

Product Design Prompts

Section A - Design Question

Approximately 30 mins – 30 - marks (¼ whole paper marks)

Context: Flat pack charity collection boxes

Key words:

- Charity
- Marketing/ logos/ Slogans/ Point of sale
- **Flat-pack**
- Net - Tessellate - waste
- Folding/ Slots/ Tabs/ Perforated
 - CAD/CAM
- One-off prototypes
- Batch production
- Mass Production

- **The 6 R's** – Reduce, Refuse, Rethink, Repair, Recycle, Reuse.

Materials

- Solid white board – primary packaging
 - Acetate - packaging.
- **Laminating** paper - print graphics onto paper.
- **Polythene coated** - to make paper waterproof
 - Thin layers of MDF - can be veneered

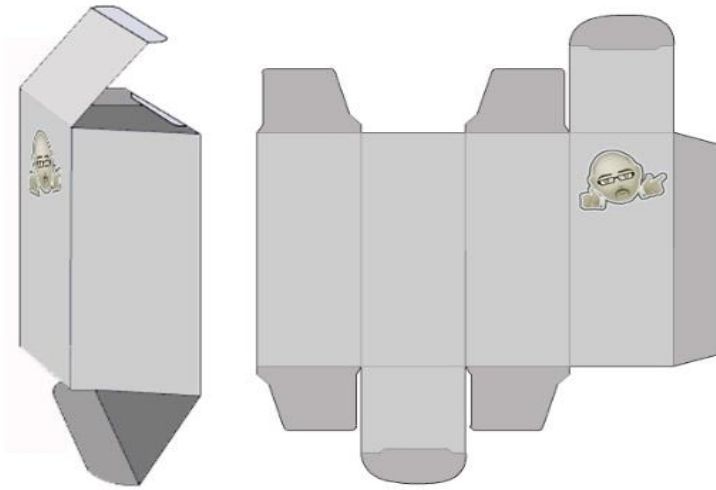


Charity boxes

Manufacturing Processes

- **Die cutting**- press out a net (for packaging) from a sheet of material. The blade is shaped to the outline of the net. Initial costs- expensive to make but once set up – easy to do large quantities with complicated designs.
- **Screen Printing** - a pattern is printed onto fabric through a stencil held in place by a screen. Each **screen prints** one part of the design in one colour.
- **Dye sublimation** – Uses heat and is suitable for printing onto a wide variety of materials in short print runs.
- **Embossing** - Uses heat and is suitable for printing onto a wide variety of materials in short print runs.
- **Offset Lithography** – commercial printing on paper and card.
- **Laser cutter** – sheet materials – cardboard/ plastics.
- **Vinyl Cutter** – 2D shapes, vinyl/ card. Signs and stencils.

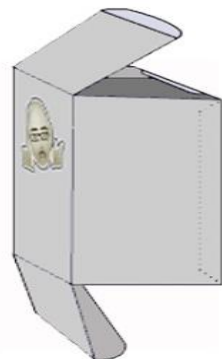
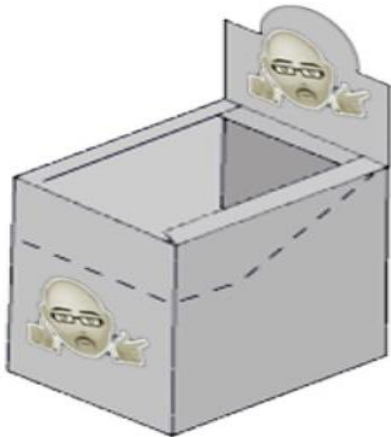
CARTONS



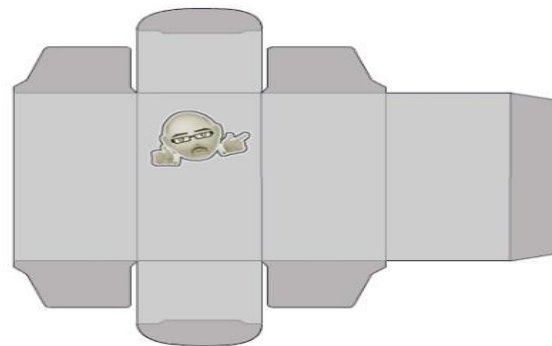
Tuck in end style. Interlocked tuck-in flaps with slit lock.



