

The design process

Understanding the design process is relevant to all aspects of Design and Visual Communication. You will need to apply this understanding more to the internals than the externals, although the work derived for the externals will normally count for the internals. You will need to have an understanding of:

- the design process
- the situation, need or opportunity
- the brief
- research
- concepts
- development
- final solution/working drawings
- presentation and evaluation.

Introduction

Designers usually follow a process when designing. It leads through various stages, as shown in Fig. 1.1.

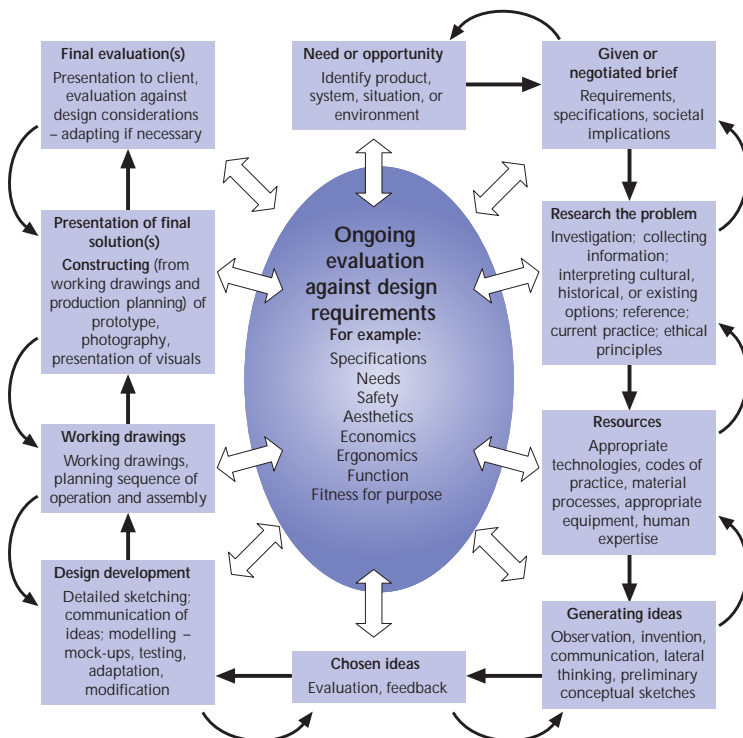


Fig. 1.1: An example of a design process

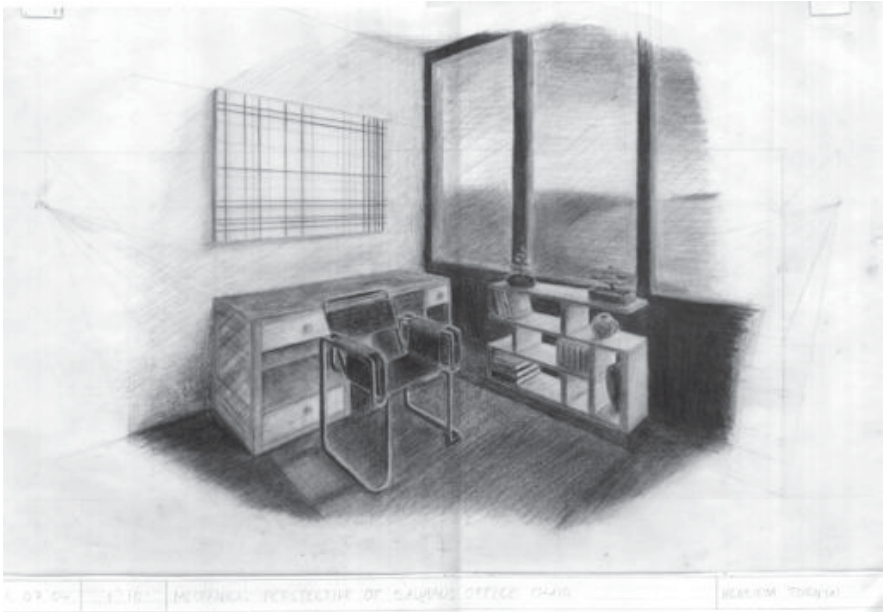


Fig. 1.4: A pictorial presentation

Orthographic drawings

If **multi-view orthographic** drawings are required, they must be to a recognised **scale**. They have to provide enough information to enable the design to be made by someone else. The orthographic drawings must explain what the solution looks like and how it goes together.

