EDUC 90478 - LEARNING AREA VISUAL ART 2

ASSIGNMENT 2.2: VCE RESOURCES PROJECT

VISUAL COMMUNICATION DESIGN •

UNIT 2 / OUTCOME 1 •

TECHNICAL DRAWING IN CONTEXT •

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Content

Teacher Cover Sheet

**VISUAL COMMUNICATION DESIGN
UNIT 2 / OUTCOME 1
<u>TECHNICAL DRAWING IN CONTEXT</u>**

Technical drawing is the composing of drawings that visually communicate how something functions or is to be constructed. Imagine you are the designer and you are giving your plans to a factory or builder to create for you. They need to completely understand the language you use to accurately bring your ideas into the world. The clearest language to communicate this to each other is the visual language, technical drawings. Technical drawings make ideas easier to understand as people use familiar symbols, perspectives, units of measurement, notation systems, visual styles and page layout. This ensures we remove ambiguity and become easy to understand. Technical drawings are matched towards international standards and therefore universally understood. This only highlights the level of accuracy that technical drawings should possess. In today's society most technical drawings are created digitally, therefore it is in our student's best interest to be able to practice them using digital software. Of course the foundation knowledge and understanding of these drawings can be built through manual drawing systems.

Technical drawing are used in two of the following contexts within Visual Communication and Design. They are:
Environmental design
Industrial/product design

For this outcome you need only to selected one of these design fields to perform a detailed study on. However this resource will provide you the choice of both.

Key Knowledge

• the conventions of presentation drawings associated with a selected field
• techniques for recording and reflecting on decision making
• purposes of presentation drawings and methods to refine drawings using manual and/or digital methods
• two-dimensional drawing methods such as plans and elevations (environmental), and third-angle orthogonal projections and packaging nets (industrial)
• three-dimensional drawing methods such as perspective, isometric and planometric and/or threedimensional process (environmental and industrial)
• rendering techniques for depicting the direction of light, shade and shadow and for representing surfaces, materials, texture and form
• measures for evaluating effective drawings such as readability, clarity, accuracy, communication of message, usability, relevance
• technical drawing conventions used with presentation drawings such as those related to layout, dimensions, labels, symbols and lines
• role of Australian Standards in providing nationally accepted conventions for technical drawing
• methods of drawing to scale using conventional ratios:
– 1:50, 1:100, 1:25 (Environmental)
– 1:1, 2:1, 1:5 (Industrial).

Key skills

• apply drawing methods that are suitable for presentation drawings and the selected field
• use manual and/or digital methods to create presentation drawings
• select and apply technical drawing conventions used with presentation drawings
• select and apply two- and/or three-dimensional methods to represent form, proportions and scale.

Outcome overview

Focus
This resource will provide a learning activity that is focused towards building the skills to create technical drawings and to reflect and evaluate during the process. However we want students to be actively thinking about design, but due to time constraints the design process will not be completely explored during this activity and can be visited later in the unit with Outcome 3.

Rendering
In addition to drawing technical drawings students are also required to consider surfaces, materials, texture and form. They will represent these in their three dimensional drawings using rendering techniques, depicting light, shadow and shadow to address these considerations. Considerations should match their design and be discussed and reflected on in writing. Students will be given scaffolds on how to represent the various surfaces, materials, texture and form.

Digital Component
Within this outcome it is also ideal for students to practice digital software. In this resource we will be using Adobe Illustrator. This can be used to represent any of the technical drawings and can be used for all of them if students are able to easily grasp the concepts of technical drawing. The resource will provide a short workshop and tutorial activity you can perform with your students to be able to create technical drawings using Adobe Illustrator.

Writing
In addition to acquiring technical skills to develop these communications students will also develop reflective practice. Within this outcome students are expected to record and reflect their design decisions whilst they develop their ideas. Students are also required to display knowledge of the measures of evaluating the effectiveness of their drawings such as readability, clarity, accuracy, communication, usability and relevance. These should be scaffolded for the students and there will be an example within this resource.

Assessment
During these learning activities we want to focus our assessments on the student's ability to create accurate, readable, clear and usable technical drawings. In addition we want to assess their ability to record and reflect using annotations and being able to evaluate their drawings. These skills will become the foundation for future environmental design work and Units 3 & 4.

INDUSTRIAL DESIGN resource outline

Within the field of industrial design students can focus on a specific area such as appliances/homewares, packaging, tools and transport. Within this document we will be looking at homeware and packaging.
In this outcome students will be acquiring the knowledge and skills to be able to communicate ideas to a client using technical drawings and their conventions. These include both representing forms using two- and three-dimensional presentation drawings.

This resource will look at the following drawings for industrial design:

Two-dimensional:
orthogonal drawing
packaging net

Three-dimensional:

ENVIRONMENTAL DESIGN resource outline

Within the field of environmental design students can focus on a specific area such a architectural, interior or landscape design. Within this document we will be looking at interior design.
In this outcome students will be acquiring the knowledge and skills to be able to communicate ideas to a client using technical drawings and their conventions. These include both representing forms using two- and three-dimensional presentation drawings.

This resource will look at the following drawings for environmental design:

Two-dimensional:
plan view
South elevation
West elevation

Three-dimensional:
isometric drawing
planometric drawing

Industrial Design Project Outline

Visual Communication Design
Unit 2 Applications of Visual Communication Design
Area of Study 1 / Outcome 1/Technical Drawing In Context

We are now approaching towards Outcome 1 of Unit 2. For this Outcome you are required to be able to create accurate, readable, clear and usable technical drawings.

What are technical drawings?
Technical drawings are drawings that visually communicate how something functions or is to be constructed. They are to be drawn following a set of standards, in our case by Australia, using familiar lines, symbols, perspectives, units of measurement, notation systems, visual styles and page layout. We will be practicing the following technical drawings within environmental design which includes:

Two-dimensional drawings:
Orthogonal drawing
Packaging net

Three-dimensional drawings:
One-point pespective
Two-point perspective
Isometric drawing

Why do we use them?
Ever had an amazing idea for an invention or building and explained it to a friend? Do they completely understand what you're talking about? Did drawing an image help? Now if you told them to make it for you, would they be able to make exactly what you're thinking? Imagine you wanted to get this idea produced by a professional builder or manufacturer. How are you going to get them to create exactly what you want? Technical drawings!

Technical drawings follow a set of standards and have become a common visual language between designers and manufacturers. They communicate an accurate representation of your idea as opposed to words and sketches that are open to various interpretations.

Task at hand:

You are an industrial designer and you are about to design a furniture piece for your employer base on the design brief given. Once you have completed your design idea, in order for the manufacturer to produce it, you must provide the following drawings:

Orthogonal drawing (third angle projection and isometric drawing)
Perspective drawing (one point perspective and two point perspective)
Rendered drawing (shaded drawing and textured drawing)
To be able to improve yourself as an industrial designer, you must evidence the following along your design process:
Records and reflection on design decision making
Evaluation of the effectiveness of your drawings (readability, clarity, accuracy, communication, usability and relevance)
Also, you need to design a packaging for your furniture, this will need you to produce a digital packaging net.

Project Timeline

Monday Double	Wednesday Double	Friday Single
Introduction to the project; Interpreting design brief Research for inspiration	Idea generation & development	Introduction to Australian Standards and technical drawing Due: Research page * 2
Orthogonal drawing: third-angle projection	Orthogonal drawing : third-angle projection Due: Idea generation and development drawing * 4	Orthogonal drawing : isometric drawing
Orthogonal drawing : isometric drawing	Perspective drawing: one point perspective Due: Orthogonal drawing page * 1	Perspective drawing: two point perspective
Perspective drawing: two point perspective	Rendering technique: shading	Rendering technique: shading Due: perspective drawing page * 2
Rendering technique: texturing using markers Due: Rendering (shading)page * 2	Rendering technique: texturing using markers	Final presentation page production Due: Texturing page * 2
Final presentation page production	Packaging net: Adobe Illustrator	Evaluation Due: Final presentation page * 1

Industrial design Final presentation Assessment rubric

Alignment with design brief	Application of perspective drawing	Use of textual element	Composition of poster	Application of marker as media	Use of verbal communication to propose design idea	Use of body language to engage audience
Provide highly developed idea that appeals to target audience efficiently	Ultilise well-developed perspective drawing skills to visualise key features of the design concept	Ultilise comprehensive texutual components to supplement visual fea-		Use markers to create both texturing AND shading effect.	Explain the design concept clearly and cohesively using engaging, persuasive language.	
Provide concept that address-es the key components of the design brief	Use perspective drawing skills to show different perspectives of the design concept	Use textual components to describe the design concept efficiently	Arrange components of the poster in a visually ap-pealling way through the use of design principles.	Use markers to create texture OR shading.	Explain the design concept clearly and cohesively	Use body language to engage the audience AND to promote the design concept
Provide concept that sits within the appointed design field	Include essential perspective drawings	Include textual components in the poster	Some key features of the poster are emphasised over the others	Use markers as media for the drawings.	Able to describe design concept	Use body language to engage the audience
Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence

Design concept	Presentation Poster				Delivery of presentation	

COMMENT

GRADE

/20

Furniture Design

Design research + Design brief

Industrial design is about problem solving. The word 'problem' is not necessary a bad term. It could an actual problem that needs to be fixed or adjusted. You might find there is a 'gap' in a certain market that needs to be filled. For example, we sometimes find it hard to plug two chargers onto one adapter next to each other due to the size. This could be a problem for companies which design adapter to think about. A 'problem' could also be an aspect of our life that hasn't been addressed before. For example, can there be a pet feeding machine be installed on the street that automatically give out food for homeless dogs or cats that walk pass it?

The design problem that you need to solve is defined for you in the design brief provided. Similar to what you have learnt in Yr 10 VCD, a design brief is a document that communicates the design needs and other information between you and your customer.

In order to generate your furniture design idea, the first step is to research according to your design brief. This is not limited to online research only. Besides looking on Pinterest or other websites, you may want to look around the real world around you and look for inspiration. This may include: reading, having conversation with people, walk around the streets, conduct market research, visit design shops and markets...

Tasks

By the end of this week, you are expected to...
- **Produce two A3 research pages.** Print and paste the inspiring images from online resources(or photos you take This can be done digitally and printed as well. Don't forget to write annotation beside each of them, indicating your thoughts and the reason of why it inspires you.
- **Start creating your own Pinterest pin board**; gather images that inspired you during your design process. This is a continuous process throughout the unit.

Design Brief

Kiddo Furniture is a furniture company which designed and produce furniture for small children and teenagers. They are specialised in designing and manufacturing safe, functioning and aesthetic furniture pieces for primary and secondary school children.

As a furniture designer in this company, you are given a task of designing a study table for teenagers at secondary schooling period. When designing the study table, you are expected to consider the following requirement:
1: The table needs to be very safe for users to use.
2: The table needs to include space for users to store their books and other learning materials.
3: The table needs to ble able to fit two users at the same time.
4: The table needs to be relatively easy for users to move around the room.
5: The table needs to be multi-functioning.
6: The table can have portable components.

This study table is expected to create a safe and comfortable space for users to spend time within. It aims to enable users to study efficiently and comfortably. Users can use this table to read, write, draw, using laptops, listening to music and many more. The appearance of this table needs to be appealing to teenagers at secondary year levels. In your final design proposal, you can include different color versions if appropriate.

The audience for the this design will not necessarily be only for teenagers as their parents are usually involved in the decision making when purchasing. Hence, you will need to consider wether your design can effectively address the concern from parents.

CLICK FOR Pinterest Page

Furniture Design
Idea generation and development

Once you have conducted enough research, next step is for you to generate design ideas. Some design thinking tools we have learnt before are brainstorming, PMI, SCAMPER and etc. Now, it is time for you to use these techniques to generate as many design ideas as you can. Once you have decided your final idea, you can develop it using other design thinking techniques such as storyboard and six thinking hats. The techniques provided by this handout are just a few examples of the techniques you may want to consider using. So go back to our previous worksheet or research online for more design thinking techniques!

Tasks

By the end of Wednesday doyble in week 2, you are expected to :
- **Produce two A3 pages of idea generation with annotation.** Use and indicate at least two design thinking techniques.
- **Produce two A3 pages of idea development with annotation**. Use these pages to clearly show how your idea has evolved to from a spark of light to the final idea.

SCAMPER

S : Substitute. Remove some part of the accepted concept and replace it with something else.

C : Combine. Join, affiliate together two or more elements of your subject matter.

A :Adapt. Change some part of your problem so that it works where it did not before.

M :Modify.Consider many of the attribute of the thing you're working on and change them, arbitrarily, if necessary.

P :Purpose. Think about why it exists, what it is used for, what it's supposed to do. Challenge all of these assumptions and suggest new and unusual purposes.

E :Eliminate.Arbitrarily remove any or all elements of your subject, simplify, reduce to core functionality.

R :Reverse. Change the direction or orientation. Turn it upside-down, inside-out, or make it go backwards, against the direction it was intended to go or be used.

DE BONO'S THINKING HATS

BENEFITS — Yellow
Positives
Advantages
Improvements
Benefits
Optimism
What are the good points?
Why is this one preferable?
How can we make this work?

PROBLEMS — Black
Weak points
Negatives
Downsides
Bad bits
Pessimism
What is wrong with this?
What do we used to be careful of?

PLANNING — Blue
Working out
Analysis
Organisation
Reasoning
Thinking
What thinking is needed?
What is our planning?
What's the next step?
How can we summarise it?

IDEAS — Green
Solutions
Recommendations
Proposals
Possibilities
Alternatives
What are our suggestions?
Are there any other ideas?
Are there any alternatives?
Could we do this a different way?

EMOTIONS — Red
Feelings
Guesses
Hunches
Gut reactions
How do we feel about it?
What are our hunches?

FACTS — White
Figures
Informations
Details
Proof
What information do we have?
What information do we need?
What information is missing?
How are we going to get the information we need?

PMI

PMI (plus, minus, interesting) is a brainstorming activity that encourages participants in a discussion to look at an idea from more than one viewpoint. PMI was developed by Dr. Edward de Bono, a proponent of teaching critical thinking in schools. The goals of PMI are to help participants see both sides of an argument and think more broadly about an issue. Dr. de Bono felt that one of the problems with traditional thinking is that people focus their attention on how to back up an opinion that has already been formed. PMI is designed to open up each participant's thinking and encourage creativity.

Change Perspective

This can often be hard to do, but try putting yourself in other people's shoes. Sometimes you can get too attached to your own work.You may be too close to notice that there are faults visible from afar. Share your ideas with others, and get a fresh pair of eyes to look at your work. Encourage constructive criticism, you don't have to take it all on board, but it may offer up some seriously beneficial observations.

Storyboard

Storyboards communicate a concept by visualizing user interactions. They use the art of the narrative to focus on a person's experience of using your service. Storyboard development is one way to prototype your service concept.Instead of developing costly technology and hiring people to prototype your concept, a pen and paper is really all that's required to create a storyboard. Furthermore, when you're introducing something unfamiliar, pictures are easy to grasp.

In this particular design task, think about : Does my furniture stand by it own? Or is it a component of something bigger? Can I make my furniture a component of a bigger service system?

Furniture Design

Technical drawing and Australian standards

Technical drawings are based on a set of standards that have been globally agreed upon by the International Standards Organisation (ISO). These standards are then tailored to the needs of each country, depending on their measuring system (metric or imperial), environmental conditions, manufacturing processes and developments in technology. The Australian Standard AS 1100 provides the technical conventions for all Australian engineers, architects, designers, surveyors and patternmakers to follow. More information about Australian standards for technical drawing can be found at www.saiglobal.com.

This is unit, you are going to learn how to produce presentation drawings.Presentation drawings. This means you will incorporate technical drawing conventions based on the Australian Standards in your final presentations. By looking at how to produce a orthogonal drawing, you will be introduced those conventions and rules of technical drawing.

Scale

There are set rules when applying scaling to your drawings within the industrial design field. Always use the scale which allows for the most information to be communicated about the object. When choosing a scale,make sure it remains consistent throughout the whole drawing. In orthogonal drawing, if you are choosing scale 1:2, all of your drawing views need to be on the same scale.

Where the object does not fit to the page, reduction ratios are used. These start at 1:2, 1:5, 1:10, 1:20, 1:50 and 1:100 (house) for drawing smaller than full size. Where the object is too small to work with easily enlarged ratios are used. These start at 2:1, 5:1…for drawings larger than full size. To interpret these scale,the number on the left represents the scale of the drawing; and the number on the right represents the scale of the actual product. For example, in a draiwng with the scale 2:1 , 2mm on the drawing is 1mm in real life. This means the drawing will be larger than the actual object.

Instrumental drawing tools refers

to tools to be used during the manual process of technical drawing. Technical drawing (or instrumental drawing) is different to freehand drawing because every line you draw needs to be drawn by drawing tools. The only exception to this would be arrow heads or writing labels. Some of the most common tools you will use in this unit include: Rulers, Set Squares, T-squares, Compasses, Drafting boards, Dividers and etc...Technical drawing can also be digitally generated using 3D softwares such as Solidworks.

