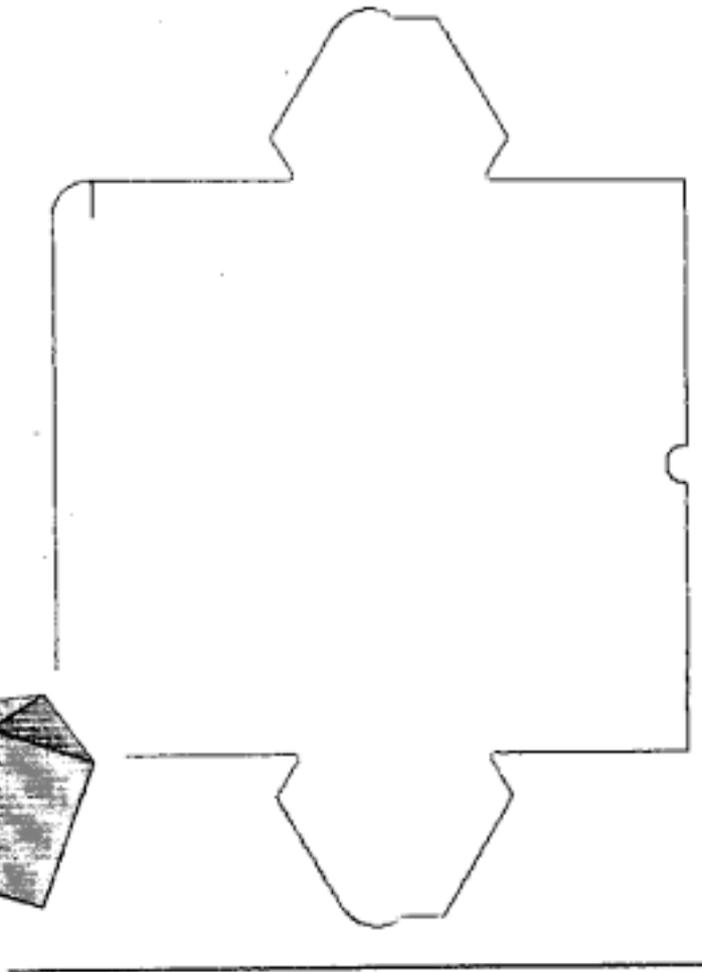
Box with Handle



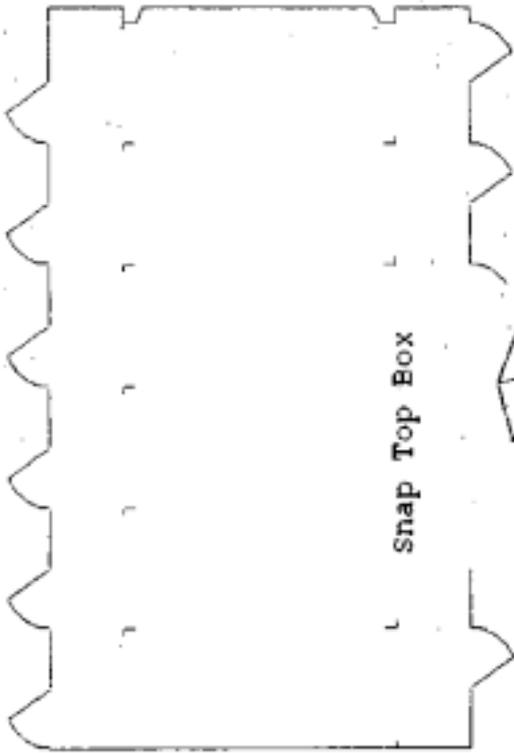
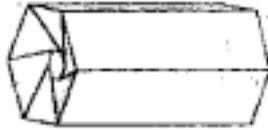
7

Examples of box designs and surface developments of boxes.

Triangular Prism



Snap Top Box



Examples of box designs.

Triangular Box



Cracker



Sweets box

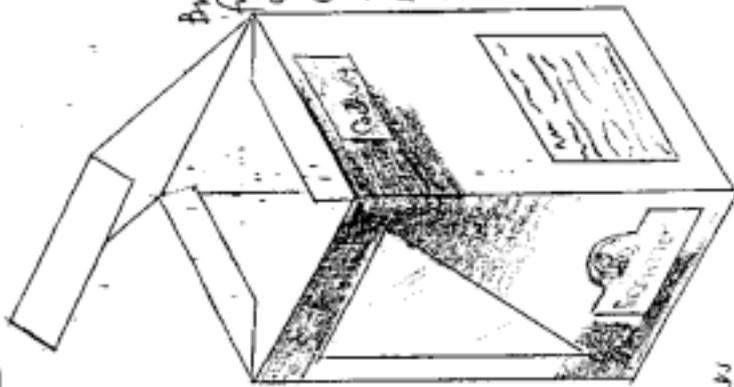


Brewster's character on the front of package, pointing to the display window. Through which the contents can be seen.



Drop down opening at the end of the package.

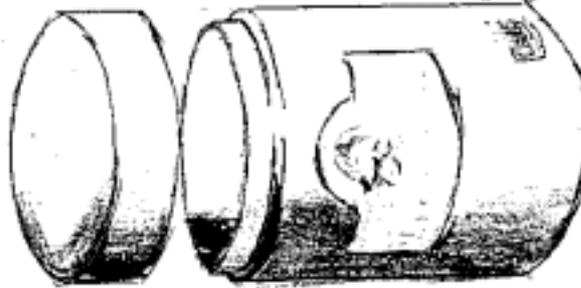
Brewster's logo on front of box in company colours. Cobby logo on side of box as required in specification.



Open top box with front window in triangle shape.

Contents can be seen through window. Colours used on box are based upon existing orange, yellow and brown scheme.

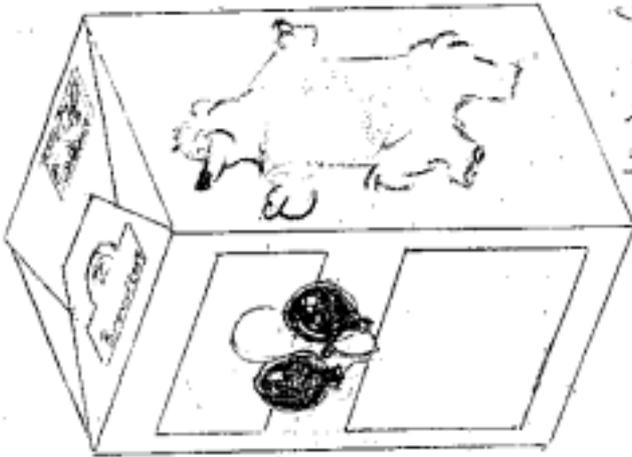
Brewster's logo and Cobby symbol are shown on front of container.



Contents of container will be featured around body of container.

Package is more of a container with pull off lid.