As a Year 12 student you should be making decisions about how much and what views you need to show. Following are some questions that may help you make the decisions.

- What do the drawing requirements of the design brief ask for?
- How many views do I need to describe the product?
- How many pages do I need to fit the work into?
- Would it be easier to show all of the individual parts?
- Does a **section view** provide more information?
- If the design has been for a package, do I need a **surface development**?

Formal orthographic drawings should include:

- a set of high-quality scaled drawings that are not overcrowded
- a completed **title block** on each page
- reference lines and labels
- dimensions
- individual labels that describe the drawings
- formal notes that outline special circumstances.

Design elements

NCEA Level 2 Design and Visual Communication material covered in this chapter involves the study of the core elements of design. These elements are the building blocks of all that you do. The chapter covers:

- principles of design
- aesthetic elements
- functional elements
- ergonomics
- designing with these elements
- using design terminology to critically analyse design ideas.

Throughout the whole of the NCEA Level 2 DVC course, the following principles of design should be kept in mind whatever Achievement Standard is being worked on. As a student of Graphics, you should be able to use these terms naturally in your conversation. You use them when talking about your design or the design of a particular designer or design era.

It is useful to be aware of the particular design elements that feature in specific design movements or eras (Chapter 15), especially one you have chosen for Achievement Standard 91340 'Use the characteristics of a design movement or era to inform own design ideas'.

There are many different ways of describing design elements and principles. Work with what you know but broaden your vocabulary and knowledge. The way they are described here comes from the curriculum document for DVC and includes more principles than outlined in the standards.

Principles of design

There are two main design principles – **aesthetics** and **function**.

Aesthetics is 'the study of the nature of beauty', and varies from culture to culture, individual to individual. It is about feelings and emotions. There is a relationship between aesthetic values and ethical values, e.g., the swastika, formerly a good-luck symbol, is now charged with a sinister meaning through its association with Nazi Germany.

Function is 'to do with how a design works, what it has to do and how well it does it'. The isolation of these elements is used to describe them only, since many of the aesthetic and functional elements overlap and merge into each other.

Aesthetic elements

Elements associated with *aesthetics* involve point, line, shape, form, colour, opacity, harmony, contrast, movement, pattern, rhythm, texture, finish, balance, proportion and style.

Point

A point is an exact position. Joined together, points can build into pictures.

Line

Lines can be straight, curved, or irregularly shaped. As lines can take on many forms and uses, they provide us with the building blocks of drawing. They identify shape and form and they 'organise space'. They can show direction, give structure, provide borders and convey information.

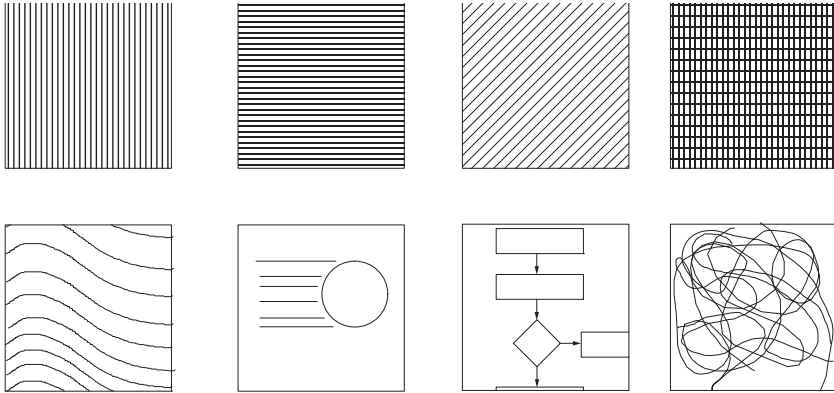


Fig. 2.1: Line

Shape

Shapes are 2-D and may be man-made, natural, geometric or **free form**. Simple shapes are remembered and understood more easily than complex shapes. Shapes can vary endlessly and can suggest physical form and direct eye movement.

