

Leaving Certificate Technology

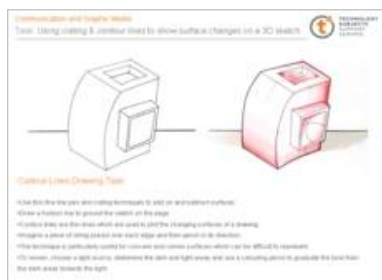


Core Module Resource:

Communications and Graphics Media

Communications and Graphics Media

Resource Document Material and Layout

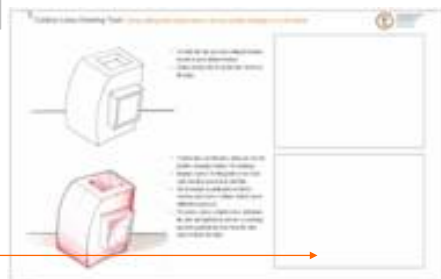


1 PowerPoint document with task instructions and communication guidelines

2 Communications and Graphics Media exercise sheets. Guidelines sheets and Photocopy template exercises included.

3 Student Practise area

- Range of tasks exploring topics and learning outcomes
- This resource pack is designed to be used in conjunction with support material, relating to design communication, produced by T4 in previous rounds.



Communications and Graphics Media

Syllabus Guidelines and Learning Outcomes



- Students should be able to.... *Select the most appropriate projection system to communicate design ideas*
- Students should be able to ... *Use light, shade, shadow, colour and reflection to communicate design material and context.*
- Students should be able to *Use freehand drawing techniques to communicate design ideas.*
- Students should be able to *Use a range of methods to enhance design drawings*
- Students should be able to *Use graphic techniques to improve sketches, graphs and diagrams.*
- Students should be able to *Model design ideas in easily worked materials and through the use of appropriate ICT software.*
- Students should be able to *Use appropriate language to convey information in a concise form*
- Students should be able to..... *Make use of ICT in the production of a report*
- Students should be able to..... *Produce drawings in accordance with standardised drawing conventions.*

Communication and Graphic Media

Sketching and Marker Rendering Equipment



Sketching equipment

- Sharp Drawing Pencils – HB, 2B, 2H
- Quality Coloured Pencils – Polychromos
- Black Fine Line Set – 0.2, 0.5, 0.8
- White Gel / Tipex Pen
- Quality Eraser and Sharpener
- Chalk Pastel Set – Glass Rendering
- Steel Rule



Marker Rendering

- Pantone Tria Triple Tip
- Letraset Promarker Twin Tip
- Cool Grey – 2, 4, 6,
- 2-3 Other Colours (Value Marker Pack)
- Optional - Bleed proof Paper – Marker Bleed



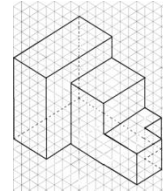
Communications and Graphics Media:

Projection Systems

- Isometric, Orthographic, Perspective Drawing

Isometric Drawing – Using 30° Gridline

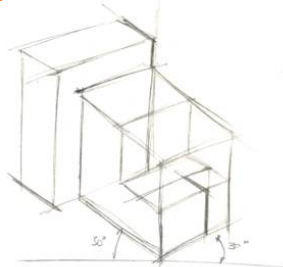
- Draw a vertical line to mark the initial height of the object and viewing edge
- Using the gridlines, project lines from the vertical line at 30° to the left and the right
- Represent hidden detail with a dotted line
- Ensure all lines in each direction are parallel.



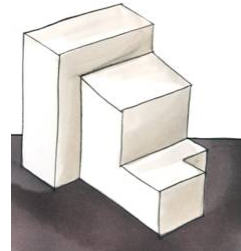
Isometric Drawing - Freehand



- 1
- Draw a vertical edge
Project lines at approx 30°
Create a frame and subtract cutouts features



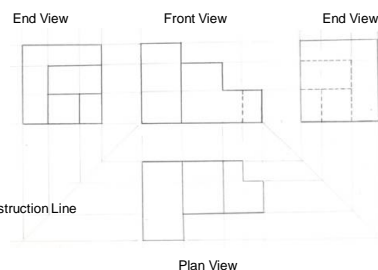
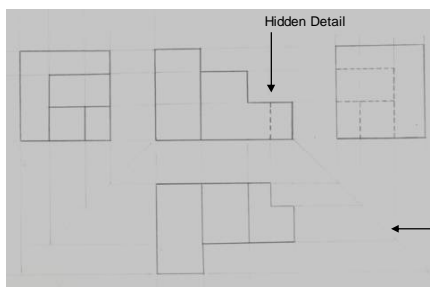
- 2
- Subtract front cutout feature
Add on rear block ensuring all lines
are parallel to existing lines.



- 3
- Fine line all lines
Remove construction lines
Cool grey 4 to create block base
Cool grey 1 to render surfaces.

Orthographic Drawing - First Angle Projection

- Decide on a suitable scale, leaving room for a page boarder and construction lines
- Draw the front view
- Project faint construction lines down to the plan and across to the end view
- Draw the plan view below the front view using the construction lines as guidance.
- To complete the end view, Draw a 45° line from the corner of the front view.
- Transfer construction lines from the plan view across, when they intersect with the 45° line, project the construction line up to the end view.
- Pencil in the end view using the construction line carried from the front view and the plan view.



Student Task:

- Draw the letters F, T, I and V in both isometric and orthographic
- Using a selection of tools and shapes available in the Technology room, present both isometric and orthographic views of chosen objects

Students should be able to

.....Produce and interpret dimensioned and scaled drawings using any of the main systems of projection.

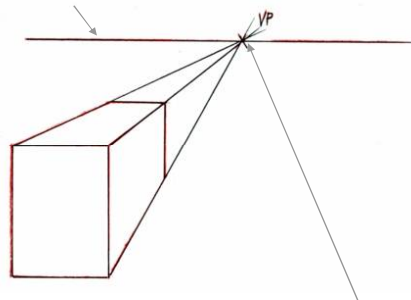


How do we recognise an object drawn in perspective?

- Objects appear smaller as they recede to the background
- Lines which are parallel appear to converge or meet in the distance
- The overall object has a sense of depth.

Perspective Key Terms:

Horizon line: The horizon line is your eye level or the line where two surfaces meet.

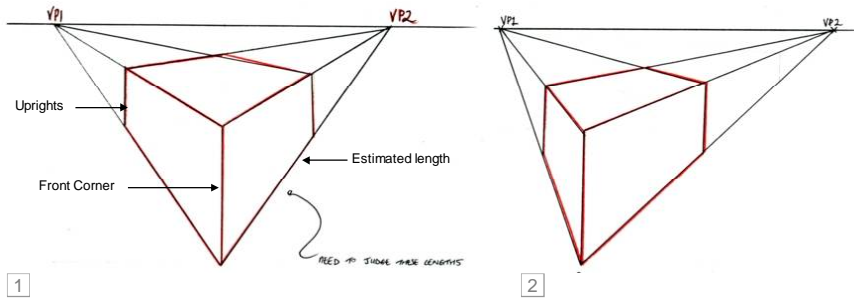


Vanishing Point: This is a point on the horizon line where all the lines will converge to.

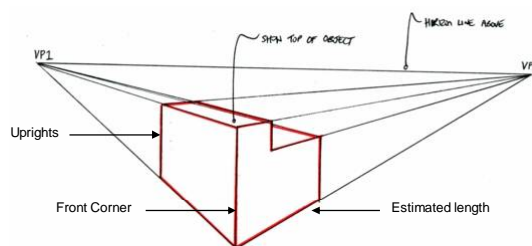
Single Point Perspective Guidelines

- Draw a flat front view
- Draw horizon line and select a vanishing point
- Lines converging to the horizon line and a single vanishing point

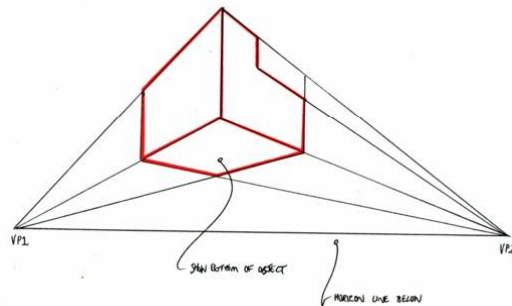
- Draw front corner
- Draw horizon line and select two vanishing points
- Draw estimated lengths
- Draw corresponding uprights
- Project rear edge to opposite vanishing points