Third – angle Orthogonal Projection Symbol

Because there are two projection systems used world-wide, all drawings must show a projection symbol to identify the system used. The projection symbol is part of labeling requirements and is placed on the drawing along with the labeling of views. In this unit, you should include the actual symbol over the written reference. When drawing this symbol you should maintain the same proportions and line conventions as seen in figure 1 and place your symbol in the top right hand corner.
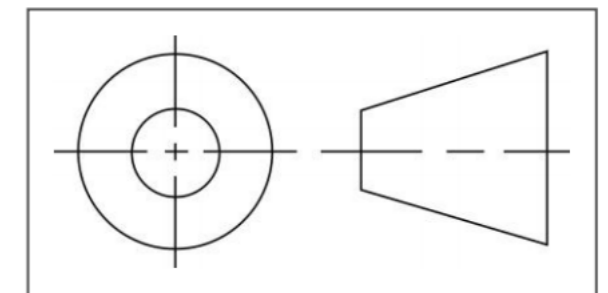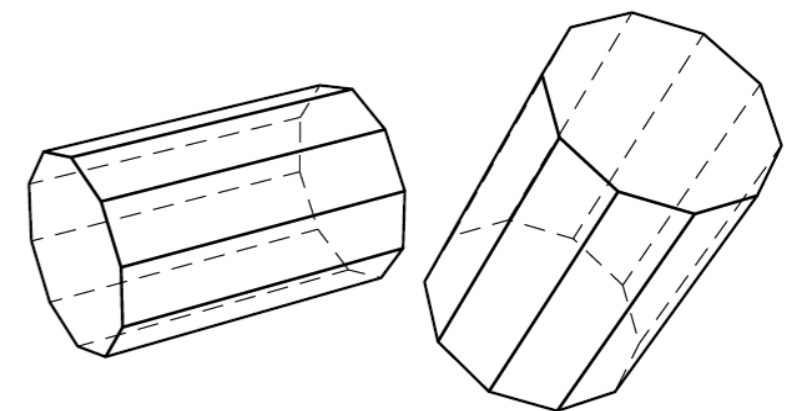
Figure 1

The use of **different line styles and widths** is important in technical drawing as they are used to indicate details and features in a drawing. Line styles make drawings easier to read: for example, solid lines used to show the object will stand out from broken lines used to show hidden information. For this unit, It is desirable to incorporate two different line thicknesses on your technical drawings.This will include: A heavier line to draw the views that represent the object being drawn and dashed lines to represent hidden lines. A thinner 'half weight' line to provide additional information such as centre, projection and dimension lines.

Note: all lines on any particular drawing should be either in pencil or ink, but not a mixture of both. Lines on drawings should be selected according to their application It is desirable to incorporate two different line thicknesses on your technical drawings.

Line styles and conventions		
Thick continuous		VISIBLE LINES used on each view; includes arcs/circles/curves/title block and border
Thick dashes		HIDDEN LINES used on each view. Dashes start and end with contact to a visible or hidden lines
Thin continuous		THIN CONTINOUS LINES used for dimensioning lines, projection lines, leaders, letterform used in title block.
Thin chain		CENTRE LINES, axis of solid forms, pitch lines (think roof line) Note: centre lines show symmetry

An example of drawing hidden lines.

Furniture Design

Third-angle Orthogonal drawing: layout & method

There are occasions where a three-dimensional drawing may not provide enough information about an object to be constructed. Orthogonal drawing is a multi-view two dimensional drawing system that resolves this problem. Third angle orthogonal drawings can include as many views as required to communicate the features of an object. In practice only the views required to describe the object clearly are drawn. The views are known as: **FRONT VIEW TOP VIEW, SIDE VIEW** (left and/or right hand view) (and at times) **BASE/SECTIONAL VIEWS** . Each view of an object (front, sides and the base) is drawn separately showing only two dimensions, but is kept aligned and to the same scale. The term 'Third-angle projection' refers to the layout of views(see figure 2)
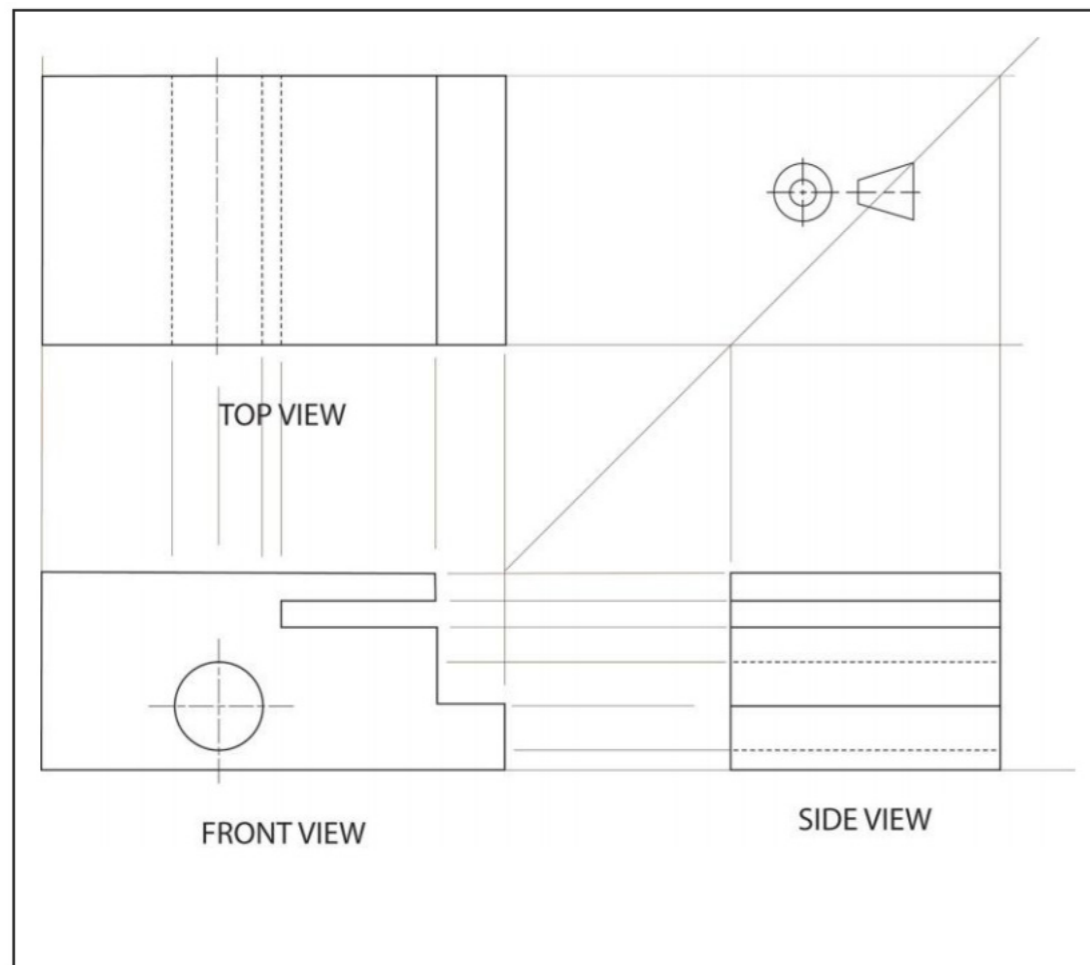
Figure 2

Section view

Sometimes we need to include section views of an object to show details. A designer can use this technique to show the interior of a design. In order for your manufacturer to produce your product, it is important for them to see very detail of your product. In this task, you are welcomed to include a section view where you think is necessary.
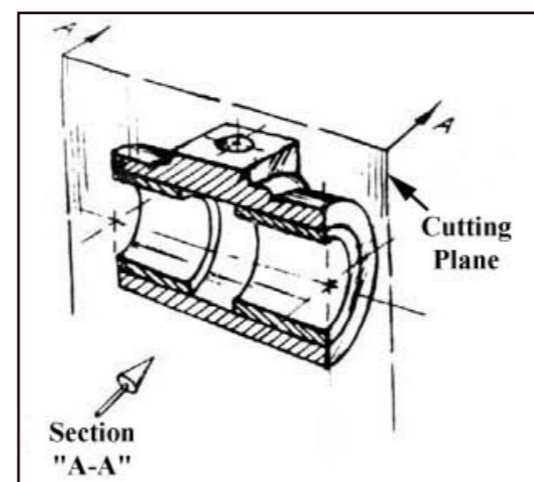
STEP 1: *Plan your layout*

It is important to plan your drawing/solution and consider placement before you start. Figure 3 shows appropriate positioning using an A3 sheet of paper. Notice there is also an isometric view positioned in the top right-hand corner. This is often placed there to provide a connection between the two-dimensional shapes of orthogonal and more visually representative three-dimensional isometric form.

STEP 2: *45 Degree Method*

The TOP VIEW is always directly above the FRONT VIEW and the SIDE VIEWS are always 'next to' and 'aligned to' the FRONT VIEW. At times the views can be placed apart equidistantly. However, the views can be placed at different distances from the front view, depending on what information, such as dimensions, needs to be included. To place your views equidistant then you can use the **45 Degree Method** to place and project your views.
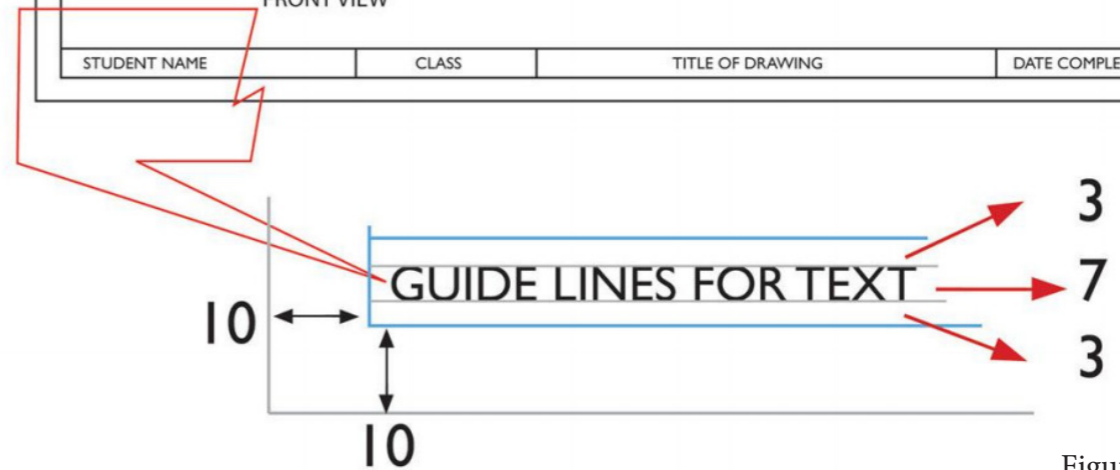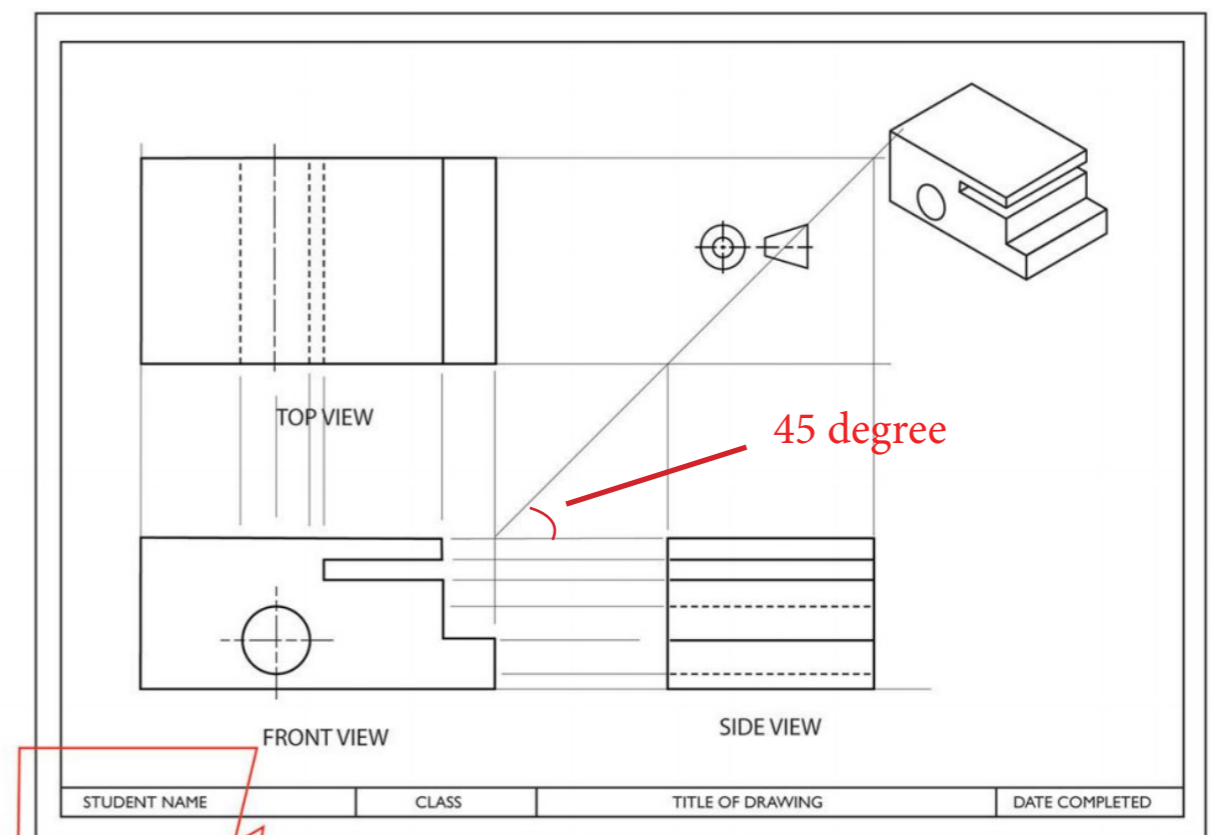

Figure 3

Third-angle Orthogonal drawing: dimensioning

STEP 3: Dimensioning your drawing

The most important thing about dimensioning is to ensure that the measurements are placed both logically and clearly. To achieve this, you should:

1: ensure that you have dimensions for the height, width and depth.
2: ensure that you have included all crucial dimensions that allow the object to be interpreted by other people.
3: dimension where the shapes are shown and try to avoid dimensioning hidden lines
4: space dimension lines so that the dimensions are not over crowded
5: not over-dimension the work as it can lead to confusion and an untidy drawing
6: Wherever possible place dimensions outside the outline of the object
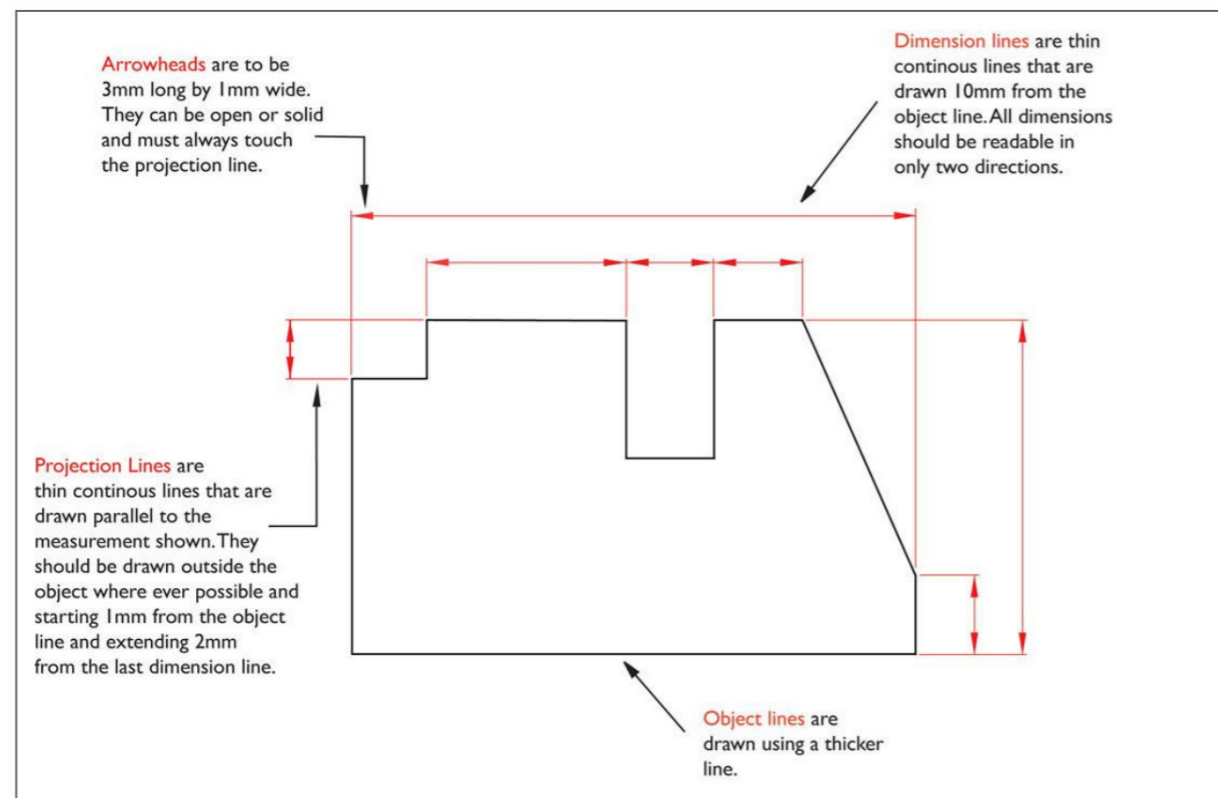
Important Note:

It is a convention that all measurements are shown in millimetres. However, you <u>do not</u> write 'mm' after every measurement; rather you write 'ALL DIMENSIONS IN MM' in your title block or near the scale.

<u>Dimension lines and projection lines are different</u>. Projection lines are thin lines, which begin 1mm from the drawing and extend beyond the last dimension line by 2mm. They define the area being dimensioned and never touch the actual object. Dimension lines are also thin lines with arrows placed at each end that touch the projection line.

Each dimension line starts 10mm from the object and is then 10mm apart. The smaller dimensions are placed closer to the object. Longest dimension lines are furthest away from a view (for example, total height).