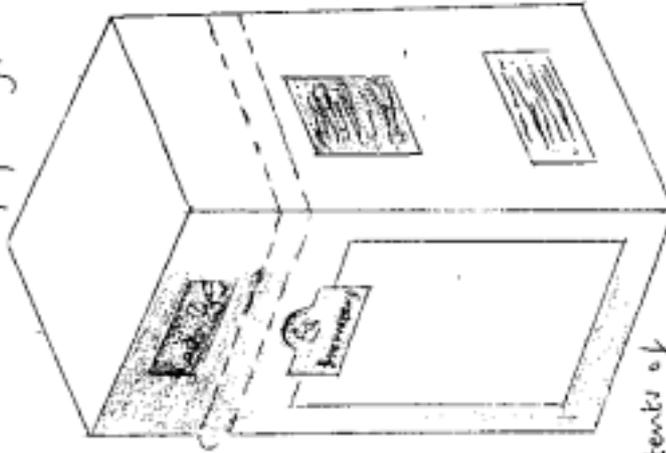
Life up top with flap that tucks into fold over piece.



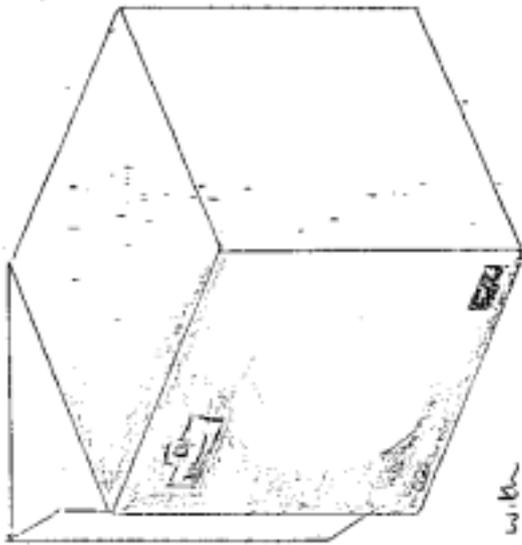
Window on front of container.

Packages show Brewster + Godding logos.

Stitched edge around container with a pull tab to allow easy opening.



Contents of package shown on side.



Cuboid with porthole windows and an opening on the side.

All designs on this page meet the requirements of the specification. They are colour fit, make use of the logos and symbols. They are easy to open.

from all of my ideas I would like to develop the idea of the 'all cuboid'. As I feel that this shape is easy to store and will hold quite a lot of sweets. It's easy to form.

11

QUALITY GUARANTEED

The product must be of a quality that the customer expects and must work as the customer desires. The manufacturing company has an obligation to meet these requirements when it produces its product. By doing so the company will have success selling the product and increase its reputation with its customers.

TOTAL QUALITY MANAGEMENT - is when the manufacturing an aim to achieve continuous improvement, trying to continually improve the performance of its organisation and its products and services. The research and marketing sections of the company have an important role to play here as they need to know what the customers requirements are and how they feel about new products as they develop.

QUALITY ASSURANCE

Is carried out by the company to see that the product meets the quality standards set. A series of planned actions and procedures will set up to check the product before, during and after manufacturing operations have taken place. The aim of the process is to prevent failure and to make sure that quality of the product is right first time and every time.

QUALITY CONTROL

Follows the quality assurance process and is used to set up ways of checking quality against the set standards or to see that items have been made within set tolerances. It involves using an inspection team who are looking for items that are not up to standard. Inspections will take place at identified stages in manufacturing as well as after the final item has been assembled.

Quality assurance and my product.

When manufacturing my product I will need to carefully select the correct materials and processes. As the project is going to be used mainly by young children it is important that the materials selected are suitable for the product and that any colouring used is permanent and will not come off on the users skin. Card is a good choice of material but the printing process used must be carefully selected. While carrying out the manufacturing processes it is vital that checks are made at regular intervals in order to ensure that the package is up to the expected quality.

The Design Process

CUSTOMER DESIGN BRIEF

DESIGN IDEAS

MODEL IDEA

MANUFACTURE PRODUCT

TEST and EVALUATE

ADVERTISE and MARKET PRODUCT

During the production of the packaging checks need to be carried out to make sure that it meets up with expectations.

1. Design package on computer.

Check - that the size of the package is not too big.

2. Select shape for package.

Check - that the layout is suitable to hold the identified contents.

3. Add graphics.

Check - that the colours used are the correct definition and they are sharp.

4. Prepare die cutter for surface development of shape.

Check - that die cutter has correct blades for cutting and folds are set correctly.

5. Cut package to shape.

Check - that package is neatly cut out, remove any rough edges.

6. Assemble package.

Check - that glue lines are not visible and package is assembled neatly.

Manufacturing package



Stages in making -

Design layout of package on computer in industry use a CAD package. In school could use Publisher

Insert information including logos, graphics, colour scheme onto the surface development.



Print off card development - use of A3 colour printer

Cut out development—use of die cutter in industry. Use of a cutting knife, cutting mat and safety rule in workshop.

Cut out window in package - use tools as listed in previous stage.

Score folds on the package - use cutting mat, safety rule and scissors.

Cut and glue acetate sheet for window into position.

Assemble unit.



Precautions that must be followed when making the package -

Take care when using sharp tools especially cutting knives and sharp blades. Always use a safety rule when cutting out and place work on top of a cutting mat to avoid marking the surface of the table.

Take care when holding scissors to score the card.

Quality checks that can be made

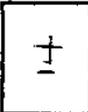
Check the accuracy of the sizes on the surface development - sizes of the sides are they equal, folds in the correct place, flaps do the cover contents, glue tab is it big enough?

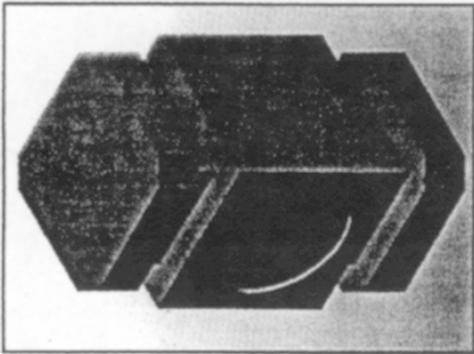
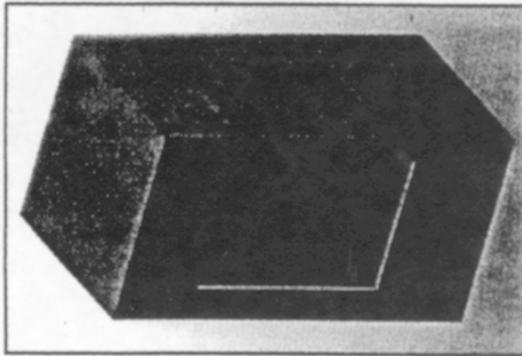
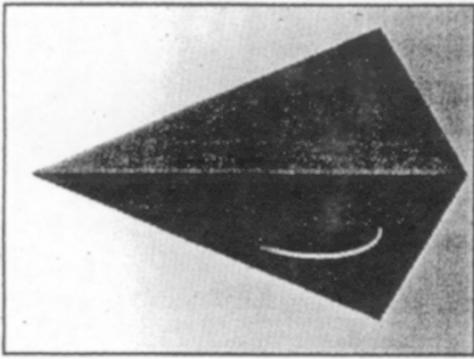
Colour used is it the correct shade, is the outlines sharp and no bleeds, are the colours blurred?