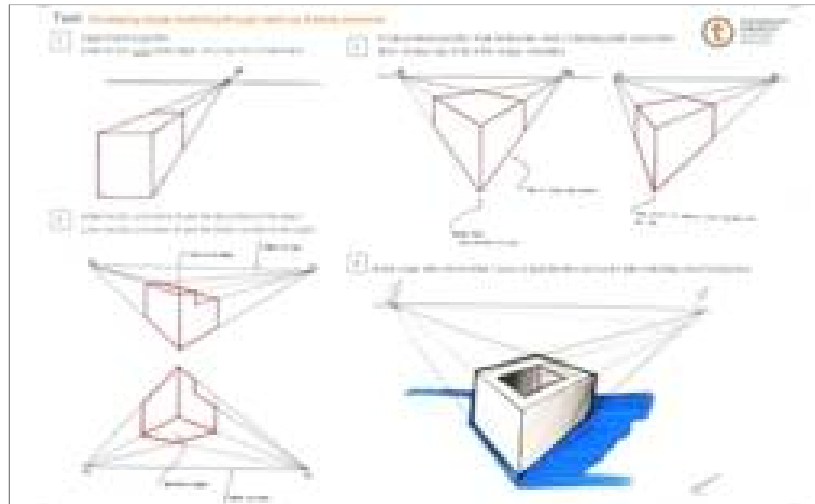
- Changing the position of the front corner between the two vanishing points creates different views as seen in drawings 1 and 2 above.



- Change the position of the horizon line to view either the top or bottom of the object.



Exercise Sheet



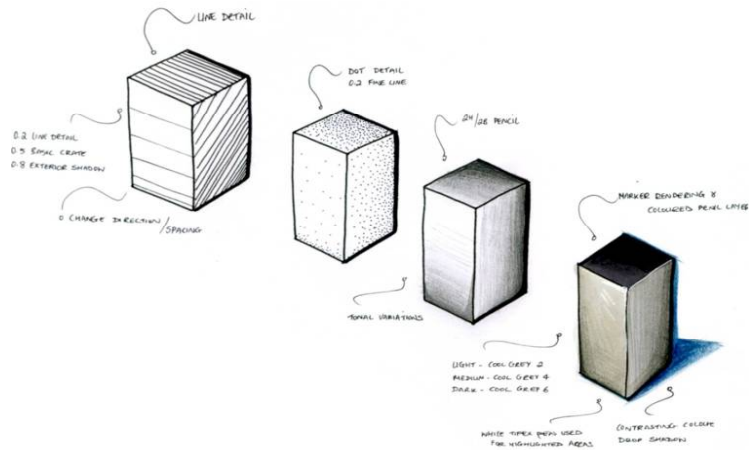
Communications and Graphics Media:

- Techniques to *enhance* freehand sketching
- Using *Crating Techniques* to build a sketch
- Using *Contour Lines* to communicate surface changes

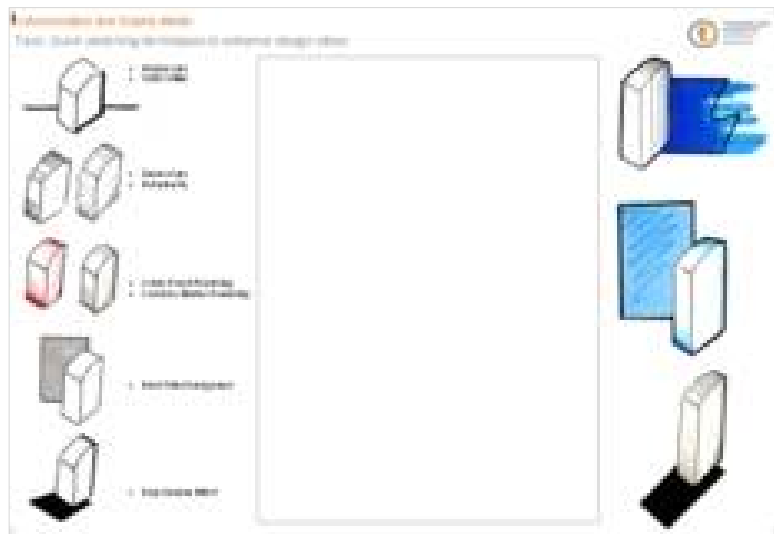
- Students should be able to

Use light, shade, shadow, colour and reflection to communicate design material and context.

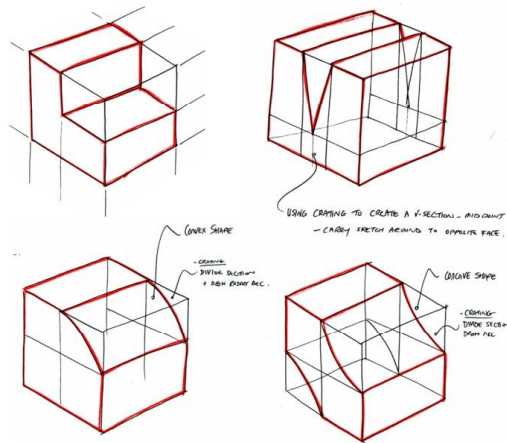
Use graphic techniques to improve sketches, graphs and diagrams.



Exercise Sheet

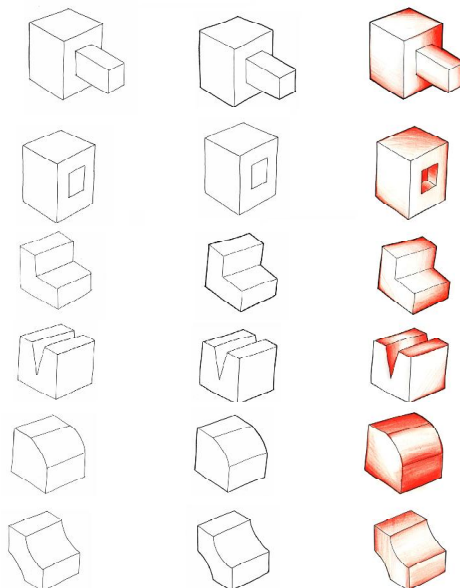


- Students should be able to
 - Select the most appropriate projection system to communicate design ideas.
 - Use freehand drawing techniques to communicate design ideas.
 - Use a range of methods to enhance design drawings

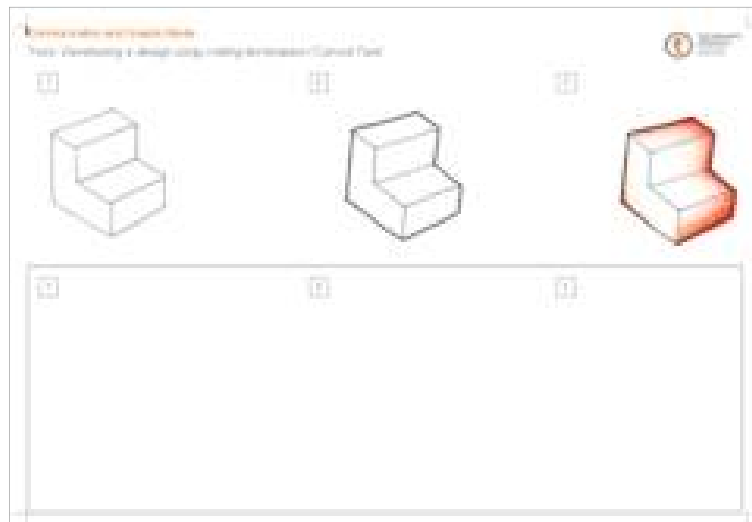


Exploring Crating Techniques →

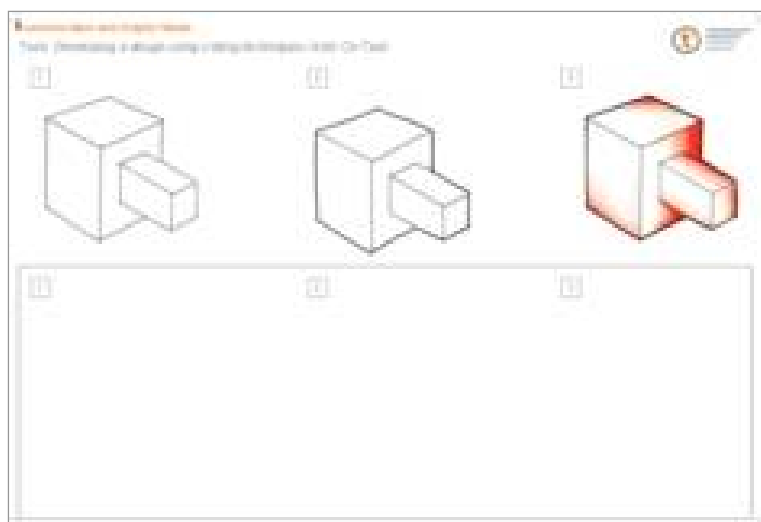
- Most sketches start as an isometric box and from that point sections can be added on and taken away to reach the final shape.
- This method of freehand drawing is referred to as *Crating*.
- Crating is a key technique in presenting a *proportional sketch*.
- Ensure all lines are *parallel* to the existing surfaces
- Dissect* surfaces, lines and midpoints to create accurate curves and to achieve symmetry