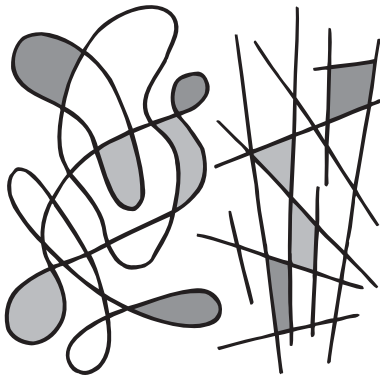


Fig. 2.2: Free shapes

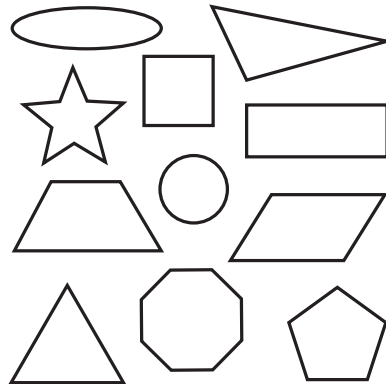
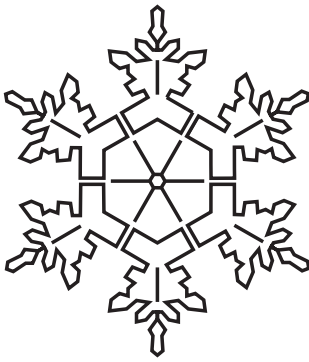


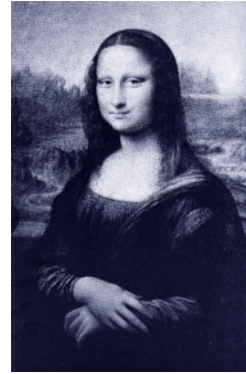
Fig. 2.3: Geometric shapes

Form

Forms are 3-D and may be man-made, natural, geometric or free form. Form can vary endlessly and can suggest physical structures. We can use composite forms to create a large entity. It is often useful to break complex forms down into their basic geometric forms for sketching and describing.



Radial



Informal

Fig. 2.10: Balance – formal, radial and informal

Proportion

Proportion involves the relationship between the various parts of an object. It is how we judge the size of an object without measurement. Proportion uses a variety of systems from Leonardo da Vinci's Vitruvius Man to the Greeks' Golden Section to Le Corbusier's Modulor system. Our sense of proportion is almost as refined as our sense of balance.

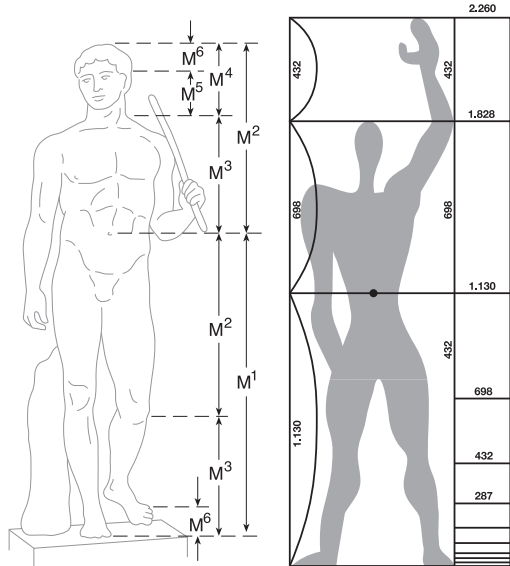
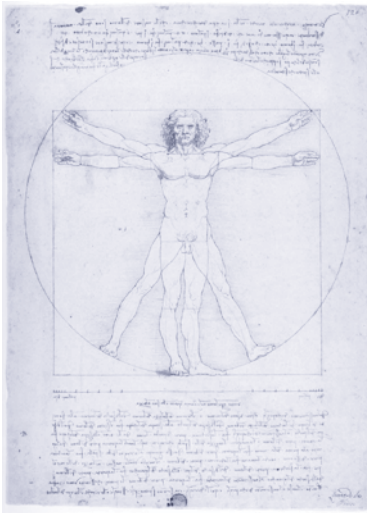


Fig. 2.11: Proportion

Not only do measurements need to be taken of the body at rest, but also when movement occurs, to find out what can be easily reached, what is the angle of vision, etc. Measurements based on movement are dynamic measurements.