Are the folds on the package sharp?

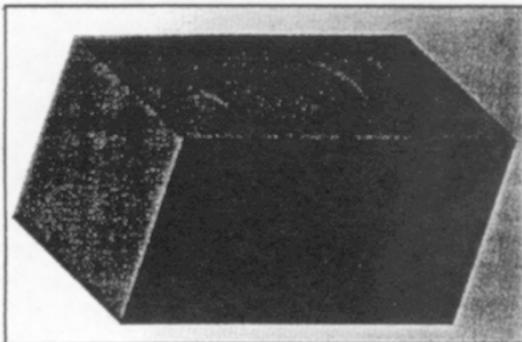
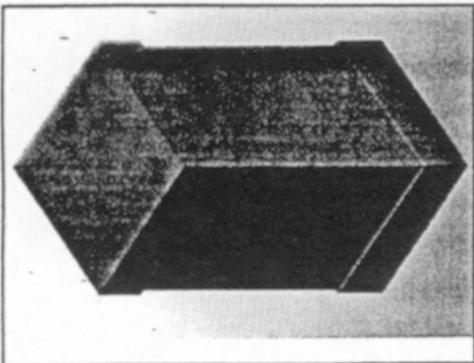
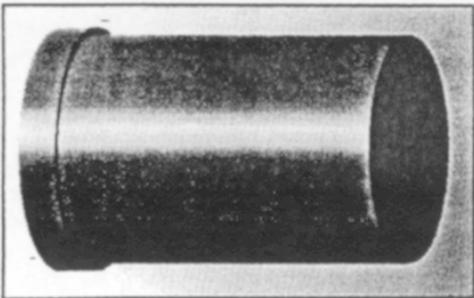
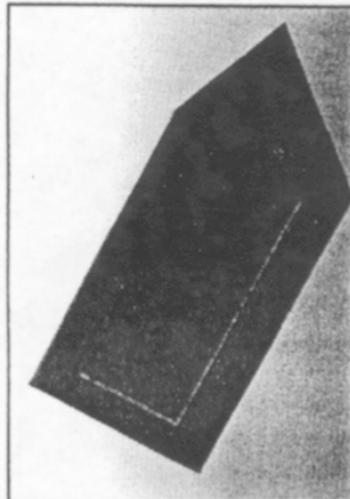
Is the final package square?

Does the package hold the contents?

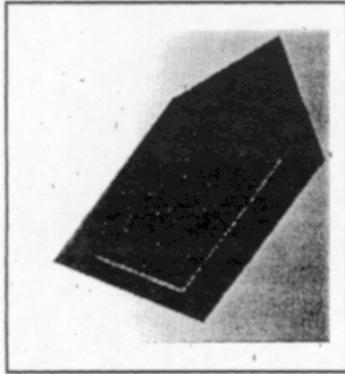




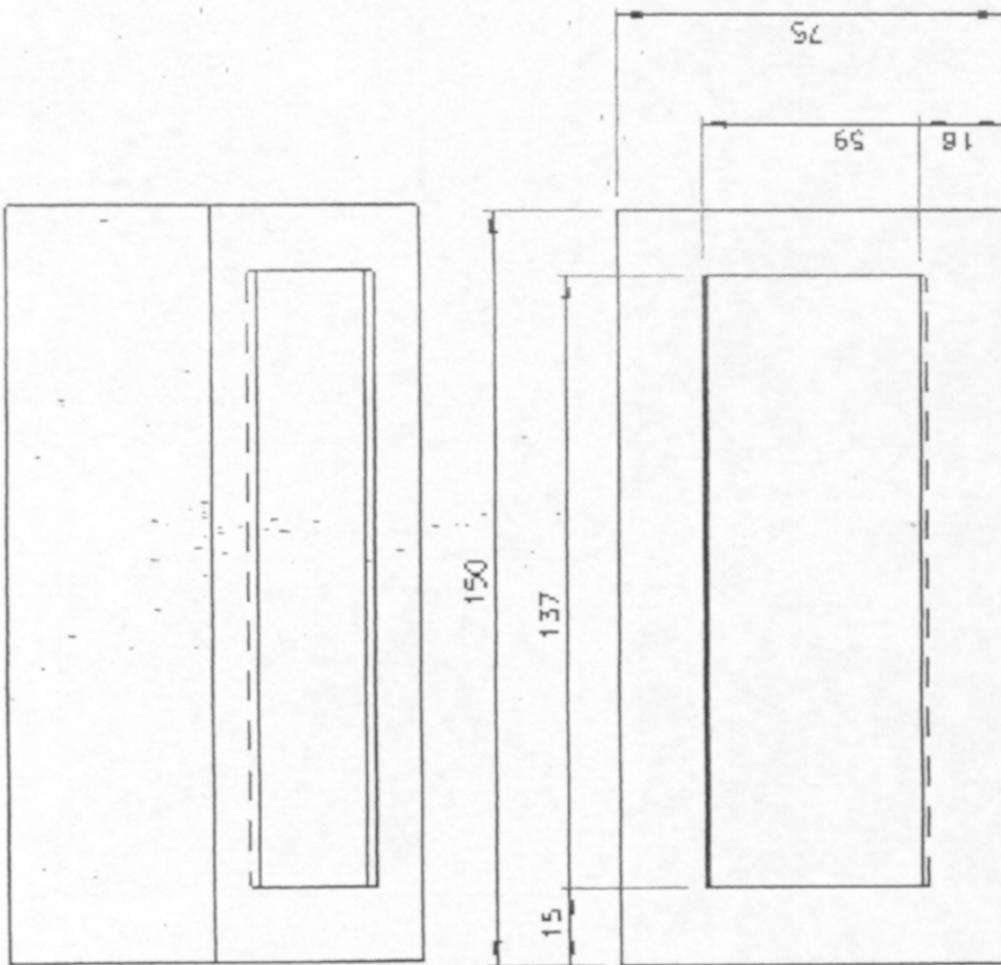
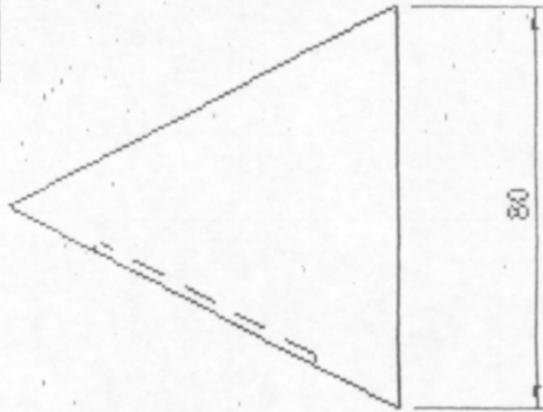
PACKAGE DESIGNS
Produced using Pro Desktop.