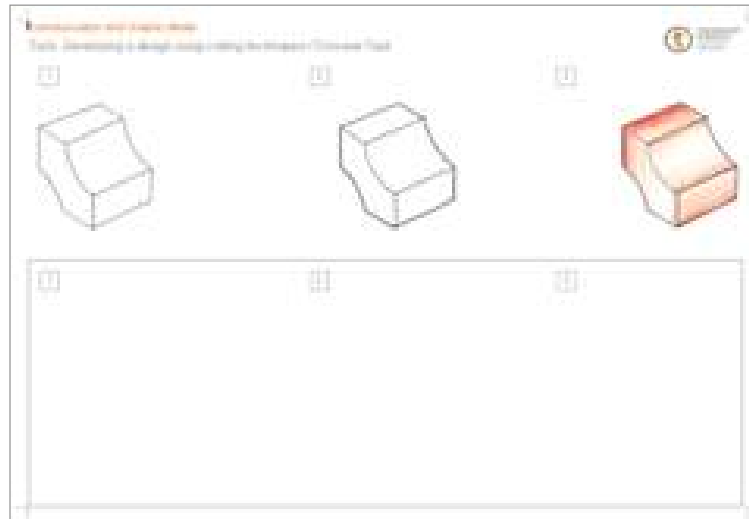
Cut-out task



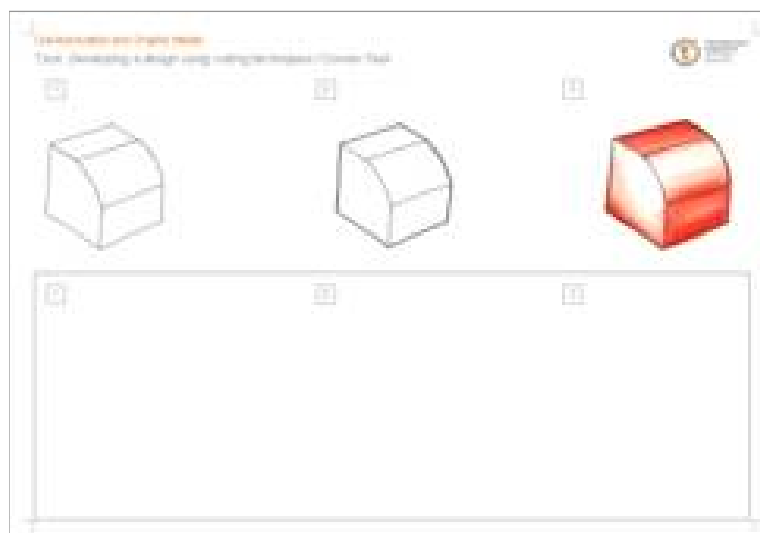
Add-On Shape



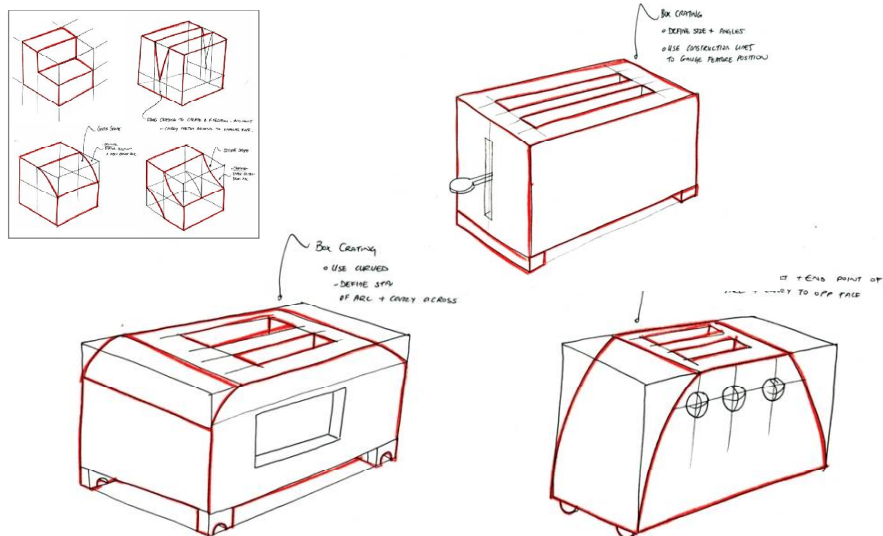
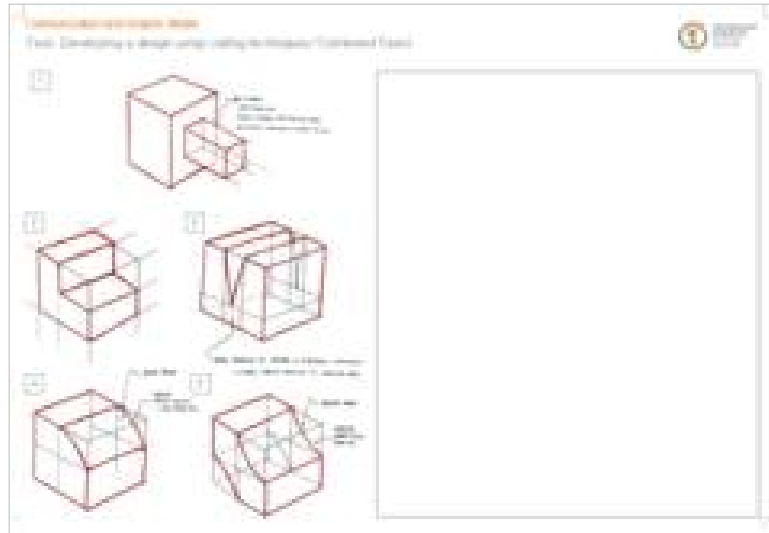
Concave Shape



Convex Shape

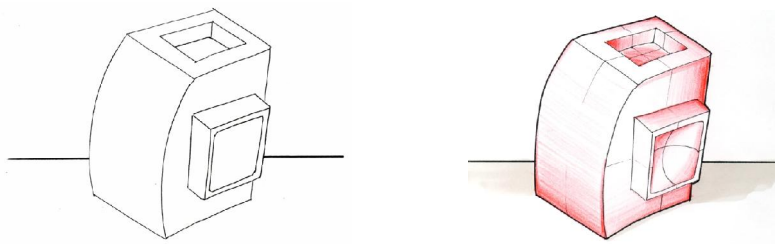


Exercise Sheet



Task: Create a range of toaster design ideas, using the crating techniques employed in previous exercises.

Exercise Sheet

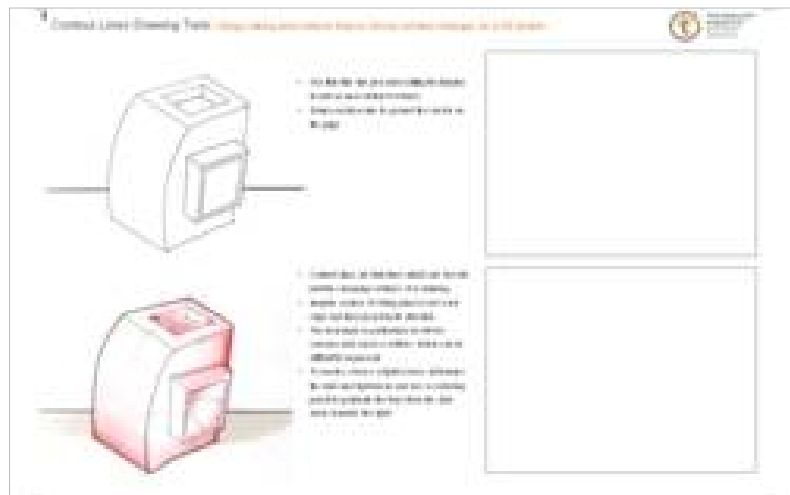


Contour Lines Drawing Task:

- Use thin fine line pen and crating techniques to add on and subtract surfaces
- Draw a horizon line to ground the sketch on the page.
- Contour lines are thin lines which are used to plot the changing surfaces of a drawing.
- Imagine a piece of string placed over each edge and then pencil in its direction.
- The technique is particularly useful for concave and convex surfaces which can be difficult to represent.
- To render, choose a light source, determine the dark and light areas and use a colouring pencil to graduate the tone from the dark areas towards the light areas.