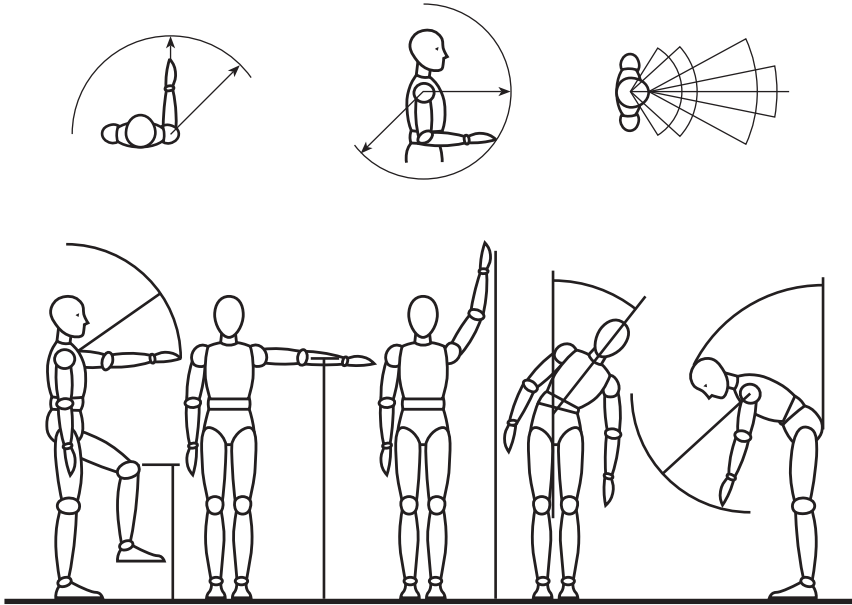


Fig. 2.13: Ranges of movements using an ergonome

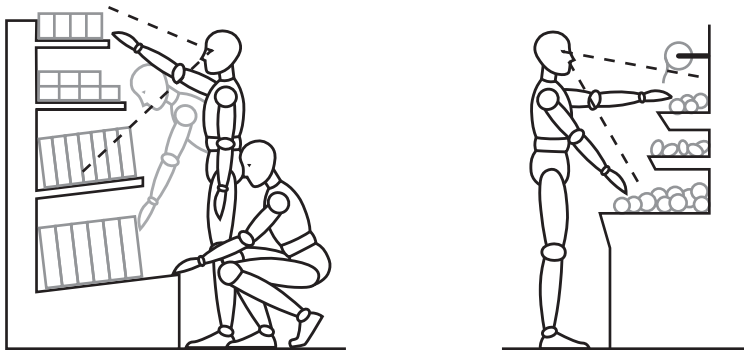


Fig 2.14: Anthropometric data of the hand

Designing with these elements

Function and form (aesthetics) are nearly always in conflict. Compromises must be reached as to how important one set of qualities is seen to be at the expense of the other set. As a designer and student you will come to this problem with a predetermined mindset that has been pre-programmed from an early age. Some of you will need to work hard at creating form, others at ensuring the functional aspects of design work. Start from your strengths!

Colour theory

NCEA Level 2 Design and Visual Communication material covered in this chapter involves the study of colour theory. Although not specifically covered in any of the Achievement Standards, it will allow you to explore aesthetics and functional elements of design. This is useful in your design work associated with Achievement Standards 91340, 91341, 91342 and 91343. You will gain an understanding of:

- using colour
- the colour wheel
- harmonious and complementary colours
- colours and feelings
- colour associations
- colour schemes.

Using colour

Before using colour we must first define what we use colour for and how we are best to use it. Colour is part of everything around us, influencing how we feel and think. Shape, form and texture provide the main character of an object's appearance. Colour can provide variation and emphasis in a design.

Colour can set the mood, create illusions of size, make writing more legible, attract attention and help to persuade consumers to purchase goods or services. When considering the colour for a design, bear in mind the purpose and the effect being strived for. Think about the target audience.

The colour wheel

The colour wheel shows how colours can be created and how they relate to one another. The **primary colours** are red, blue and yellow. Mixing two primary colours in equal quantities gives the **secondary colours** orange, green and purple. **Tertiary colours** result from secondary colours mixed equally with the adjacent primary colour, e.g., yellow-green is made up of 75% yellow and 25% blue.

If all three primary colours are mixed, brown is formed. If colours opposite each other on the colour wheel are mixed, different types of brown result as follows.

- Ochre is the outcome of mixing yellow and violet.
- Sienna – from red and green.
- Umber – from blue and orange.

