



Calderglen High School

Technical Department

Advanced Higher

Graphic Communication

Study notes for

**Knowledge
&
Interpretation**

Booklet 1

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Introduction Higher Graphics

The Higher course consists of:-

External assessment by examination paper **50%**

External moderation of the Reception Desk Assignment **50%**

The examination paper is 2 hours long and consists of one part:-

Graphics knowledge (*Content of this booklet*)

The graphics knowledge consists of a total of **70** marks.

The Reception Desk Assignment also consists of **70** marks

The following information contained within this booklet contains all the information required to fulfil this aspect of the course.

It is therefore imperative that candidates are fully conversant with the information contained within this booklet.

For the Higher Exam it is suggested that candidates spend approximately 1.5mins per mark allocated. If this is done this will leave approximately 25 minutes left for perusing over the examination paper.

Introduction Advanced Higher Graphics

The Advanced Higher course consists of:-

External assessment by examination paper **40%**

External moderation of two tasks and final Assignment **60%**

Having said this the two tasks (Camera case attachment and the riverside museum tasks are pass or fail units)

The examination paper is 2 hours long and consists of one part:-

Graphics knowledge (*Content of this booklet*)

The graphics knowledge consists of a total of **80** marks.

The Final Assignment consists of **120** marks

The following information contained within this booklet contains all the information required to fulfil this aspect of the course.

It is therefore imperative that candidates are fully conversant with the information contained within this booklet.

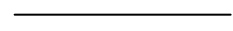
For the Advanced Higher Exam it is suggested that candidates spend approximately 1.5mins per mark allocated. If this is done this will leave approximately 25 minutes left for perusing over the examination paper.

Types of line used



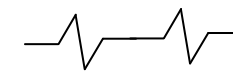
Continuous thick

Used for visible outlines and edges.



Continuous thin

Used for projection, dimensioning, leader lines, hatching and short centre lines.



Continuous thin straight with zigzags

Used for limits of partial or interrupted views and sections if the limit is not an axis.



Dashed thin line.

Used for hidden outlines



Chain thin.

Used for centre lines,



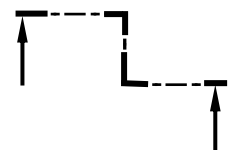
Chain thin double

Used for ghost outlines



Continuous thin irregular

Used as the limit to an interrupted view when an axis is not present.

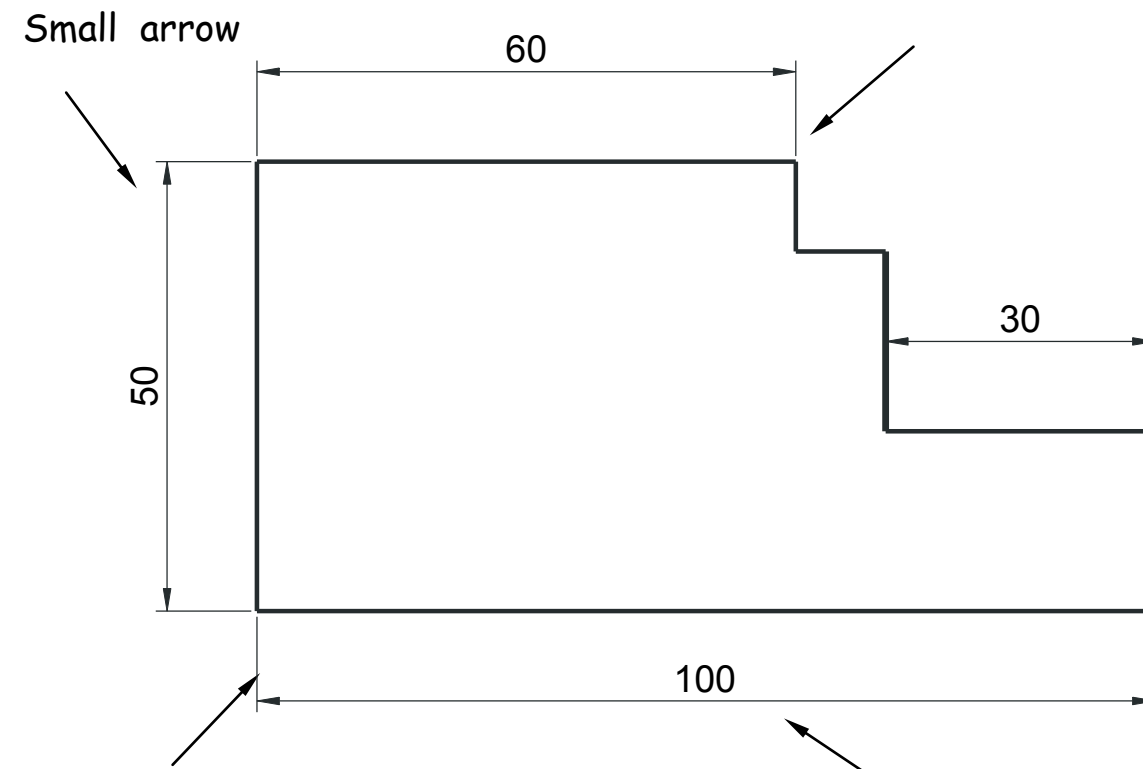


Chain thin thick at both ends and

Used on Cutting planes.

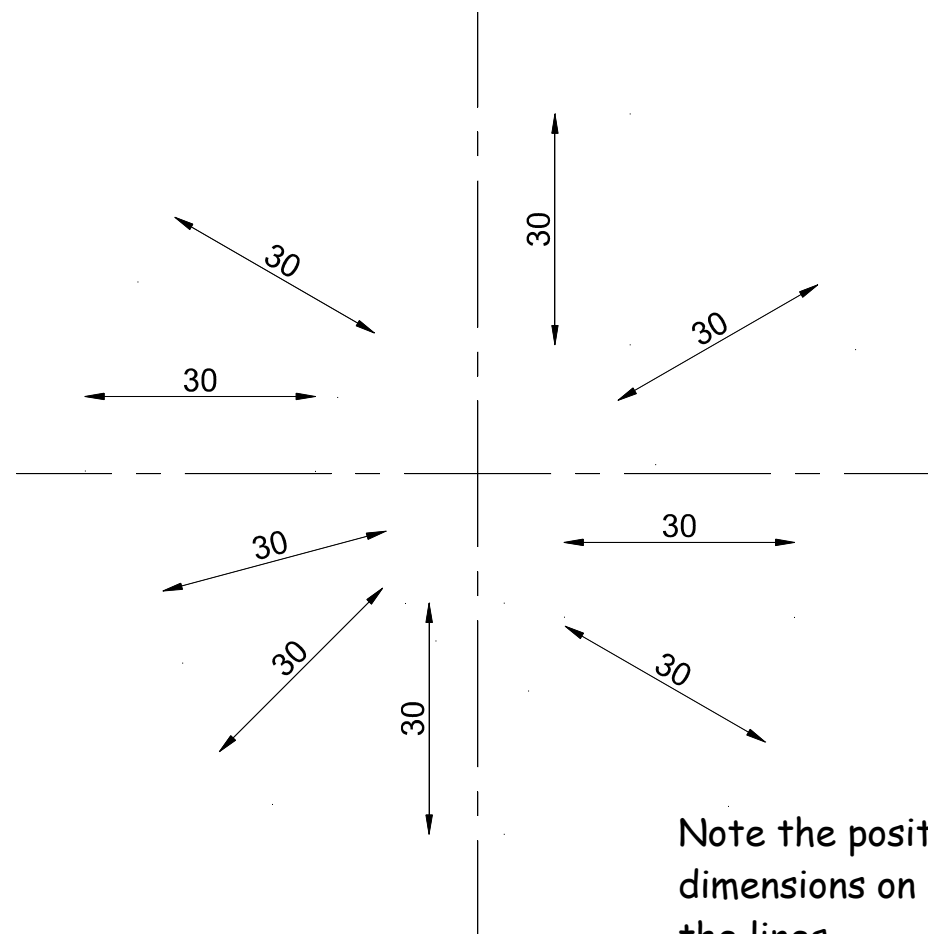
Dimensioning

Small gap between Leader and line of drawing

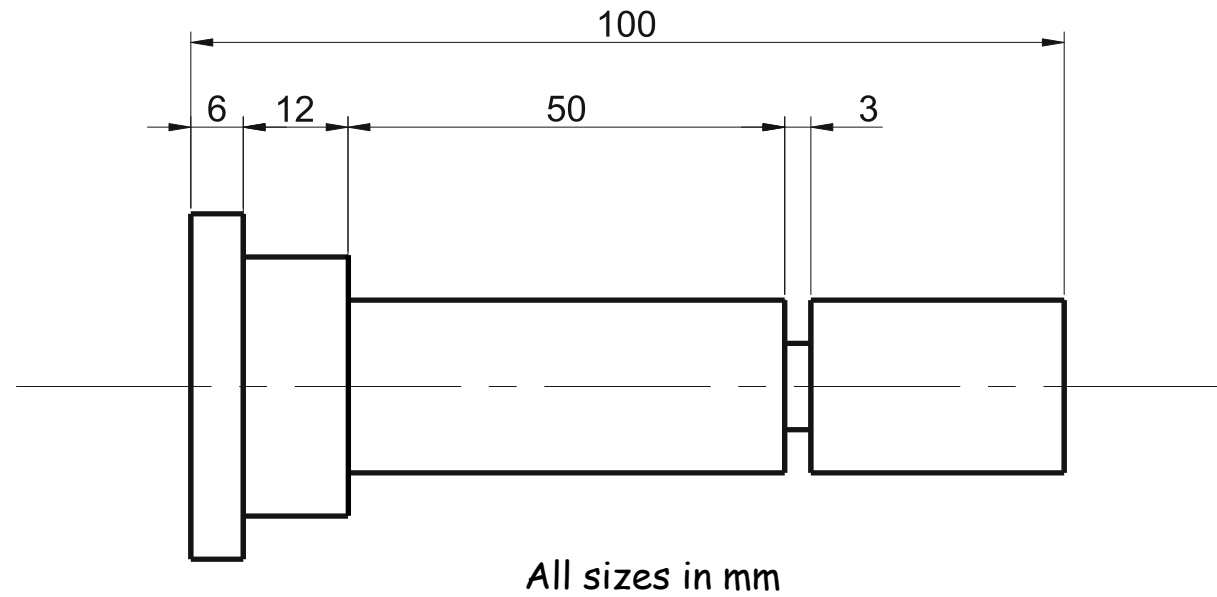


Short extension (Leader)

Dimension



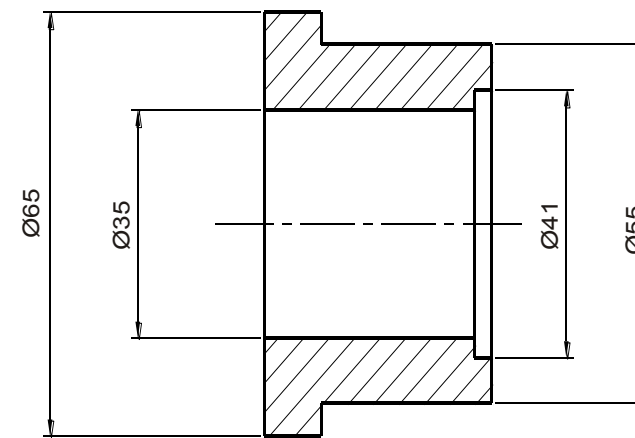
Note the position of the dimensions on each of the lines



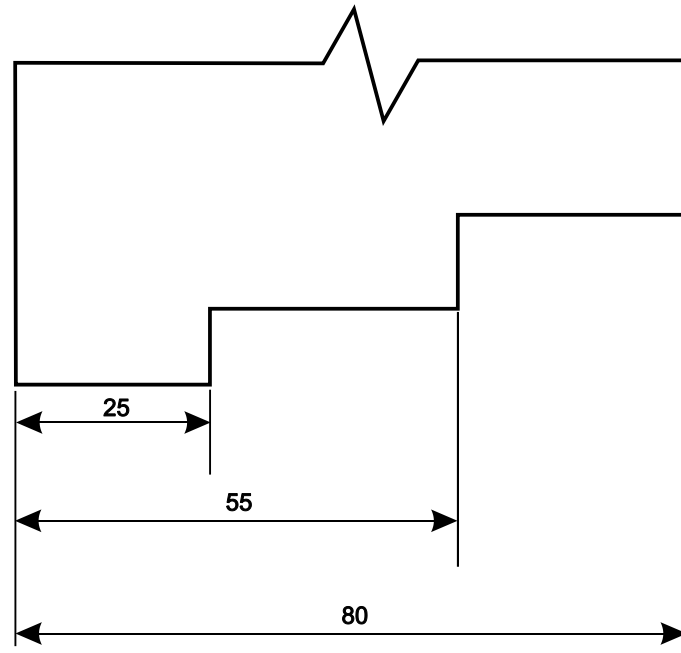
Notice on the above drawing that the largest dimension is placed on the outside of the smaller dimensions. Where there is a limited space for dimensioning, the dimension can be placed above, or in line with, the extension of one of the dimension lines. E.g. the 3mm dimension uses the 50mm dimension leader. It is also important when dimensioning not to include the units of measurement. As can be seen from the drawing above, state on the drawing the unit of measurement. i.e. **(All sizes in mm)**.

The sectioned drawing opposite shows some possibilities for putting a diameter on a drawing. This is by no means the only method.

If the section shown was **Square**, then the following symbol would be used. \square 45

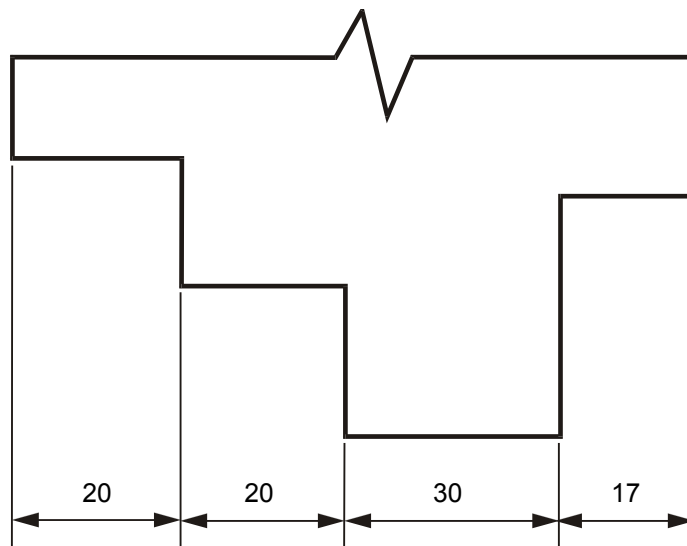


Dimensioning methods



Parallel dimensioning

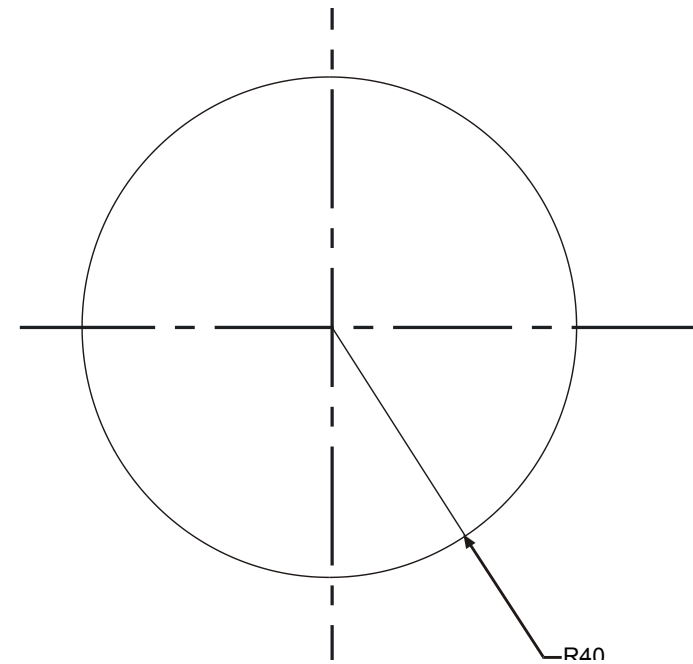
Parallel dimensioning shows dimensions taken from a common datum.