Task :Using Crating & Contour lines to show surface changes on a 3D sketch.

Exercise Sheet



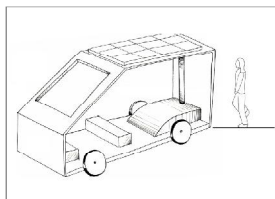
Communications and Graphics Media:

- Representing *Scale* in freehand drawings

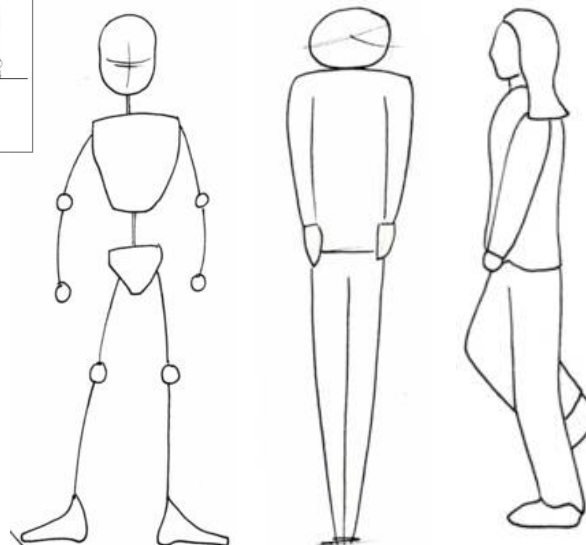
Students should be able to *Use graphic techniques to improve sketches, graphs and diagrams.*

Techniques to communicate the scale and proportion of a design concept.

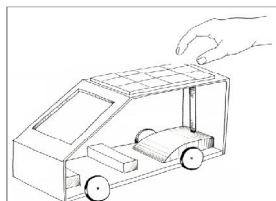
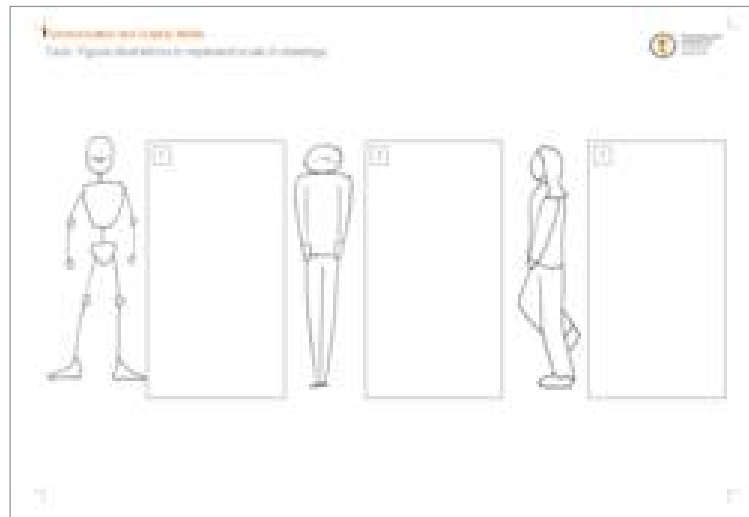
- Add dimensions in sketch format
- Sketch a hand or figure outline to gauge dimensions
- When creating a prototype model, photograph the model in context/ in use
- Photograph the model with a ruler or related object next to it



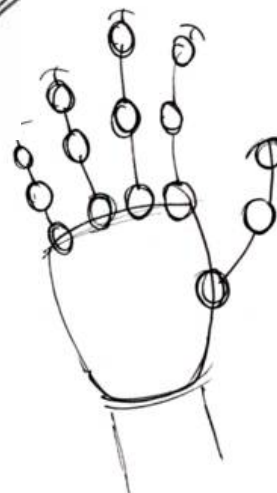
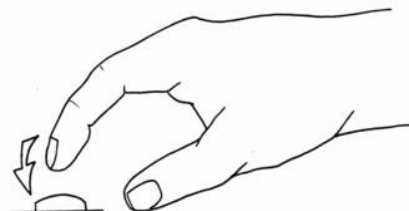
Scale **Figure** outline to use in design sheets



Exercise Sheet

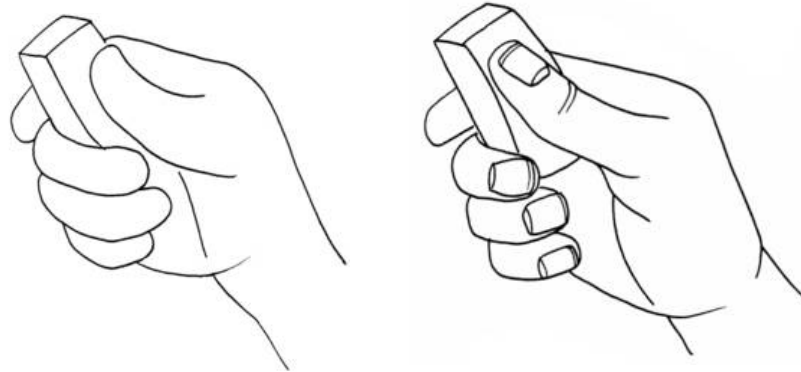


Scale **Hand** outline to use in design sheets





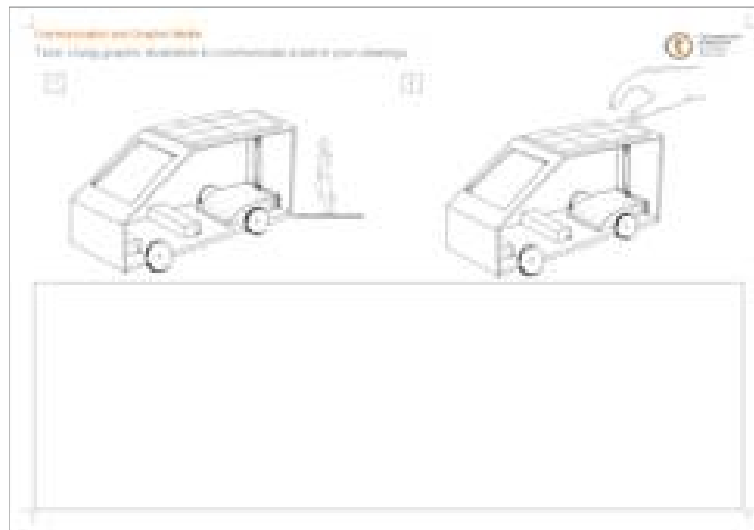
Scale **Hand** outline to use in design sheets



Exercise Sheet



Exercise Sheet



Communications and Graphics Media:

- *Rendering* techniques to communicate design ideas

Rendering / Structured Process

1. Choose a *light direction*
2. Decide *highlighted* (white) areas
3. Decide dark/ *shadow* areas
4. Layer and Tone Colour...
5. Tip....*Limit colour palette used for quick design sketching*



Rendered Cube / Low gloss material



Sketches rendered to communicate high gloss material & surface changes



- Pro marker chisel nib and point nib



- Suggested colours: Cool Grey 1, 3, 4, Additional material colour

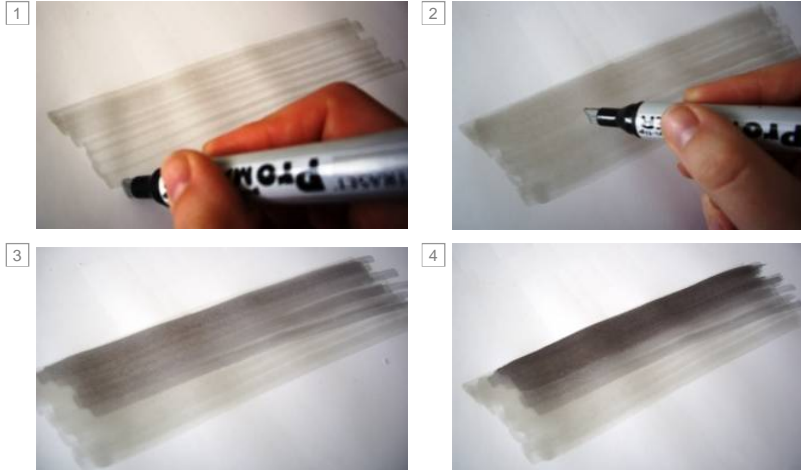
Exercises

- Sketch a variety of Cubes, Cones and Circles, decide light direction and layer marker to render.