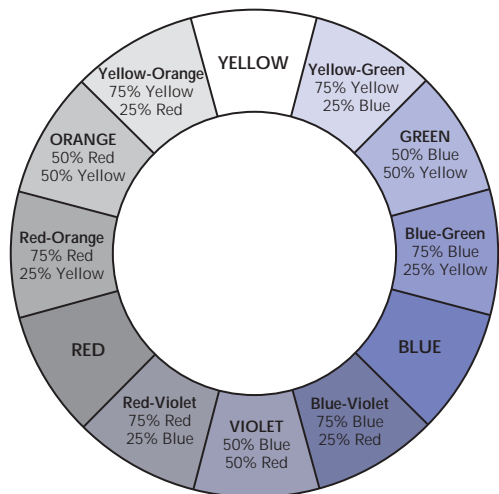


Fig. 4.1: The colour wheel

Presentation sketching

Presentation sketching is the use of sketching for high-end presentation. Some of you may struggle with formal drawing – this is another way of producing quality outputs. As you come to produce this type of sketch you may find it easier to trace a quality sketch and then render this to a high quality. Rendering of product designs should be realistic. Large areas, like spatial design areas, could be section-rendered (see Chapter 8).



Fig. 7.12: An example of Presentation sketching

Activity 7A: Sketching

(Ans. p. 230)

1. Produce a human factor sketch of your hand holding a pencil.
2. Produce a 3-D technical sketch of your cellphone, or other digital device.
3. Trace the answer to 2 and use thick and thin lines to highlight sides.
4. Produce a technical sketch of a kitchen fork.

Drawing systems using sketching

During the year's course of NCEA Level 2 DVC, students are expected to follow the design process in each of the briefs undertaken. This will necessitate a number of freehand sketches with design notes, in the areas of research, investigation of materials, construction methods, conceptualisation, design development and the final presentation, depending on the type of brief being undertaken. The complete units of work showing sufficient freehand sketches will be assessed externally.

Sketching in orthographic

Sketching in orthographic provides the viewer with details and information that are not always evident in a pictorial. An elevation or plan provides details that potentially show relationships between parts. Part views show details that clarify and explain.

Formally drawn orthographic drawings contain the information needed to produce the object. These are sometimes known as working drawings.

In sketched orthographic drawings, the rules for formal orthographic projection still apply, even though the work is sketched freehand. In a multi-view orthographic projection (one with a plan, elevation and either one or two end elevations) two assumptions are made.

- The views are at right angles to each other.
- The views are in line with each other, so that features on one view can be directly projected to the adjacent view.

Sometimes two views, a plan and an elevation, are sufficient to fully describe the object. Generally, however, three views are used and occasionally four – the latter would show both the right-hand elevation (**RHE**) and left-hand elevation (**LHE**), especially when they are different. For further details on how to do orthographic sketching, see online at www.esa.co.nz **► ESA Online**.

A multi-view orthographic sketch is shown in Fig. 7.13.