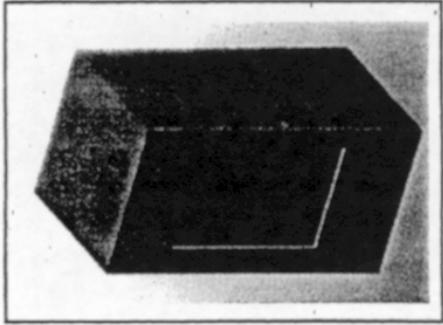
ALL DIMENSIONS IN MMS.



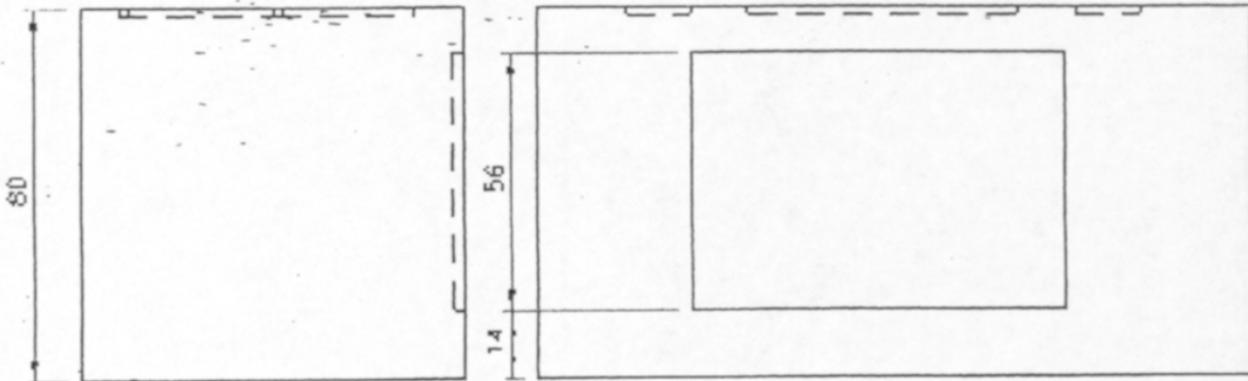
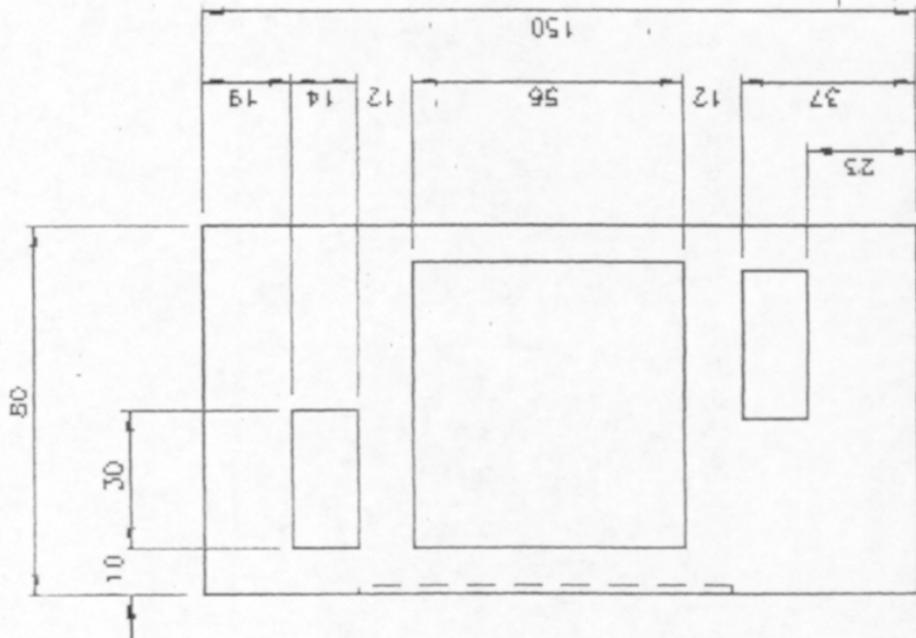
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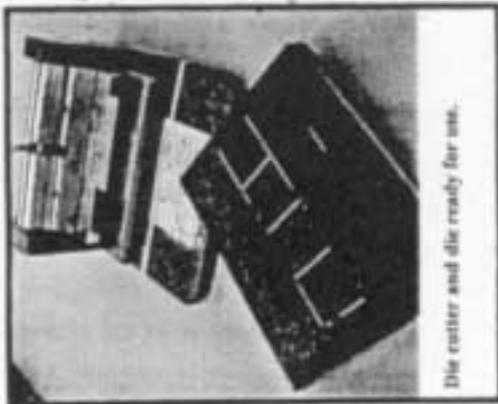
17



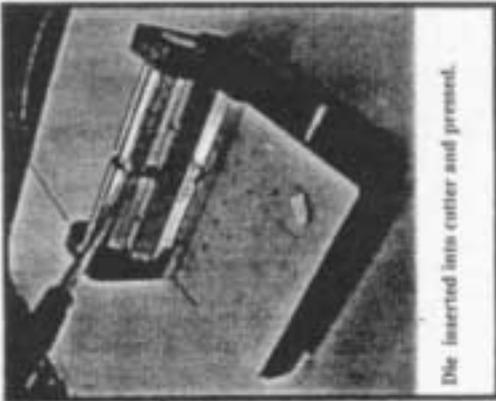
ALL DIMENSIONS IN MMS



MODELLING using die cutter.



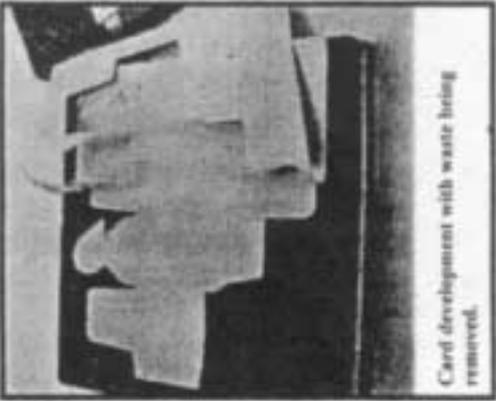
Die cutter and die ready for use.



Die inserted into cutter and pressed.