Marker Rendering layering exercise to achieve tone

- Layer strips of Cool Grey 1 horizontally
- Allow to dry and overlay an additional layer of cool grey 1, reducing tone towards the bottom
- Layer Cool Grey 3, Dry, Layer Cool Grey 4.



Low Gloss Metal / Plastic

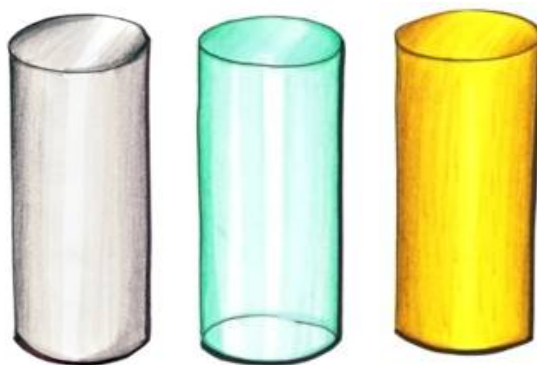
- Cool Grey Markers 2-6
- White Centre Section - Reflection
- Layer colour into centre

Transparent Plastic / Glass

- Aqua Markers, Pastel,
- Minimal Colour- Highest Reflection
- Blue Pencil
- Indicate Hidden Detail, Back Edge

Wood Section

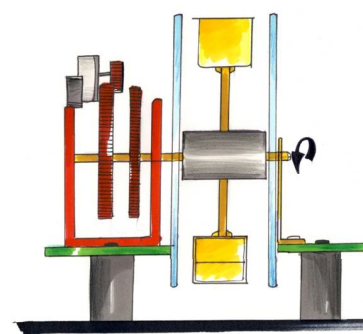
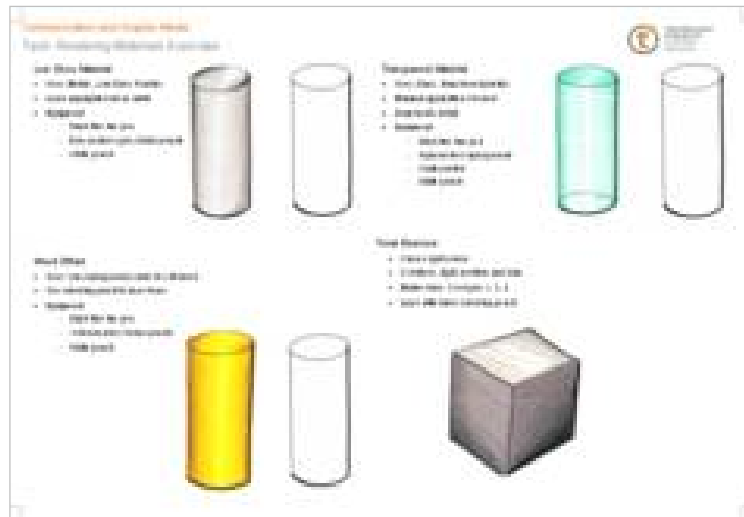
- Yellow Marker, Brown, Yellow Tone Pencil
- Indicate Grain Direction
- Vary Background colour- wood tone



Coloured Pencil and Marker swatch

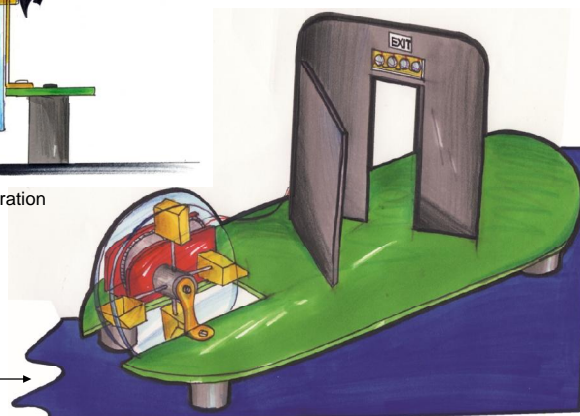


Exercise Sheet



Sectional view of technical illustration

Final Presentation Drawing



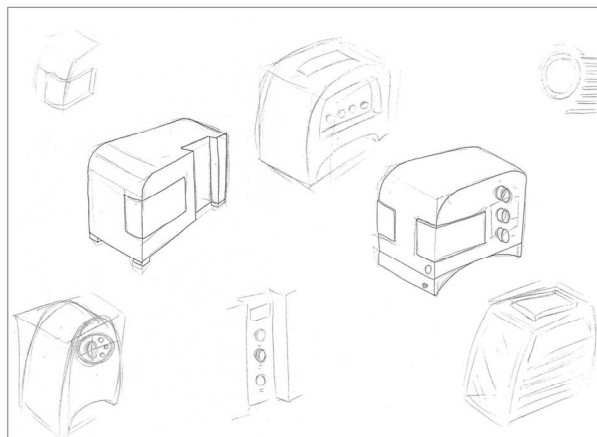
Communications and Graphics Media:

- Techniques for enhancing design *sheet layout*

Communication and Graphic Media

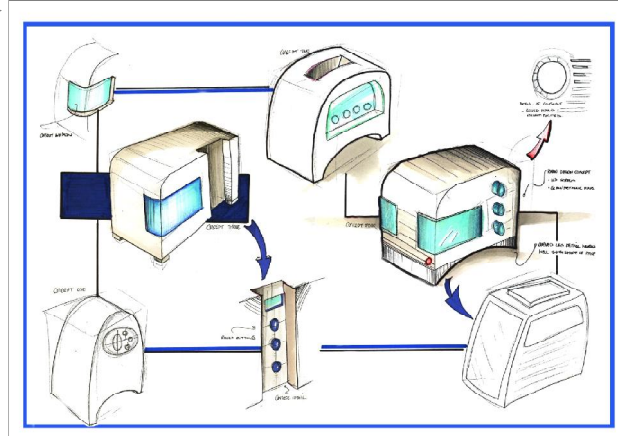
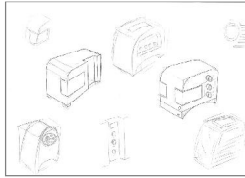
Task: Techniques for enhancing the layout and communication of design sheets

- Poor communication
- Lacks design/ feature detail
- No obvious thought progression
- No dimensions or scale
- Little design Conclusion/ Analysis



Communication and Graphic Media

Task: Techniques for enhancing the layout and communication of design sheets



- Define Space – Page Border
- Add *block boxes* to key sketches
- Limit *colour range*
- Use quick *sketching techniques* to communicate surface detail.
- Link thought progression with *connecting Lines* and *graphic arrows*
- Add *Annotation* to explain design features

Communication and Graphic Media

Task: Techniques for enhancing the layout and communication of design sheets

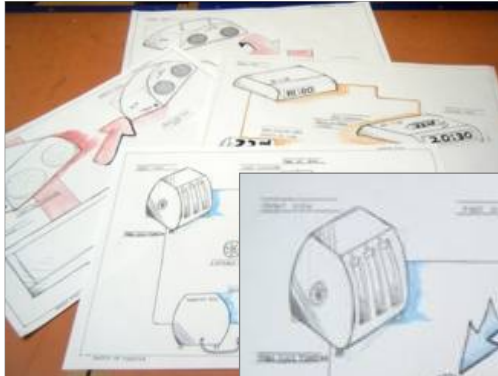


Exercise Sheet – Template Sheet to photocopy for students

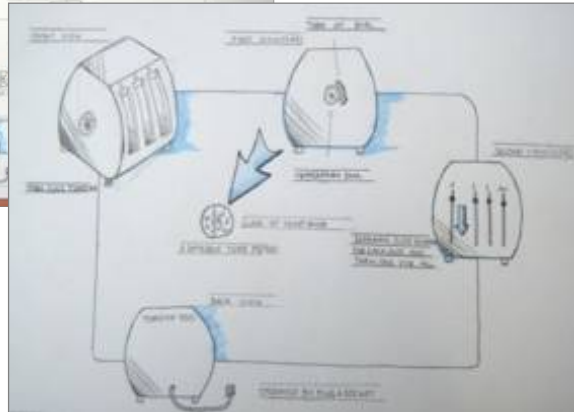


Exercise Sheet – Including Guidelines





Student Exercise sheets.....