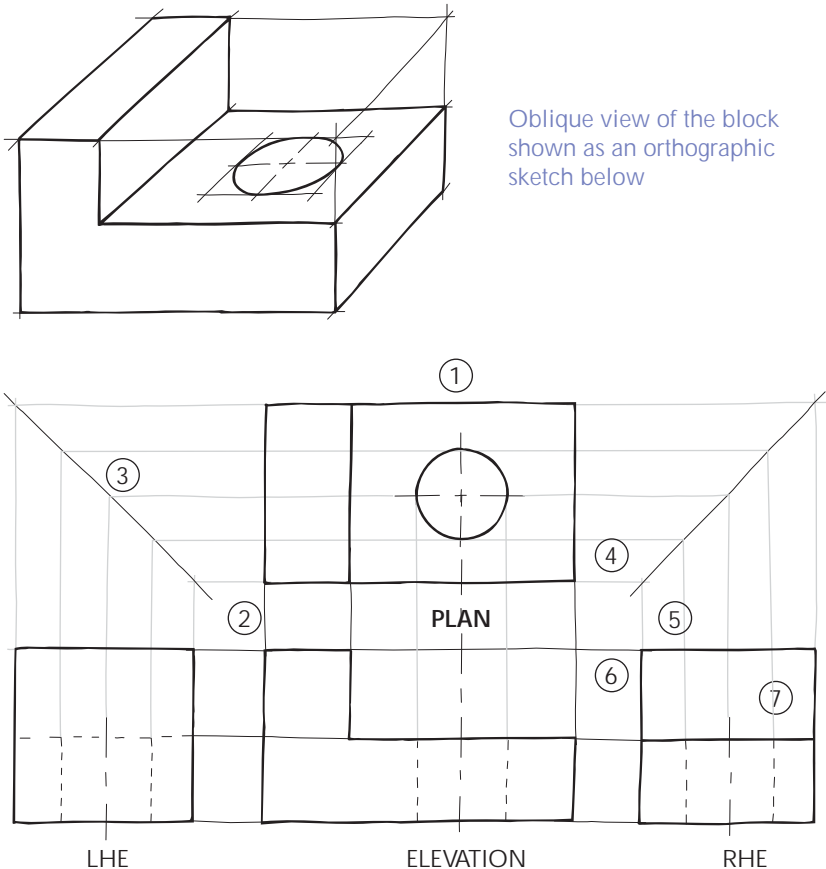


Fig. 7.13: Construction for a multi-view orthographic sketch with hidden detail, centre lines and construction lines

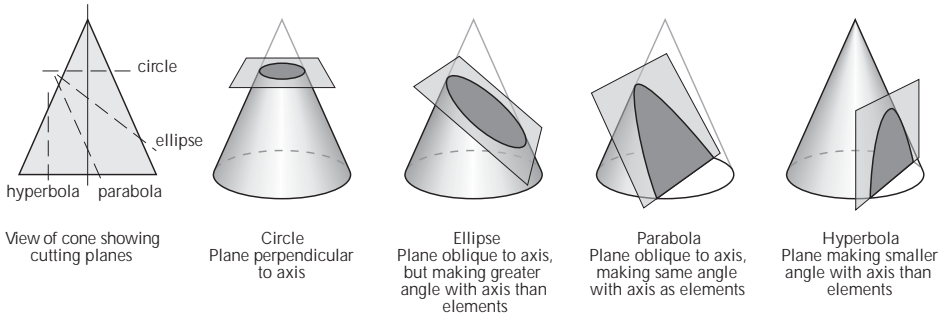


Fig. 12.13: Conic section created by cutting planes

Ellipse

When a sectional plane cuts all the generators of a cone on one side of the apex, the section is an **ellipse**. The use of an ellipse will often be found in the bordering of logos or symbols. The effect of increasing or decreasing the major and minor **axes** will allow the shape of the ellipse to vary from almost a circle to a long skinny oval. An ellipse could be described as the locus of a point which moves at a constant distance between two focal points.

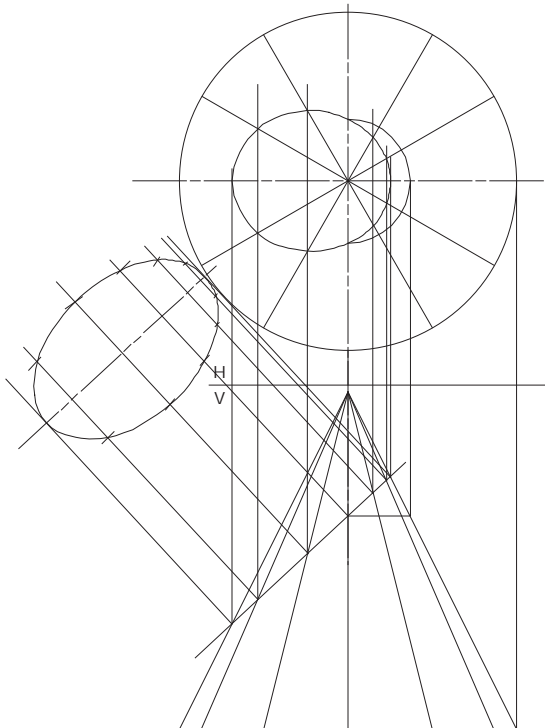


Fig. 12.14: Ellipse drawn using generator and projection

George Gershwin (songwriter), Fred Astaire (tap dancer) and Ella Fitzgerald (singer) were famous performers of this era.

Second World War, 1939–44

The war years were a period of austerity, with rationing of basics such as food and petrol in some countries, including New Zealand, and government spending diverted to the war effort. Nationalism was the theme.

The cost of the war included a generation of designers lost on the battlefields. The cities of Europe and England were also badly damaged, but America was left intact.

Design was functional and packaging was plain without colour. (Use is made of the same style of packaging today to tap into the older-aged market, to convey good value.)