Above image shows 28 nets arranged for die cutting.



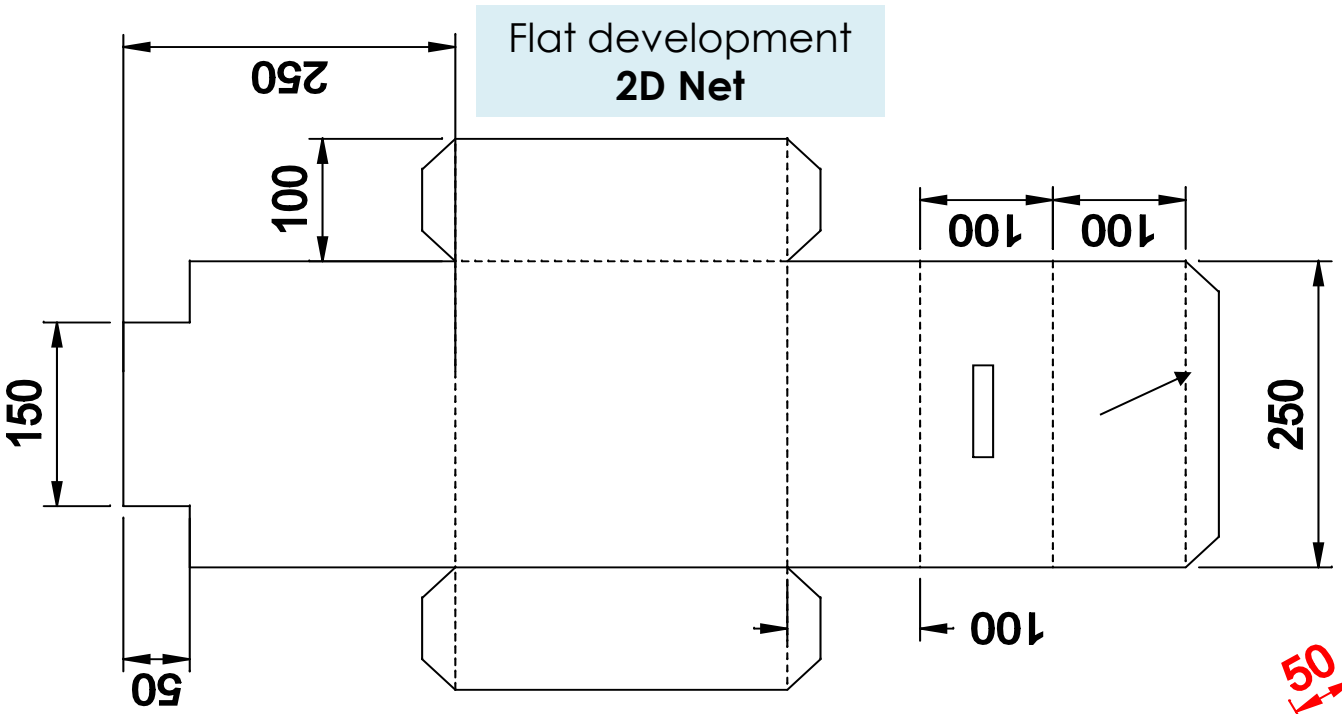
Tuck in end style. Parallel/aeroplane tuck-in flap with slit lock.



Remember the layout of text/images so they aren't upside down when assembled.