Communications and Graphics Media:

- Combined *Presentation Drawing Exercises*

Communication and Graphic Media

Task: Combined Presentation Drawing Exercise 1



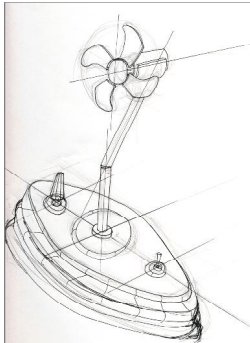
Students should be able to....

..... Use light, shade, shadow, colour and reflection to communicate design material and context.

..... Use freehand drawing techniques to communicate design ideas.

..... Use a range of methods to enhance design drawings

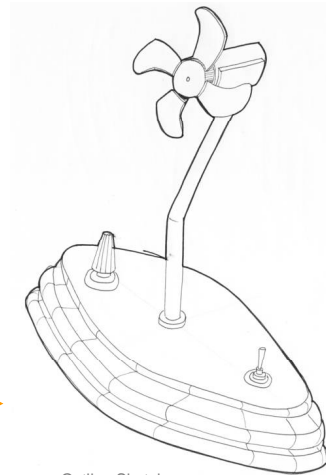
..... Use graphic techniques to improve sketches, graphs and diagrams.



Preparatory Sketch

Skills used...

- Crating for base
- Centre Line for support stand
- Solid Outline
- Contour surface detail



Outline Sketch

Communication and Graphic Media

Task: Combined Presentation Drawing Exercise 1



LEAD PENCIL - PRELIMINARY - ONLY COPY 2
- Final COPY 2



LEAD PENCIL - PRELIMINARY - ONLY COPY 2
- Final COPY 2



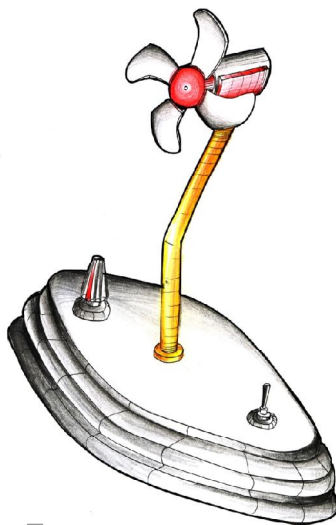
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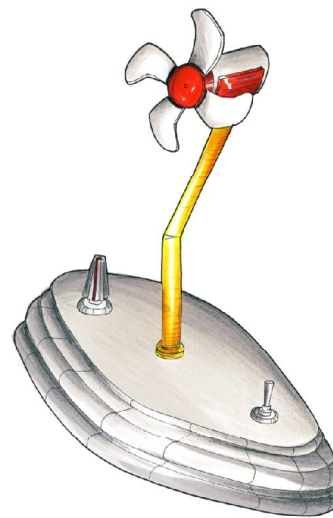
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- Final COPY 2



1 Colour Swatch



2 Colour Pencil Rendering



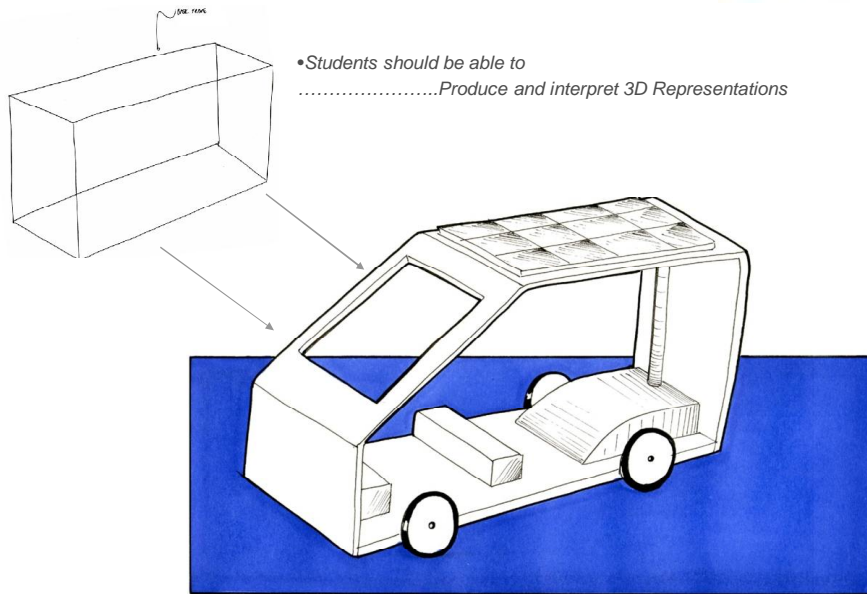
3 Marker and Colour Pencil Rendering

Exercise Sheet



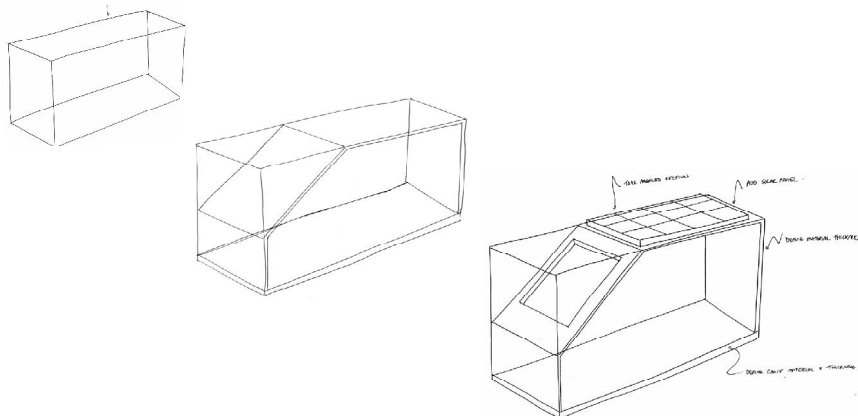
Exercise Sheet

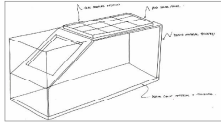




Step by Step Exercise Sheet.

- Create a light isometric crating frame, to establish the proportions of the design.
- Subtract angled section. Add material thickness. Roughly sketch position of mechanical components.
- Subtract cut out window. Add solar panel using light contour lines to indicate surface changes .

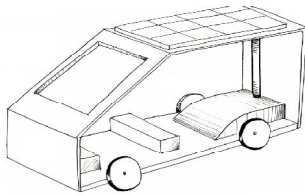
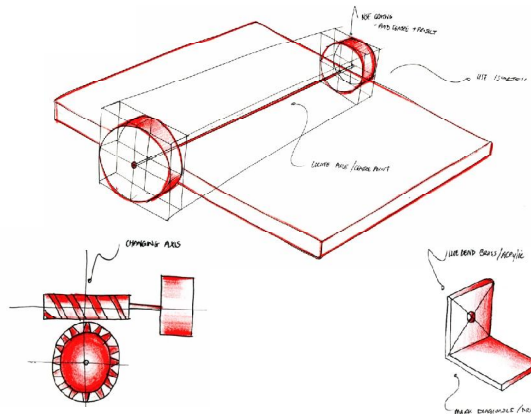
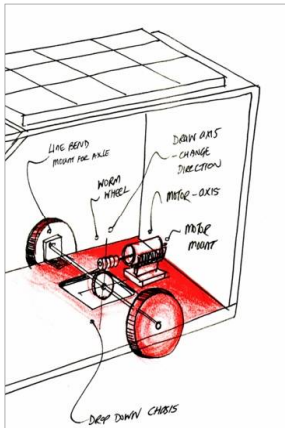




Step by Step Exercise Sheet.

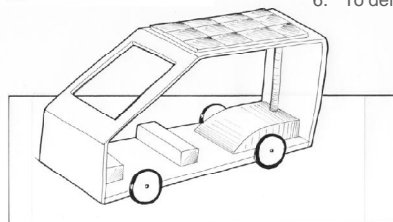
4. Sketch mechanical components to ensure the design functions within the frame provided.