Dimension numbers <u>can be written vertically or horizontally.</u> The selection of vertical or horizontal writing must be consistent throughout the drawing.
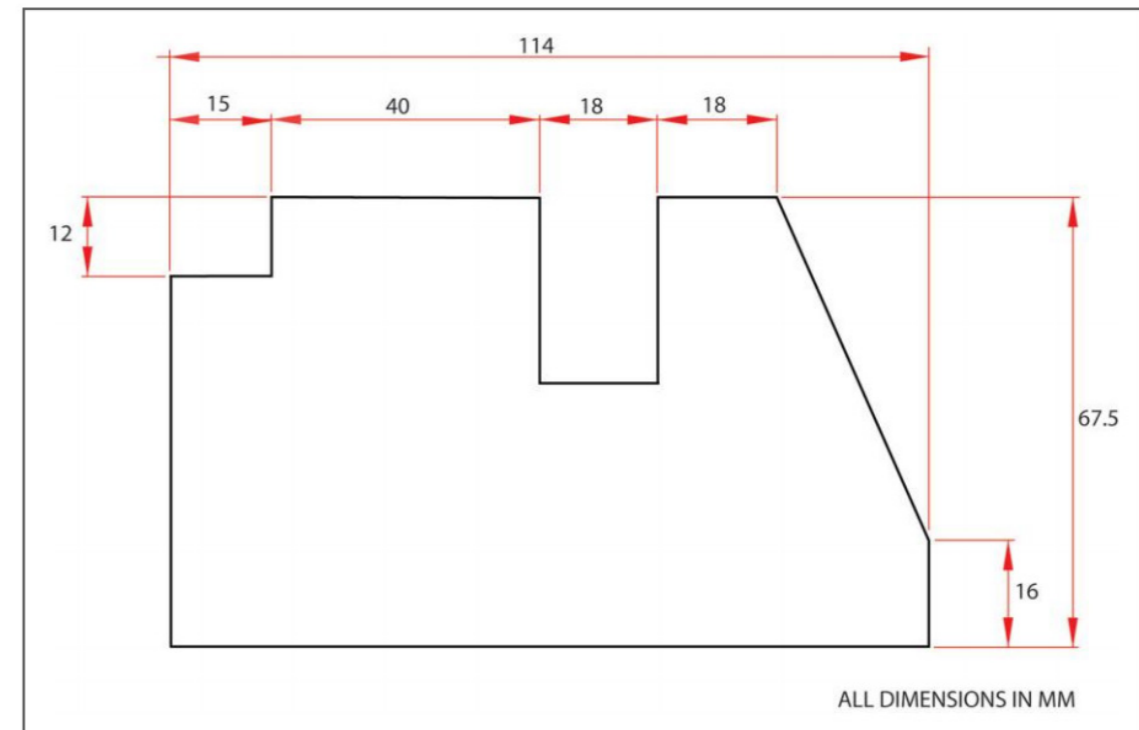
Dimensioning circles

Circles are usually dimensioned by their diameter. The symbol Ø means the diameter and 'R' refers to radius. When dimensioning part of circle (arc) use the R for radius. When you are showing a circle on an orthogonal drawing you need to include the centre line. The centre line is a chain line that is placed through the centre of the circular feature. When dimensioning a circle often a leader is used. Leaders stop with an arrowhead touching a line, within the outlines of a view. They are always 'sloped' and are used to carry dimension numbers for diameters and radius. (see figure 4)
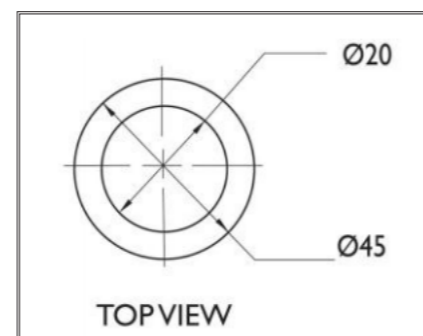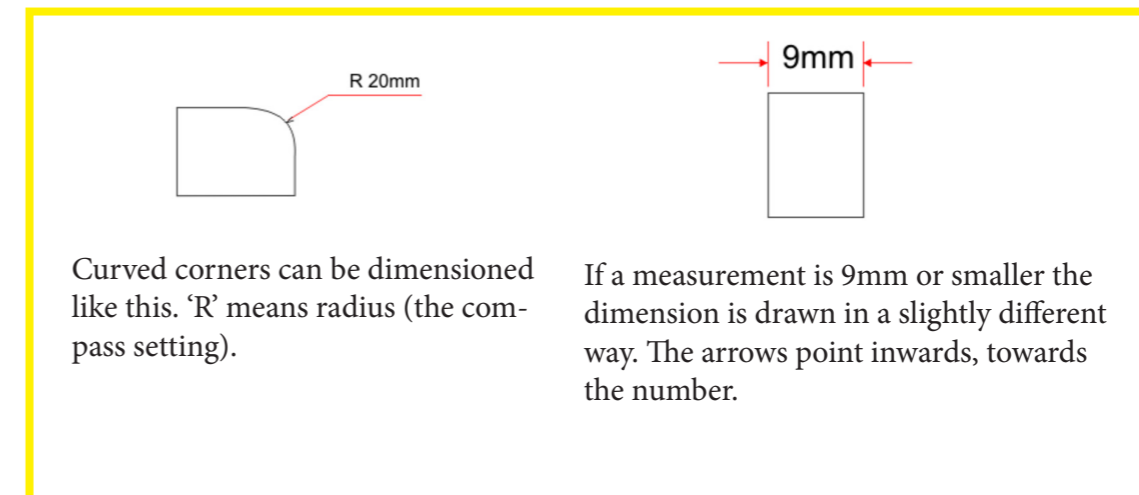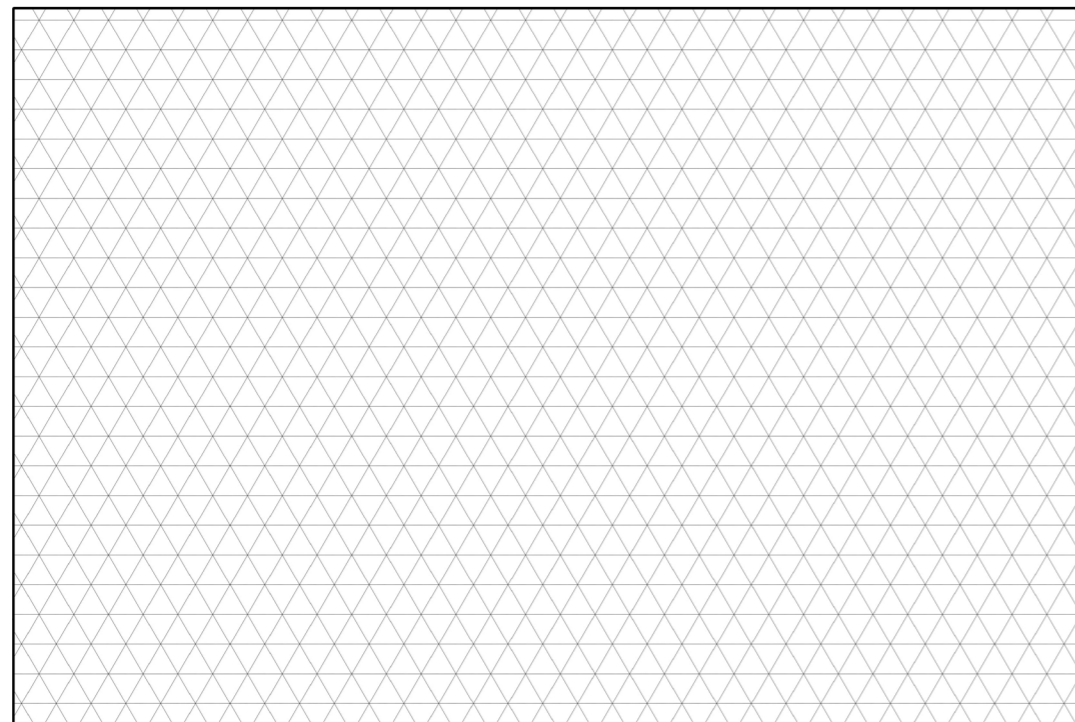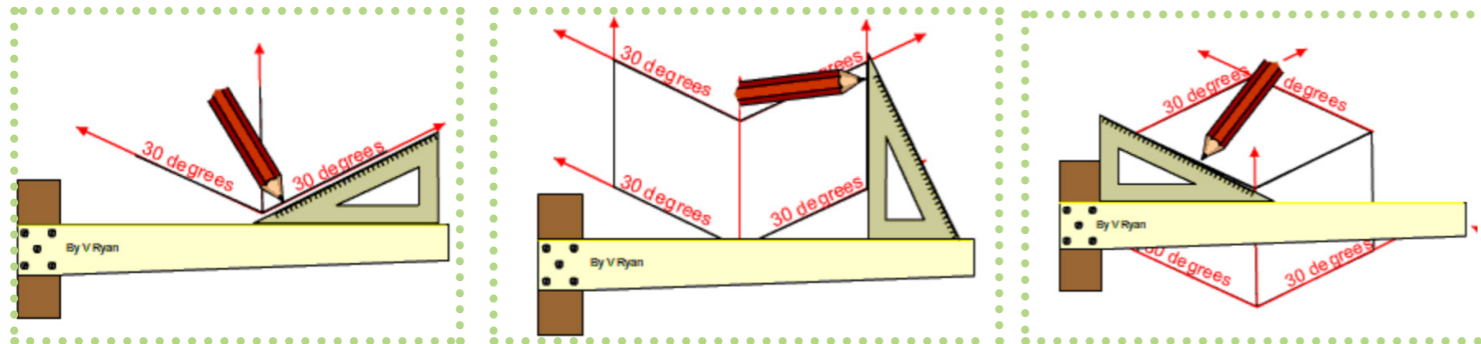

Figure 4

Curved corners can be dimensioned like this. 'R' means radius (the compass setting).

If a measurement is 9mm or smaller the dimension is drawn in a slightly different way. The arrows point inwards, towards the number.
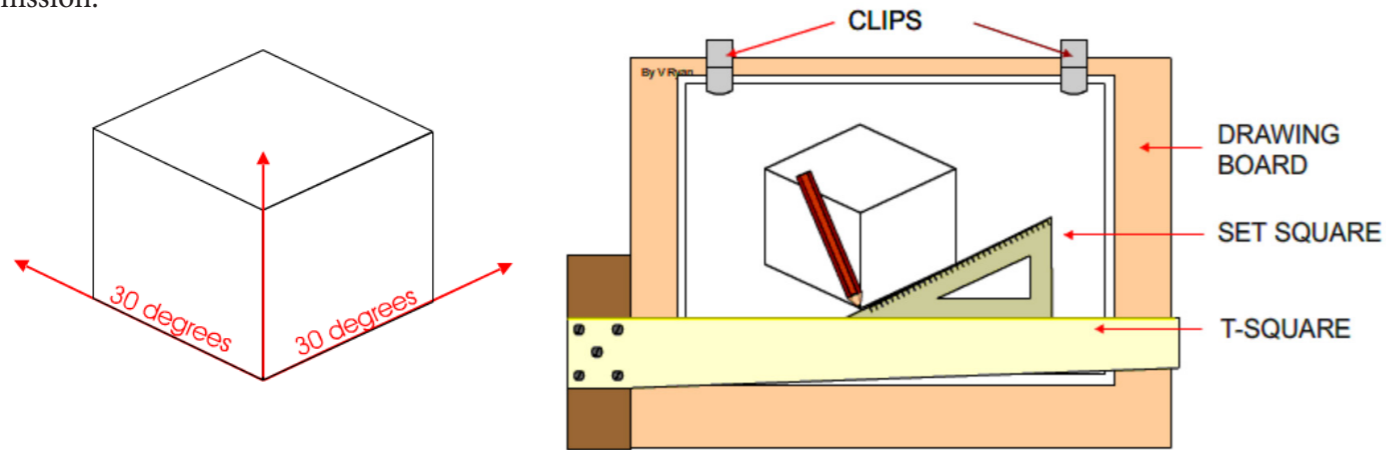
Furniture Design

Isometric drawing

Isometric drawing is way of presenting designs/drawings in three dimensions. The example below has been drawn with a 30 degree set square. Designs are always drawn at 30 degrees in isometric projection. It is vital that drawing equipment such as T-squares and 30/60 degree set squares are used carefully. The drawing paper should be clip securely to a drawing board. In this unit, you need to include an isometric drawing in your orthogonal drawing submission.
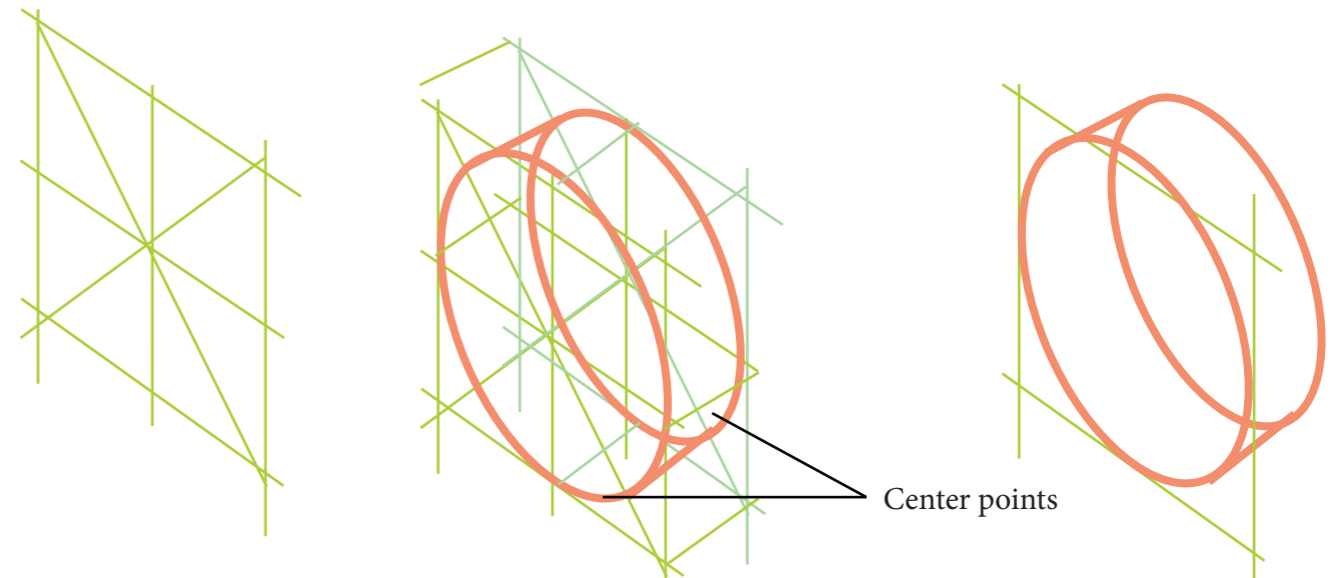
CLIPS

DRAWING BOARD

SET SQUARE

T-SQUARE

30 degrees   30 degrees

30 degrees   30 degrees

30 degrees   30 degrees

30 degrees   30 degrees

Start from the cube provided, construct a pattern of cubes.

To draw an isometric cylinder

Center points

In isometric drawing, circles are often represented by ellipses dur to perspective. To draw an ellipse, you need to first create an isometric box. Then, draw center points on each edge (Hint: to find the center point, draw diagonals to each comer.) Also, mark the center point of each plane. Connect the points with an ellipse, keeping the curve tangent to the box at the center points marked. To create a cylinder, connect 2 ellipses with tangent lines parallel to the appropriate axes. Marker over the lines you need, then erase construction lines.

An isometric cylinder tutorial

To draw a cut surface in isometric drawing

For any 'cut-surfaces' that are non-isometric, we can start by drawing guidelines to show where the starting point of the 'cut' and where the 'surface-slope' will end. For example, begins at the top of a block, you can mark where the cut starts. Next, you can mark where the 'slope' shall end. After you have located all the important points, you can now connect them together.
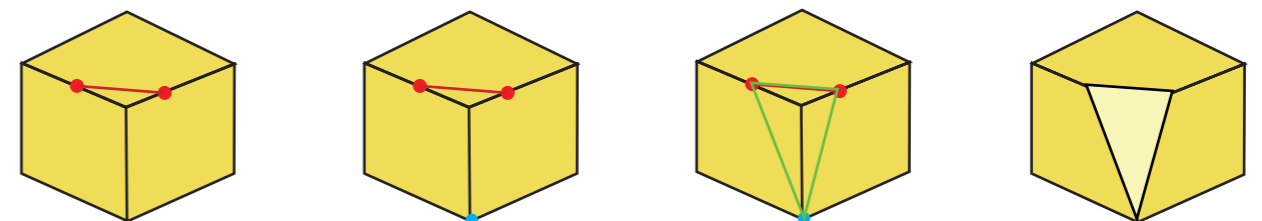
1: Mark where the 'cut' begins.

2: Mark where the 'cut' finishes.

3: Connet the points

4: Erase the uncessary lines

Perspective drawing

Perspective drawing is a drawing technique used to illustrate dimension through a flat surface. There are many forms used under perspective drawing such as, one perspective, two-point perspective, three-point perspective, bird's eye view, worm's eye view and others. In this unit, you are going to learn and apply one-point and two-point perspective to your furniture design.

One-point perspective

One point perspective is a drawing method that shows how things appear to get smaller as they get further away, converging towards a single 'vanishing point'. This is a point that is located directly in front of the viewer's eyes, on a 'horizon line' (also known as an 'eye level line'). It is a way of drawing objects upon a flat piece of paper (or other drawing surface) so that they look three-dimensional and realistic.

Drawing in one point perspective is usually appropriate when the subject is viewed 'front-on', such as when looking directly at the face of a cube; or when looking directly down something long, like a railway track. It is popular draw-

*vanishing*

horizon line
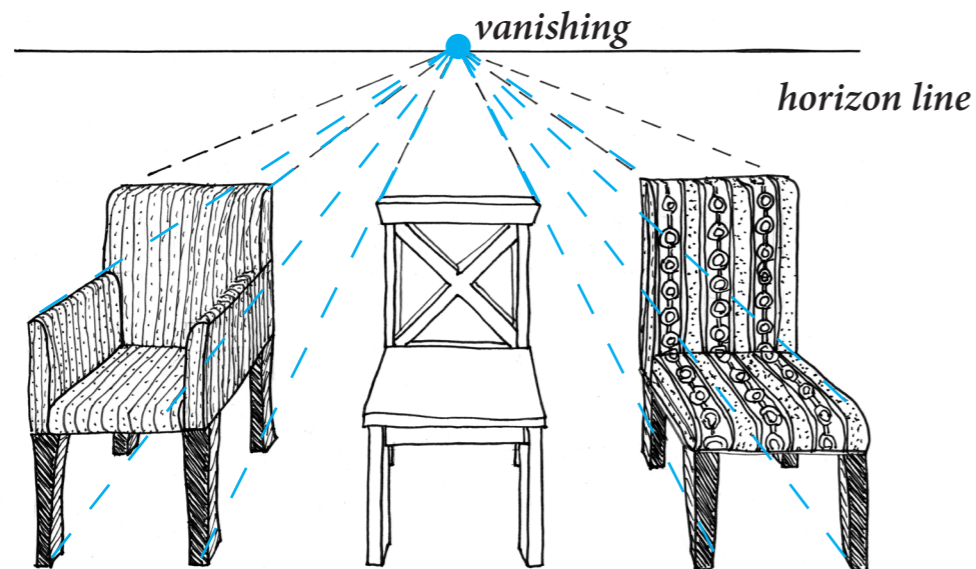
Exercise

Refer to the example on the left. Draw a name or word of your choice in a style that incorporate one-point perspective. Add color/shading to enhance the 3D effect.