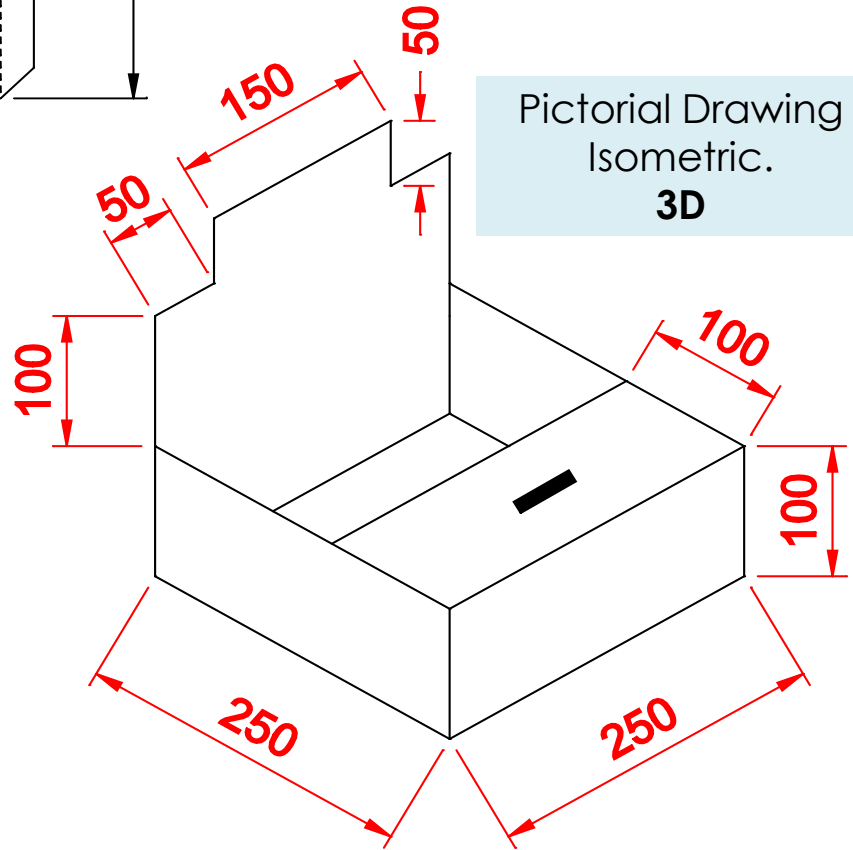
When packaging nets are produced commercially, they print as many nets as they can fit onto large sheets of card. In order to minimise waste they arrange the nets so there is very little gaps between them. This process is called tessellation.

**Flat development
2D Net**



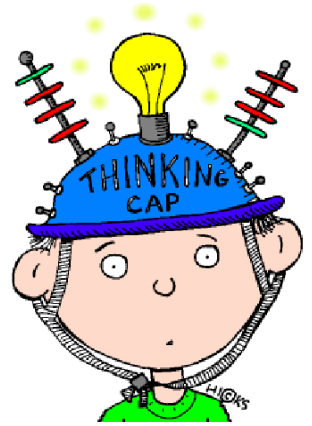
- Construction Details**
- Made from 2mm white faced corrugated cardboard.
 - Design using CAD
 - Printed using Lithography printing process (using CMYK inks)
 - Net Die-Cut to size, shaped and glued with the hot glue gun.