Using crating and pencil rendering techniques, explore various axle positions, drive gear mountings, directions of rotation, axle mountings and motor enclosures.

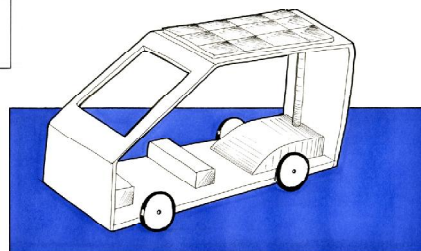


5. Add housing to conceal motor and mechanical workings.
Add wheels and vertical tubing to housing wiring.

6. To define the sketch, create a block shaped background



7. To finish, use thick fine line pen around the outside edge.
Apply solid colour to the inside of the block shape.



Activity Drawing Task *How can you use cardboard boxes to create a car model?*

1. A rectangular cardboard box is shown.
2. A diagonal line is drawn on one side of the box, indicating a cut.
3. The cut is made, creating a triangular flap.
4. The triangular flap is folded down to form the car's body.
5. The car's body is shown with wheels attached.
6. The car's body is shown with a roof and windows added.
7. The final completed car model is shown.

Task: Designing and constructing the design to develop a design idea

1. Identify the problem or challenge
2. Research and gather information
3. Generate ideas
4. Develop a solution
5. Create a prototype
6. Evaluate and improve the design

Template guideline sheet

- Concept *Development* Sheets
- *Exploded* Drawings
- *Centre Line* Drawings

Using a combination of freehand sketches, annotation and technical illustration to communicate a concept's development.

- [illegible]

Design Sheet 1

solar panels

wind turbine - this would be used to light the wheels

base will be made from wood to combine

new design for the front with a more aerodynamic shape

new wheel design

cover for wheels

P.T.O.

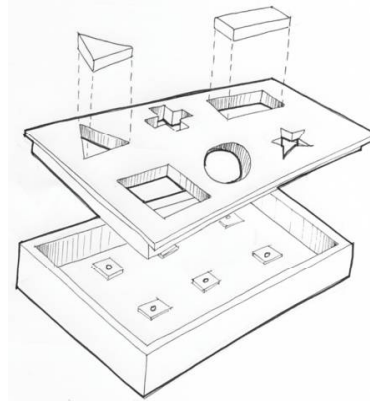
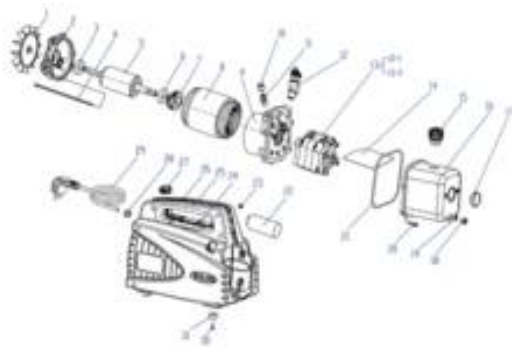
Development

Design Development

Student Task :

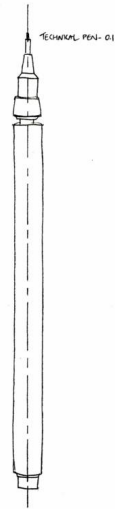
Complete a page of concept designs and developments for a solar powered vehicle suitable for transporting ten passengers

- An exploded drawing shows all the parts of a design separated or exploded in line with the corresponding plane.
- All parts should line up using vertical and horizontal guidelines
- All components are shown and can be labelled using the system below and a legend key.

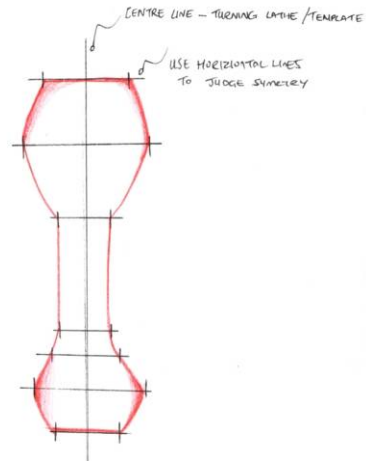


Exercise Sheet





USING CENTRE LINES FOR SKETCHING



- Modelling design concepts in 2D and 3D form

Communication and Graphic Media

Task: Using model making to *explore design ideas*



Students should be able to model ideas in easily worked materials and/or through the use of computer software.

- For physical model making use a combination of paper, foam board, expanded polystyrene
- For virtual model making use Solid works, GIMP, Google sketch- up. (T4 support material supplied in previous rounds)

- 1 Foam board concept model
- 2 Solid works frame development
- 3 Final design



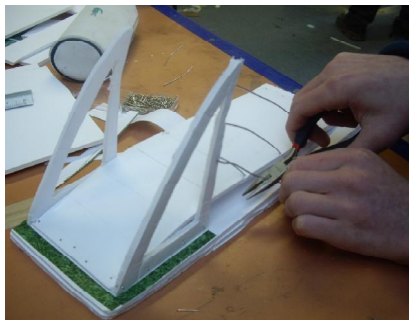
Communication and Graphic Media

Task: How can students *record decisions* made through the modelling process?



Following model-making students complete a *Model Analysis Sheet*

- Indicate the strengths and weaknesses of the design
- Use the model to explore proportion, scale, structure, mechanics, aesthetics, ergonomics, usability.
- Indicate design modifications, Further research and development.



Communication and Graphic Media

Task: Developing a design through the *disassembly* of an existing model

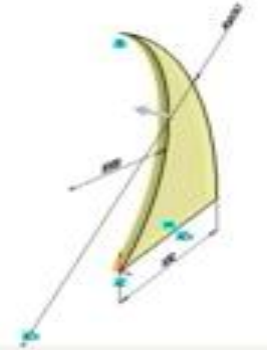


Using foam board and Solid works to modify a design concept

- Change position of LED housing
- Elevated car logo from base to a more central position
- Explore side panel shapes on Solid works.
- Ensure Motor and electronics are housed in base unit



1



2



3

Communication and Graphic Media

Task: Model making – Equipment List



Equipment

Cardboard, Paper
Architectural foam board – 5mm
Dressmaking Pins, Butterfly clips
Styrofoam – Extruded Polystyrene – Blue/ Pink Foam
PVA, Contact Adhesives – UHU
Shaping - Selection of Rasps, Surforms, Files, Glass Paper
Decoration – Vinyl (Offcuts), Beads, Craft Accessories



Communications and Graphics Media:

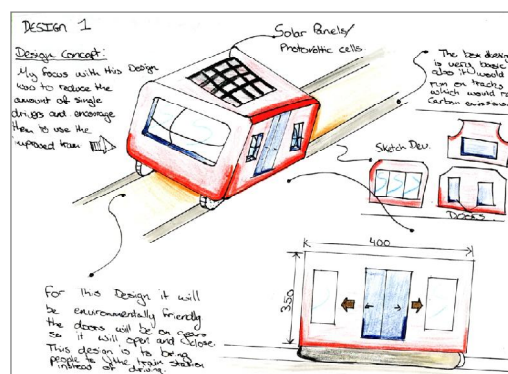
- Design *language* and Key terms
- Additional student *rendering exercises*

Communications and Graphics Media

Task: Key Terms used in the *Communication* of design ideas.