Fig 15.15: Second World War style

Affluence, consumerism and style, 1945–1960

Post-war design, influenced by America, was loud and brash. It was a 'show-off' style, with products bigger and better, reflecting the 'American dream' of material success. TVs were huge, cars were long, low and streamlined with large fins.

The 1950s were very materialistic and commercial. The style of the period became known as the modern or international style. One of the architects associated with this style was Le Corbusier.

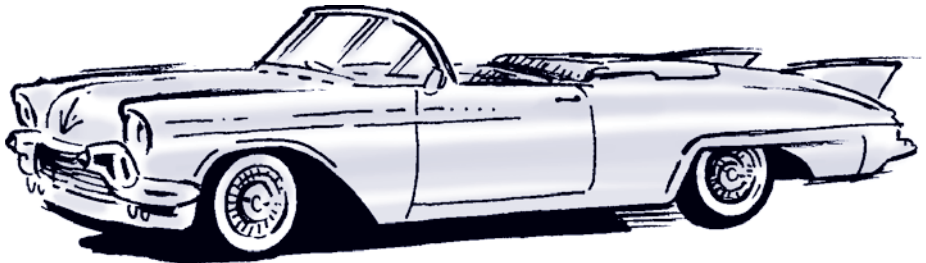


Fig. 15.16: 1950s American car

The Rule of Thirds

This is a compositional technique that provides a quality visual layout. The thirds rule is based on a 3x3 grid and divides the image into thirds. This grid structure will provide you with 9 squares and 4 intersections. By placing the subject or dominate image on an intersection you will produce an asymmetrical image that has interest. If you keep separate elements of the image within the thirds this also provides a balance and a harmony to the layout.

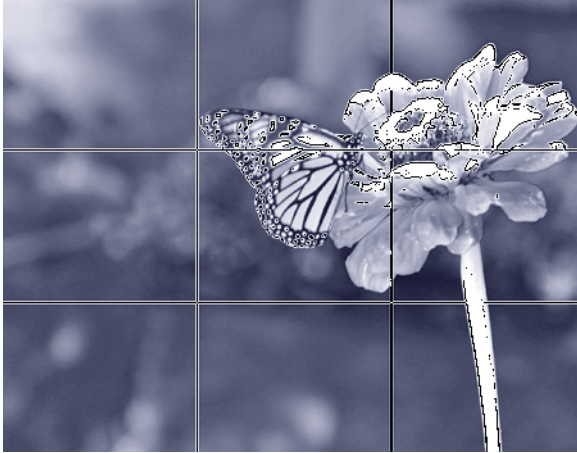


Fig. 21.1 Image on thirds

Positive/Negative space

Positive space in a composition is where visual information has been placed.

Negative space refers to where it hasn't been placed. We should not be afraid of either but need to remember that too much positive can become cluttered and potentially un-viewable. Negative space helps define a subject, and brings balance to a composition. It is not necessary to balance the positive and negative space but you can achieve a degree of balance if the positive element of the design is 'grounded' (anchored down) rather than floating in negative space. Don't be afraid of white space as it does allow your composition to be uncluttered.



Fig. 21.2: Layout without grounding



Fig. 21.3: Layout with grounding

The externals for NCEA Graphics are defined by the specification. For each of the Standards they require a combination of work that comes from your work undertaken during the year in answering design briefs. The answers in this section of work cannot be given NCEA grades as they equate to class exercises and do not resolve design problems. For the internals an appropriate design process and final solution in response to a design brief is required.

Activity 1A: Design process (page 15)

1. When evaluation or testing shows problems in the design, then moving back to an earlier stage needs to be considered so that issues and problems can be resolved.
2. What? Where? When? Why? and How? Keywords are nouns.
3. Existing products. The situation. Users of similar products or services. Suitable materials. Construction methods.
4. A trip made by putting oneself in the same situation.
5. Effects on society. Needs of the users. Impact on other stakeholders. Compliance with various codes.
6. To clearly show modification and alternatives with the justification behind them.
7. A multi-view orthographic drawing to scale.