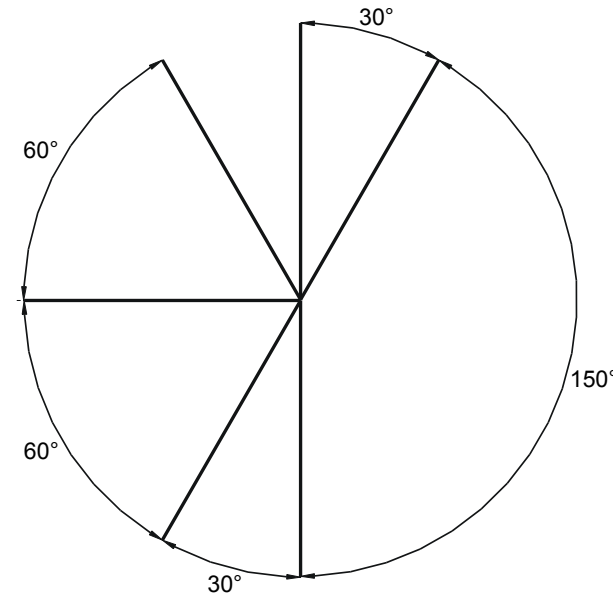
Chain Dimensioning

Chain dimensioning should only be used when the accumulation of tolerances will not affect the part.

Radii should be dimensioned by a dimension line that passes through, or is in line with, the centre of the arc. The dimension lines should have one arrow head only, that which touches the arc. The symbol R is placed in front of the dimension.



Angular Dimensions



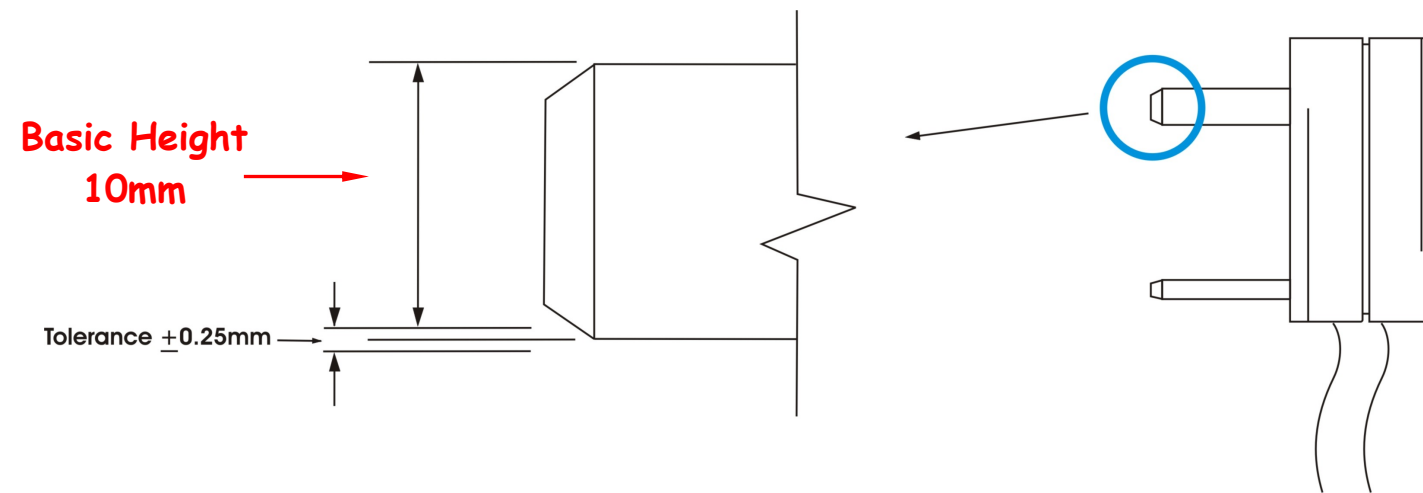
Dimensional Tolerances

When products are manufactured, they, in many cases have to be able to be assembled to other components which make up the complete product. It is very difficult to ensure that the components are the exact size every time, therefore to allow for slight mistakes in manufacturing we use a system called Tolerance. This allows the components to be made within certain sizes which in turn allows for slight mistakes allowing the components to still fit. In the first example given overleaf the component has a tolerance of 0.25mm either way. This means the component can be made within the sizes 19.75mm to 20.25mm. The tolerances vary depending what is being made.

In the example shown opposite (*button for TV remote*) the button has been made with a tolerance of $\pm 0.5\text{mm}$. This means that in the manufacturing process it will have a full 1mm allowance. This does not seem a lot but in manufacturing terms is a substantial allowance.

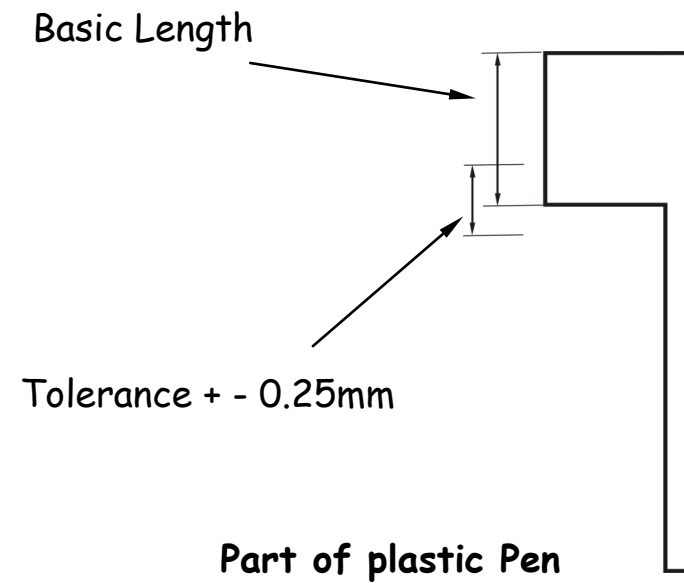


For example, the height of a pin of an electrical plug, has shown below, is 10mm. The company has determined that the size could vary between 9.75mm and 10.25mm and still be able to fit in the slots in the socket. In this case a tolerance of 0.5mm could be applied to this dimension without affecting the function of the part. This size is normally stated as $\pm 0.25\text{mm}$.



When manufacturing or constructing an item it is virtually impossible to achieve precisely the required size of the item. The error permissible in manufacture is called tolerance - this is normally given on the drawing of the item. Tolerances which affect the size of an object or feature on it are referred to as dimensional tolerances. They are also used to tolerance the size of locating features on an item in relation to another. For example, the required length (or basic length) of part of a plastic pen clip shown below is 10mm. This size could vary, between 9.5mm and 10.5mm and still fit in the slot provided for it on the pen.

tolerance of 1mm, normally stated as $\pm 0.5\text{mm}$ could therefore be applied to the dimension without affecting the function of the part. The length of the part of the clip could then be manufactured to any size between 9.5mm and 10.5mm and still be acceptable.

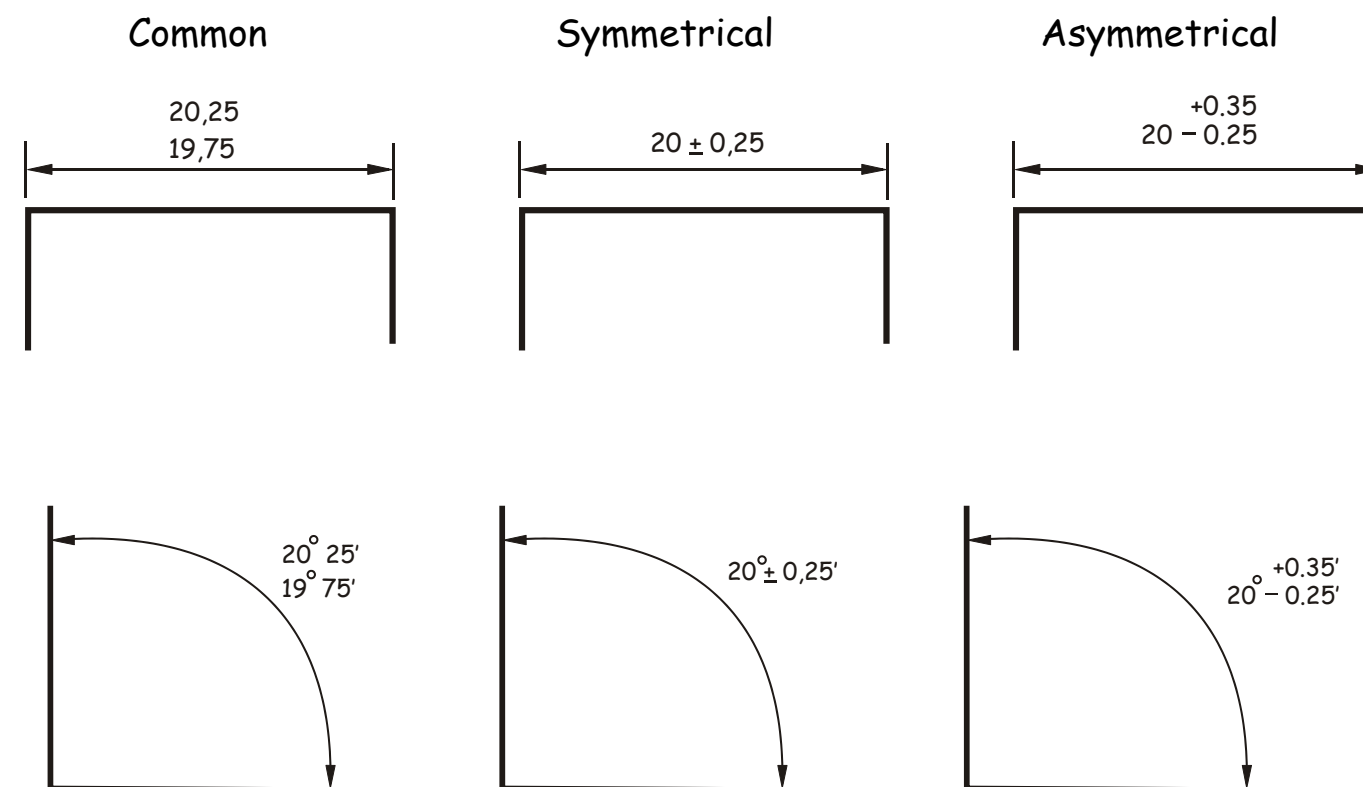


Types of Tolerance

Functional & non functional dimensions

The remote button and the electrical pin of the plug shown on the previous page are examples of a **functional dimension** as they are directly affected by the size of both components. If either was out with the tolerance allowed they would not fit.

Whereas a **non functional dimension** would be the height of the inside button or the length of the pin would not affect the fit of the two components.



Scales

Scaling drawings allow us to draw exceptionally large objects such as houses on any size of paper available to us. To enable this to happen we have to scale every size (dimension) by the same factor. i.e. taking the example of the house, every dimension would have to be divided by say 100. By doing this we are scaling **DOWN** the size of the house. We can also draw exceptionally small objects larger, examples of which are, the minute electronic chips which are now part of our every day life. They are so small we could not draw them as they are we have to **SCALE UP** the drawing to be able to draw them.

1:1

When we carryout a drawing using the actual dimensions, this is called '**full size**', or the drawing has been drawn to a scale of **1:1**. For every 1mm drawn, 1mm is represented.

1:2

When we carryout a drawing and reduce all the sizes by a factor of 2, i.e. all dimensions are divided by 2, this is scaling down the drawing. This makes the drawing half its original size. What the 1 & 2 represent are, for every 1mm drawn on paper the actual size of the real object is 2mm.

2:1

We can also increase the size of an object by any factor. In the example shown opposite the sizes have been increased by a factor of 2. This will make the drawing twice its original size. The 2 is stating that for every 1mm actual size of the object, 2mm have been drawn. If we increased the object by **10** the scale would be **10:1**. If we reduced the objects dimensions by twenty the scale would be **1:20**.

We can also increase the size of an object by any factor. In the example shown opposite the sizes have been increased by a factor of 2. This will make the drawing twice its original size. The 2 is stating that for every 1mm actual size of the object, 2mm have been drawn. If we increased the object by **10** the scale would be **10:1**. If we reduced the objects dimensions by twenty the scale would be **1:20**.

With respect to Engineering drawings, there are recommended scales for reduction and enlargement. These are as follows:-

Reduction:- 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:500, and 1:1000

Enlargement:- 2:1, 5:1, 10:1, 20:1, and 50:1.

The size of scale used is mainly dependant on two factors. These factors are the;

Size of paper available

And the size of the object being drawn.

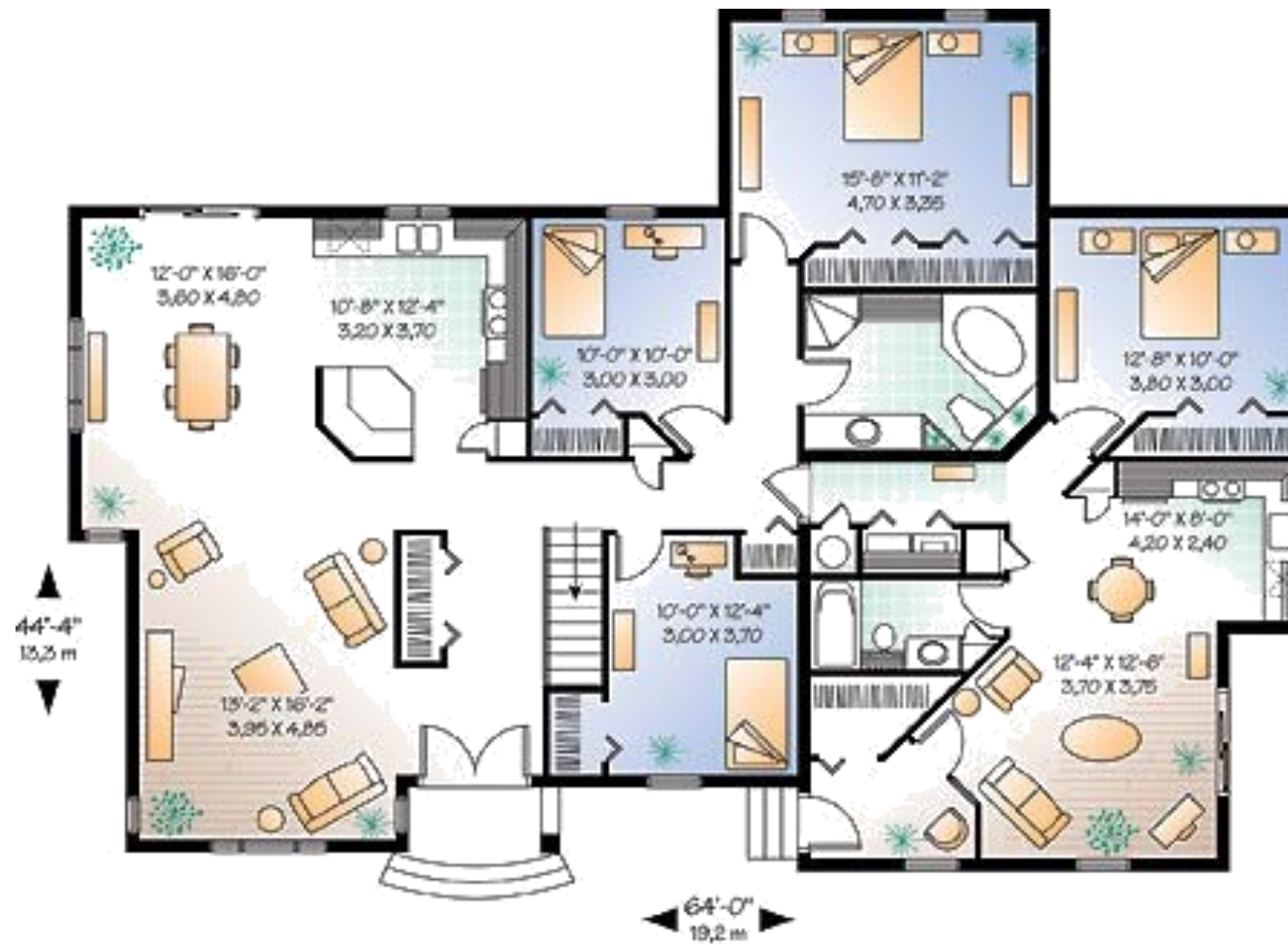
The amount of detail required

E.g. If house was being drawn on a piece of A4 paper opposed to a sheet of A2 paper, the scale used will obviously have to be different or it won't fit onto the page.