Students should be able toUse appropriate **language** to convey information in a concise form

- Adherence to the project brief and specifications
- Design Function
- Design Aesthetics
- Mechanical features
- Electronic features
- Materials
- Colour and finish
- Manufacture
- Assembly / Disassembly
- Waste management
- Ergonomics
- Usability / User needs
- Research of existing products
- Environmental impact
- Social and Moral impact
- Sustainability
- Control features
- Quality management
- ICT



Exercise Sheet



Exercise Sheet

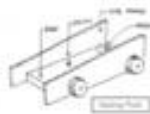


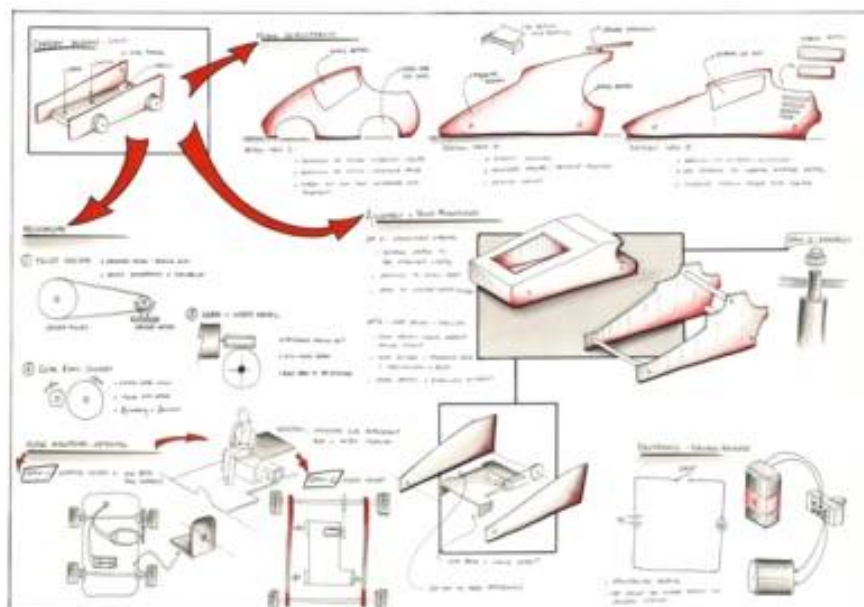
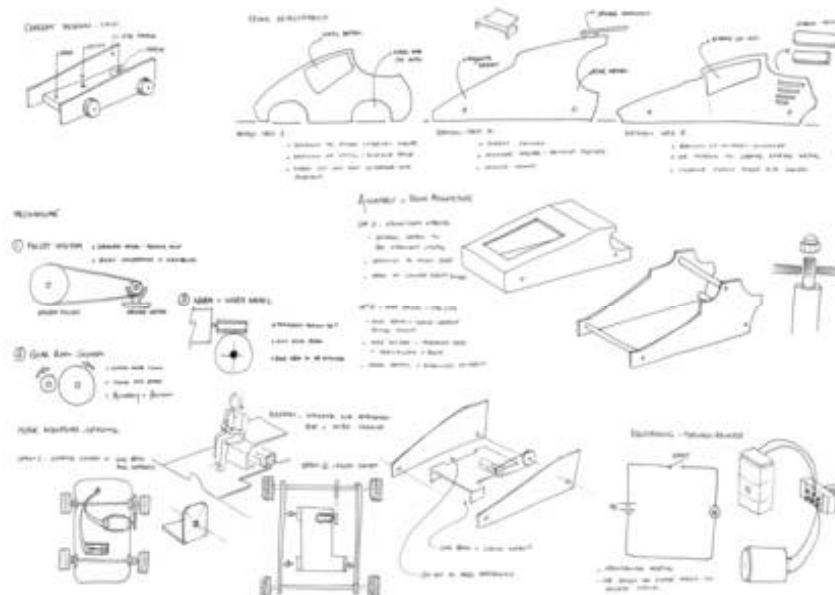


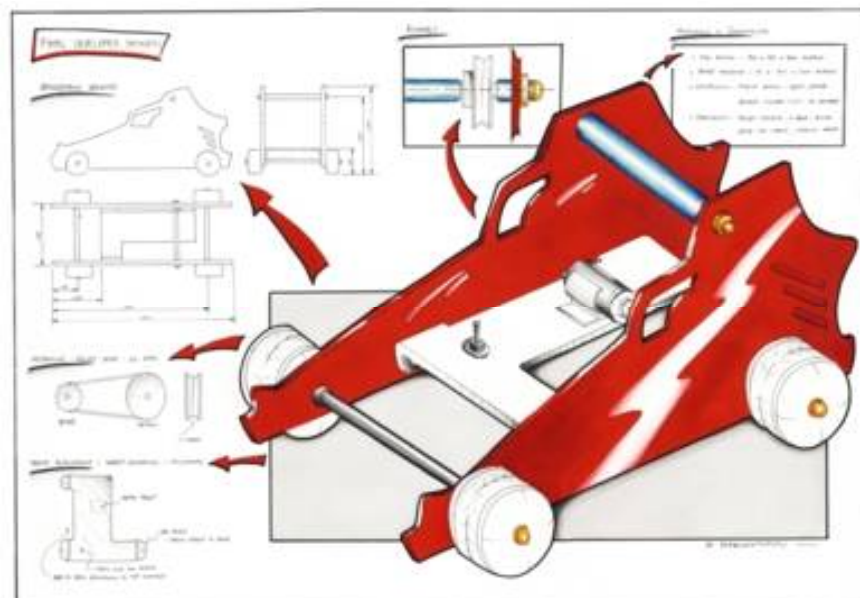
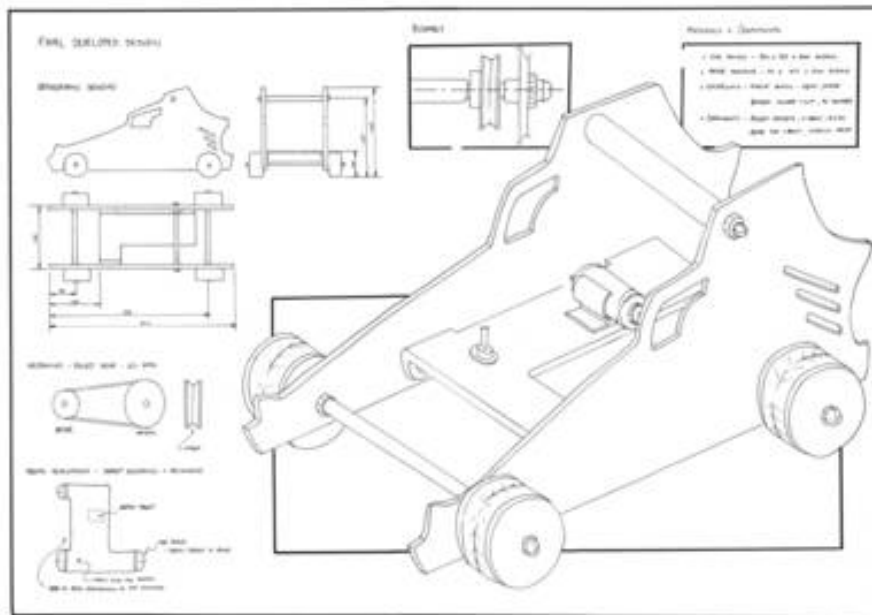
Concept Development Worksheet

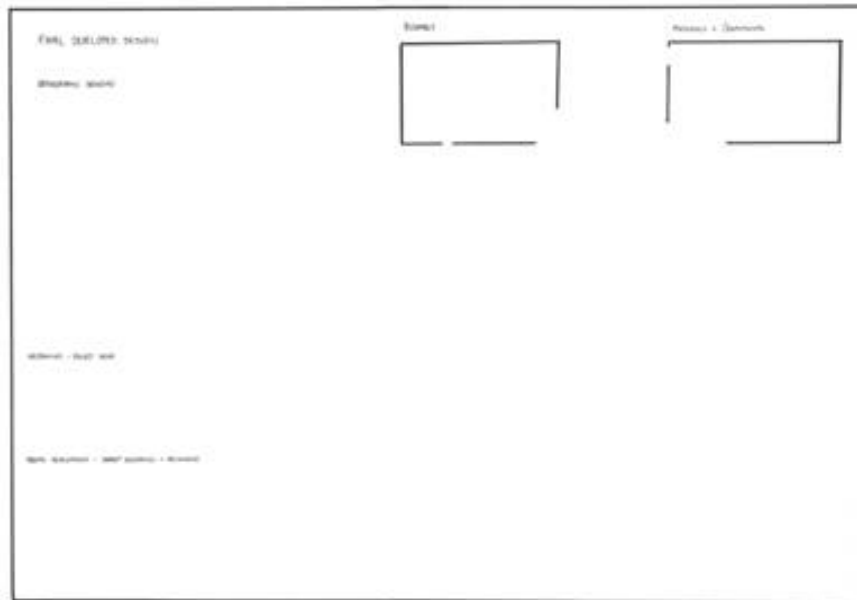
Suggested areas to explore:

- Possible mechanisms
- Electronics
- Form and Structure
- Assembly and Manufacture
- Materials and Components
- Integrating electronics and sensors
- Aesthetics
- Design in context









- *Starter Resource Pack - Basic sketching*
- *Gimp - Image Editing Resources*
- *Sample project design folders - Production of a report, design language resource*
- *Word Processing and File saving – Resources available in ICT core and option module*
- *SolidWorks - 3D Modeling Training Resource*