*How to draw a table using one-point perspective*
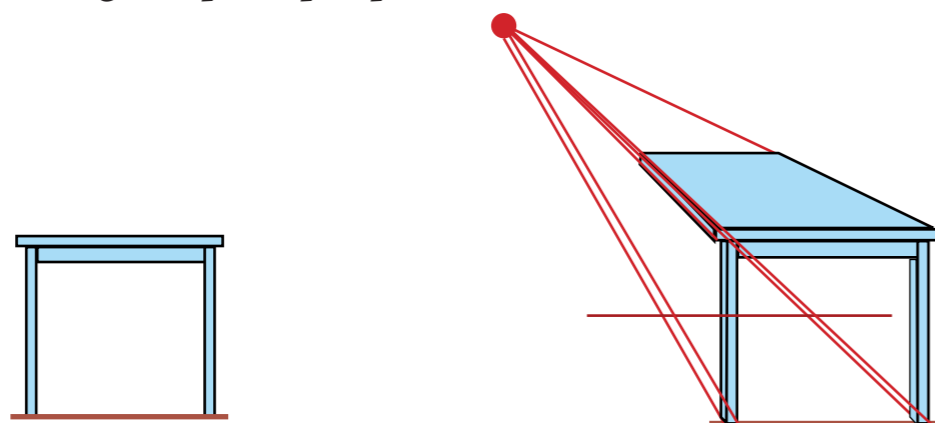
1: Draw a side of the table and the position of the vanishing point. Positioning the vanishing point high on the left or right hand side means that one side of the table will be seen when the drawing of the table is completed.

Starting with the table top, project guidelines back to the vanishing point and complete drawing the top. Then project more guidelines for each of the front legs, adding thickness to each one.Mark another horizontal line where the back legs locate.
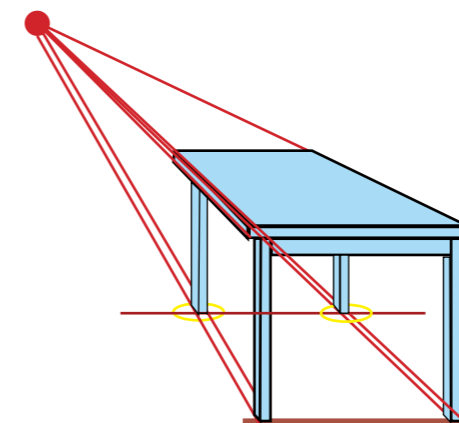
The intersection of the lines is where the back legs will be sitting. Draw vertical lines to the top of the table to create the back legs.
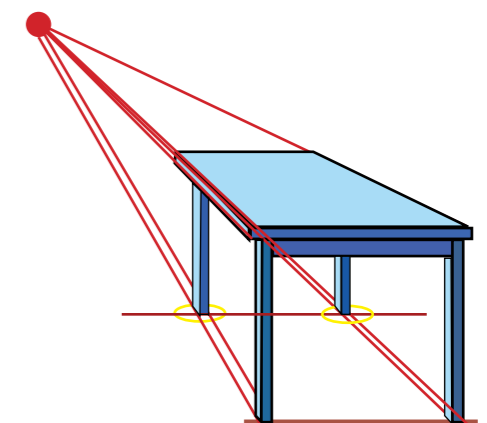
Add shading to enhance the 3D effect.

Perspective drawing

Two-point perspective

Now, we have already looked at one point perspective. Two point perspective drawing has two vanishing points, which means that the sides of the object vanish to one of two vanishing points on the horizon line. When an object is drawn in this way, it is even more realistic than if it were to be drawn with a single vanishing point. By changing the vanishing points of the object, one can make increase or decrease the size of the object. It is much like an isometric drawing, however the receding lines go toward the vanishing points instead of being at a specified 30 degree angle. Note, an object's vertical lines do not relate to the perspective rules of the horizontal lines.
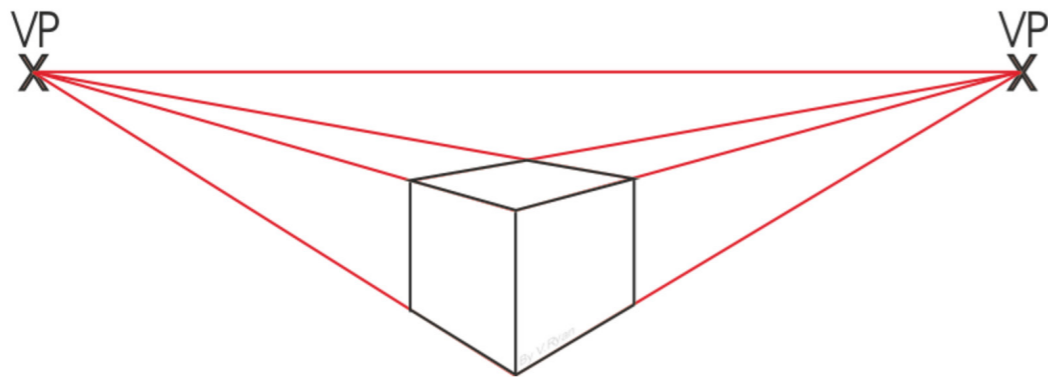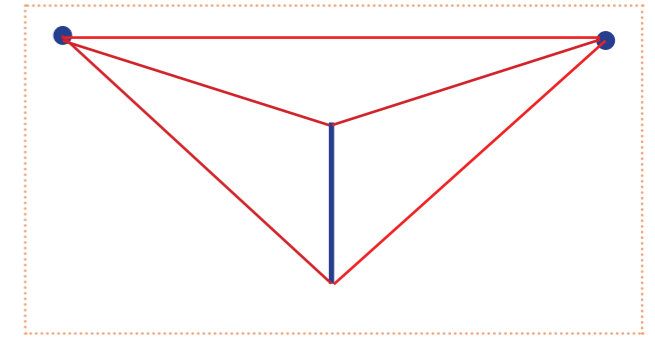
Step by step tutorial of how to draw a cube using two point perspective
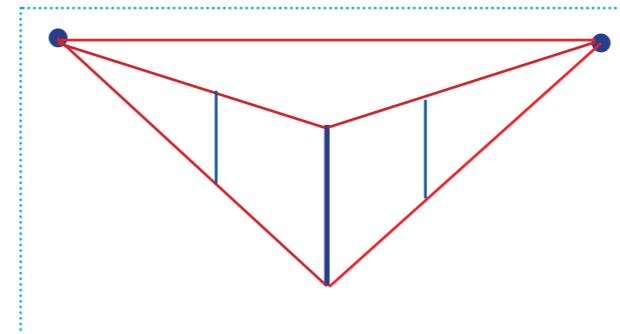
1: Mark two vanishing points on the paper and draw a horizontal line between them. Then draw one edge of the cube beneath the horizon line and in the centre between the vanishing points.
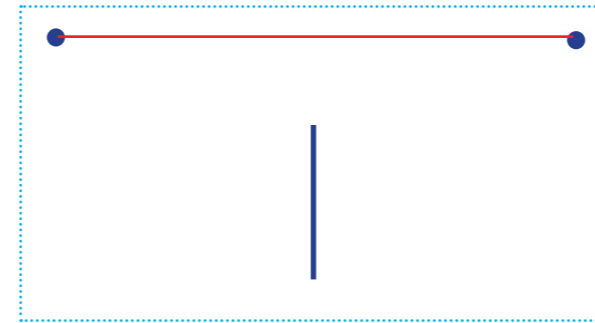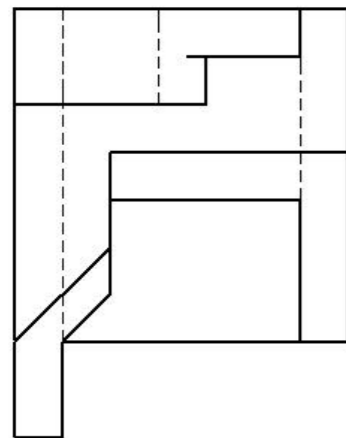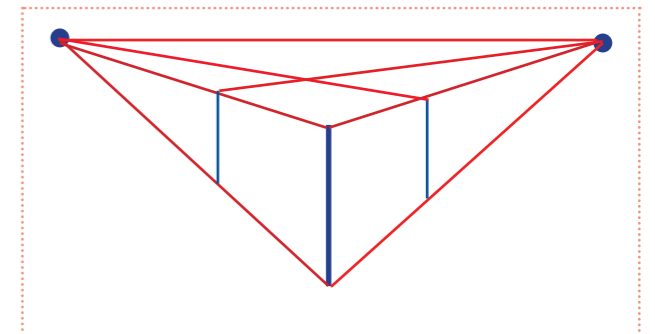
2: Draw lines from each end of the edge of the cube to the vanishing points.
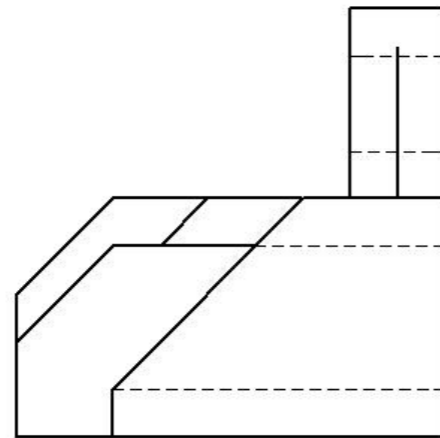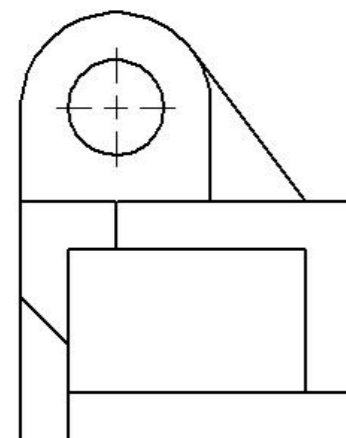
3: Draw two more edges of the cube.

4: Draw lines from the ends of these edges to either vanishing point. The top plane is now created.

Exercise:
Use the orthogonal drawing provided to produce a two-point perspective drawing.

Tasks
By the end of week 4, you are expected to...
Produce one-point perspective and two-point perspective drawings for your furniture piece. For each perspective drawing, provide at 2 drawings with different vanish point(s) on an A4 page.

Furniture Design

Rendering techniques: shading

Interpret light source

Rendering is to making an object look three dimensional by adding tone, color and texture. Before we begin rendering to enhance the form of a draw object we must be aware of the location and direction of the light source. A light source is often positioned above an object. The light source may also be in front of the object or behind. This position of the light source will largely effect the way it is shaded. See examples provided below for reference.

10 evenly spaced tones from white to black

Shading flat surface

When rendering flat surface, we need to first decide the strength of tone on each face according to light source. Like the example provided below, the lightest tone is applied to the top of the cube where the light stands out the most. The medium tone is applied to the side of the cube. And the darkest tone is applied to the back surface where the light can barely reach. See the examples below to get an idea of how to render a cube of different light source.Use them as a guide to practice on A4 papers.

|	Left, Back	Right, Back	Middle	Left, Front	Right, Front
High					
Mid					
Low					

A video tutorial of how to render a cube
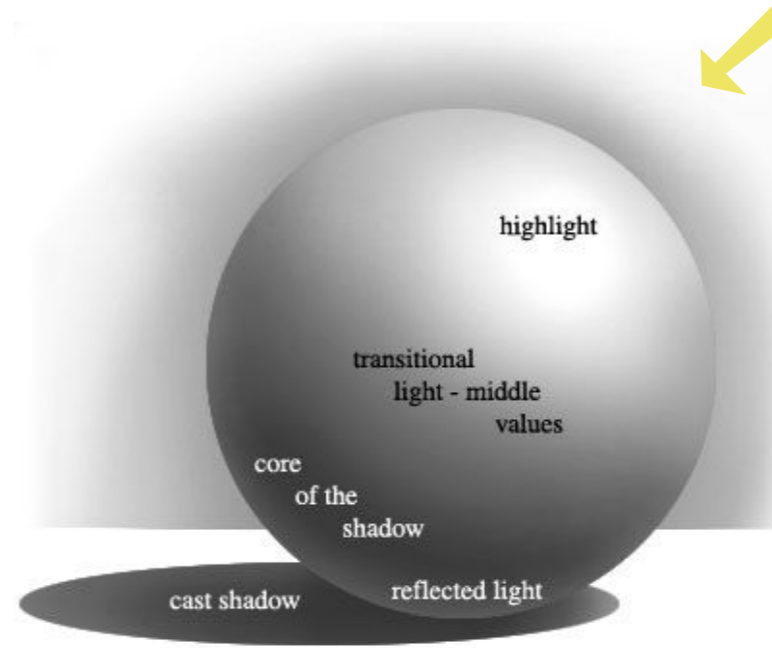
Shading sphere

When rendering a sphere,three tones(light, medium and dark) are evenly blended gradient in both axis. This is called a 'radial' gradient. In a radial gradient the tones blend in both directions - vertical and horizontal. It means that there shall be no straight line when rendering a sphere; all the lines shall be curved. Rendering sphere is more tricky than rendering flat surface, because you need to make sure it doesn't contain any obvious thick line on the surface except around the edge. Rendering a sphere needs a lot of practice, check out the video link provided and try rendering spheres with different light sources!

highlight

transitional light - middle values

core of the shadow

cast shadow   reflected light

A video tutorial of how to render a sphere

Shading cylinder

When shading a cylinder, we can enhance its 3D form by applying differents tones in an evenly blended spread. This is called a 'linear' gradient. In a linear gradient the tones blend along parallel axis.

cast shadow
light
mid-tone
core shadow
reflection
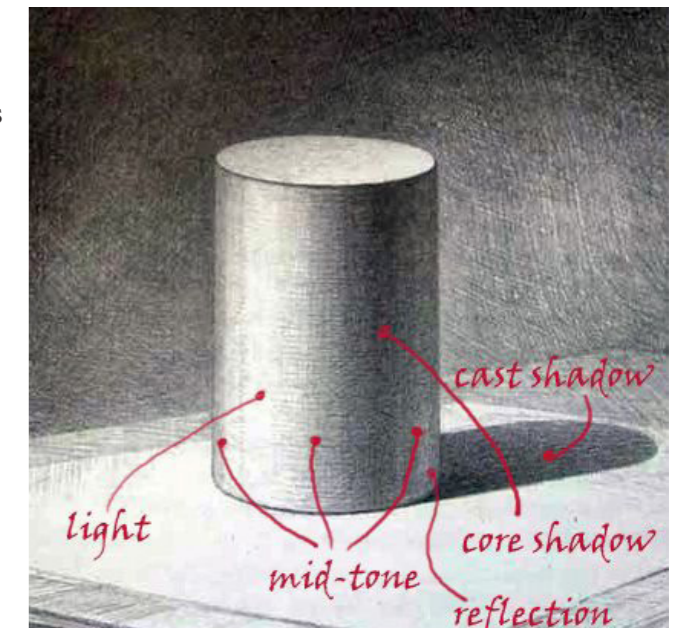
A video tutorial of how to render cylinder

Tasks

1: Use these shading technique to practice shading your design on papers. These are just pratice sheets and do not need to be submitted, but you are recommended to so them before start shading on your previous perspective drawings.

2: Shade the previous perspective drawings (at least 2* one-point pespective + 2* two-point perspective) using these shading techniques. Note: Before you shade your drawings, make sure you keep photocopies of them. You will need them again in future sessions.

Furniture Design

Rendering techniques: Creating texture using markers

Now it's time to give your design a texture. No matter they are wooden, glass, metal or plastic, markers are capable of giving them any texture you want. In this unit, we are mainly going to apply texture using markers. We are going to learn some basic techniques in the class, including metal, wooden, glass, plastic and leather. A great source to check out is the website of *IMAGINATION INTERNATIONAL INCORPORATED*, where you can find a lot of copic rendering tutorials. Of course, Youtube is always a good place for you to search any bigginer level markder rendering tutorial.

Tasks

1: Check each tutorial link provided. Pratice your texturing technique using the photocopied drawing from previous lesson or simply praticing on spare papers.

2: Produce two A4 pages of final rendering pages based on the photocopied drawing. This time, combine both shading techniques we've learnt previously with the texturing techniques together.

Render with marker wooden texture

Render with marker leather texture

Render with marker plastic and metal

Render with marker Glass texture

Furniture Design
Final presentation page production

Now it's time for you to produce a final presentation poster to exhibit your design to the class. This poster requires you to propose your design idea to your employer. At the presentation, you need to use visual, textual and verbal support to introduce, and most importantly, to promote your design to the audience (the teacher and other students in the class).

You can create your poster manually using drawing. You are also welcomed to make it digitally using Adobe softwares. Note, you are in total control of what to put into your poster. Here is some advice for you to consider if you wish to create an impressive poster:

1: Show different perspectives of your table! This helps audience to have a clear vision of what it looks like.
2: Include short but comprehensive textual information (eg. annotation) to support your visual preseantation.
3: Make it look good! Consider design elements/principles when you arrange/position the elements of the poster.
4: Do not try to stuff too many things on poster! Select the most representative images and only include highp-quality drawings. Remember, this is a design proposal poster and it should not become a visual folio of your design journey! Your design journey should be delivered verbally, not visually.
5: You can place your furniture into contect. When you drawing your table, it's a good idea to also draw the environment around it so audiences are able to see how it can be used.