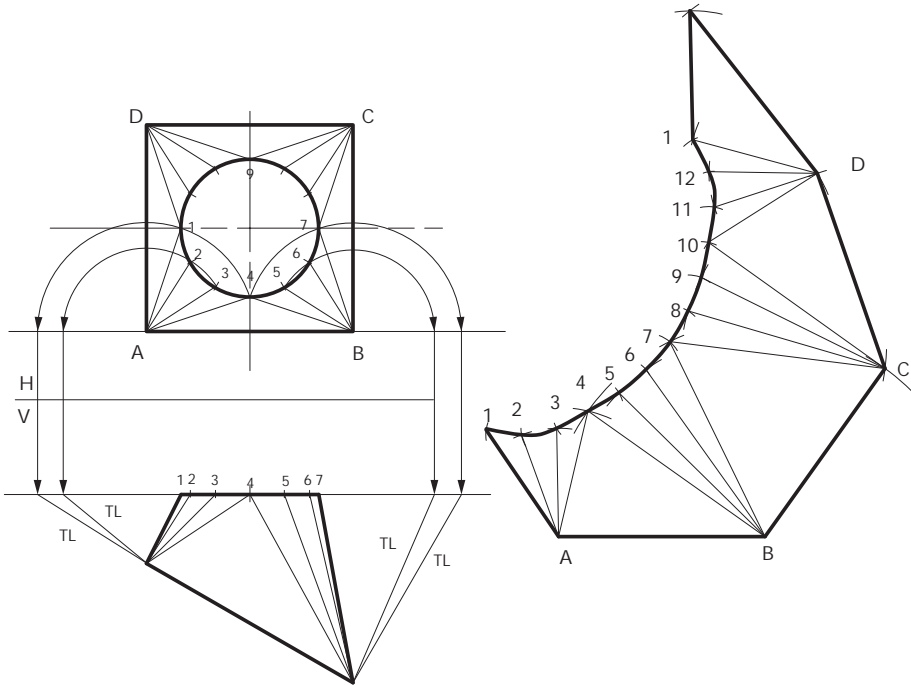
Activity 2A: Design elements (page 31)

1. Aesthetics and function.
2. [Students' sketches.]
3. The science of measuring people.
4. By putting in a diagonal brace, thus triangulating it.
5. 460–760 mm.
6. Strength, durability, reliability, fitness for purpose, ergonomic fit, stability, efficiency, safety and user friendliness.
7. A 2-D model of a person made to scale with moveable joints. (Normally made of cardboard)

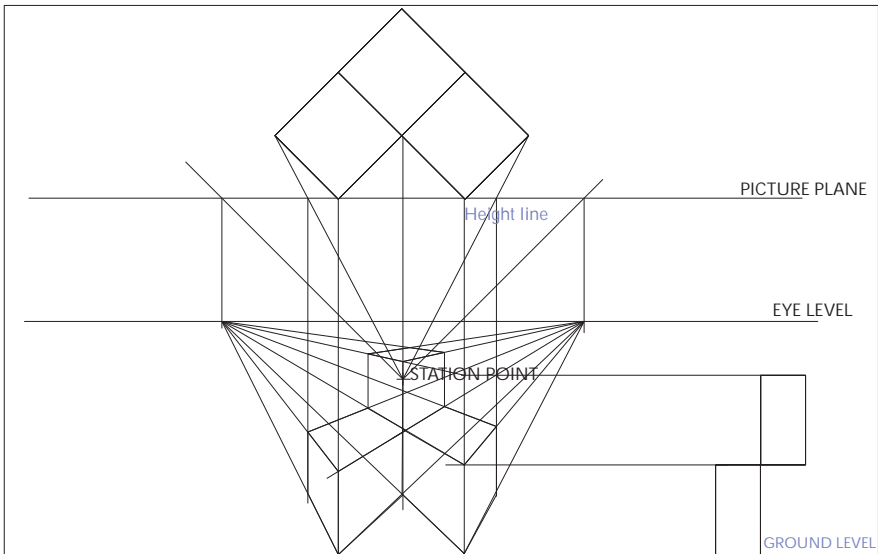
Activity 4A: Colour theory (page 38)

1. Sets the mood, makes the drawing realistic, unifies, enhances, differentiates, accentuates, colour-codes information.
2. The colour plus white.
3. Colours adjacent to each other on the colour wheel.
4. The colour plus black.
5. Blue and orange, red and green, yellow and violet.
6. Yellow and violet, red and green, blue and orange.
7. Because black absorbs light and heats up.
8. A hue is the pure colour.
9. Green, blue, violet.
10. One colour and tones.

Activity 13B: Triangulation (page 131)



Activity 14A: 3-D perspective drawing (page 155)



Answers

		SCALE:	REV:
		DATE:	Topic:
		NAME:	