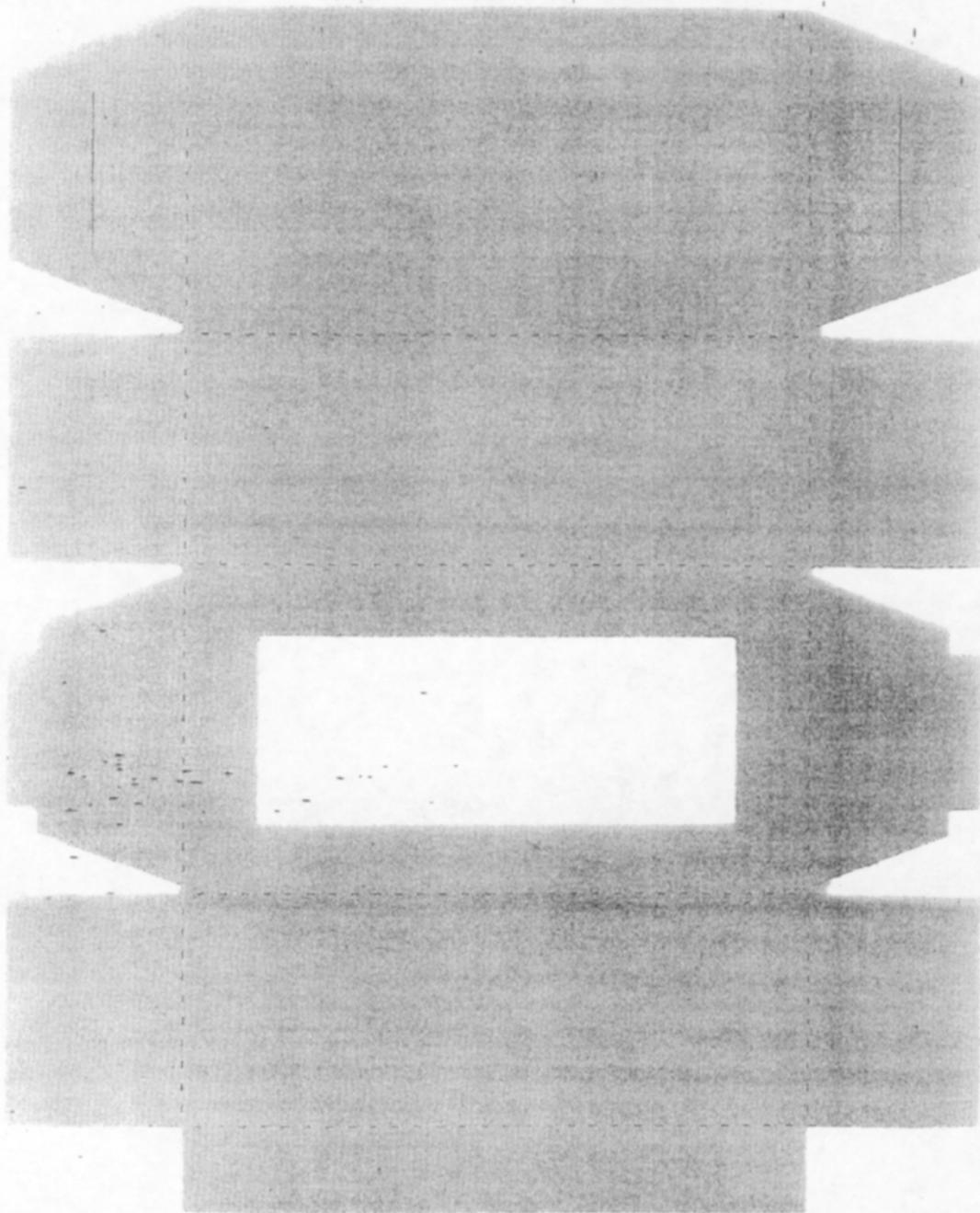


Die being pressed for second time.



Card development with waste being removed.

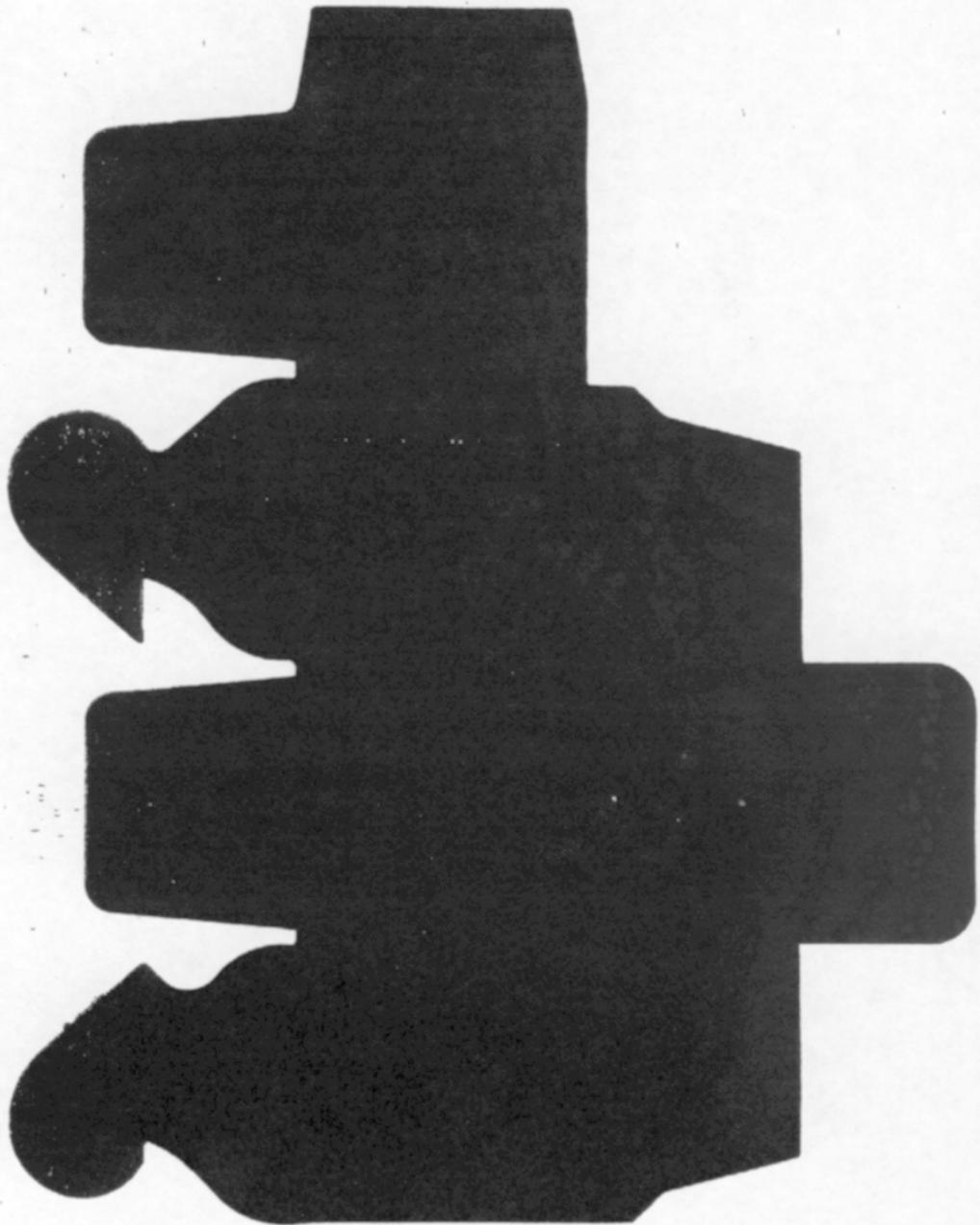
Sample packages manufactured using prepared die and stamped out using die cutter.