Floor Plans

Scales are used a great deal in building drawings. They are used in three main areas, Floor plans, Site plans and Location plans. Each of the three types of drawings have preferred scales. These are as follows:-

Type of Drawing	Floor Plans	Site Plans	Location Plans
Preferred Scales	1:50 or 1:100	1:200 or 1:500	1:1250 or 1:2500



This type of drawing shows the layout of the rooms inside the building and the position of the doors, windows and important fittings like a bath, sink and toilet.

Site Plans

This type of drawing is concerned with one or more buildings which are within the same area and shows these buildings within their own site (or plot) boundary.

The buildings are shown as outlines and boundaries are marked slightly darker. The scale and the north point are both indicated on the drawing. The site is numbered (usually as plots). Waste pipe runs, manholes and trees are also indicated. Important dimensions are shown.



Block Plans

A **Block Plan** or **Site Location Drawing** shows where the site is located within the local area. It shows roads, outlines of buildings and site boundaries (Garden boundaries).

The block plan below shows where a bungalow is situated within the surrounding area. It is normally drawn to a scale of 1:1250.

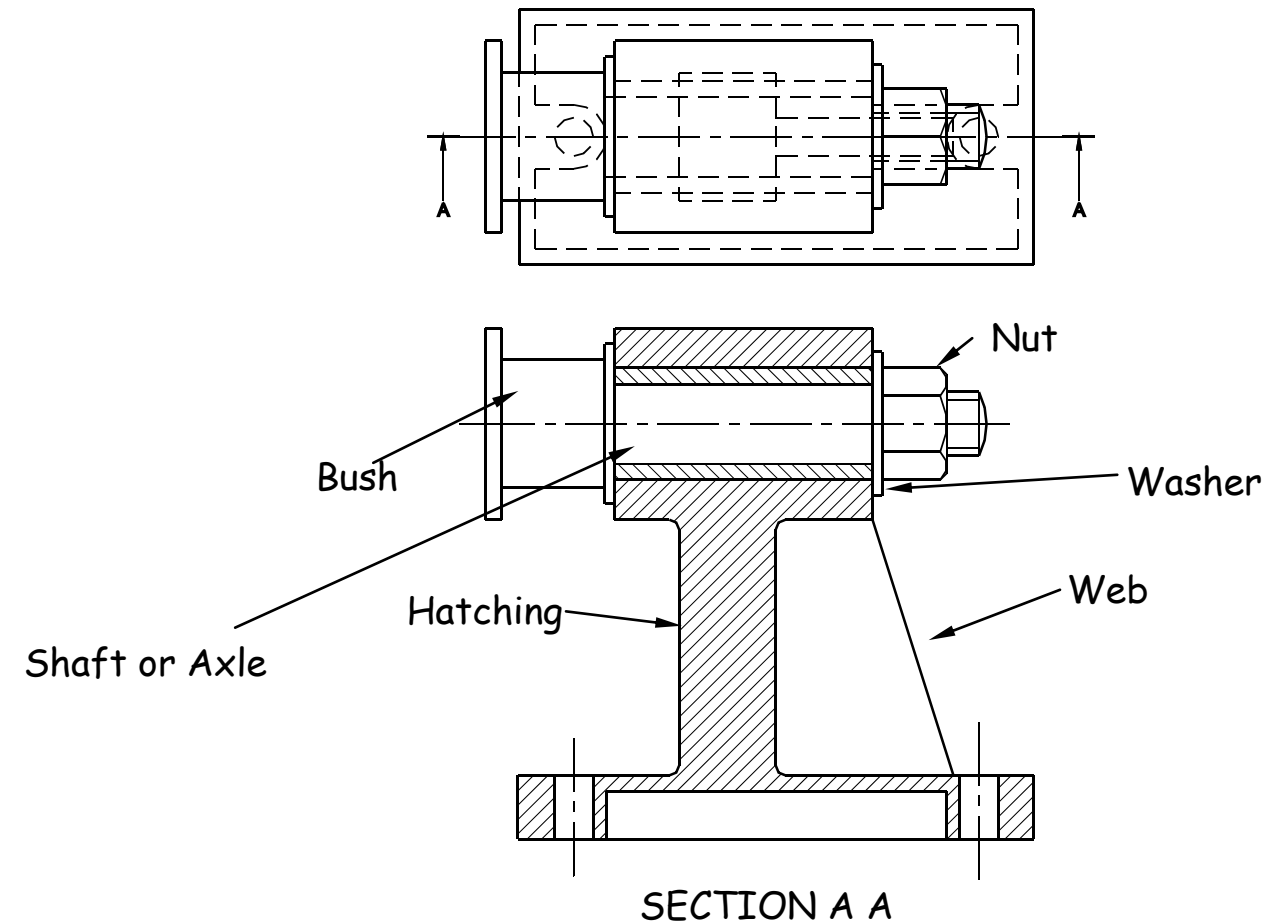


SCALE 1:1250

Ground contour lines

North Point indicator and scale.

Sectioned Drawings



Sectional views are drawn to show more clearly what hidden parts would look like.

The cutting plane is shown as a chain dotted line thickened at the ends and labelled with a letter.

Where parts are cut by the cutting plane they are hatched using a thin line drawn at 45° . These lines should be equally spaced at 4mm. Adjacent parts are hatched in the opposite direction.



offset



Herring bone

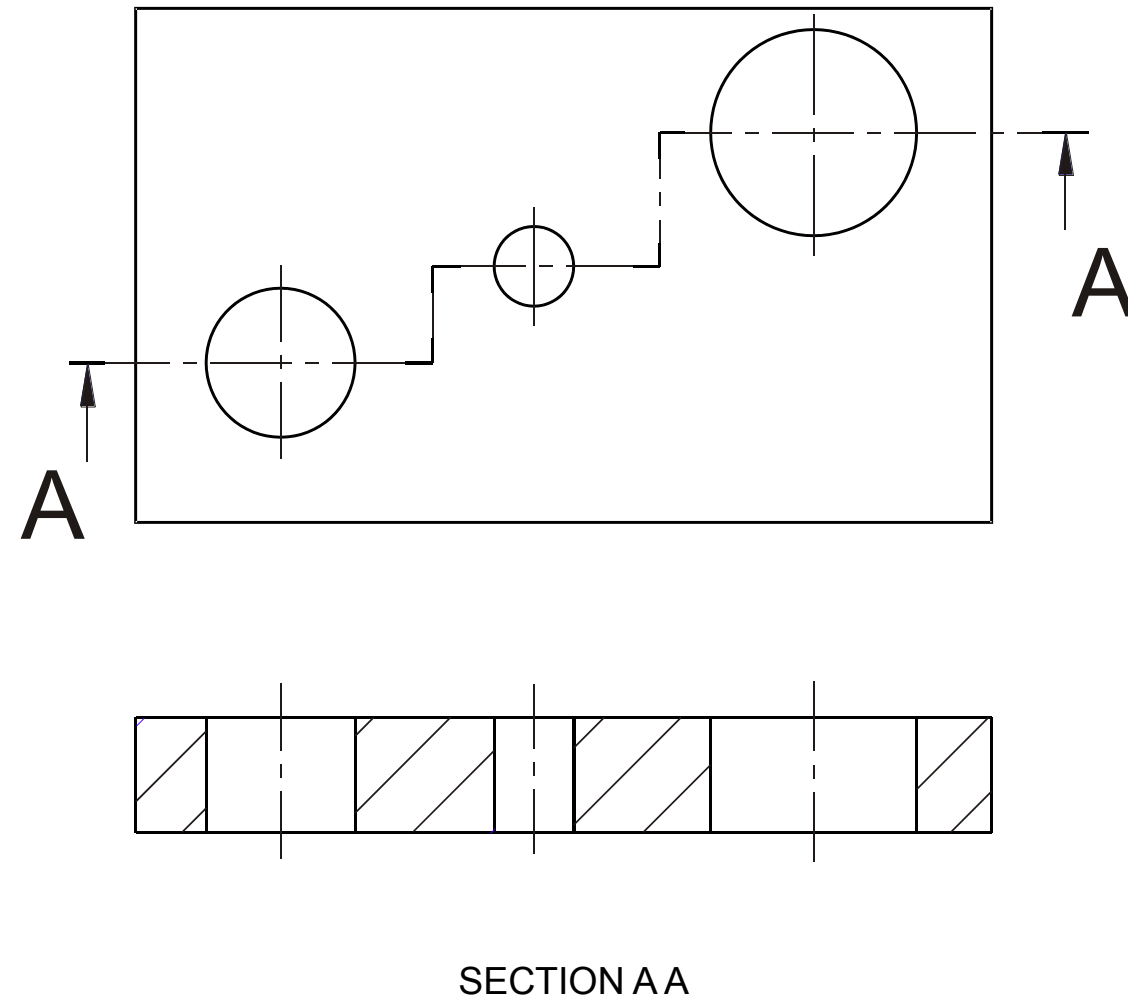
Offset hatching lines between parts. **Do not** produce herring bone pattern.

The following parts are **not** normally sectioned:-

Shafts, ribs, webs, spokes of wheels, nuts and bolts, washers and keys.

Stepped Sections

(Sectional views in more than one plane)



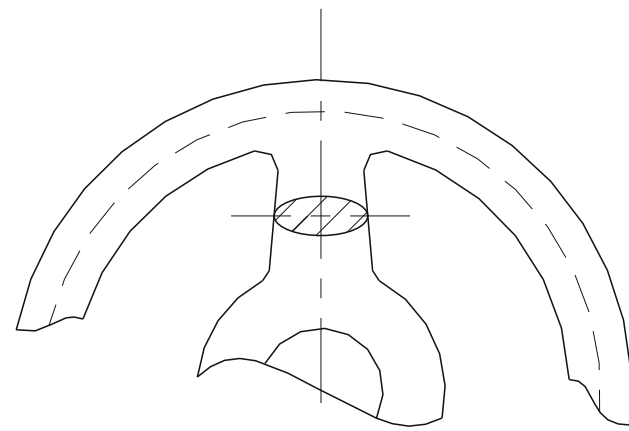
It is convention to draw these views as if the cutting planes were one continuous plane.

Moving a CAD drawing to a DTP package

The Cad file is exported out as a WMF (Windows Meta File) Imported into an illustration package and then exported out as a JPG file. In the DTP it imported into the file currently in use.

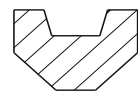
Types of DTP Software packages

MS Publisher, Photoshop, Serif Page Plus, Quark Publishing.

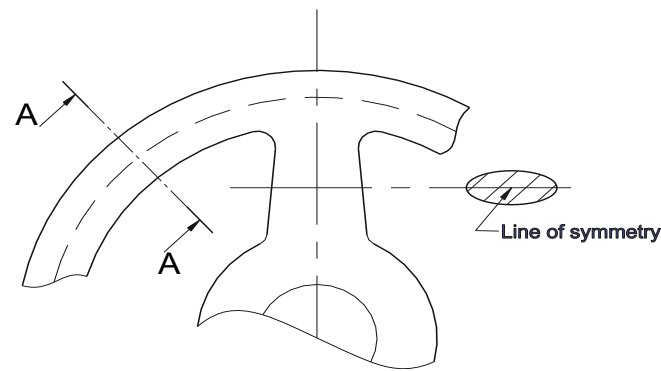


Revolved Section

This type of section, as the name implies, has been turned through 90 degrees to show the reader what the section looks like.

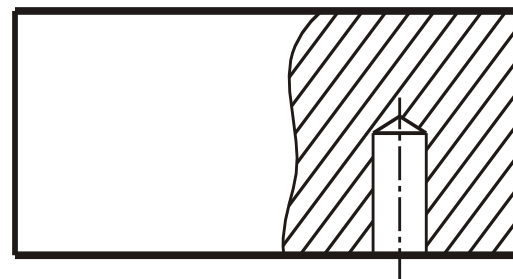


A-A



Removed Sections

A removed section shows the cut section out with the actual drawing as shown in section A-A. The groove shown on top of the cut section A-A is the top of a pulley wheel which would accommodate a belt.

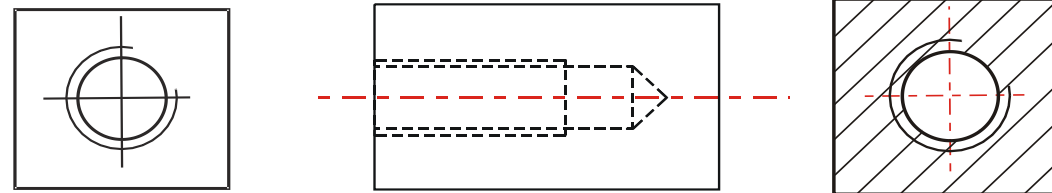
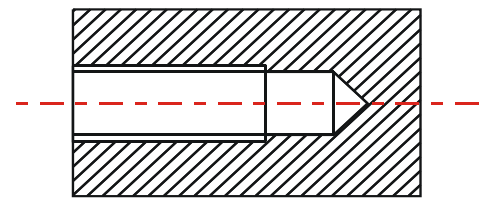
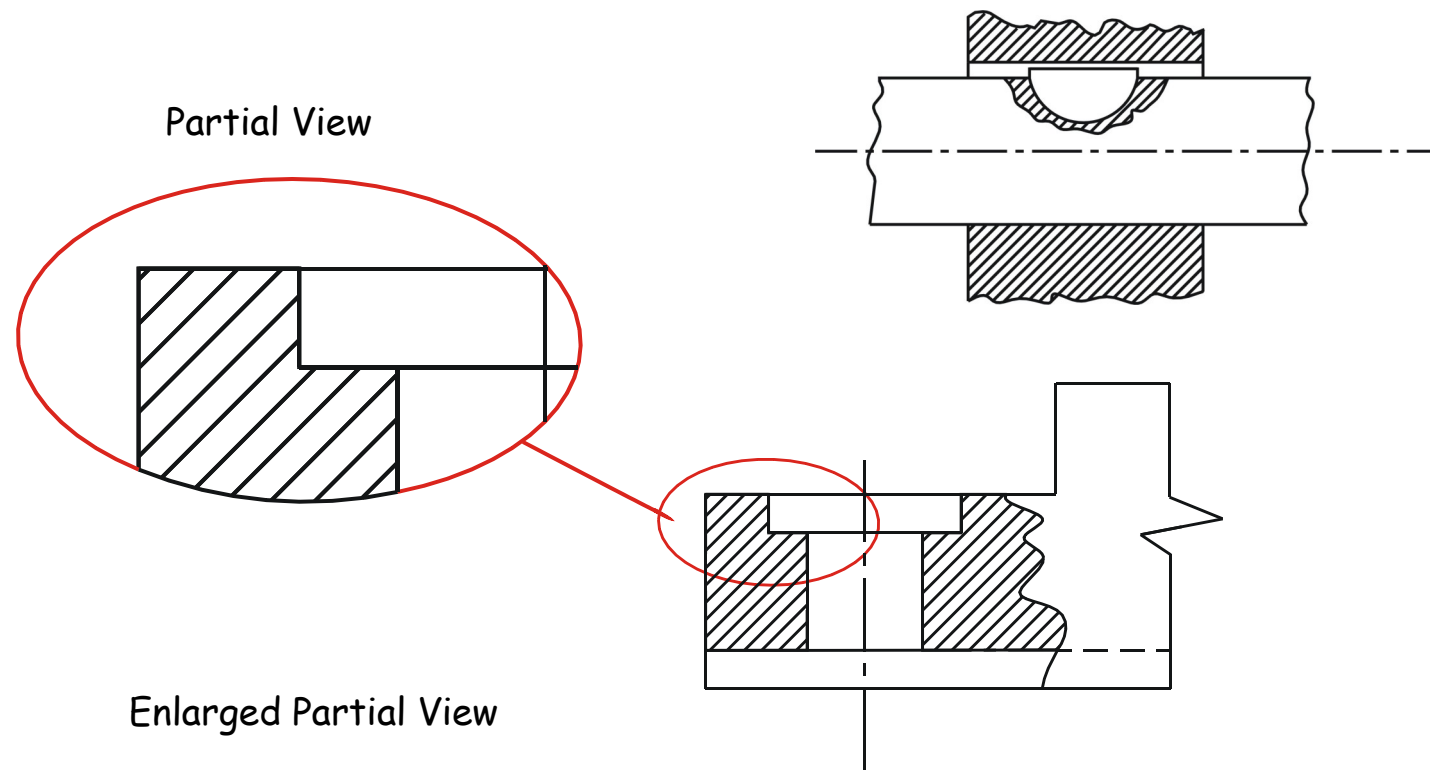