At the presentation, besides explaining the components and functions of the study table, also remember to explain to your audience: x
1: what inspired you?
2:How did you develop the idea?
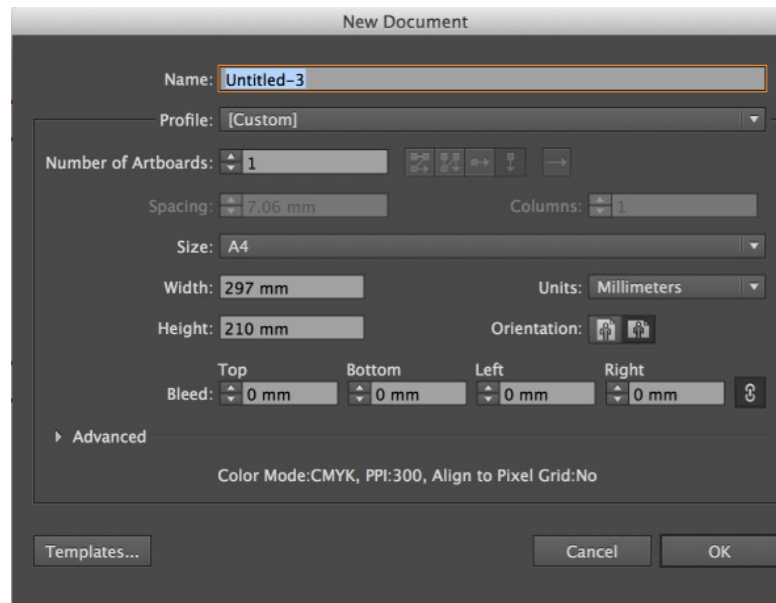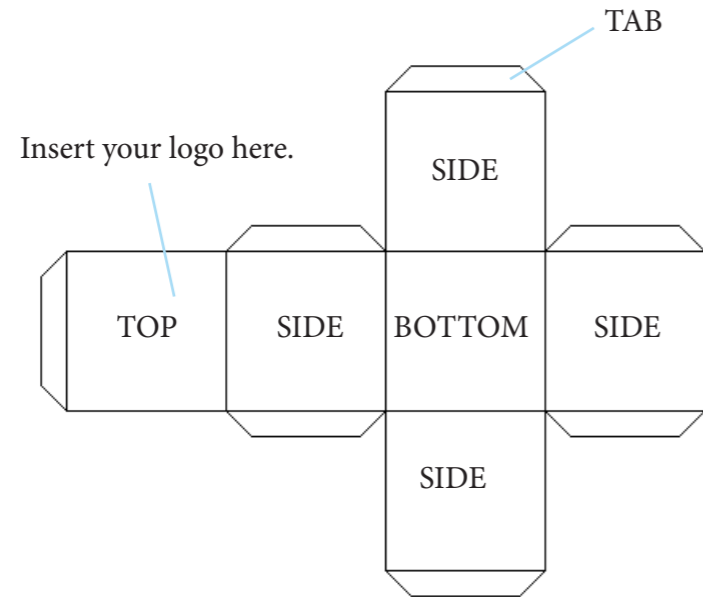3:Why does it match the needs of targeted users? / Why should people buy your product?

A good starting point to design your final poster is to look at some of the exsiting concept boards created by other artists/designers.
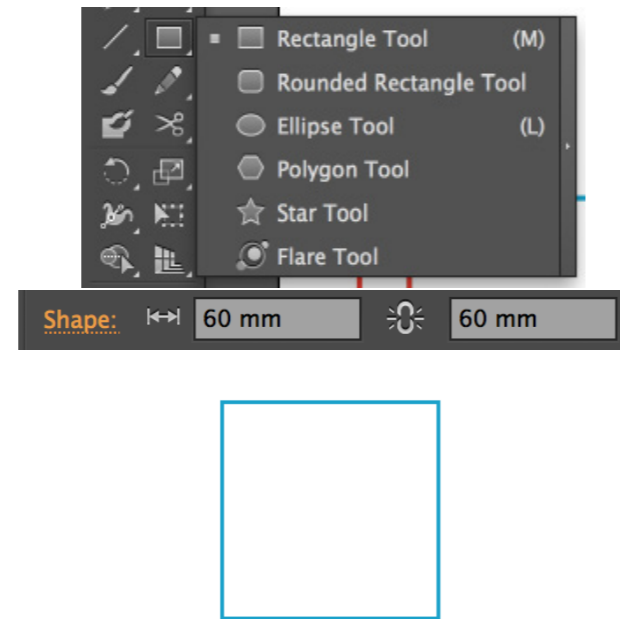
Examples of design presentation
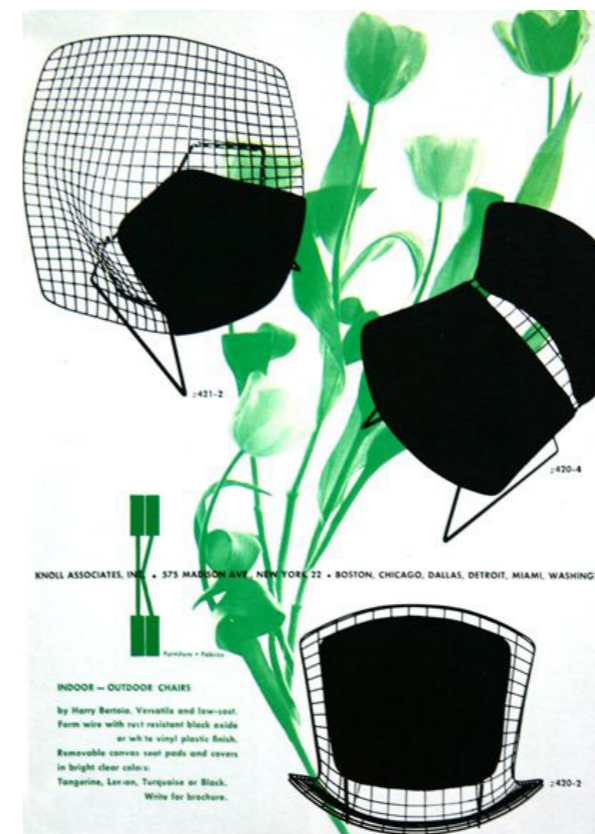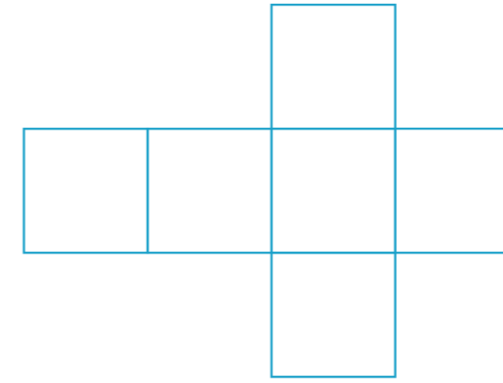
Packaging net design

Congratulation! You have now reached the final stage of this unit! We are now going to design a packaging for your furniture pieces. Don't worry. This doesn't mean that you need to produce a 1:1 scale packaging. We are only going to create a mini version of it using Adobe Illustrator. Adobe Illustrator is a powerful for packaging design and other type of graphic design. The tutorial included in this handout is an simple example of how to create a cubic packaging. If you wish to create packaging with different shapes, you are more than welcomed to ask your teacher about it in the AI help session. On your packaging, remember to include a logo of your design studio.
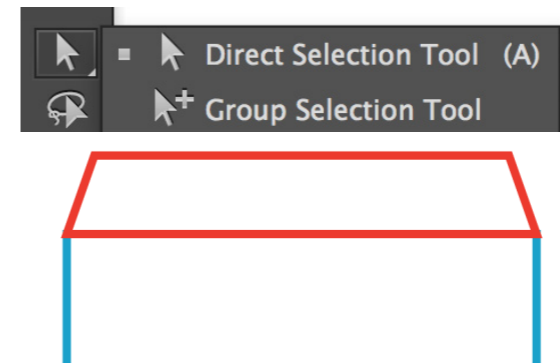
TAB

Insert your logo here.

SIDE

TOP   SIDE   BOTTOM   SIDE

SIDE

3: Hold ALT and drag the square to duplicate another five squares.

Direct Selection Tool (A)
Group Selection Tool

5: Use the Direct selection tool to select the anchor point on the top left corner of the rectangle. Press the right buttom on your keyboard ten times to move it towards the right. Repeat with the top right corner.
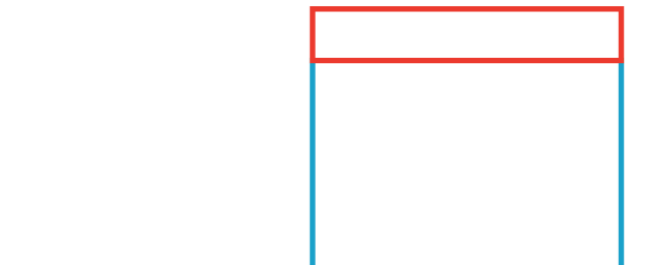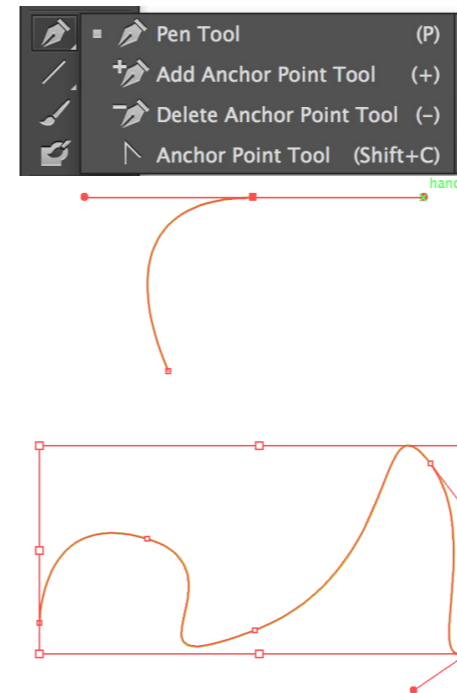
4:Use rectangle tool to drag a rectangle with width of 10 mm and length of 60 mm. Align it to the edge of any square.

6: Hold ALT and duplicate it like showed above.By rotating them, you could have tabs facing different directions.

New Document

Name: Untitled-3
Profile: [Custom]
Number of Artboards: 1
Spacing: 7.06 mm   Columns: 1
Size: A4
Width: 297 mm   Units: Millimeters
Height: 210 mm   Orientation:
    Top   Bottom   Left   Right
Bleed: 0 mm   0 mm   0 mm   0 mm
▶ Advanced

Color Mode:CMYK, PPI:300, Align to Pixel Grid:No

Templates...   Cancel   OK

1: To open a new document, click File-New and select a A4 template. Remember to select the landcape option for ths task.

Rectangle Tool   (M)
Rounded Rectangle Tool
Ellipse Tool   (L)
Polygon Tool
Star Tool
Flare Tool

Shape: 60 mm   60 mm

2: Use the Rectangle tool to draw a square. By holding shift when dragging the shape, it gives you a perfect square. You can adjust its width and length to 60 mm.
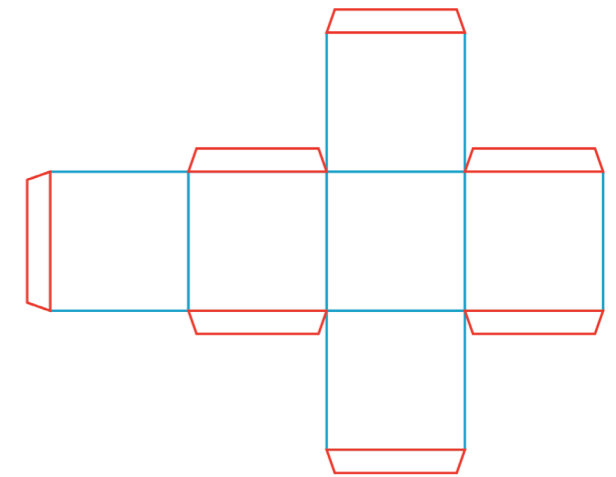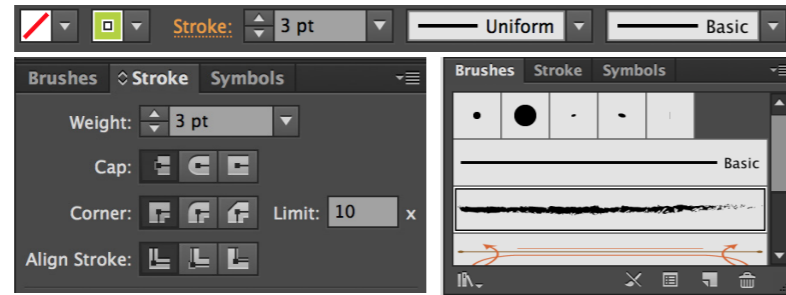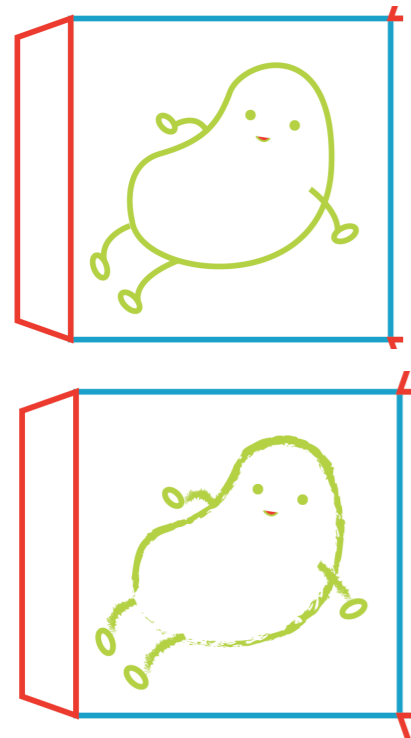
Pen Tool   (P)
Add Anchor Point Tool   (+)
Delete Anchor Point Tool   (−)
Anchor Point Tool   (Shift+C)

handle

7: In AI, Pen Tool is your best friend when creating organic shapes. After selecting the pen tool, click anywhere to create the starting point. Then click nearby and drag (do not let go the left click when dragging!). Now you will see two handles coming out. These handles are used to adjust your curve. Now let go the left click next place to continue draw the curves. If you wish to finish your curve, press ESC. If your last point goes back to your first point, it gives you a closed loop. If you click your shape using Direct selection tool, you can see there are many anchor points along the surve. Click on any one them, you will see two handles. You can adjust sections of those curves by dragging the handles. Pen Tool is a bit tricky to master. More details will be explained in the class.

Tutorial of Pen Tool

Packaging net design

Tasks:

8: It is optional for you to add a logo onto your packaging. When using the Pen Tool, you can always adjust the stroke and color of your lines. By applying different brushes to your lines, you can have many interesting effects! Play around with these settings and try !
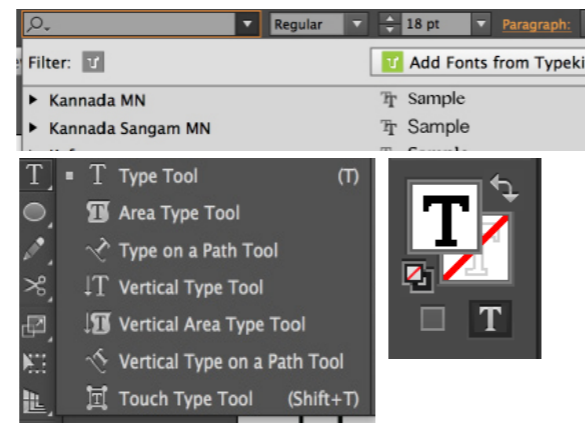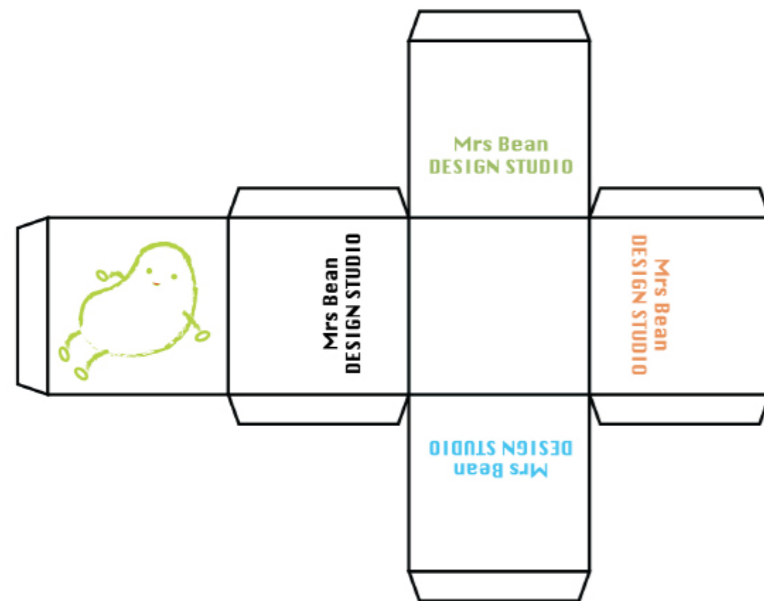
9: According to design brief, add any text you think will be appropriate onto the packaging. The example shown is just to show you how you can use Type Tool to create text. So on your own packaging design, do not include any info that doesnt match the design brief.