ASSEMBLED PACKAGE

19

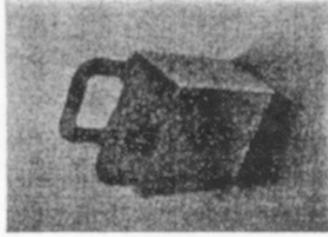
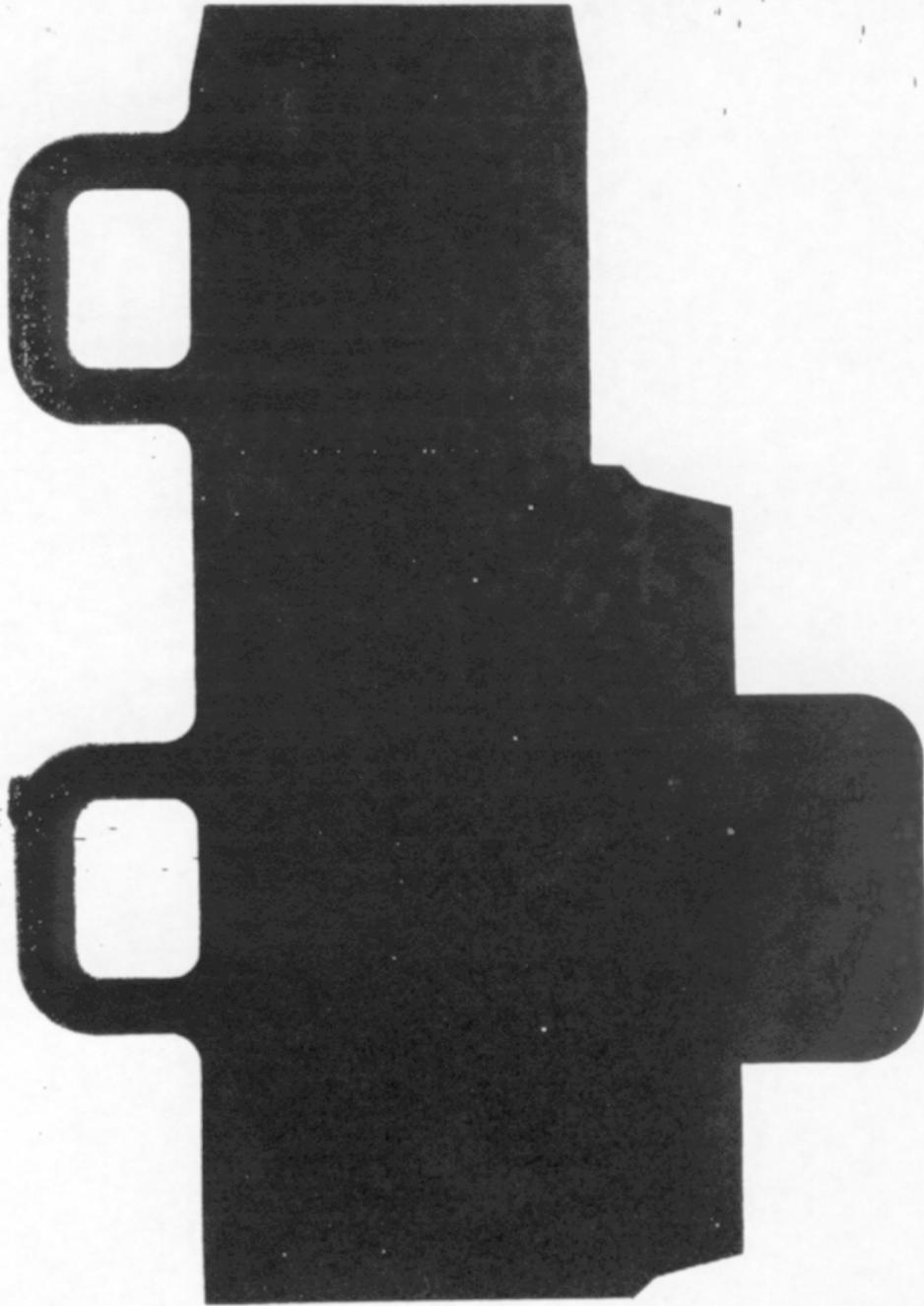
Sample packages manufactured using prepared die and stamped out using die cutter.



ASSEMBLED PACKAGE

20

Sample packages manufactured using prepared die and stamped out using die cutter.