Part Section

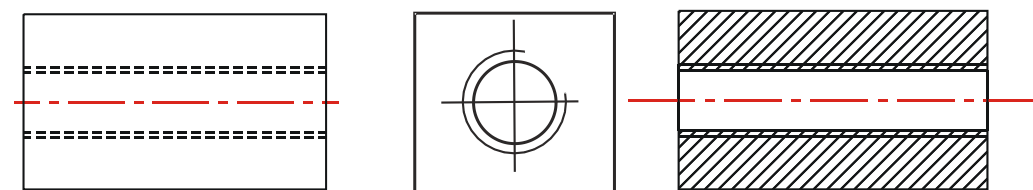
This type of cut section only shows part of the component sectioned. It would most likely be carried out to show hidden detail such as this blind

Sections Continued

Woodruff Key

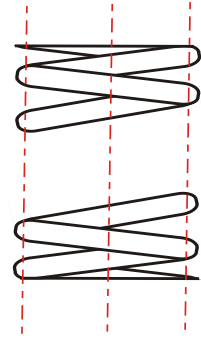


Internal threads (Blind hole)

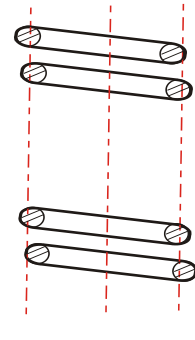


Internal threads (Through hole)

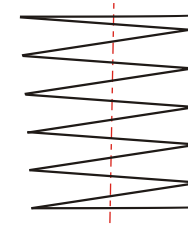
Springs



View



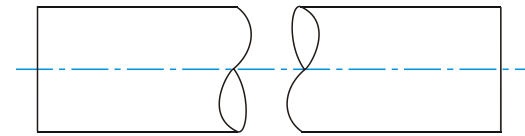
Section



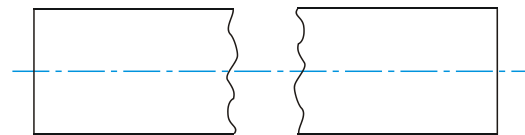
Simplified View

Nuts, Bolts & Shafts

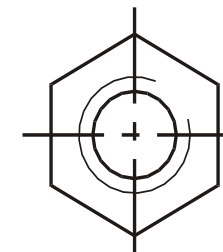
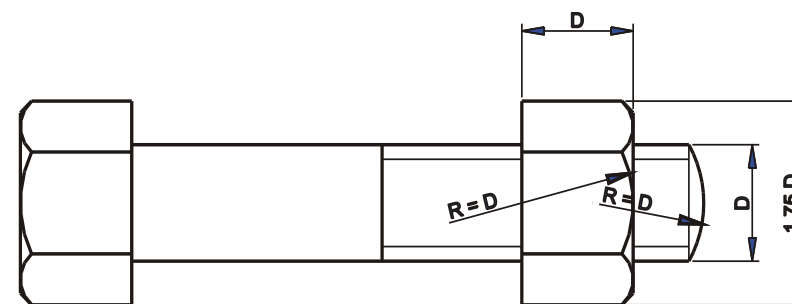
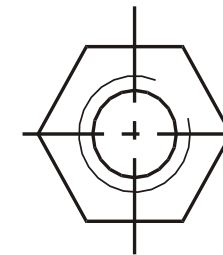
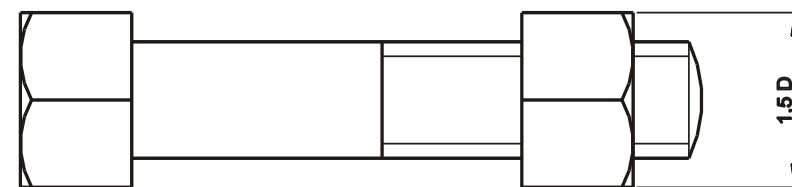
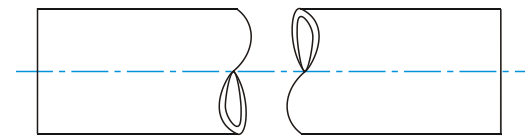
Conventional break lines for a solid shaft

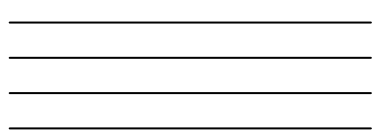
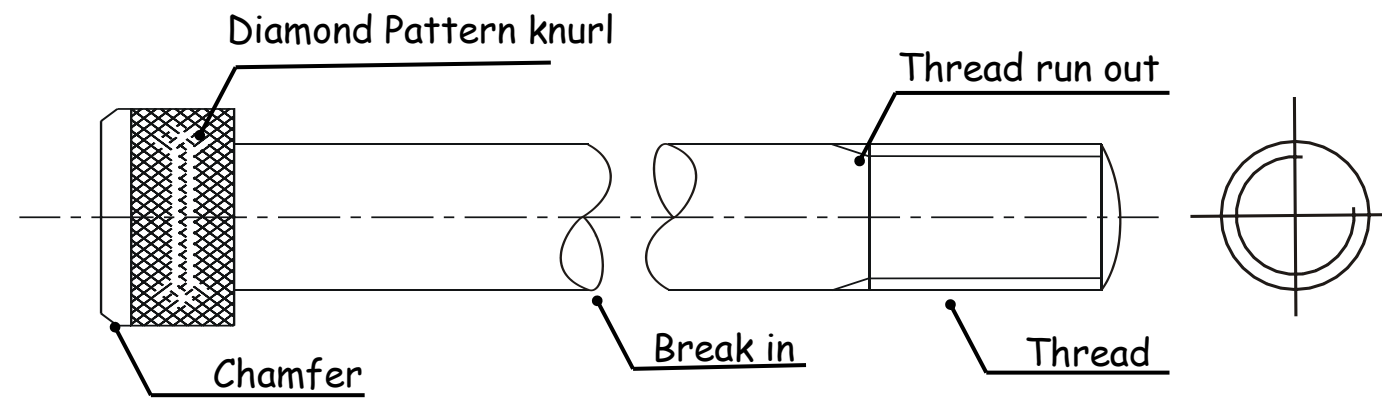


General break lines (continuous irregular used)

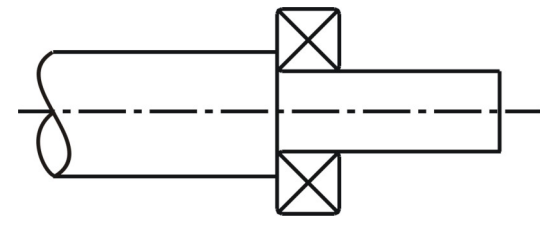


Conventional break lines for a hollow shaft



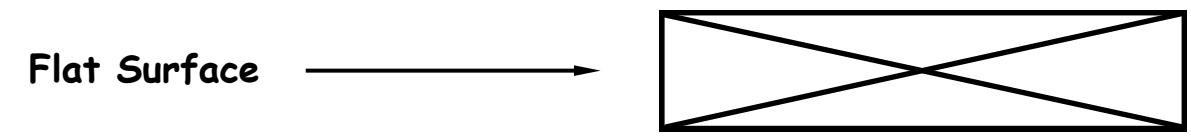


Straight knurl

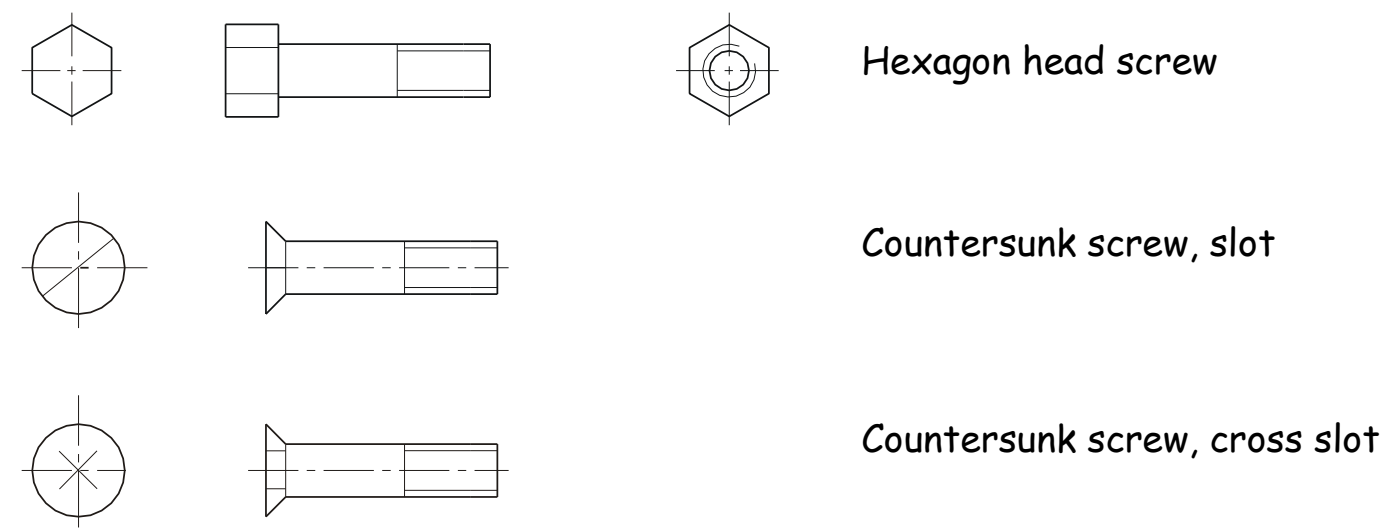


Roller Bearing

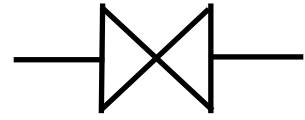
Conventional sizes to draw a nut and bolt are shown. Use these sizes if you have to draw the nut or bolt accurately otherwise use the simplified convention shown below.



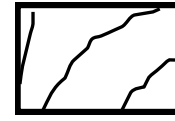
Simplified Fasteners, etc



Construction Symbols



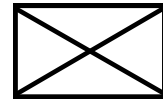
In-line valve (any type)



Softwood, machined



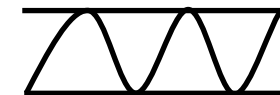
Radiator



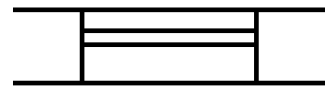
Wood, any type, sawn



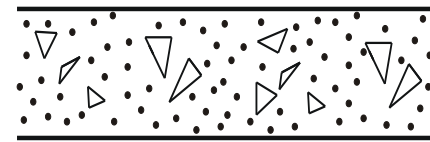
Brickwork



Insulation



Window



Concrete



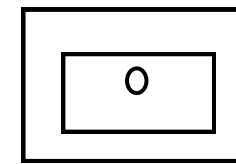
Switch



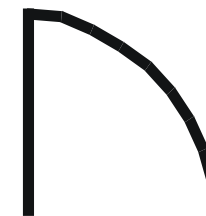
Lamp



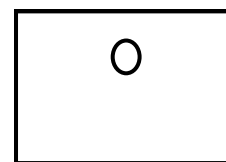
Socket



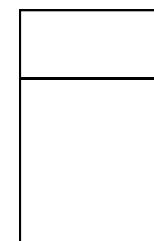
Wash basin



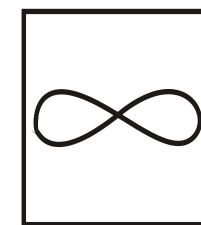
Door



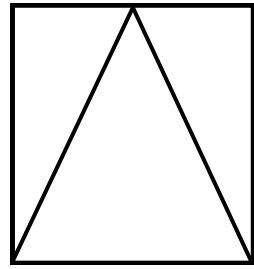
Sink, any type



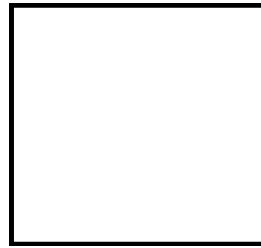
WC



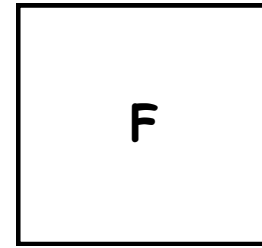
Fan



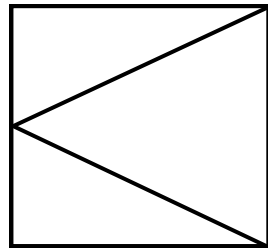
Hinged Window at Top



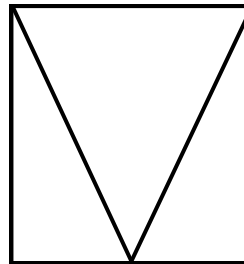
Any type Window



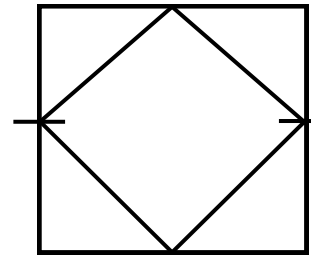
Fixed Window



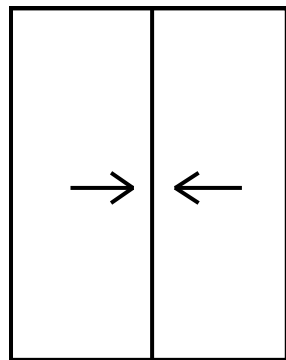
Hinged Window at Side



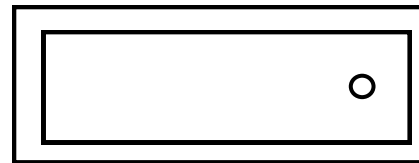
Hinged Window at Bottom



Pivoted, Horizontal axis, i.e. hinged in middle either side.