Isometric drawing paper

Orthogonal drawing template
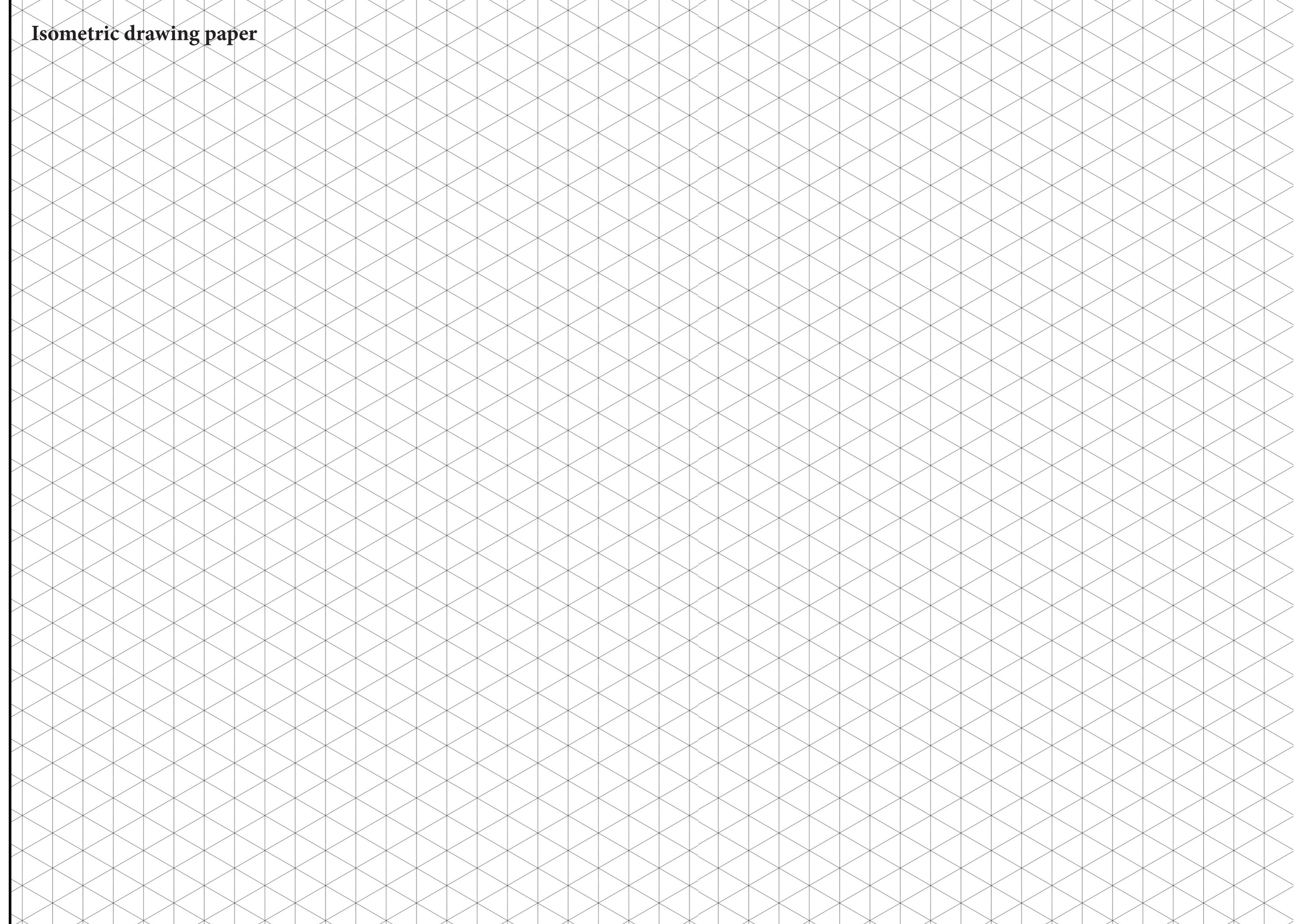
STUDENT NAME	CLASS	TITLE OF DRAWING	DATE COMPLETED

Visual Communication Design
Unit 2 Applications of Visual Communication Design
Area of Study 1 / Outcome 1/ Technical Drawing In Context

We are now approaching towards Outcome 1 of Unit 2. For this Outcome you are required to be able to create accurate, readable, clear and usable technical drawings.

What are technical drawings?
Technical drawings are drawings that visually communicate how something functions or is to be constructed. They are to be drawn following a set of standards, in our case by Australia, using familiar lines, symbols, perspectives, units of measurement, notation systems, visual styles and page layout. We will be practicing the following technical drawings within environmental design which includes:

Two-dimensional drawings:
plan view
front elevation
side elevation

Three-dimensional drawings:
isometric drawing
planometric drawing

Why do we use them?
Ever had an amazing idea for an invention or building and explained it to a friend? Do they completely understand what you're talking about? Did drawing an image help? Now if you told them to make it for you, would they be able to make exactly what you're thinking? Imagine you wanted to get this idea produced by a professional builder or manufacturer. How are you going to get them to create exactly what you want? Technical drawings!

Technical drawings follow a set of standards and have become a common visual language between designers and manufacturers. They communicate an accurate representation of your idea as opposed to words and sketches that are open to various interpretations.

Task at hand:
Brief

- Need - The school board has decided to build a cafe in the empty space beside the oval on school grounds. They need designs to be able to give to a builder to create the building. They will need a floor plan with elevations and a 3D representation of the building to get a better sense of what it will look like.

- Purpose - These designs will be used to inform builders to be able to create the building.

- Audience - The target audience are all students and staff members of the school.

- Context The cafe will be run by students and be accessible before, during and after school. During school students will only be able to access the cafe during recess and lunch breaks as well as any spare periods they might have. The cafe will be available for students to study as well as hold team meetings.

- Constraints You have a 10m x 10m block of land to work with. You do not need to use the whole block. The school board wants a space that creates a balance of relaxation and professionalism.

Project Timeline

Monday Double	Wednesday Double	Friday Single
Introduction; Coventions; Symbols; Annotations	Idea generation	Idea generation
Plan view overview	Plan view drawing	South elevation overview
South elevation drawing	West elevation overview	West elevation drawing
Complete any incomplete drawings	Planometric overview	Planometric drawing
Rendering	Rendering	Evaluation

| Applies standards and conventions	Draws a plan view	Draws elevations	Draws a planometric drawing	Renders design	Reflects on decision making	Evaluates drawings
	Creates a drawing using symbols and conventions using accurate measurements.	Creates drawings using accurate placements measurements.	Creates drawing following conventions and accurate measurements.			
Follow standards and conventions using accurate measurements.	Applies symbols and conventions to create a structured plan view.	Lines up elements with other views.	Applies 45 degree angles and maintains parallel lines.	Applies rendering to create form and texture that follows a given light source.	Reflects on sketches and informs future ideas.	Reflects on how to improve technical drawings.
Applies conventions to arrange elements on the page.	Uses symbols and conventions to create plan view.	Uses flat shapes to represent elevations of design.	Uses 45 degree angles to create drawing of design.	Applies rendering to accentuate form and create texture.	Analyses sketches and identifies strengths and weaknesses.	Identifies areas of improvement.
Places elements on the page.	Draws a drawing using a top-down view.	Draws a different views of their design.	Creates a 3D drawing of design.	Uses media to apply a surface to the design.	Describes what has been drive.	Restates what they have done.
Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence

COMMENT

GRADE

/24

Australian Standards and Conventions

STANDARDS

Before we get started on the drawings we need to know how to properly lay them out. We do this to follow a set of standards set by Australia, called the Australian Standards AS 1100. These specific standards can be found at saiglobal.com. Otherwise VCAA has supplied a 'Technical Drawing Specifications Resource' which is a simplified version of the standards and can be found online for free. These standards allow our drawings to be identified professionally and have key information and conventions making it easier to read.

Sample layout
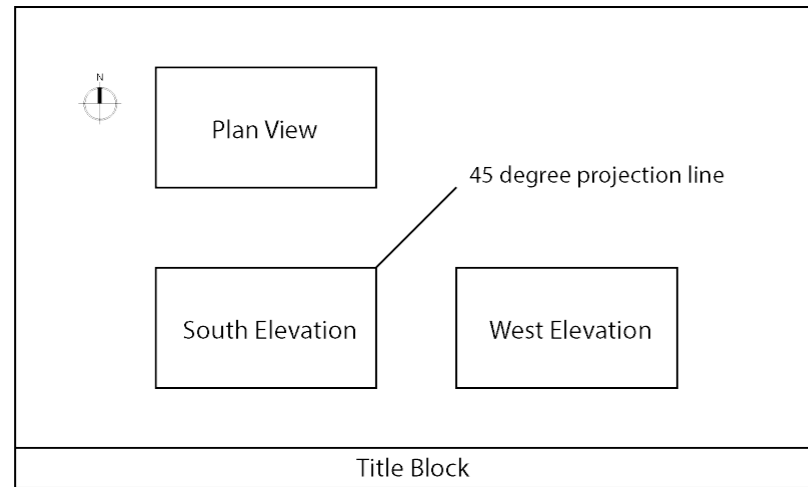
PAGE LAYOUT

Border and Title Block

To set up our drawing in an Australian Standard we must perform the following steps:
Rule up a 20mm border around your page.
Rule of a horizontal line 20mm away from the bottom border creating a 'title block'. (Optional: section off this newly created title block into separate parts)
Include the following information in your title block:
Name
Title
Scale (eg. 1:100)
Dimension used (eg. ALL DIMENSIONS SHOWN IN MM)
Date Drawn

Labelling

To make sense of what each drawing is we must label them with their respective name, PLAN VIEW, SOUTH ELEVATION and WEST ELEVATION.
They also must be:
10mm under the respective view
Using a clear sans serif font. Eg GILL SANS
5mm in height
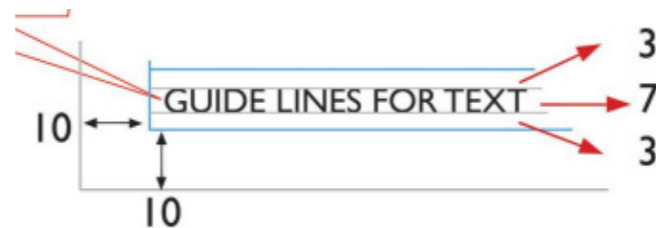
Line Styles

Technical drawings use different line styles and widths to indicate details and features in a drawing. Different line will make a drawing easier to read. Here is a table of the different lines used.

Line styles and conventions		
Thick continuous		VISIBLE LINES used on each view; includes arcs/circles/curves/title block and border
Thick dashes		HIDDEN LINES used on each view. Dashes start and end with contact to a visible or hidden lines
Thin continuous		THIN CONTINOUS LINES used for dimensioning lines, projection lines, leaders, letterform used in title block.
Thin chain		CENTRE LINES, axis of solid forms, pitch lines (think roof line) Note: centre lines show symmetry

Drawing Placement

Now where to put our drawings?
Firstly we want to ensure our drawings and labels are at least 10mm away from any of the borders of the page.
Upper left: PLAN VIEW
Bottom left: SOUTH ELEVATION (front view)
Bottom right: WEST ELEVATION (side view)

To place our WEST ELEVATION we need to draw a 45 degree angled line from the upper right edge of our SOUTH ELEVATION. This line projection line protrudes until it aligns with the bottom of the PLAN VIEW. From this point project a line downwards until you are aligned with the top of the SOUTH ELEVATION. From here is where you should start your WEST ELEVATION.

Australian Standards and Conventions

Dimensions (Measurements)

Dimensions are the key to our technical drawings. We must label our dimensions to allow another person to interpret, construct or manufacture our design. Therefore we need every element on our drawings to be given a dimension including small windows to big walls.

Following the Australian Standards there are a set of conventions we must follow. A formal reference can be found on the Technical Drawing Specifications Resource which will cover the minute details of the different lines.

Use a lighter pencil.
1. Draw dimension lines - at least 10mm away from sides of drawing and other dimension lines.
2. Give all elements of your drawing a dimension.
3. Start with the shorter dimensions and place them closest to the respective view, then work outwards.
4. If two dimensions do not overlap, pace them along the same line.
5. Mark the end of each dimensions with a 4mm 45 degree line mark.
6. Draw projection lines - Thinner continuous lines that are perpendicular to the ends of objects lines.
7. Do not repeat any dimension.

After drawing up your dimension lines you need to place measurements on them.
All measurements should be in MM but you don't need to write MM after each number. This should be instead communicated in the title block stating 'ALL DIMENSIONS IN MM'. Therefore you only need to write the number for example 25,50 or 350.

- When labelling your dimension lines with dimensions it is important to ensure they are clear.
- Position them in the centre of the dimension line if possible.
- Either vertically or horizontally, but be consistent.
- If horizontal, write them so you will be able to read all if you rotate your page once to the right.
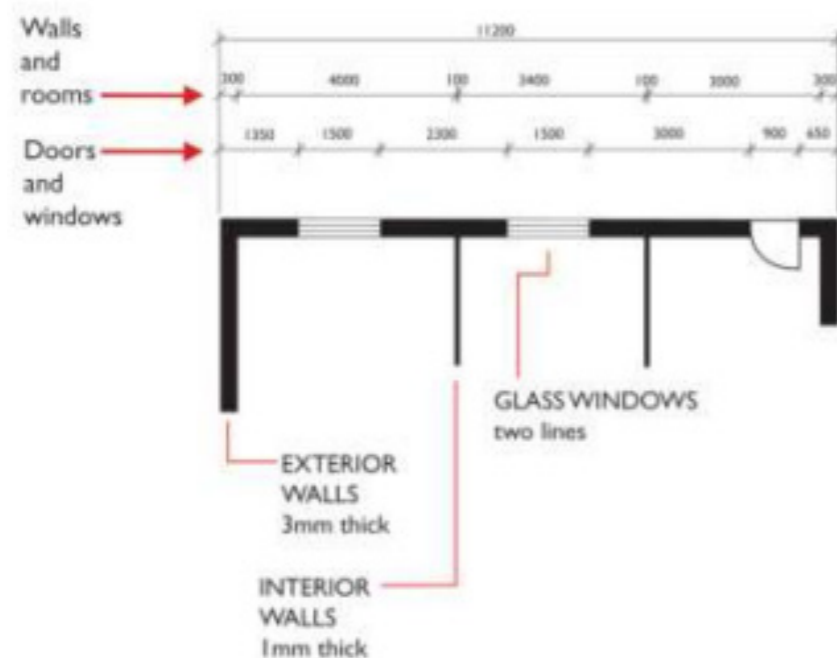
Circles are a bit different when it comes to dimensioning. They are usually dimensioned by their diameter. The symbol Ø means the diameter and 'R' refers to radius. When you are only dimension part of a circle (arc) use the R for radius.

To dimension a circle draw a sloped/diagonal line, preferably at 45 degree angle through the circle which exceeds its diameter that turns into a horizontal line within the outlines of the view/drawing. You must then label using the symbol, for example Ø20 meaning it is 20mm in diameter.

North Symbol
Next to your PLAN VIEW you must indicate where north is. This is usually pointing upwards labelled with 'N'. Refer to the example to see how it should look like.

Walls and rooms

Doors and windows

GLASS WINDOWS
two lines

EXTERIOR WALLS
3mm thick

INTERIOR WALLS
1mm thick
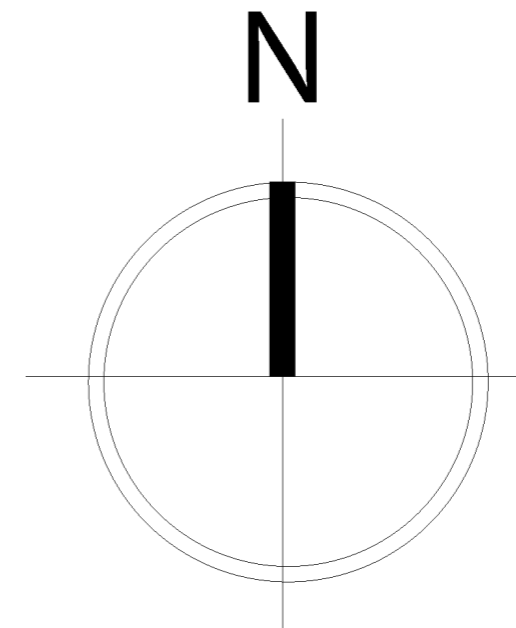
Recording and reflecting on decision making

During our idea generation and visualisation stages of our design, us designers should be actively thinking about our design and what decisions we're making in order to meet the client's brief or create a better product. It allows us to see what's working in each of our ideas and be able to build on them as we generate more. So it's important for us to reflect on our decision making after each idea we create and not just at the end of our idea generation. We can make the most out of this if we stick to this process.

Annotations

Annotations are the most common and easiest way of recording and reflecting on the decisions you make. It is the writing of notes beside an idea on a page or the writing on a post-it note placed beside the idea. This writing isn't just any scribble, we want our writing to help us in creating more ideas and to make sure we're creating meets the client's brief and is either effective, efficient, eye-catching etc. Therefore this handout will provide you with a structure you can follow so you get the most out of your annotations.

PMIQ

PMIQ stands for Plus, Minus, Interesting and Question. These are four different elements that can be placed inside an annotation. Within each element you will first have to record your decisions before you reflect on them with the PMIQ and explain why.
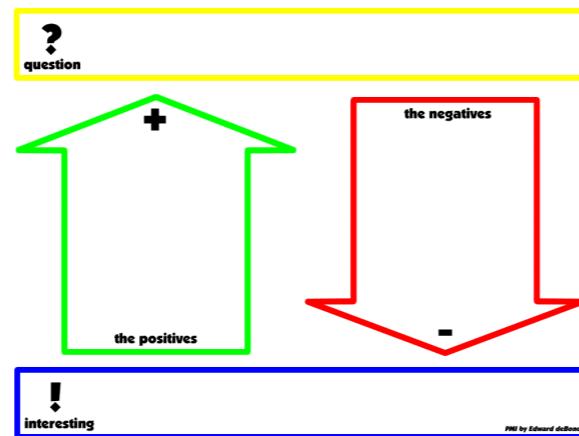Here's what each of the four elements mean:
Plus - A positive outcome of your design
Minus - A negative outcome of your design
Interesting - An interesting outcome of your design
Question - Question to ask yourself that will inform your next idea.

Writing the annotation

When writing your annotations they should somehow follow this structure:
- Record: Describe what design elements,principles and/or features you've included in your design and how you've used them.
- Reflect: Were the design elements and/or principles you've used either a Plus, Minus or Interesting? Why were they a Plus, Minus or Interesting? How do they affect the viewer? How do they respond to the brief?
- Question: What is something that you might experiment with in this design to improve it?

All of your annotations do not have to be thorough and excessively long. Pick one or two stand-out things from your idea/design and record and reflect on them. Here's an example:
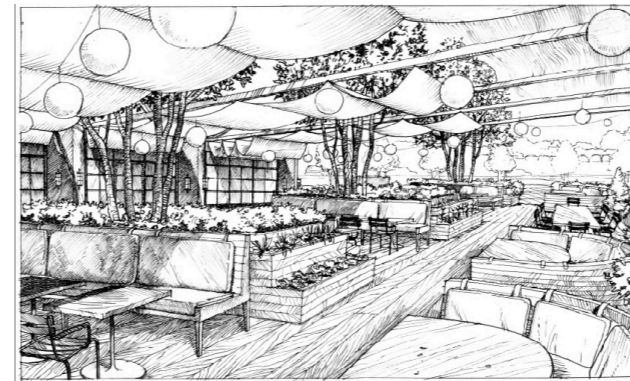
Example:
I've used many round shapes in my design for example the lanterns and tables. I've arranged and aligned these elements in the space so they're creating a sense of balance. It impacts positively on my design as I've looking to achieve the feelings of calmness and relaxation in my audience. Something I might try in my next idea is combining the use of a pattern with the balance I've created whilst remaining the use of round shapes.