ASSEMBLED PACKAGE

21

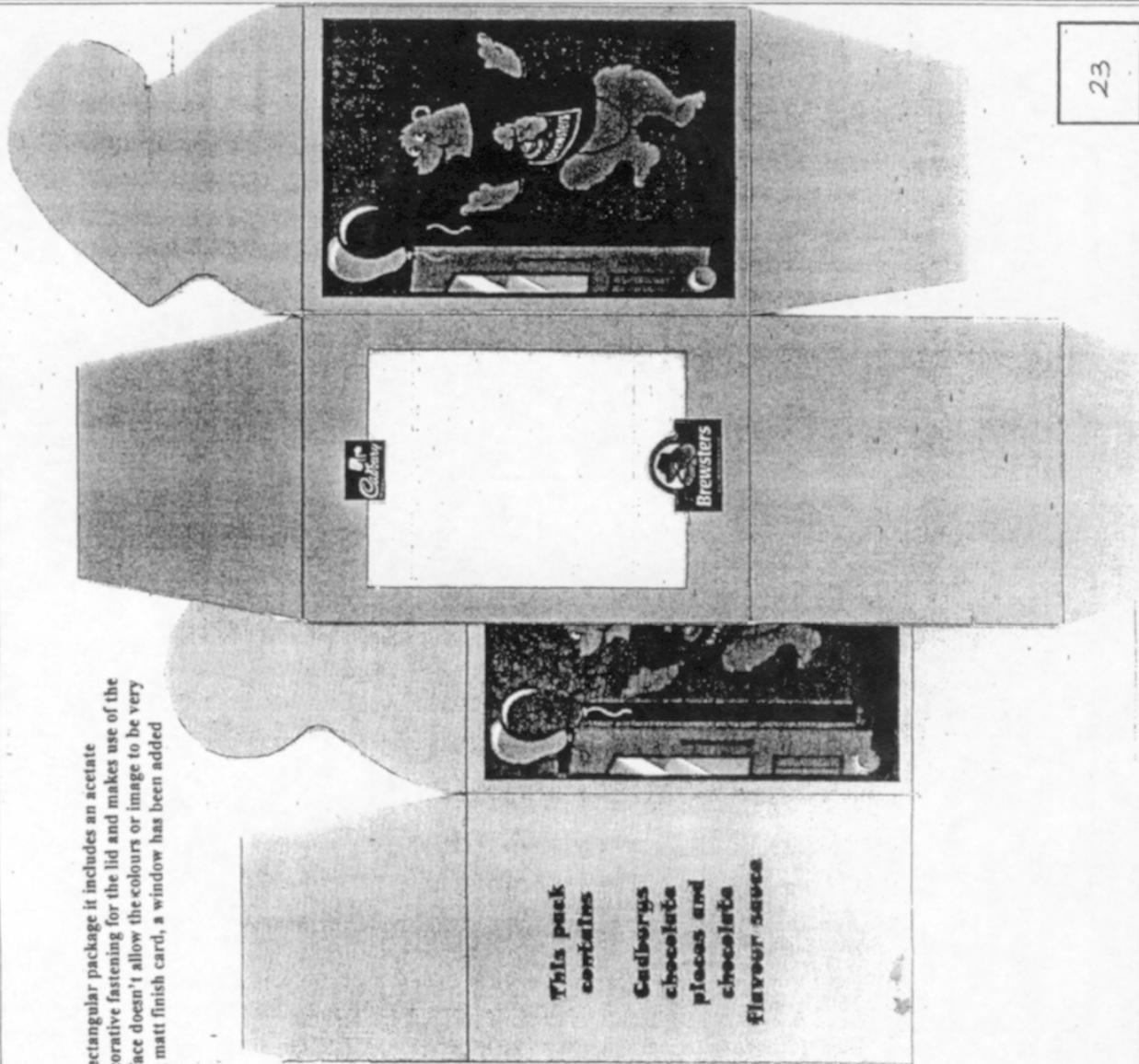


A possible surface development that can be used for the package is shown. The main colour used is similar to existing products used by Brewsters. Other features that need to be included are the Cadbury and Brewster logos as well as the Brewster bear character and a list of contents. The surface development could be developed further by adding a window to view the contents.

22

Modelling the idea.

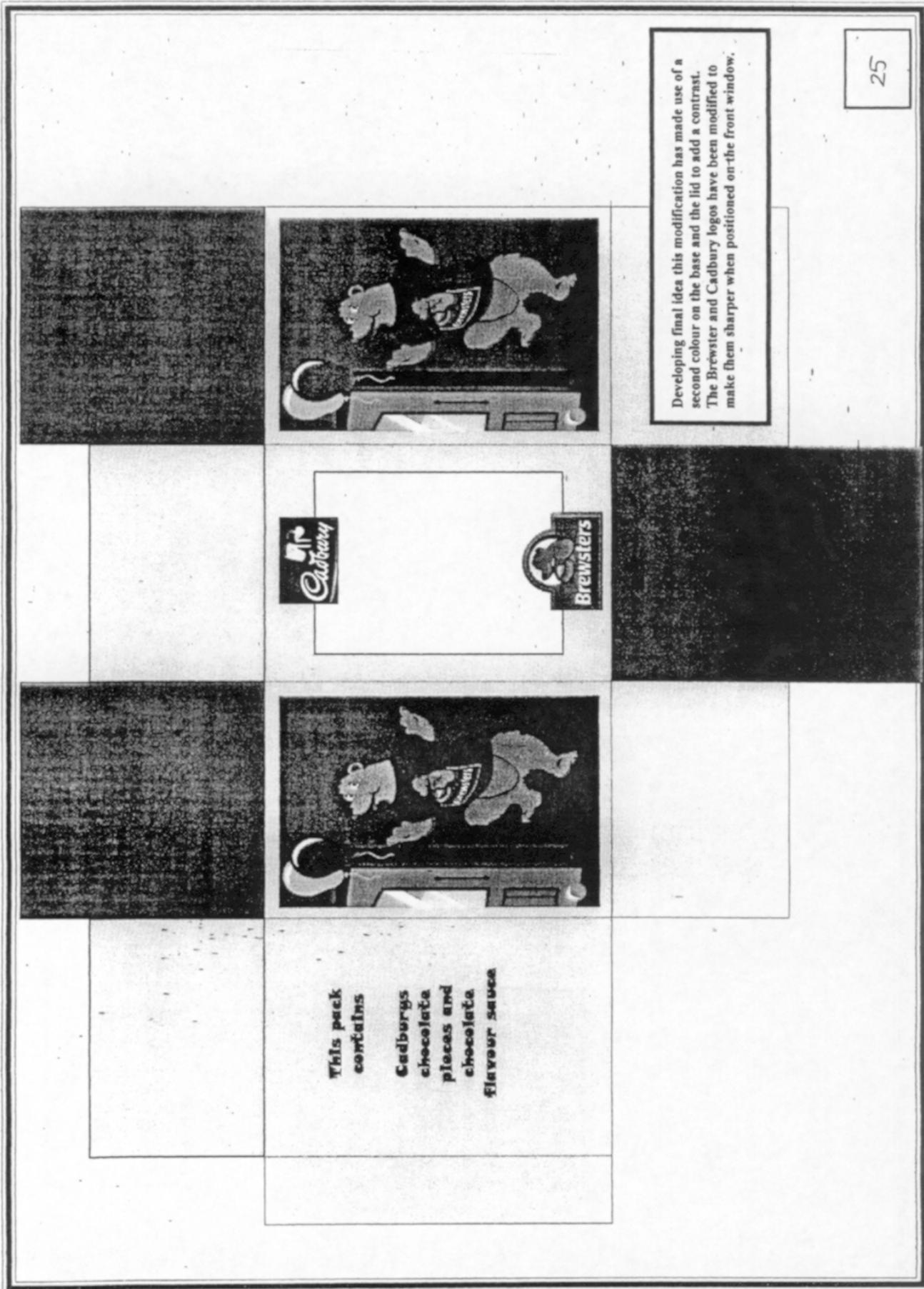
The white model gives a basic idea for a rectangular package it includes an acetate window. The middle design includes a decorative fastening for the lid and makes use of the Brewster colours although the waxed surface doesn't allow the colours or image to be very sharp. The third design is produced using matt finish card, a window has been added along with Cadbury and Brewster logos.





With your
 confidence
 Cadbury's
 always holds
 the cream and
 the best
 of the best

Selected idea using the Brewster and Cadbury logos with their special colour scheme. Featuring the friendly, cheerful Brewster bear in a prominent position on the package as required in the specification.



The selected idea is shown as a surface development and also as an assembled box. Note that this idea differs from the previous examples as it makes more use of the colours orange, brown and yellow. These colours are used with extra effect on the lid of the box where the use of two colours contrast as can be seen on the assembled view. To add to the effect the overlapping flaps on the lid have been cut in such a way that when they are interlocked they form a decorative heart shape.