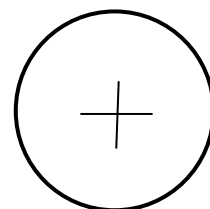
Sliding horizontally



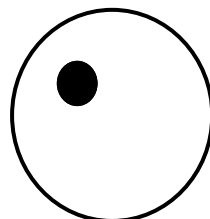
Bath



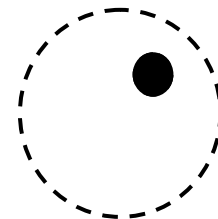
Shower tray



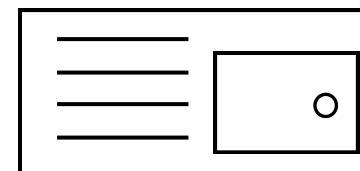
Proposed Tree



Existing Tree

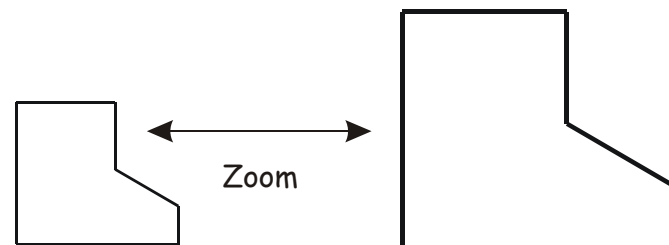
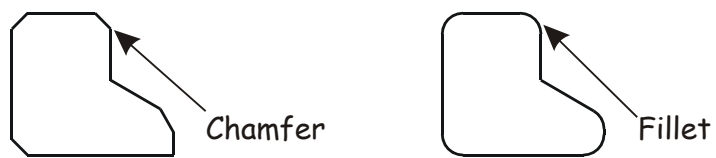
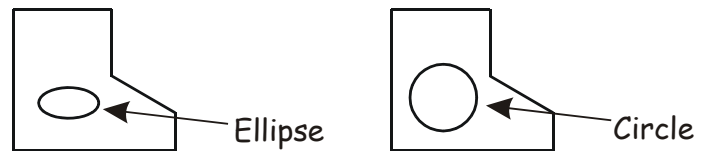
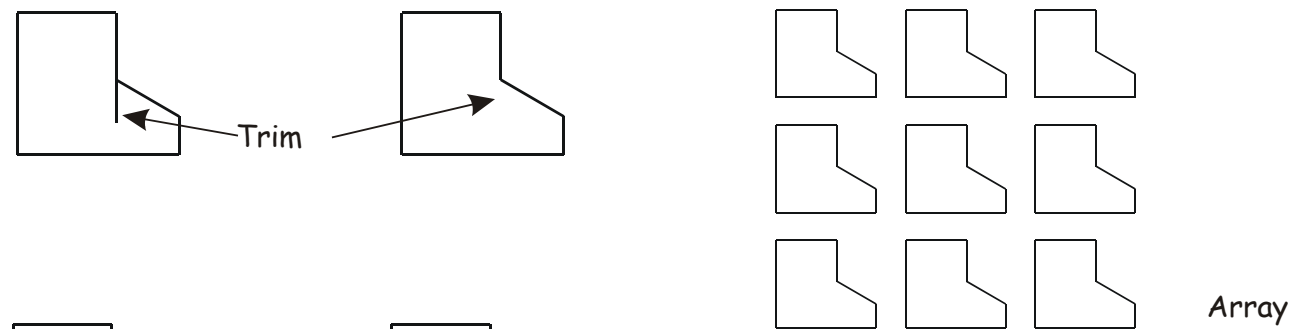
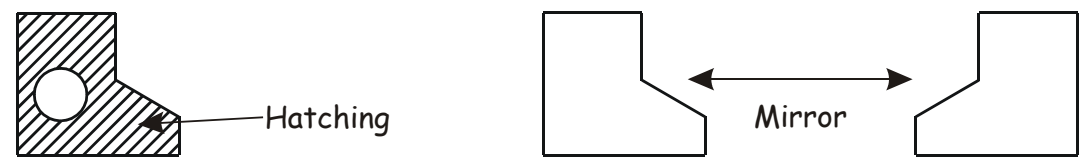
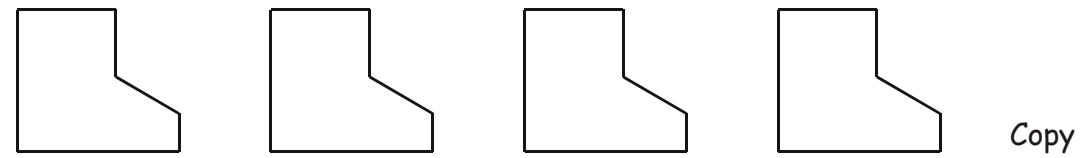


Existing tree to be removed



Sink top

Common CAD Commands



Copy means to copy an object to the clipboard.

Paste means to paste the contents of the clipboard onto the page.

Undo means to reverse the last command.

Move means to move an object to a new position on the page.

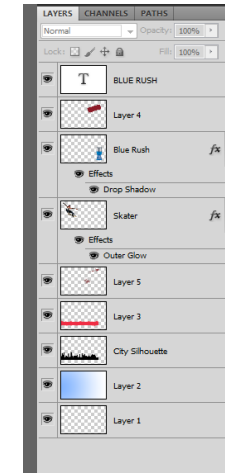
Erase means to remove part of a drawing.

Desktop Publishing layering

The use of layers in DTP software packages can aid the designer and enhance the quality of his/her graphic in many ways. Shown below is an example of layering.



Final document

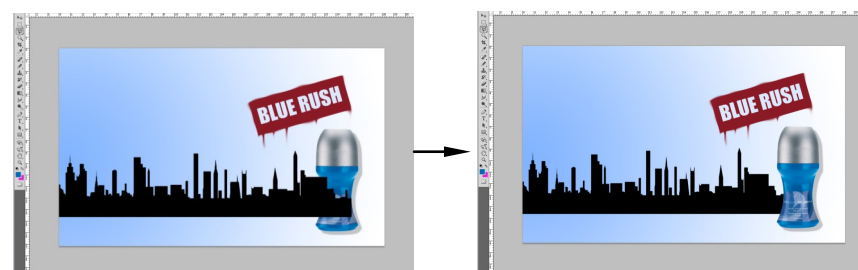


Layering tree



Layering allows graphics and text to be edited separately. They can be turned off and on to aid clarity as shown opposite. The visibility of the spray paint, image of skater and flow text have been turned off to allow easy editing of the silhouette.

Layers can also be brought forward or backward as necessary (Example A). The city silhouette was initially positioned in front of the deodorant bottle. However, it was moved back to improve the clarity of the bottle. The designer can easily duplicate a layer to obtain an identical copy of a graphic or text. This saves time and effort (Example B - deodorant bottle).



Example A



Example B

Advantages of CAG over manual drawing techniques.

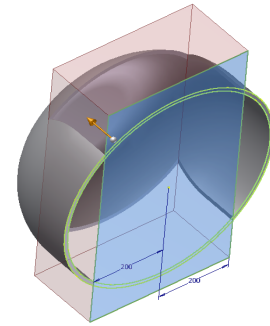
- Drawings are produced quicker and very accurately.
- Drawings are easier to edit/change.
- Libraries of various parts can be created.
- Lead time can be reduced.
- Quality of drawings are improved.
- Convenience of use (Lap top).
- Standardisation.
- Drawings can be easily scaled up or down.
- Use of layers allows different parts to be drawn separately.
- Easier to store drawings.
- Easier to send drawings to another location quickly.
- True 3D modelling made easy.
- New designs from existing designs.

Disadvantages of CAG over manual drawing techniques.

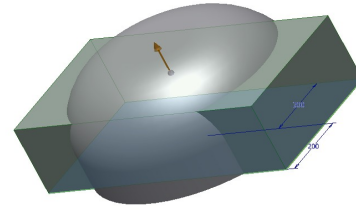
- Overall cost of hardware.
- Overall cost of software.
- Continual need to upgrade systems to stay competitive.
- Risk of catching computer viruses.
- Staff training costs.
- System faults/crashes.
- Data loss security.

3D Modelling Techniques

Union



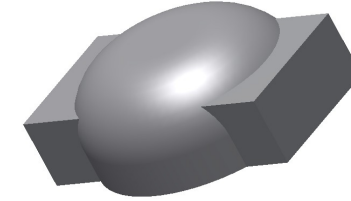
Sketch



Union

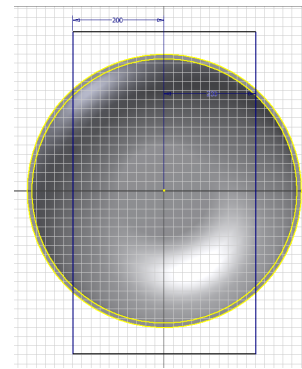


School Bin

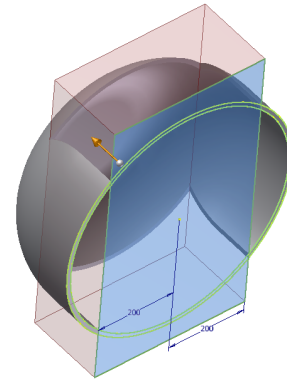


Completed Union

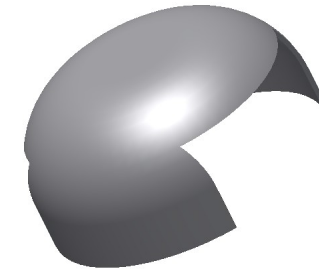
Subtraction



Sketch

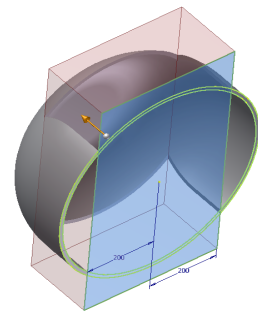


Subtraction - *Extrusion*

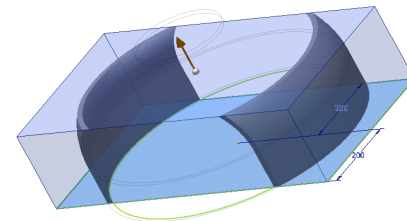


Completed Subtraction

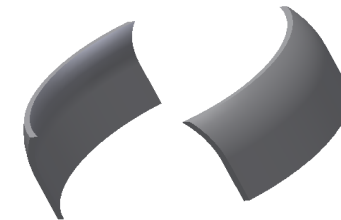
Intersection



Sketch

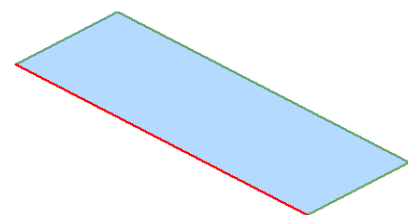


Intersection

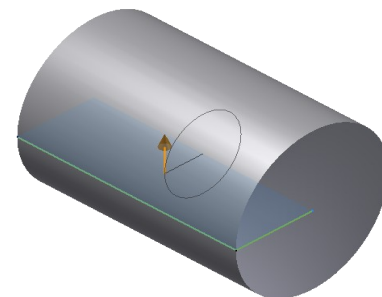


Completed Intersection

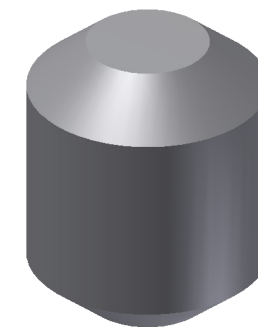
Revolve



Sketch



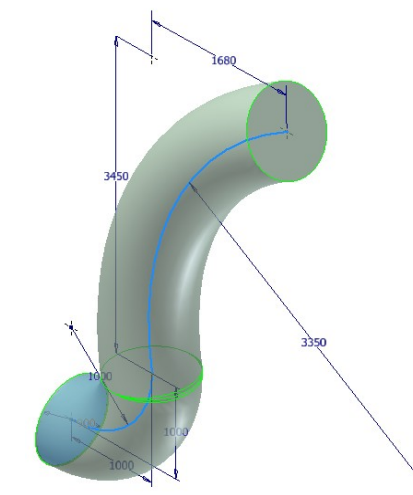
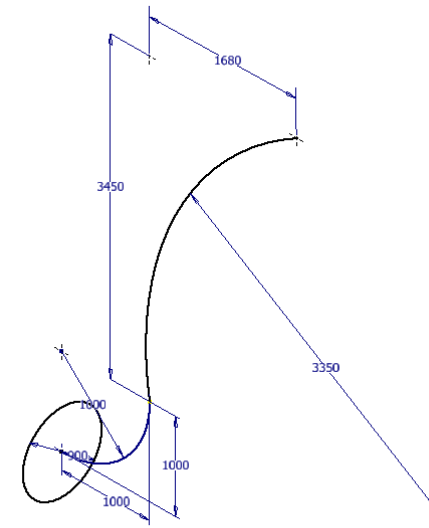
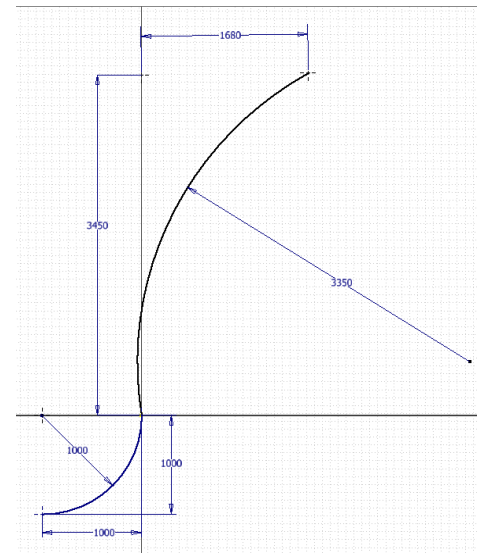
Revolve



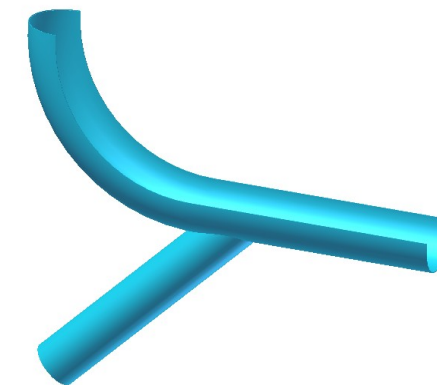
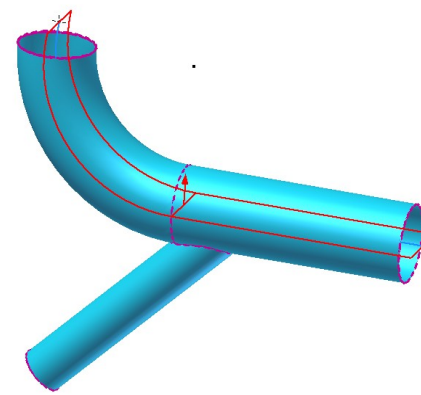
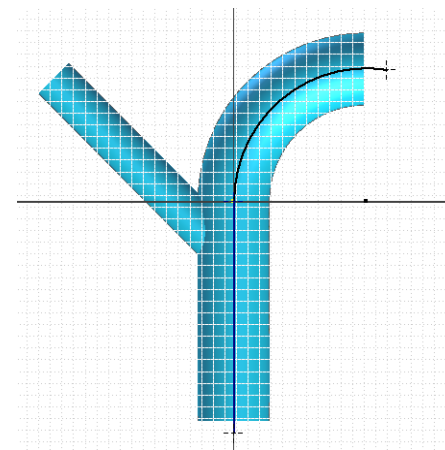
Completed Revolve
with Chamfer

3D Modelling techniques (continued)

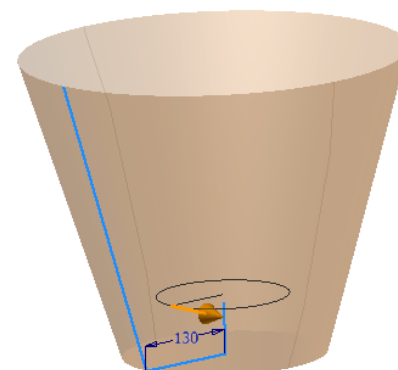
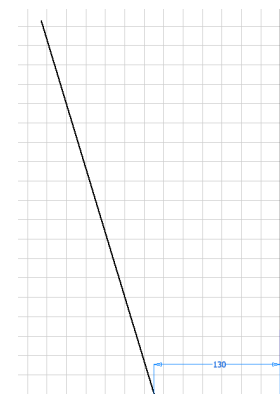
Extrusion along a path