**Pictorial Drawing
Isometric.
3D**



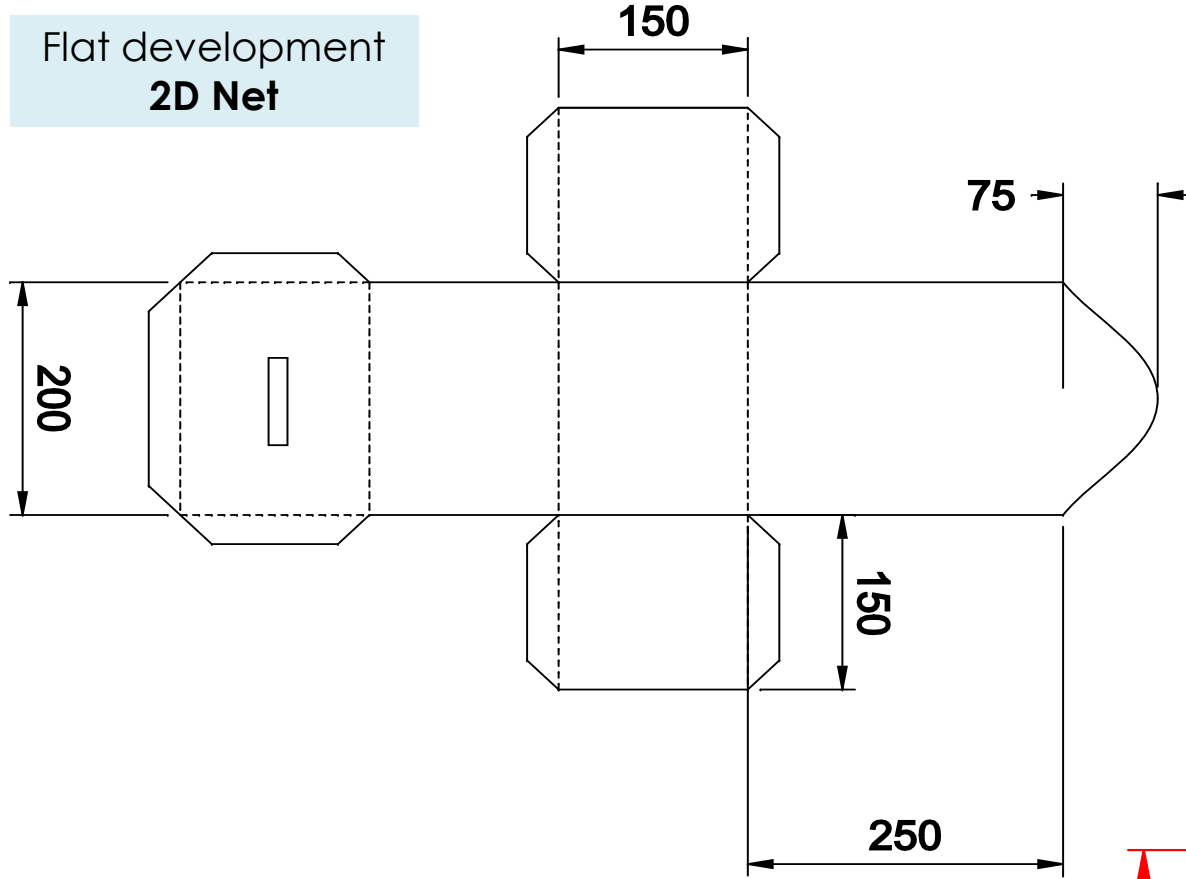
Net Key:

————— Cut lines
 - - - - - Score/fold
 Dimensions (mm)



Memorise for section A

**Flat development
2D Net**



Construction Details

- Made from 800 micron white boxboard
- Design using CAD
- Printed using Lithography printing process (using CMYK inks)
- The box has been encapsulated to give a high gloss finish and it also make it durable.
- Net Die-Cut to size. Double-sided tape applied to glue area so the box can be posted flat but assembled easily but people who are collecting for the charity.

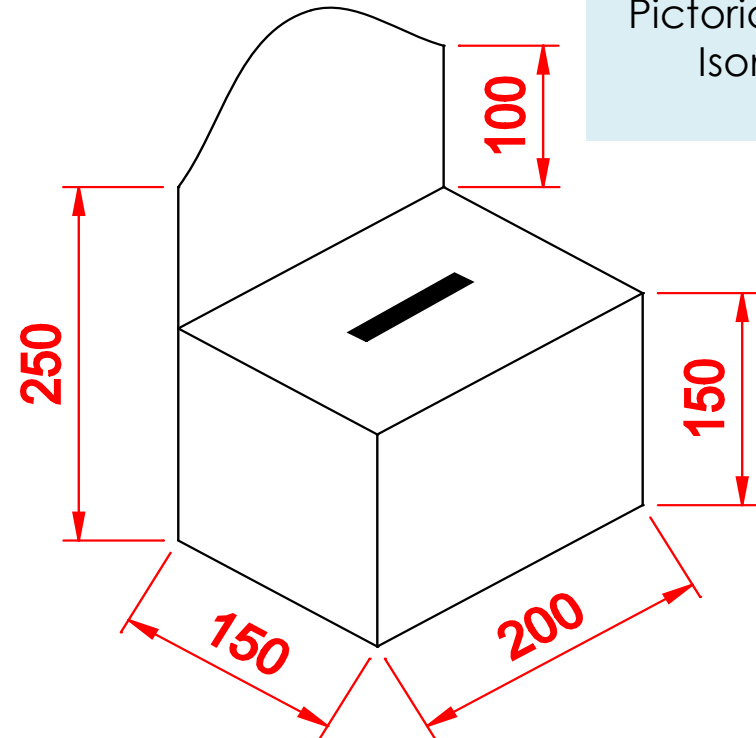
Net Key:

————— Cut lines
 - - - - - Score/fold
 Dimensions (mm)



Memorise for section A

**Pictorial Drawing
Isometric.
3D**



TYPES OF MATERIAL	Properties	Uses	Cost 10= High 1 = Low
Board (card)	Rigid surface that can be easily printed on	Model Making	5
Carton board	Different layers and materials used to make carton board Aluminium foil for insulation Plastic for waterproofing Greaseproof paper for baking Wax coating for waterproofing	Packaging Takeaway coffees Baking cups for cup cakes Innocent Smoothies Capri Sun drinks	7-10
Mount board	Thick coloured rigid board	Model making and high quality picture mounting	9
Corrugated card	Strong and lightweight	Packaging protection – perfume Point of sale displays	5
Corflute	Fluted plastic – light, strong weather resistant material	Exterior signage ('For Sale' sign)	5
Foam Board	Two layers of high quality card with a foam centre	Point of Sale displays Presentation boards	10
Essex board (Grey board)	Made entirely of waste paper – recycled	Inner packaging (Shoe boxes) The base of boxes	5
Plastic polystyrene	Low density, can be vacuum formed	Inserts in chocolate boxes	
Polypropylene	Flexible	Food products	
Laser photo paper	Special paper for high gloss or matt finishes	Magazine covers, presentations & photos	

INDUSTRIAL PROCESS	Common use	Advantages	Disadvantages	How it works?
Offset lithography	Newspapers Magazines Books	High quality finish Most common method used in mass production Fast	Expensive to set up	Consists of 4 printing plates (CMYK) Each plate transfers the image onto paper. The image needs to pass through all four plates before image is transferred onto paper
Vacuum Forming	Trays , casing and containers	Protects product inside of the packaging.	Expensive to set up	Sheets of thermoplastics are heated and shaped over a mould
Foil blocking	Christmas cards Expensive packaging	Makes packaging more visually appealing	Expensive	Pre- glued metallic foil is stamped onto paper and card by using heat and pressure.
Embossing	Expensive packaging	Makes brands and logos more visually appealing on packaging	Expensive to set up	Raises part of the card surface by applying five tonnes of pressure to a steel dye or stamp onto the surface.
Die cutting	To cut accurate 2D nets	Can cut thousands of 2D net accurately. Very fast	Serrated blades on the dye cutter are expensive to make so only use when mass producing a 2D net	Rounded edges or serrated edges forms the outside of the die which and is stamped into a press formed base which is made out of plywood.
Laminating	Menus	Strengthens paper or card Improves appearance Produces a wipe of surface	Plastic can over heat on the steel rollers and can effect production	The process involves heat sealing a thin layer of plastic to the printed surface using heat and pressure from big steel rollers.
Varnishing	CD covers Magazine covers Book covers	Protects the colour applied on the paper/ gives paper a matt, satin or gloss finish.	Can dry slowly onto paper if UV light not applied	Varnish is sprayed onto a printed surface and then it is passed under a UV light which dries the varnish immediately.
Blow moulding	Milk bottles, Easter egg casing	Keeps food products fresh and protected.	Expensive to set up	Plastic is blown onto the sides of a mould to form a shape.