Here's a template of the structure you can practice with using this image.

What is a design element/principle in this image?
_____

How have they used it?
_____
_____

Is it a Plus, minus or interesting?
_____

Why? What does it make you feel?
_____
_____
_____

What is something that you might experiment with to improve this design?
_____
_____

Design thinking strategies

Having trouble thinking of ideas?

As we all know, sometimes ideas might not come to you in the flash of a light or you're struggling to come up with unique and original ideas. Don't worry! Designers in the industry experience the same thing.

Try these strategies to help that brain thinking. Make sure to record which strategy you're using and how've you used it and explained how they've helped you in your thinking process.

SCAMPER

SCAMPER is an acronym that consists of 7 different ways of thinking about the design elements and principles of your design or idea as well as the different components you have included.

- Substitute - Remove part of the situation or concept and replace it with something else.
- Combine - Join two or more elements together to create a solution.
- Adapt - Change part of it so it works where it did not before.
- Modify/Magnify - Consider changing some of the design elements or principles used.
- Purpose - Modify what the subject is used for.
- Eliminate/Minify - Remove some or simplify of the subject.
- Rearrange/Reverse - Flip or rotate the subject or modify the order of hierarchy.
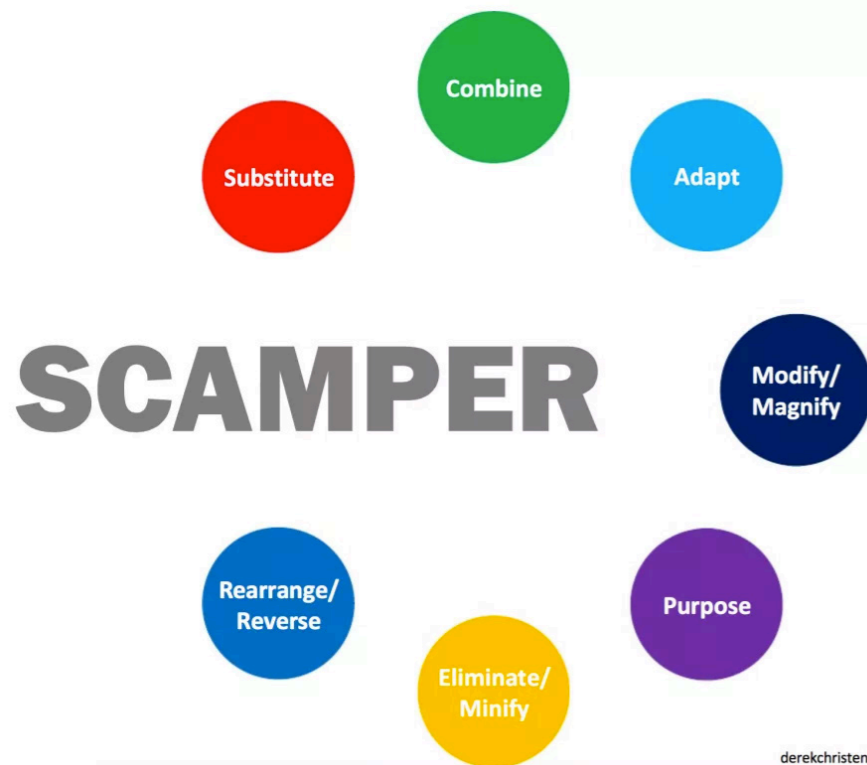
Debono's Thinking Hats

Debono's thinking hats are 6 different hats you can wear to focus your way of thinking. By wearing one of the hats you will focus your thinking and ask questions using that thinking.

- Blue Hat - Process
- White Hat - Facts
- Red Hat - Feelings
- Green Hat - Creativity
- Yellow Hat - Benefits
- Black Hat - Cautions

Pooch

POOCH is an acronym for a flowchart process that you can use to approach your thinking. Each progressive step breaks down the problem or the design brief to create a range of outcomes that you can then to select and combine.

- Problem
- Options – What might be done?
- Outcomes – Possible results for each option.
- Choices – What options will I go with?
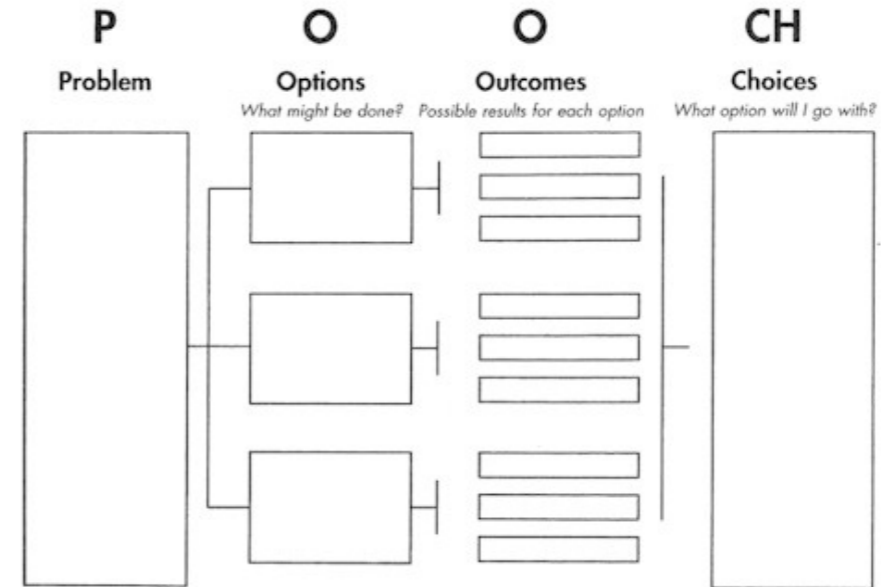
PMIQ

1. Choose an existing design you have created.
2. Identify and describe the following:
3. A positive thing about the design. Something that works well.
4. A minus thing about the design. Something that doesn't work too well.
5. An interesting thing about the design.
6. A question that you can explore to improve the design.
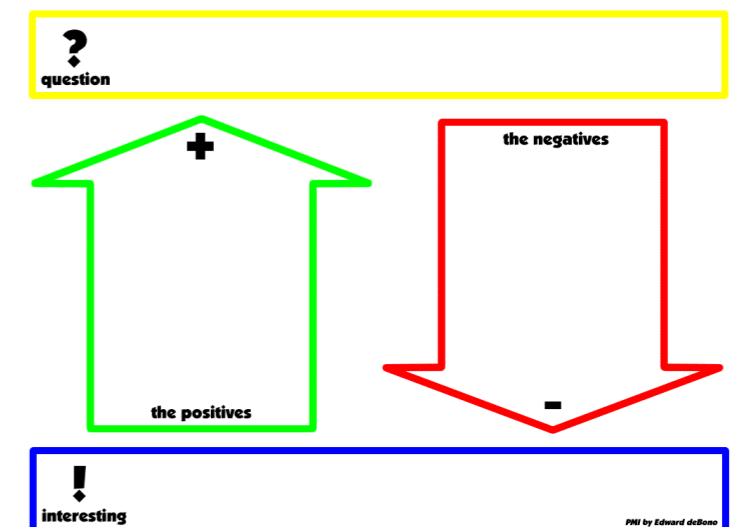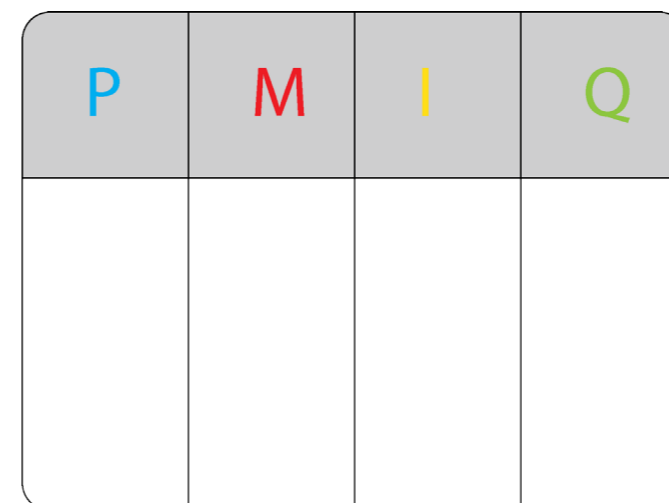
Technical Drawing: Plan View & Elevations

PLAN and ELEVATION

Within environmental design we use three drawings to represent the structure of our building. We use:
Plan View
South Elevation (Front elevation)
West Elevation (Side elevation)

All three sides must be drawn so the dimensions of everything can be shown to a builder to follow. This includes being able to see the length, width and height of every wall, door, table, chair or window in the design. To be able to create an accurate representation of our design we will need to follow a scale. Architectural drawings usually work to a scale of 1:100. That means 10mm equals 1m (1000mm). We will be using this scale our own technical drawings.

Firstly tape the corners of your canvas onto the left-hand side of your workspace with a generous amount of space between the edges of it. 15cm is a good amount. Ensure that the side of your canvas is parallel to the edges of your workspace. This will allow you to get consistent and accurate angles and straight lines.

Plan view

This is a floor plan of our environmental design and is what you should start off with. It allows us to look at the design from a bird's-eye view and see what the design contains and more importantly where all the walls, doors and windows are going to be.This will where you will finalise the design decisions you make regarding your design.

This drawing should show the layout of the building rooms, windows, doors, appliances etc.
It should contain the following details:
- exterior dimensions of the building
- dimensions of each room
- position and dimensions of each window
- position, dimensions and opening direction of each door
- position of appliances.

Here's a structure you can follow to ensure a well detailed plan view:
1. Place all your walls. Remember you can add walls to divide larger spaces into smaller ones.
2. Add in all the doors and windows. Identify where people inside the environment may move around often.
3. Add in the essential furniture. Furniture directed to be included by your client or necessities such as a toilet should be considered.
4. Add details/objects/appliances. Following your brief, explore what items you can add to your design
5. Add dimensions to your drawing.
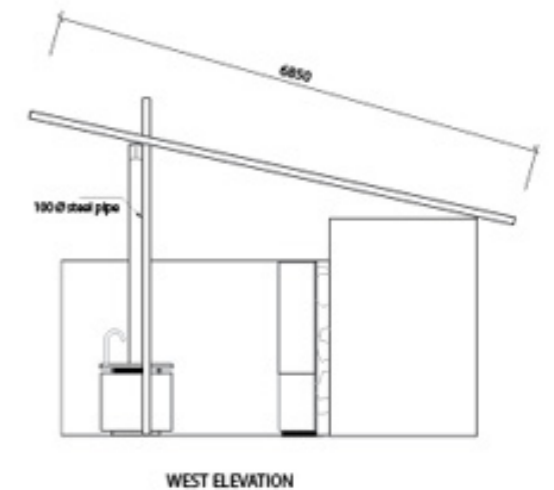
IMPORTANT!

When drawing a plan view, there is a specific set of symbols and lines we have to use in order to follow standards. Please refer to the symbol handout.

PLAN
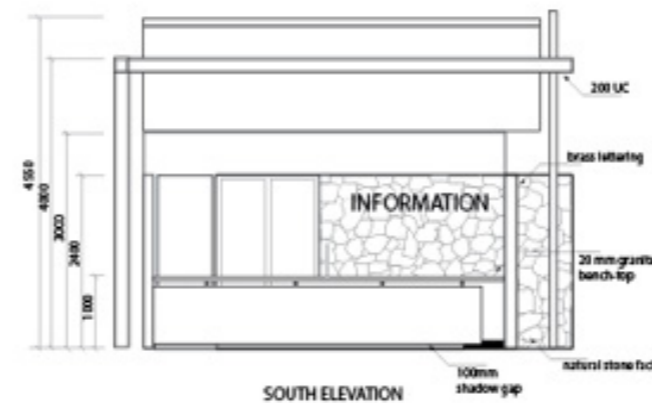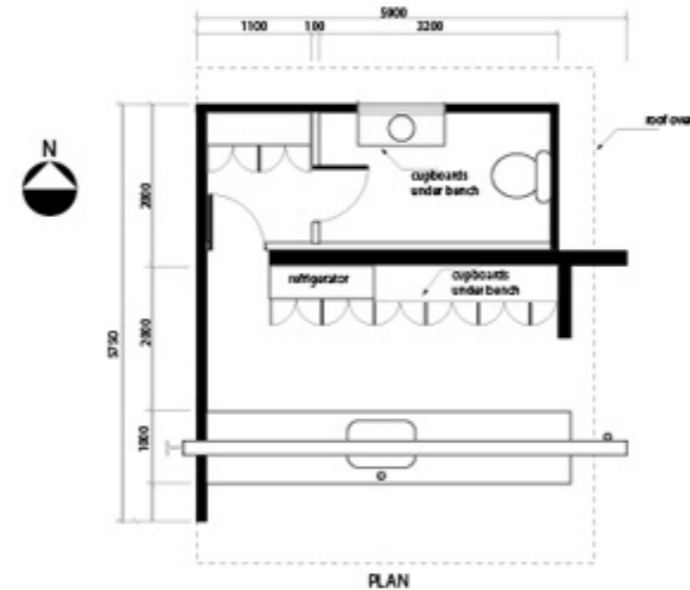
West elevation

To the right of your SOUTH ELEVATION will be your WEST ELEVATION. This drawing allows us to see everything that was hidden behind other objects that we drew in our SOUTH ELEVATION. This ensures we can see and be able to dimension every element of our design.

- Use thin lines from your SOUTH ELEVATION to retain the height of walls and objects of your design.
- This drawing is similar to your SOUTH ELEVATION, just from a different perspective.
- Ensure the dimensions of the objects you draw follow the dimensions you have used in your PLAN VIEW.

SOUTH ELEVATION

WEST ELEVATION

South Elevation

On the same page you will now proceed to do your SOUTH ELEVATION drawing. This is basically what you see if you were to break down the front wall of the building, flatten it and then look at it from the front. It is important to understand that all drawings are within a scale so that means no dimensions have changed. However drawing this SOUTH ELEVATION fills in the gap of what a PLAN VIEW doesn't show you and that is the height of objects within your design.

Draw thin lines which can be erased later from your PLAN VIEW that represent all the edges to allow you to get accurate widths.

- There isn't a set of symbols needed to be used for elevation drawings. Draw using simple shapes that best represent your design.
- Add any text, texture or details that will be permanent to the design.
- DO NOT add in decorations such as books, statutes or posters. Only draw what you have indicated in your plan view. These are the things that are integral to the structure.

Technical Drawing: Paraline Drawings - Isometric & Planometric

Paraline Drawings
Isometric and planometric drawings are in the family of paraline drawings because they use parallel lines that never touch each other. When drawing paraline drawings we want to include all lines so we are able to see a 'skeleton' of our design from a 3D perspective.
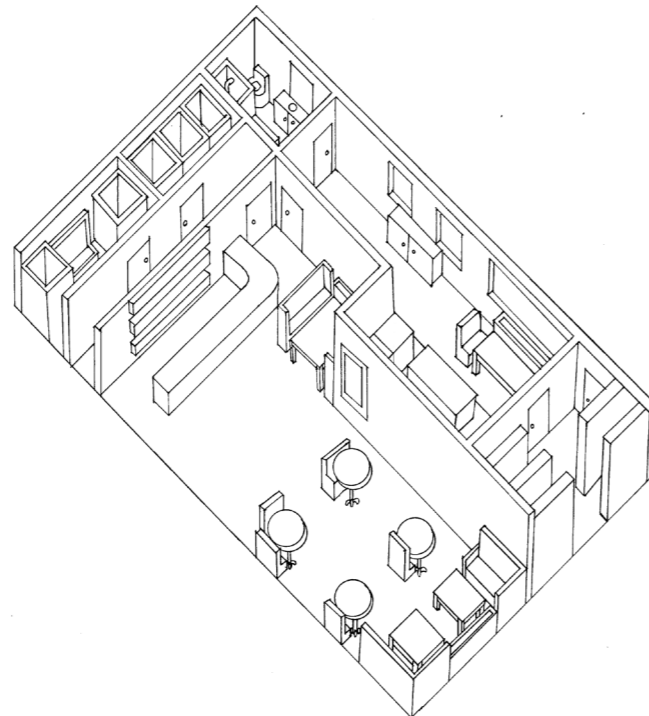
Isometric
Isometric drawings are constructed with both sides of an object receding from the corner edge at 30 degrees.
It provides a comprehensive overall view of the object.
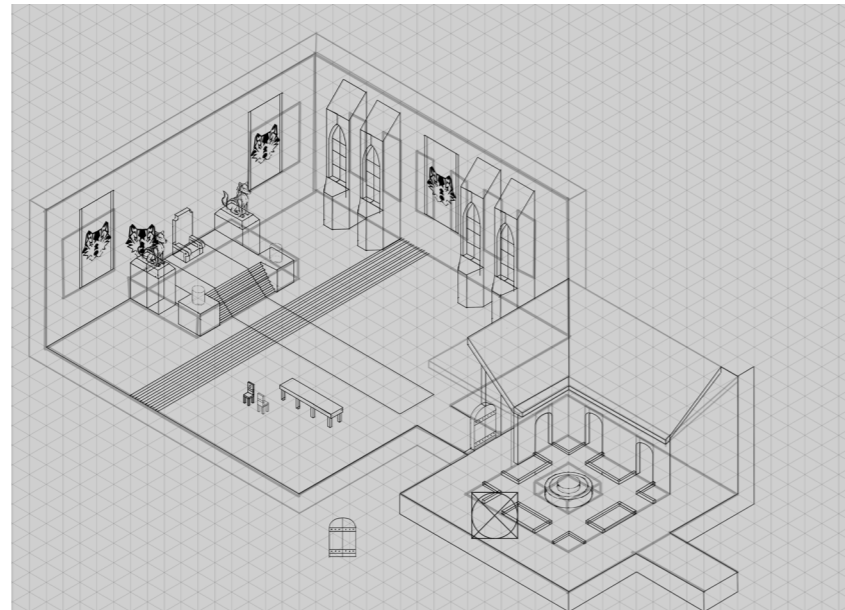
Planometric
Similar to isometric drawings however the the base of the drawing retains its true form (it is not altered) with both sides receding at 45 degrees.