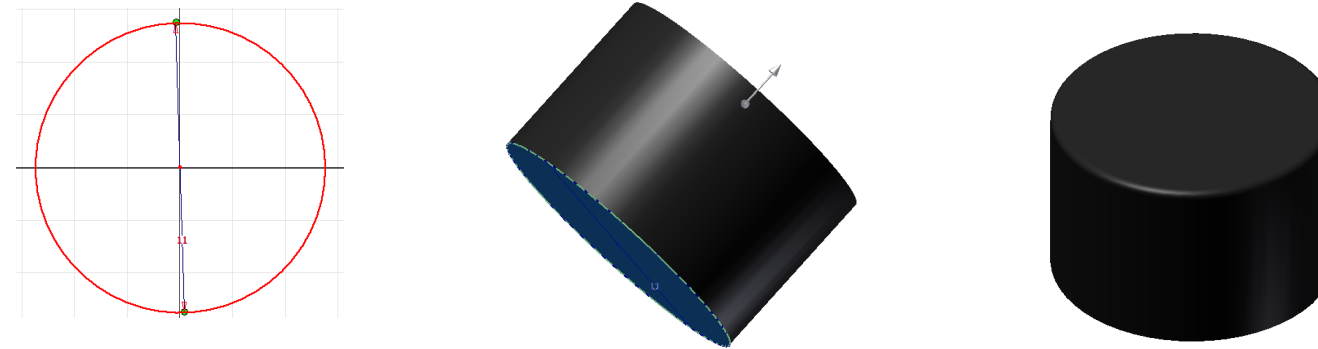
Split



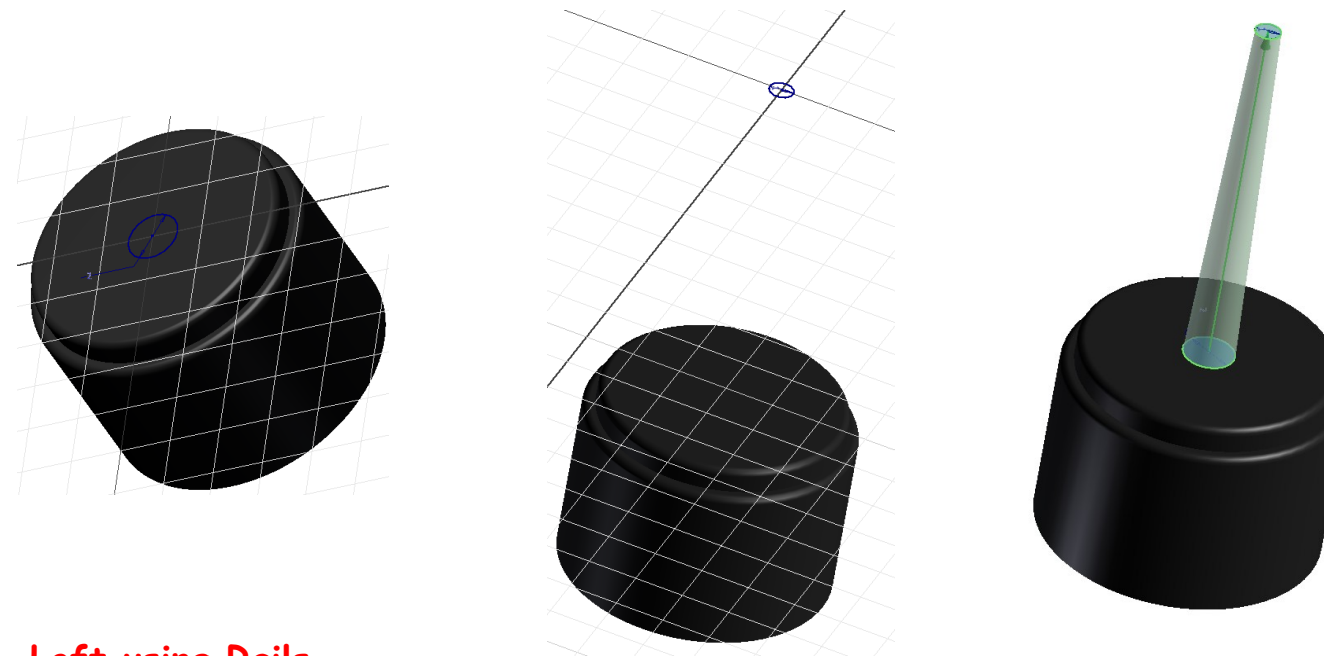
Surface Revolution



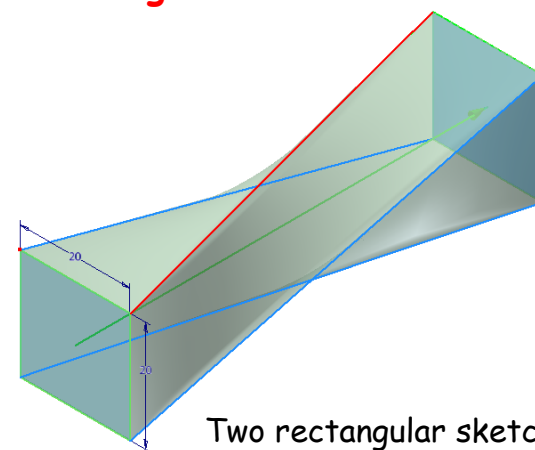
Basic Extrusion



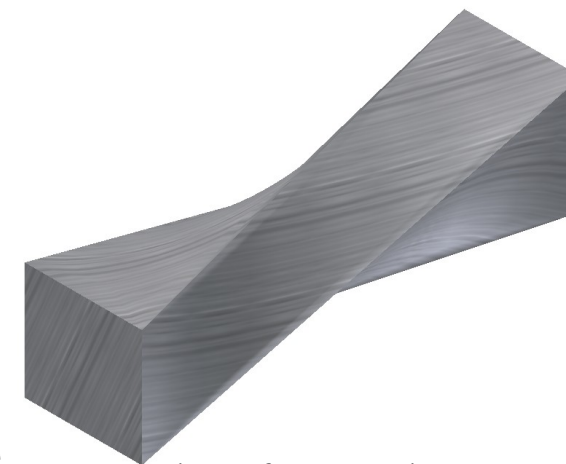
Extrusion between two entities - Loft



Loft using Rails

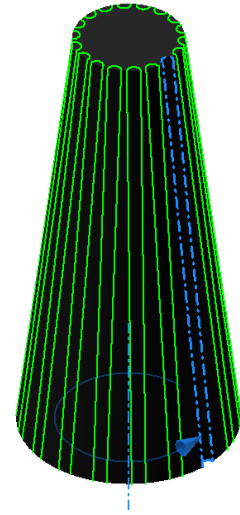


Two rectangular sketches are drawn. Four separate sketches are now drawn on each surface with a diagonal line going to each corner as shown.



The Loft is now drawn using the four rails as the paths.

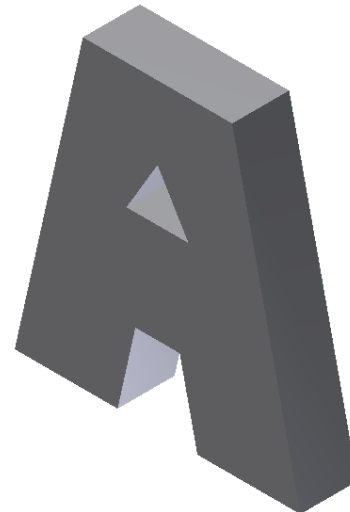
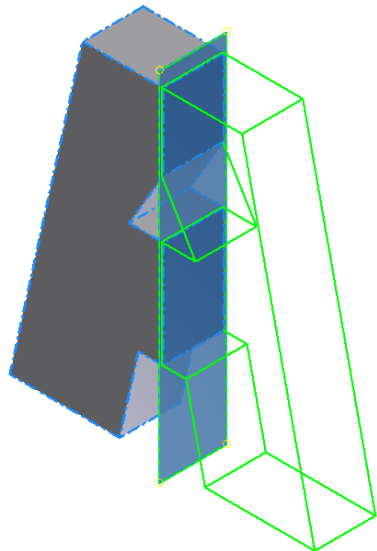
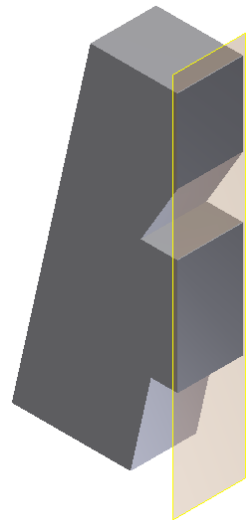
Circular Array



Rectangular Array



Mirror



The 3 P's

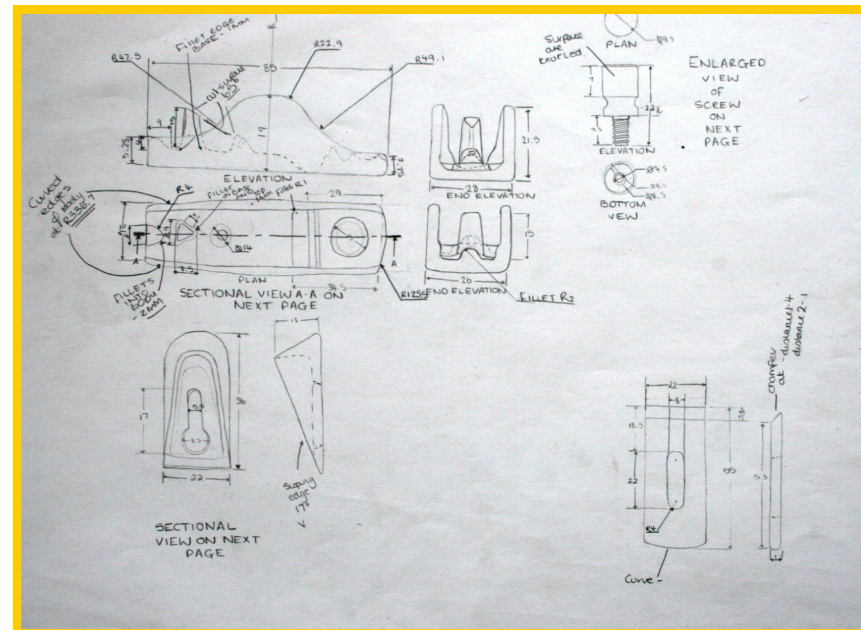
In your thematic presentation you will approach the theme just as a professional designer would, in the world of industry. This is tackled using the **3 P's**.

The first of the P's is the **Preliminary Sketches** usually carried out using freehand. These sketches consist of various drawings including all planning towards production and promotional drawings.

The second of the P's is the **Production Drawings** which consist of all drawings enabling the manufacture of the product being designed. The drawings will be in the form of CAD drawings including orthographic, sectioned, exploded isometric, etc.

The third of the P's is the **Promotional Graphics** and consists of all **CAG** drawings which promote all aspects of the product being designed. This will include posters, fliers, booklets, etc.