**This pack contains
Cadburys
chocolata
pieces and
chocolata
flavour sauce**



26

The design produced informs the customer of its contents and features the Brewster and Cadbury logo on the front of the box. An acetate window on the front of the package allows the contents to be viewed.

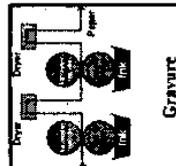
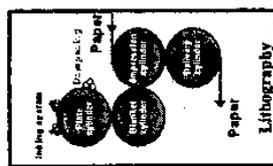
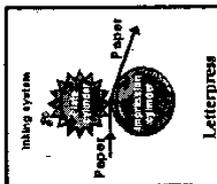
PRINTING PROCESSES

Printing methods

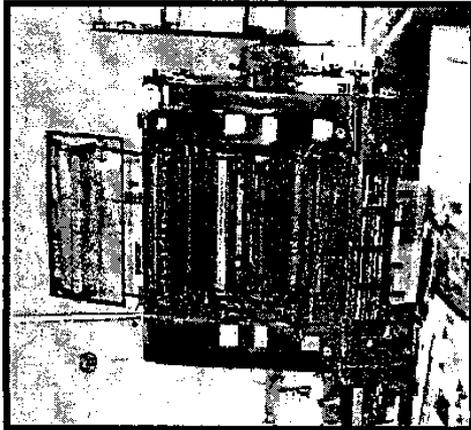
There are four main methods of printing. Each has its own advantages and disadvantages.

METHOD	APPLICATIONS	ADVANTAGES	DISADVANTAGES	PRINT RUN
Letterpress	Books with large amounts of text, letterheads and business cards.	Good quality in terms of sharpness and solidity.	Few suppliers. Not economical for colour work. Slow process.	500 to 5000 copies.
Lithography	Newspapers, magazines, books, letterheads, posters and packaging.	A widely used modern process. Many suppliers. Good print quality. Produces very high quality print work.	Plate life limited to 150000 copies, but can be quickly remade. Expensive to set up.	Ideal for medium to long runs: 1000 to 1 million copies. 500000 to several million.
Gravure	Expensive magazines, books and postage stamps.			
Screenprinting	Posters, T-shirts, shop display boards, fabrics and wallpapers.	Can be printed onto smooth, absorbent or rough surfaces.	Only suitable for short runs. No fine detail possible.	Good for short print runs: several copies 400 or 500.

NOTE - on short runs you may also consider the use of a photocopier or printers that may be connected to PCs such as laser and ink jet. These printers may produce work for you in colour or black and white, however quality will depend upon the printer being used.



Offset Litho Machine



Four-colour Process

It is possible to divide the spectrum of white light into three broad bands - violet/blue, green/yellow and orange/red - which appear essentially blue, green and red to the eye. These are in effect the additive primary colours. If these colours, in the form of beams of coloured light, are added to one another in similar proportions upon a white screen then white light is created. With the overlapping primary colours of blue, green and red the secondary colours of yellow, magenta and cyan are produced.



In applying colour pigments to paper the same effect cannot be obtained because, starting with the white light reflected by the paper, the addition of colour inks to it subtracts portions of the spectrum in the white reflection. Yellow, magenta and cyan form the subtractive primary colours.



Almost all commercial work is printed in four rather than three colours, adding black to the process set to compensate for deficiencies in the yellow, magenta and cyan pigments and to allow type to print in only one colour.

A great deal of commercial work is in full colour. Modern colour printing makes use of a dot structure made up of the three primary colours - red (magenta), blue (cyan) and yellow with black to create the full range of colours when superimposed on the page. A separate printing unit is required for each colour. Modern four, five or six colour fast litho printing presses print each colour in sequence with additional units adding special colours or the finished coating. A camera or scanner is used to separate the magenta, cyan, yellow and black from the image. Four individual printing plates are produced (one for each colour). A screen is also used that converts the separated colours into dots. The dots are very small but can be seen clearly if you look closely at a magazine photograph. The process of positioning one printing exactly over another is known as registration.

Colour printing



Die Cutting

Printing effects

There is a range of special printing effects that can be used to help add interest and impact to a publication.

EFFECT	APPLICATIONS	ADVANTAGES	DISADVANTAGES	COST
Die cutting	Packaging. Unusual shaped papers.	Once set up the die can be reused many times.	Slow process	Expensive for short runs if special shapes are required.
Varnishing	Protects paper and card. Looks more attractive.	Easy process for enhancing or protecting the product from scuffing. Increases durability. Provides a high gloss finish.	Cannot be added until printing ink is dry. Expensive. Can peel and blister.	Low cost. Can be applied on the printing press. Twice the cost of varnishing.
Laminating	Cartons, special brochures and company reports, menus. Special effects for packaging, business cards etc.	Attractive, enhances graphic designs.	Expensive process requiring special tooling.	Doubles initial print cost.
Embossing				

Making the Brewster package in quantity.

The surface of the development will be stamped out using a die cutter with the appropriate outline transferred onto a cutting board so that the shape can be stamped out in bulk. The main body of the unit will be made from card with an acetate sheet window, glued into position possibly using double sided tape as the means of applying it.

The box will be printed using the lithography process which is suitable for runs of 1000 to 1 million copies.

Quality control checks will have to be made throughout the manufacturing process the cut out developments will have to be checked to guarantee correct fitting when assembled.

Colour will have to be checked during the print run to ensure sharpness and correct colour with no bleeds or runs evident.

Samples will be taken at regular intervals to be inspected.

Die cutting and folding

Paper and card with straight edges are cut to shape and size in batches on large guillotines. Die cutting is a machine process where a quantity of an irregular shaped designs can be produced. The die cutter works on a similar principle to a pastry cutter when the design is stamped out. Any folds in the design are achieved in a similar way except that the blade does not go all the way through but merely squashes the material against a shaped recess, forming a line to fold at a later stage.

Varnishing

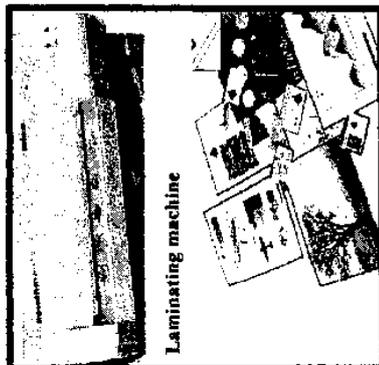
A thin coat of glossy varnish is applied to the surface of the material to protect it and at the same time it makes it look more attractive. Varnishing takes place at the end of the printing process but prior to any folding, cutting and trimming.

Laminating

A thin plastic coating is bonded to the surface of the printed product. Laminating provides a glossy finish and gives greater protection. Sometimes one off items may be laminated in school by inserting them in a plastic wallet and then putting the object through heated rollers to bond the surfaces.

Embossing

This process raises part of the surface above the surrounding area. It is done for effect, both visual and to the touch, and provides a very subtle look and feel of quality. The required shape is pressed into the printed work using a steel die.



Laminating machine