To begin your paraline drawing you will need a T-square and a set square. For an isometric drawing use a 30-degree set square. For a planometric drawing use a 45-degree set square.

Step by step paraline drawings
Firstly tape your canvas onto the left-hand side of your workspace with a generous amount of space between the edges of it. 15cm is a good amount. Ensure that the side of your canvas is parallel to the edges of your workspace. This will allow you to get consistent and accurate angles and straight lines.

Start with blocking out the larger shapes of your design. That would be the exterior walls in this case. Work from big to small to allow yourself an easier time placing each element into your design.

To draw a shape:
1. Align your t-square so it runs horizontal across the page under where you want to start your shape.
2. Measure and draw the height of your object.
3. Place your set square so the narrow corner of the setsquare points towards either left or right and is pressed against the top of the t-square.
4. Measure the length of your object and draw a line across the 30/45 degree angle to get the sides of your shape.
5. At the ends of these lines draw the height of the object to continue with the side of the shape.
6. Move towards the top of your object and draw diagonal lines to join up on the corners to build your top.
7. Finish off by placing the parallel lines and closing up the object.

1

2

45 degrees

3

4

5

6
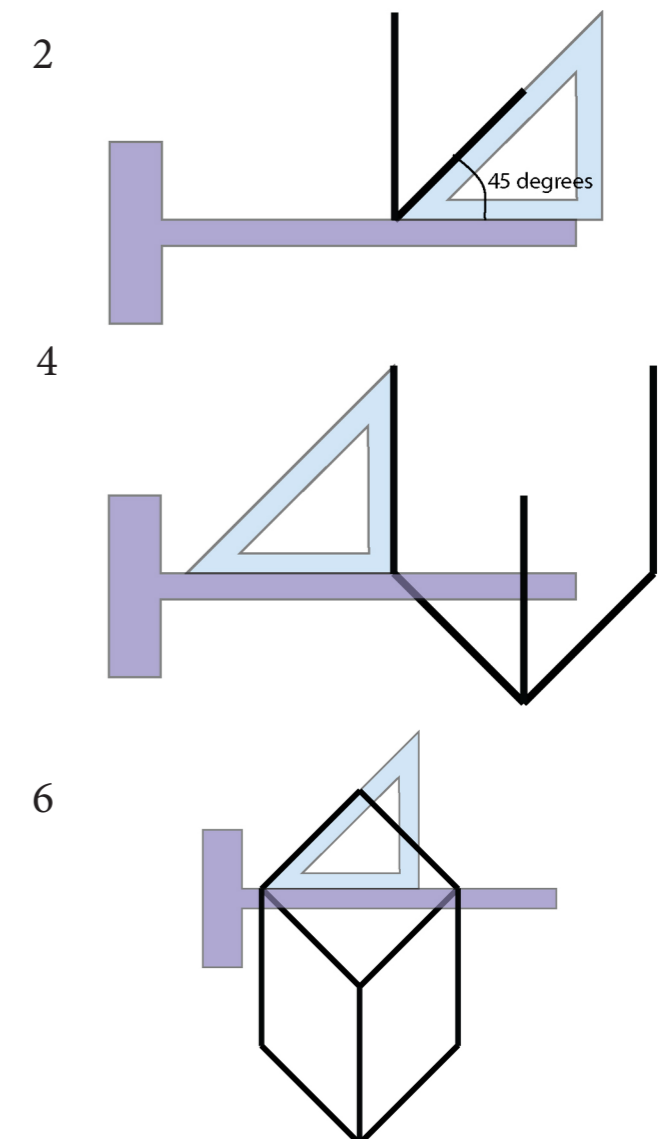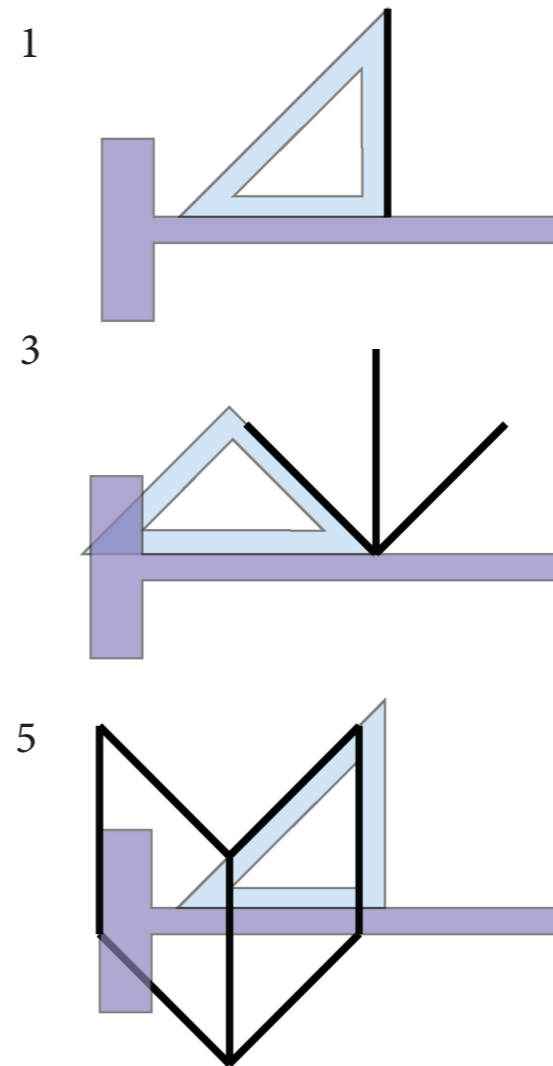
Symbols

To represent items in the plan view, we use symbols. These are a set amount of symbols to use for the structure of the design including walls, doors and windows. appliances etc. However these still need to remain within scale.

For furniture, there is loose standard but designers are able to take a few liberties to represent what type of furniture will be inluded.

This page will include a few examples. For further examples refer to the student resource page and follow the links.

SYMBOL	MEANING
	Window
	Single-swing door (90 degrees)
	Single-swing door (180 degrees)
	Single double-acting door
	Pocket / cavity door - a sliding door that slides into the wall cavity
	Exposed sliding door
	Bifold / concertina doors centred on a track
	Bifold / concertina doors fixed to one side on a track
RAMP	**Ramp** - arrow points upwards
	Stairs - arrow points upwards

ARCH	**Archway**
LINTEL	**Lintel**
ACCESS HATCH	**Access hatch**
	Recessed object - an object recessed into a particular wall or surface.
	Surface-mounted object - an object mounted directly on a wall or surface.
	Free-standing object - an object not connected to the adjacent wall or surface.
	Object mounted over - an object mounted over the area shown.
	Object sittting above the plane of the depicted section - a surface mounted object sitting higher than the plane of the diagram.
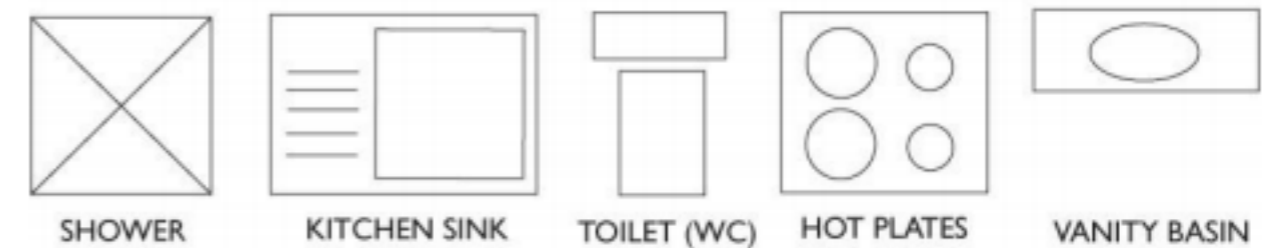
SHOWER   KITCHEN SINK   TOILET (WC)   HOT PLATES   VANITY BASIN
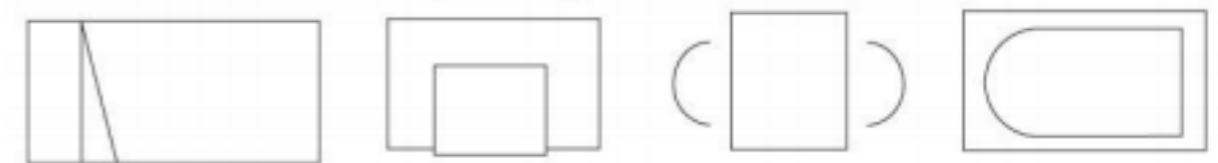
SINGLE BED   LOUNGE CHAIR   TABLE AND CHAIRS   BATH

Environmental Design

Evaluation of Drawings

Evaluate the effectiveness of your drawings.
How can each of these be improved in your drawing? What are some specifics you can improve on?
Check and respond to the following criteria:

- Readability – Are all labels legible and can be read at a glance?

- Clarity – Are all elements and numbers understandable and have a clear meaning? Is there any too much clutter of information?

- Accuracy - If you add up dimensions do they all make sense? Has it been measured correctly? Do your lines align up with others?

- Communication of message - Have you used the appropriate symbols? Are readers able to understand what each of the symbols represent?

- Usability – Does the drawing follow the Australian Standards and conventions? Will someone else be able to intepret, construct or manufacture this design?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
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Scale

Scale worksheet

It is important we can get **a good sense of scale** to be able to draw our sketches.
This is an exercise to help you get familiar with working with scale.
Following the standard, this exercise will feature: ALL MEASURES IN MM.

Firstly let's look at how to read a scale. Scales are represented in ratios. For example, 1:100, means 1 for every 100. In we're using MM, it'll mean every 1mm represents 100mm. So if we had a drawing of a square that had lengths of 1mm. That would represent a real sized square of 100mm sides. This means we can represent large objects on a small page. We wouldn't be able to fit a 5m x 5m design (5000mm x 5000mm) on an A3 piece of paper. This is why we use a scale.

A method to find out how long your sketch will be is using multiplication and division. For example, let's use the scale of 1:100 and we want to draw a wall that is 8m long. Firstly convert that 8m into mm by first multiplying by 100 to get 800cm and then by another 10 to get 8000mm.
That is : 8m x 100 x 10 = 8000mm.
To find out how long our lines needs to be to represent that 8000mm using our 1:100 scale we can simply divide the 8000 by 100.
8000 / 100 = 80.
We end up with 80mm and that's how long your line should be.
To check if you're accurate multiply the length of your line by the scale. So, multiply your 80mm by 100 and check if you get the intended size of 8000mm

Not all scales start with 1. For example 2:1 can be used to represent small designs more largely so we can see more details. This will read every 2mm will represent 1mm. So we're zooming into the design and making it 2 times as larger than it should be in our sketch.

Try the following:
Firstly, there will be lines and shapes that will be using an existing scale. Using the scale provided and a ruler, interpret the actual intended size of the design. The first one is done for you.

1) 1:20
__3200__ mm

2) 1:50
_____ mm

3) 1:200
_____ mm

4) 2:1
_____ mm

5) 1:32
_____ mm

Now you will be given a scale and intended size. Use these and draw a representation using a pencil and ruler.

1) 1:100
5000 mm

2) 1:25
2000 mm

3) 1:1000
30000mm

4) 2:1
80 mm

5) 1:38
760 mm

Now there is the the intended size and sketch, figure out what the scale is.

1) ___:___
6000 mm

2) ___:___
1250 mm

3) ___:___
20000mm

4) ___:___
30 mm

Resources for teachers and students

Industrial design resources

Rendering technique

How to draw a cube and render it with Pencil, Pen, Markers and Pastel
https://www.youtube.com/watch?v=UqKCKs84KRo

How to Draw and Shade a Cylinder
https://au.pinterest.com/pin/161074124152919138/

How to draw a shaded sphere
http://www.wikihow.com/Draw-a-Shaded-Sphere

Draw a Sphere in 6 Easy Steps
http://www.artistsnetwork.com/articles/art-demos-techniques/draw-a-sphere-in-6-easy-steps

Marker techniques
http://www.letraset.com/pdf/dlr049.pdf
Rendering techniques
http://helveticamediuma.com/common/theory/rendering.html

Design Marker Tutorial - Wood Grain
https://www.youtube.com/watch?v=VHv2HxbzSgE

Rendering glass with markers
https://www.youtube.com/watch?v=KsGzmHSiNPQ

How to draw leather with markers
https://www.youtube.com/watch?v=mX8-UaskeCo

render with gray marker - plastic and metal
https://www.youtube.com/watch?v=iSBOA-edKGM

Rendering Surface Finishes with Copic Markers
https://imaginationinternationalinc.com/copic/inspire/how-to/rendering-surface-finishes-with-copic/

VCAA Official resources for technical drawing

Technical Drawing Specifications Resource: A guide to support VCE Visual Communication Design study design 2013-17.

http://www.vcaa.vic.edu.au/documents/vce/visualcomm/technical_drawing_specifications.pdf

Perspective drawing

How to Draw Perspective:
http://www.wikihow.com/Draw-Perspective

An introduction to perspective drawing
http://www.technologystudent.com/prddes1/persy2.html

How to Draw a Road with Trees in One-Point Perspective
https://www.youtube.com/watch?v=shlbPsrxoag

How To Draw One Point Perspective - Drawing Backgrounds
https://www.youtube.com/watch?v=SamH1VPG9cU

How to draw - Two point perspective - sofa with coffee table
https://www.youtube.com/watch?v=nwfwsJiV8qE

Orthogonal drawing

INTRODUCTION TO THIRD ANGLE ORTHOGRAPHIC DRAWING
http://www.technologystudent.com/designpro/orthogrp1.html

THIRD ANGLE ORTHOGRAPHIC DRAWING: AN EXAMPLE
http://www.technologystudent.com/despro_flsh/clock1.html

Isometric Cylinder:
https://www.youtube.com/watch?v=Yg6aocIMdqs

Drawing Basics - Isometric Drawing :
http://designjournalsos.blogspot.com.au/2013/01/drawing-basics-isometric-drawing.html

2: Isometric drawing:
http://web.mit.edu/16.810/www/Isometric%20Drawing.pdf

Pinterest board created for this unit of study

Pinterest board for the class: Industrial design
https://au.pinterest.com/angela_xu_1993/industrial-design/

Examples of how designers/artists present their ideas:
https://au.pinterest.com/angela_xu_1993/presentation-poster/

Packaging net

Carton Packaging Design in 5 minutes - Adobe Illustrator
https://www.youtube.com/watch?v=A4_t7ogZWKY

Adobe Illustrator Basics: Pen Tool Tutorial
https://www.youtube.com/watch?v=0B_IQK7hMo0

Environmental design resources

Environmental design drawing information
Architecture symbols
http://www.build.com.au/floor-plan-abbreviations-and-symbols

Plan view information
https://www.dlsweb.rmit.edu.au/toolbox/electrotech/toolbox1204/resources/04diagrams/02architectural/03floor_plan.htm

VCD teacher unit resource
http://helveticamediuma.com/vcd/index.html

Australian Standards (1100)
https://www.saiglobal.com/

Inspiration and Ideas

Sample cafe
https://www.broadsheet.com.au/melbourne/art-and-design/gallery/best-interior-design-2015

Floor plan samples and ideas
https://sippdrawing.com/category/floor-plan-rendering/

Environmental design samples and inspiration
http://pmelchert1.wix.com/main#!interior-design

Environmental design sketches and observational drawings
http://www.frankching.com/wordpress/

Architecture Inspiration
http://www.lizsteel.com/

Environmental design video tutorials

Line styles tutorial
https://www.youtube.com/watch?v=_t2NjPpsegE

Isometric tutorial
https://www.youtube.com/watch?v=ZBuhGaGPYfQ

Isometric from orthogonal
https://www.youtube.com/watch?v=eYz1g5onMQ4

Orthogonal tutorial
https://www.youtube.com/watch?v=vg9l9ZDqukg

Plantometic - How to draw circles and curves
https://www.youtube.com/channel/UCDwfRrrnftVh7ENYXTxM-lA

Elevation tutorial
https://www.youtube.com/watch?v=eTux32m95Ns

Plan view and elevation explanations
https://www.youtube.com/watch?v=ekNqiLB8pL8
https://www.youtube.com/watch?v=4FAz_hsOOfE
https://www.youtube.com/watch?v=0oIL8OQOdOM

Places to visit:

Fitzroy

In Fitzroy you can find a great mix of art galleries, studios, shops and specialist bookshops. Go visit the local street art and commissioned murals, and check out studios, galleries and workshops like Brunswick Street Gallery, Alcaston Gallery, Sutton Gallery, Panelpop and Centre for Contemporary Photography.

The Rose St. Artists' Market

This is where those in-the-know find Melbourne's best art and design talent. Each Saturday and Sunday there's a huge line-up of creative types, so be ready to feed your eyes with plenty of unique gems and one-off wonders that you won't get anywhere else! There's everything from Art, Photography,Jewellery, Homewares, Collectables, Vintage Pieces and more!

Top Designs (at Melbourne Museum)

https://museumvictoria.com.au/melbournemuseum/discoverycentre/top-designs/

Melbourne CBD

Melbourne is rich in a variety of environmental designs and architecture to look it. Take your students for a walk around the city and pick out a few key locations depending on the theme of your project.
Use this list to create a list of places of your own to visit with your students.

Cafes

Melbourne is polluted with a variety of cafe's. Take your students and wander the CBD from cafe to cafe and do some quick sketches or take photographs of the things you see.
Otherwise there are plenty of shortlisted cafe's that people are looking at. For example here's a list.
https://www.theurbanlist.com/melbourne/a-list/best-cafes-melbourne-design

Bibliography

- Pictures from page 8, 9 and 10 are orginated from *Technical Drawing Specifications Resource: A guide to support VCE Visual Communication Design study design 2013-17.* See more information from *http://www.vcaa.vic.edu.au/documents/vce/visualcomm/technical_drawing_specifications.pdf*

- Step by step instructions of isometric drawing on page 9 are originated from Technology sudent.com. See more information from *http://www.technologystudent.com/despro_flsh/isomty2.html*

- *Illustration on the right hand side of page 11 & 13, and illustration at the buttom of page 12 are drawn by Angela Xu using Adobe Indesign. You are welcomed to use them.*

- *Other web images (Industrial design part)*

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Maki, S. (2016). how to shade a cube with a light source. Retrieved from *https://au.pinterest.com/pin/9992430401844094/*
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