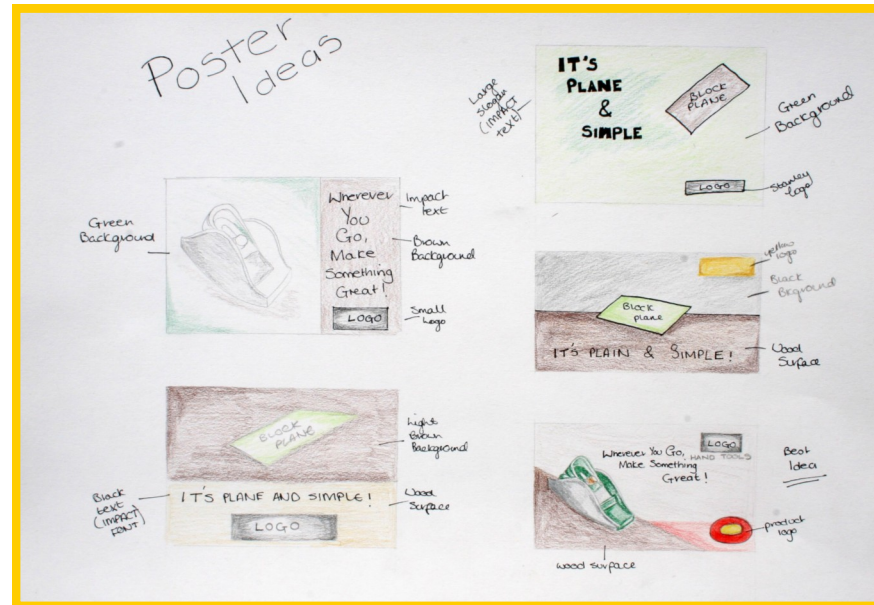
Preliminary Graphics



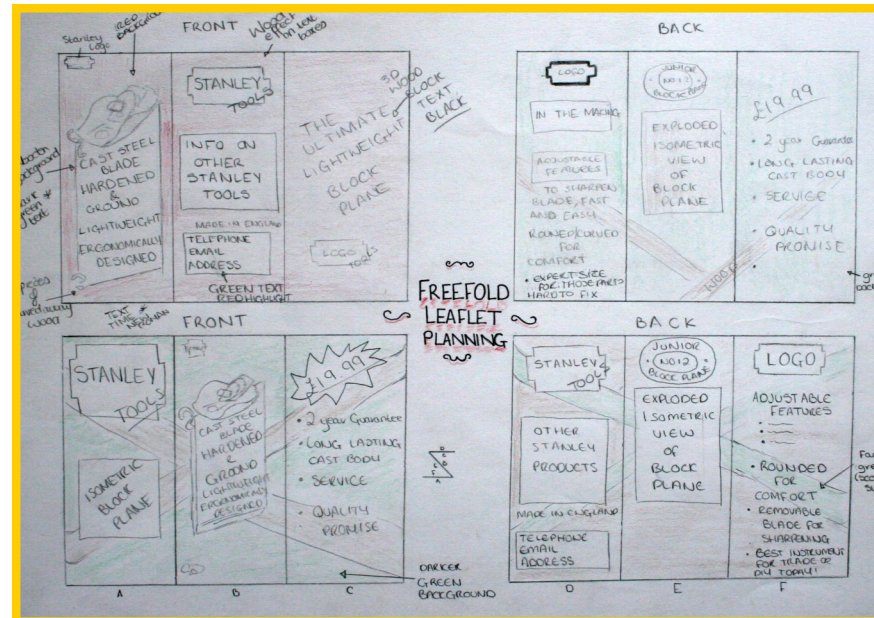
Orthographic freehand sketching

Drawn by Emma Napier 2008

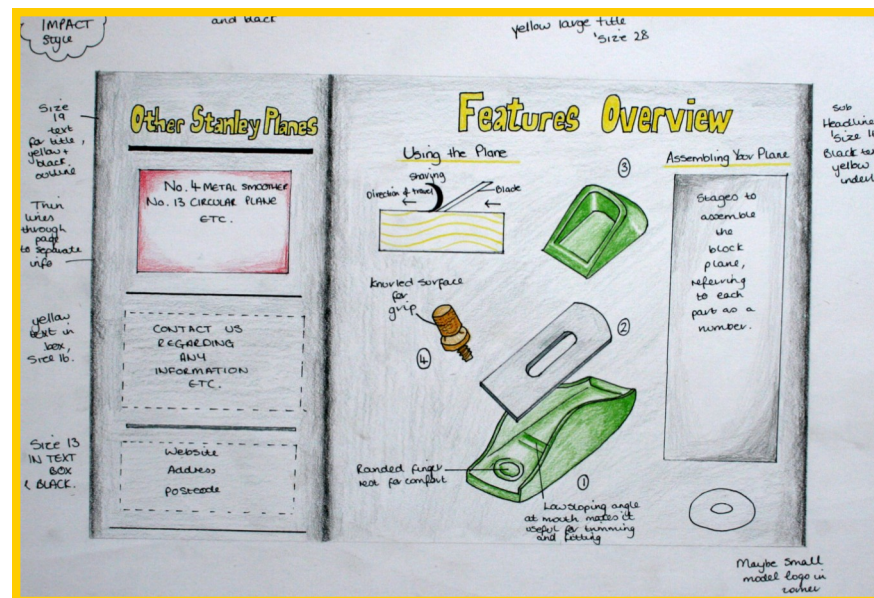
Pictorial freehand sketching



Planning for three fold leaflet

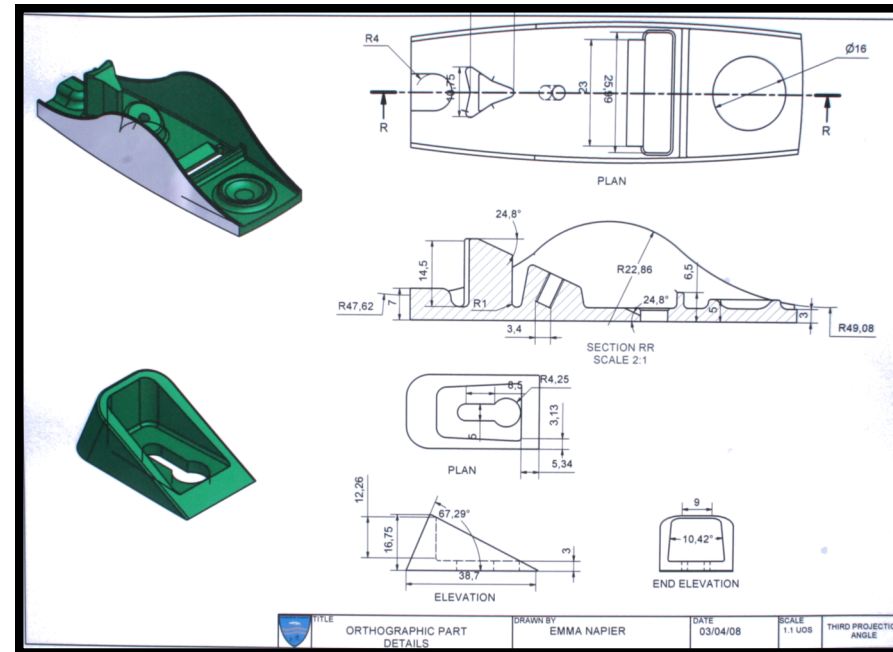


Full size Working Rough for the three fold leaflet

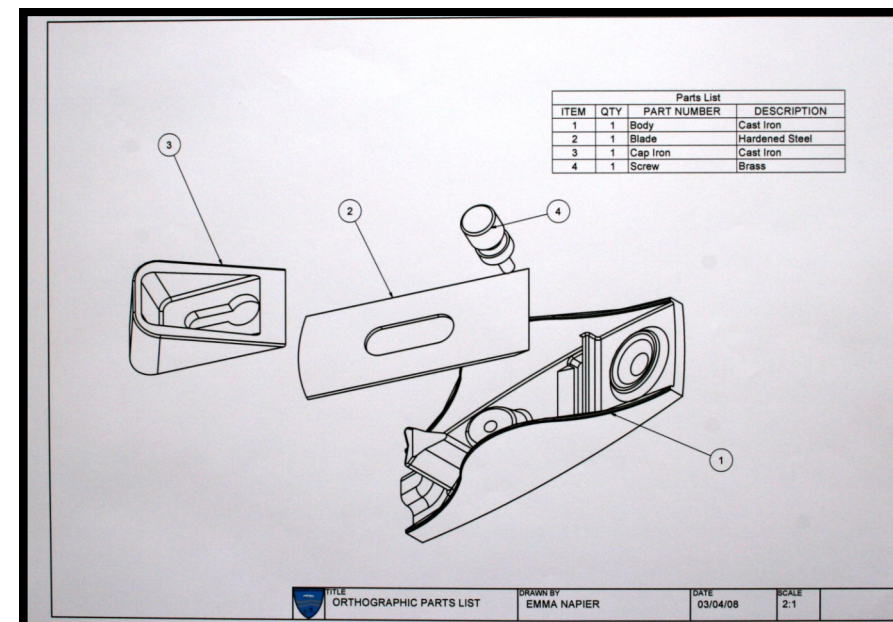


Production Drawings

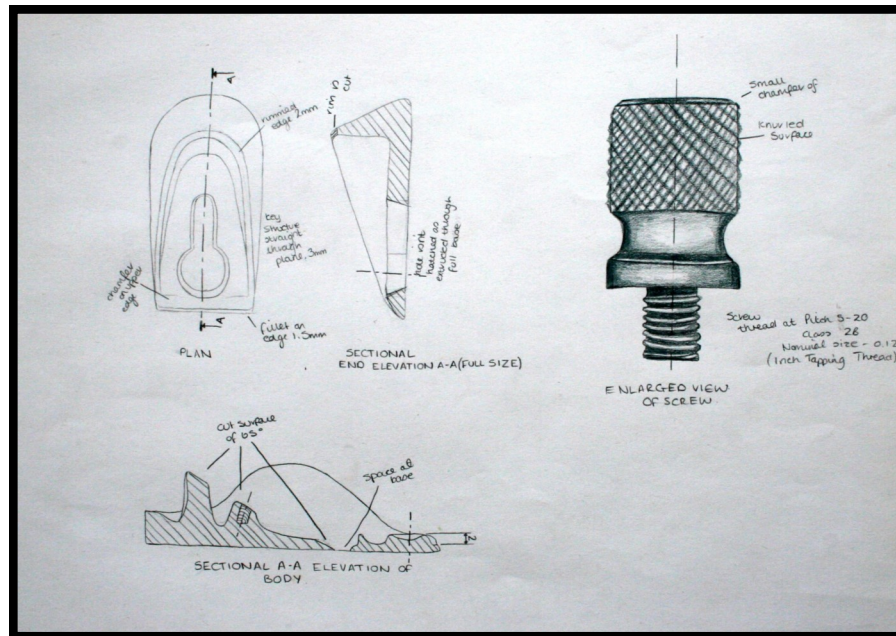
The production drawings as stated overleaf show all manufacturing sizes to enable manufacture of the product being designed.



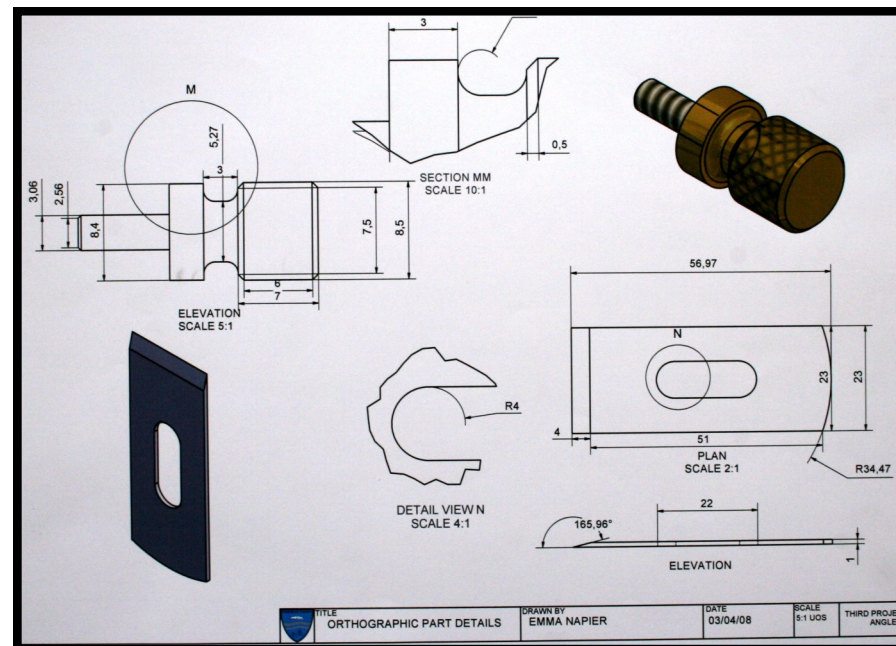
Computer Aided Drawing (Section)



Computer Aided Drawing (Exploded Isometric)



Detailed freehand drawing showing sizes



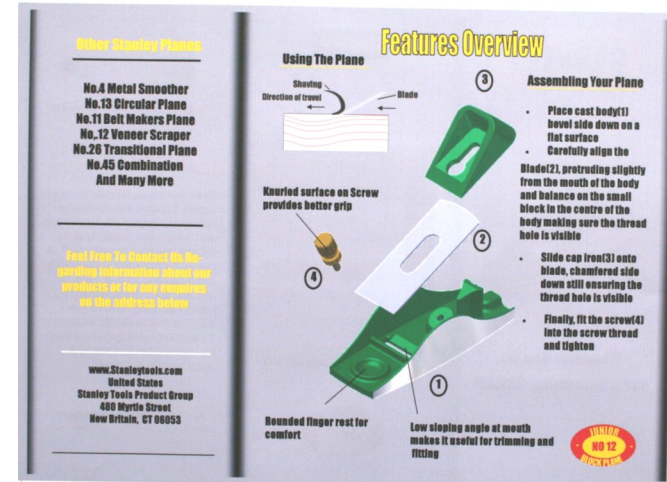
CAD - Detailed orthographic drawing showing various components

Drawn by Emma Napier 2008

Promotional Graphics

The sole purpose of a promotional graphic is to try advertise and tempt potential buyers to buy the product being sold.

This can be done in a number of ways including, flyers, posters, etc



Shown above and to the side are both sides of a three fold leaflet.

The preliminary sketches of the leaflet can be seen on page25.

In the examples shown the background fill colour is not an ideal choice as it does not make the product being sold stand out. (It does not contrast well against background)



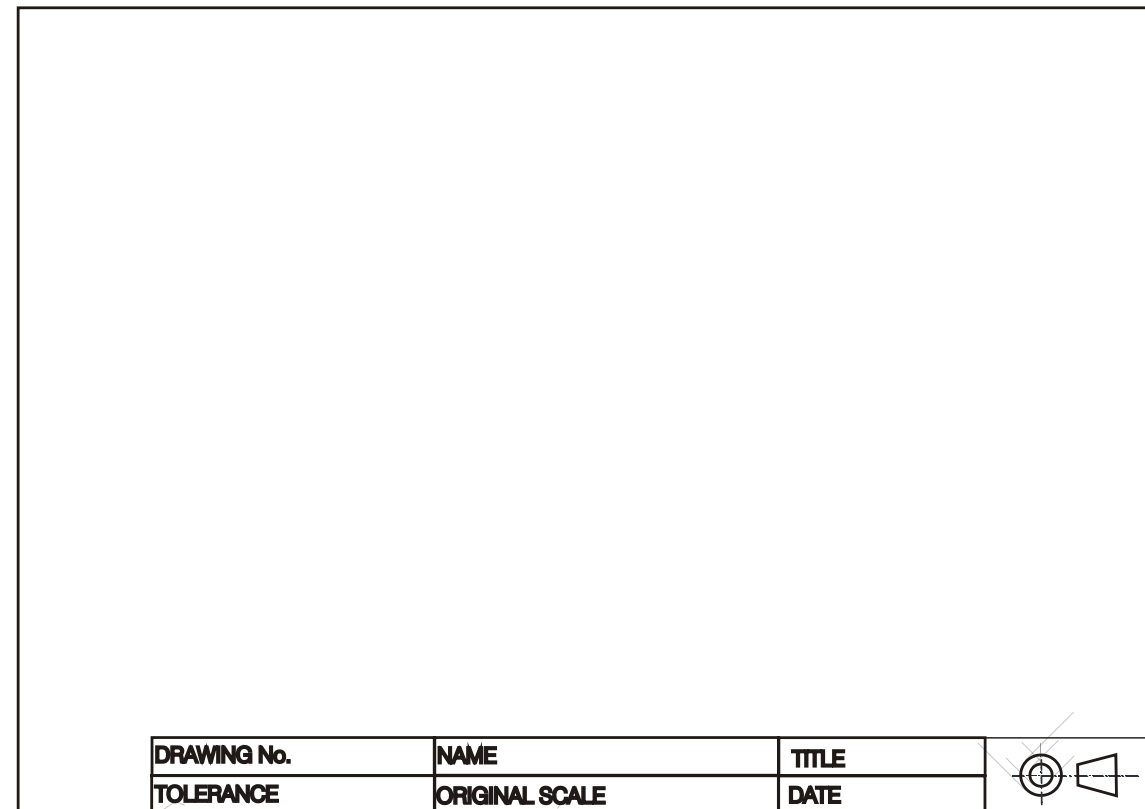
Drawn by Emma Napier 2008

Title Blocks

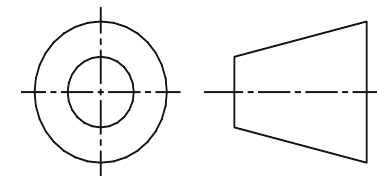
Title block are very important when producing CAD drawings as they inform the reader of many aspects of the drawing. A Title Block must always have the following information on display when producing CAD drawings.

Drawing No. **Name** **Title of Drawing**
Original Scale **Date** **Tolerance**

It must also show the third angle projection symbol or whatever method has been used to draw.



Third Angle Projection Symbol



The use of the third angle projection symbol informs the reader of the drawing that it has been carried out using this projection.

Glossary of Common Graphics Terms

This is a guide to **CAG** terms likely to be encountered in the course.

CAD Computer-aided drawing.

DTP Desk-top publishing.

CAG Computer Aided Graphics. A term used which encompasses CAD, DTP and modeling.

2D Two-dimensional drawing in which an item is depicted as a flat object. Example: first and third angle orthographic drawings.

2½D Two-and-a-half-dimensional drawing in which three surfaces of the drawn item can be viewed. For example, isometric, oblique.

3D Three-dimensional drawing or model in which the complete object can be displayed, normally in colour, and manipulated to show views from any chosen direction.

Alignment positioning of text in a column or on a page. This can be in the form Left aligned, right, center or justified.

Animation "Bring to life". The manipulation of electronic images by means of a computer to create moving images, similar to creating a film, the computer is giving the illusion of moving parts.

Auto Tracing This where the application software automatically traces round the outline of an object.

Automatic Dimensioning Any system of generating dimension lines in specific locations.

Acetate A clear, cellulose sheet which can be used to overlay artwork on which other artwork or remarks can be placed.

Airbrush A device, which uses compressed air to propel ink or paint through a variable fine nozzle to create artwork.

Alignment	To arrange text and objects so that they line up with each other horizontally or vertically.
Ampersand	The symbol "&", which means "and".
Application	A word to describe a computer software package which performs a specific task.
Ascender	The part of a letterform which sits above the main body of the text, for example b, d, h, k, l.
Asymmetrical	Letters or objects set in no apparent order or pattern.
Banner	Main headline across the top of a page
Box	A rectangular box around text or a graphic
Baseline	The imaginary line that runs along the base of the body of letters in a line of text.
Bevel	The effect of sloping edges on a two-dimensional object to make it resemble a three-dimensional object.
Bezier (curve)	The mathematical method of drawing curves and for representing text used in computer drawing applications.
Binary	The basis on which computers work. Anything which is made up of two parts for example 1&0, On & Off.
Binding	The process of glueing and covering the pages of a document or book.
Bit Depth	Describes the amount of options (colours) assigned to each dot in a bitmap image.
Bitmap	Describes a computer image made up of screen dots (pixels).

Bitmapped Font	A computer typeface made up of dots which show on the screen as jagged edges.
Black Letter	Also known as Gothic or Old English, a style of handwriting made with broad-nibbed pens.
Body (text)	The main text part of a document usually smaller than 14 Points in size.
Boot Disk	A disk, which can be used to start up a computer
Booting up	The process of starting a computer up.
BPI (Bits Per Inch)	The intensity of dots used on a computer to describe an image.
Bromide	A photographic paper used to create high quality proofs.
Buffer	An area in computer memory used to store specific information when required, commonly used for printing data.
Bullet	An ornamental dot or other shape used to mark an item in a list or to add emphasis to a piece of text.
Byte	A group of eight bits, which also represents one character on a computer.
Back-up	A term used to describe the processes of making a second copy of drawing files, CAG programs, etc. in case the working copies are damaged.
CAD Library	An area where previously drawn parts can be accessed and reused to save on both time and consistency in drawings.
Calligraphy	The art of handwriting
Colour gradient	One colour merging with a different colour
Capitals	Often shortened to Caps and also known as Uppercase.
Caps Lock	The button on a keyboard which allows every letter typed to appear as capitals.

- Centre-Aligned** Text which is aligned around its centre point.
- Chapter Head** The title heading that appears on every page of or opening page of a book.
- Character Count** The amount of letters, numbers, punctuation marks etc in a piece of text.
- Character Set** The complete collection of all possible characters for a font.
- Clip Art** Pictures which come with computer software
- Composition** The process of arranging elements such as text and graphics in the most suitable and economical way.
- Condensed Type** A narrower, more compact version of a typeface.
- Copy** The name given to the main text in a publication. Also the command for making a duplicate of selected text or objects.
- Copy fitting** The process of calculating the amount of space that text will take up in a publication and adjusting it to fit.
- Cursor** The pointer or other graphic symbol which shows the current position on the screen.
- Caption** The text which explains an image.
- CAE** Computer-aided engineering.
- Column Rules** vertical lines between columns
- Central Processing Unit (CPU)** At the heart of the computer, it controls all other units.
- Colour fill** Single colour within an enclosed area

- Centre spread** Two adjacent pages which can be found in the middle of a magazine.
- Column guides** non printable guides found in DTP software to allow planning of work
- Crop** to trim excess parts of a screen graphic.
- Colour Gradient** This where a colour starts off dark and and gradiates to a light colour OR gradiates from one colour to another; e.g. say blue to yellow.
- CGA Colour graphics adaptor.** A colour adaptor which provides low resolution up to four colours. (320 h x 200 v pixels at 4 colours)
- Desk-Top Publishing (DTP)** is the creation of a whole publication on computer, preparing it for printing without the normal processes of typing, typesetting, cutting & pasting and laying out. This book let is produced using DTP.
- DPI Dots per inch.** A measurement of resolution of output devices. The more dots per inch the greater the clarity of the graphic.
- Drop Capital** this is a large starting letter which si bigger than the rest of the text. It falls below the baseline.
- Default** The values that are set when no other option is given.
- Descender** Any part of a letterform which sits below the baseline.
- Digital Image** Any image that has been converted into bits for use on a computer.
- Dingbat** A font made up entirely of decorative symbols or images.
- Disk, diskette** A flat magnetised plate used for storing computer data.
- Disk Drive** A device used to spin a disk at high speed over a read / write head.

Display type	The name given to text which is used for headlines or for catching attention.
Download	Transferring information from one computer source to another.
DPI	Dots Per Inch - the term used to describe the resolution of an image, sometimes used to refer to screen images too.
Drum Plotter	A pen-type plotter in which the paper is rotated on a drum under the pen while the pen also moves across the drum.
Dump	A colloquialism for transferring what is in the computer's memory to disc or printer or some other output device.
DXF	Drawing Exchange Format. A system controlling the format of data interchanged between CAG systems. Drawing files held in DXF format will have the suffix DXF.
EGA	Enhanced graphics adapter. A colour adaptor allowing a variety of high resolution modes (320 h x 200 v at 64 colours to 640 h x 350 v at 16 colours).
Extrusion	A command whereby an existing 2D (x,y) shape is translated into a 3D shape by addition of the Z depth or length.
Ellipsis	Three dots in a row used in punctuation to show the deliberate omission of further characters
Extended type	A wider, expanded version of a typeface.
Facing Pages	Pages which seem to be facing each other in a publication.
File	A file is the collection of data of which a drawing is comprised and which has been given a name (filename) by which it can be recognised when stored on disc.
Flush Left/Right	describes text, which is perfectly aligned on one side.

Folio	Page number
Font	Collective name for every letter, number, symbol, accent, ligature, fraction and punctuation mark for a typeface at a particular size.
Galley	A proof of text before it is arranged on a page.
GUI	Graphic User Interface. The visual way that the user works with a computer, such as Windows™
Gutter	The space between columns.
Flat-bed plotter	A flat table over which a pen moves in both the X and Y planes.
Footer	The space at the bottom of the page where the page number and any other text is placed
Frame	a box used to hold an imported graphic or text so as to allow movement around the page.
Frame grab	The screen image is captured and stored separately and may then be manipulated by software.
Graphics Processor	A special CPU that deals only with the handling of the graphics and screen display. called digitisers.
Grid	All CAG systems provide 'transparent' grids; patterns which appear on the screen as construction aids but do not form part of a drawing.
Handles	The small rectangles that surround a selected shape. Text blocks in DTP software commonly have four handles.
Graphics Tablet	A flat-bed input device with a grid of fine wire below the surface. A puck, stylus or light pen will chase the cursor around the screen as it moves over the surface. Useful for 'tracing over' existing drawings to convert them into computer-stored versions, and for making free-hand sketches dimensionally accurate. With overlaid menus they can be used to input symbols from icons. Graphic tables are also, and more frequently,

- Hairline** The thinnest possible line.
- Halftone** The result of converting a continuous tone image, for example, a photograph into a series of black dots which imitate the tones.
- Hanging Indent** Describes when the first line of a paragraph aligns to the margin, but the following lines are indented.
- Hanging Punctuation** When items such as inverted commas are allowed to be positioned into the margins in order to keep the body of text aligned with the margins.
- Hardcopy** A paper printout from the computer
- Hardware** The mechanical and physical components of a computer system.
- Headline** The title or main introductory text in a publication.
- Highlight in text** Method of making the text stand out, eg colour flash, underlining, bold, italic
- Highlight in I & P** Technique to show light reflection on edges and surfaces and curves
- Hyphenation** The process of allowing a word which will not fit fully on a line to be split with a hyphen. In Desktop Publishing hyphenation can easily be controlled.
- Hard Copy** Simply means any copy of drawings produced as a plot, printout, or photograph, for example.
- Hardware** The physical parts of the computer. Example: the case, disc drives, motherboard, floppy discs, etc.

- Header Space** The space at the top of the page where the number and any other text is placed
- Hidden-line removal** A CAD command that removes background lines from 3D wire-frame images. Wire-frame perspective views show every line used to assemble a model. To be able to display and plot views as seen in real life means editing out all the lines and planes which would be concealed by other lines and planes. This is known as hidden-line removal and poses massive calculation problems for the computer.
- Housekeeping** Embraces all the routines which, although essential to smooth running, do not assist problem solving.
- Icon** A graphical screen image used to represent a file, programme or folder on a computer screen.
- Image Compression** The process of reducing a file's storage size without necessarily decreasing its quality.
- Imagesetter** A machine which produces high quality text and images on paper or film for commercial printing.
- Indent** Where one or several lines of text are positioned a specific distance from the margins or main text.
- Initialising** The process of preparing a disk for use on a computer. Also known as formatting.
- Import** To bring in a copy of a text file or graphics, for example from an external application to the page layout application.
- Input** A term used to describe information that is being sent to the computer.
- Inkjet Printer** Computer printer (usually colour), which works by firing tiny dots of charged ink at the paper.
- Input device** Any piece of hardware used to transfer data to a computer such as a mouse, keyboard or scanner.

Interface	The way that a computer communicates with a user or other device.
Italics	Slanted text which resembles handwriting. Often used for emphasis.
Joystick	An input device which normally moves in two axes. The output from the joystick can be used to control the screen cursor movement.
Kerning	The removal of excess space between letters to improve the visual impact of text. For example, in the large type used for headlines.
Landscape	Description of the shape of a document page that is wider than it is high. (See Portrait.)
Justified Text	Text which has word spacing added so that it aligns to both edges of columns or margins.
Kerning	The process of adjusting the space between letters. Especially important in headlines.
Kerning Pairs	Specific pairs of letters which, because of their shape, require to have spacing between them adjusted e.g. Po, Pi, Pe, Ko, Te. between lines of text
Landscape	Page orientation with the long edge at the bottom.
Leading	The addition of space between lines of text, so called, because in traditional typesetting, lead was used as a spacer.
Ligature	Where two or more characters are joined as one.
Line art	Art work which is made up entirely of black.
Lowercase	The small letters of the alphabet.

- Laser Printer** A non-contact printing device predominantly used in DTP. Laser printers use a laser beam focused on an electrically charged drum which forces the ink to follow the light pattern and form the characters. It is a fast method of printing which also provides very clear images.
- Layers** CAG software allows drawings to be built up as a series of layers, each layer dedicated to one aspect of the drawing, e.g. construction lines, text, dimensions, hatching, or electrical layout. Layers can be switched in and out and act like clear film overlays which are always in perfect alignment with each other.
- Light pen** A light sensitive device which can be used as an input device. The light pen is used by pointing it at a raster-type display. Not commonly used in desk-top CAG applications.
- Margin** The unprinted space on the sides, top and bottom of a document.
- Mb (Megabyte)** One million bytes, or 1,000 kilobytes.
- Menu** On-screen display of options.
- Modem** (Modulator / Demodulator). A device which connects data into signals, which can be sent along a phone line and back again.
- Monospaced Font** A font in which all of the characters take up the same width.
- Mouse** A device for recording and plotting the movement of the cursor on a computer monitor as well as for undertaking on-screen commands.
- Make-up** An assembly of all the elements of a document. DTP allows this to be done accurately and creatively and makes it easy to modify.

Maths Co-processor Known also as a maths chip, it processes numbers very rapidly using floating-point notation, 100 or more times faster than a standard CPU.

Modeling/Model A CAG model is more than just a three-dimensional screen representation of an object: it is something which the computer can recognise as having three-dimensional 'shape' and which it can interrogate as such. Any screen display or plot is restricted to two-dimensional limitations, however, the shape exists in computer memory as if it were a solid model.

Montage A collection of separate graphics which when combined make up a new picture

Mouse A mobile hand-held interaction device for controlling the cursor position.

Orphan A line of text that begins a paragraph but has been left at the bottom of the previous column or page. To be avoided in page layout.

Optical Scanning A process in which documents are scanned and the incident light from their contents generates signals which are received by the scanning device and transmitted to the computer.

Oblique Text which is slanted, but not italic.

OCR (Optical Character Recognition) The ability to scan pages of text and digitally re-create them as editable text.

Pen plotter A drawing device that uses a pen. Any plotter using detachable pens is a pen plotter. There are two main types, flat-bed and drum.

Peripherals External equipment that can be added or connected to the computer. Examples: printers, graphics tablet.

Pixel Picture element. Video and screen displays are made up of tiny dots called pixels. These dots are arranged in a grid and can be set to give typical grid densities of 320 h x 200 v, 640 h x 200 v and 640 h x 400 v dots per grid.

Portrait Description of the shape of a document page which is higher than it is wide. (See Landscape.)

Proof A test print of a document used for checking for mistakes prior to printing react to a persons input. i.e. A flight simulator, or a games consol.

Paragraph Rules Lines used to separate paragraphs of text.

Paste-up The act of placing text, graphic and picture items on a page.

Pixel (Picture Element) The smallest dot element on a computer screen.

Point The traditional unit of type measurement equal to $\frac{1}{72}$ inch or 12 Picas.

Portrait Page orientation where short sizes are at the bottom.

RAM Random Access Memory. Memory chips which are used temporarily when the computer is running. The more RAM available, the more programmes can be running at the same time.

Registration The correct alignment of one image on top of another in printing.

Reverse Used to describe placing white text on a black or dark background.

ROM Read-Only Memory. Its contents are fixed during manufacture and cannot be changed. It is used to store the permanent programs which form the basic intelligence of the computer.

- Runaround** Technique of setting text to follow the contour of an image or object.
- Rough** Manually produced design layout sketch
- Real time** The term used to describe an event that is executed immediately, rather than an event that will be carried out after a time delay.
- Register Mark** Printers cross-hairs (thin lines) placed outside the page area in order to check that the printed colours are accurate
- Resolution** The sharpness of definition of a digitised image depending on the number of pixels displayed on screen. Normally defined by the number of pixels shown on screen horizontally and vertically, e.g. 320 h x 200 v.
- Rubber Banding** CAG systems provide for a visible flexible connection between the screen cursor and the position from which it last moved. As the cursor moves away from it, the connecting line seems to stretch.
- Screen Dump** When a screen image is sent to a printer to obtain a hard copy, the resulting copy is a screen dump.
- Simulation** This is very similar to animation but with simulation the graphics can be interacted by the user.
- Spine** Bound edge of a publication
- Sans Serif** Meaning "without serifs". Any typeface which does not have bars across the ends of letter strokes.
- Scalable Typeface** Typeface which will enlarge to any size without loss of quality.
- Scroll Bar** The bar at the edge of a window by which the contents can be moved up or down, right or left.

- Serif** Any typeface which has bars crossing the ends of strokes such as this one.
- Small caps** Capitals which match the x-height of a typeface.
- Spread** Two facing pages.
- Snap** A *CAG* command that locks or 'Snaps' the cursor to the nearest 'snapable' point. This might be points on a screen-displayed grid, or any point naturally arising as a 'lockable' point (a line-end or vertex). Such 'lockable' points can often be forced into a drawing by special commands. The 'snap' facility is a powerful tool for precision work.
- Software** The programs which the computer executes. In addition all data files can be classed as software.
- Solid modeling** The creation of a three-dimensional image on screen, thereafter capable of manipulation to show other views and
- .
- Surface Modeling** A three-dimensional model in which the surface is defined by connecting elements.
- Tab** A keyboard character which causes the cursor to jump to the next point on a page, or to a specific point on a page set by the user.
- Template** A dummy publication that acts as a model, providing the structure and general layout for another similar publication.
- Tonal scale** A colour gradually becoming lighter or darker
- Tracking** The average amount of space between characters in a word.
- True Type** A font format, which generates a font at any size and at high quality depending on the printer.
- Uppercase** The capital letters of a typeface.
- Utilities** Software programmes for undertaking jobs such as file

Vector Graphic A graphic produced using a drawing programme in which the image is described using points, lines and curves. Vectors are generally able to be scaled without apparent loss of quality.

Thumb Nails Design sketches of page layouts

Type Sizes The standard 'point' system used to describe type sizes is based on 72 points to an inch. (12 points is, therefore, 1/6" high.)

VDU Visual Display Unit: an alternative way of describing the monitor. **VGA** Video graphics array (adaptor). A colour adaptor allowing high resolution and a range of colours. (320 h x 200 v at 256 colours to 640 h x 480 v at 16 colours.)

Widow One or two words at the end of a paragraph that spill onto the top of the next column or page. To be avoided.

White Space Empty spaces on a page, graphic designers use this in publications to create balance on a layout as well as resting the readers eye.

Window A window is a rectangular box that can be used to define a space around an object or set of lines. At its simplest, a window can be a frame drawn around a selected area of the screen, to isolate the area within the 'window'.

Wire-frame model A three-dimensional image made up as a series of connected lines between all edges and line end-points.

Weight Describes the thickness of the strokes of a typeface.

White Space The blank areas on a page which are not occupied by text, illustrations or colours.

Widow A word or line belonging to a preceding paragraph, which is added to a new page or column.

Window The graphic device on screen which organises and allows access to files, folders and applications.

WYSIWYG "What You See Is What You Get". The ability of computer monitors to simulate exactly the result of using software on screen.

DTP Terms

Lines

Lines can be long or short, straight or curved. Lines can be horizontal, vertical, or diagonal. They create patterns. Lines can be solid, dashed, thick, thin, or of variable width.

Sometimes a designer uses a line alone to divide or unite elements on a page.

Lines can denote direction of movement (as in diagonal lines and arrows) or provide an anchor to hold elements on a page (such as lines at the top, bottom, or sides of a page).

You can use lines in conjunction with other elements. One well-known example, the AT&T logo, is a pattern of thick and thin lines arranged in a circular shape. Go through your own magazines with an eye on lines. I want you to find as many different examples of lines of all kinds used in these pieces. Are the lines used prominently? Are they part of a logo or used in other ways to divide the page or add decoration?

Shapes

Circle, square, and triangle are the three basic shapes. Perhaps the most familiar shape to desktop publishing is the square (and rectangle). Paper is rectangular. Most text blocks are square or rectangular. While you may encounter printed projects cut into other shapes, most circles, triangles, and freeform shapes in desktop published materials are found on the page within the graphics or in the way the elements are placed on the page.

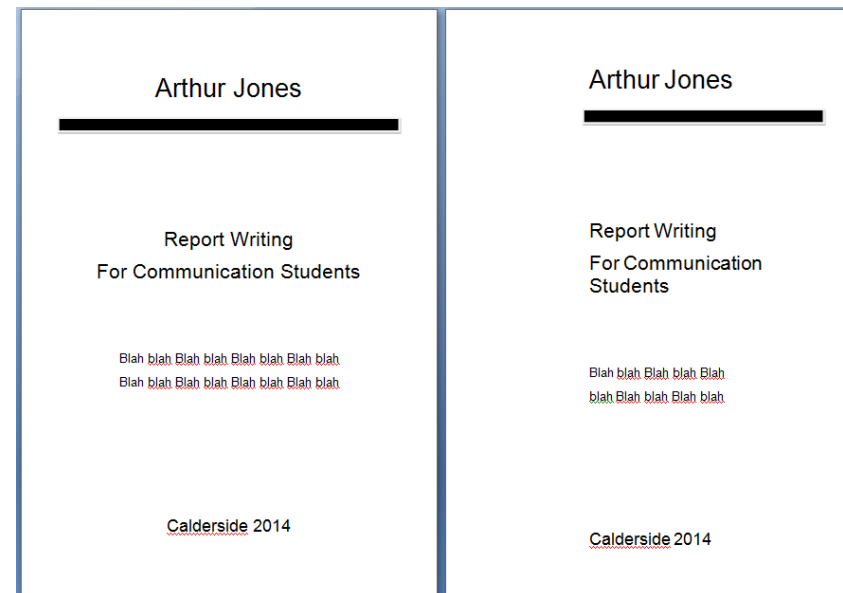
Go through your own magazines looking for a variety of shapes. No doubt you can find many examples of squares and rectangles but keep an eye out for other shapes. Are the examples you find actual graphic elements or can you find examples of lines or text arranged in geometric shapes?

Mass

Mass is size. There is physical size and visual size. Size can be relative. A physically small brochure can have a great deal of mass through the use of heavy text and graphic elements. A physically large brochure can appear smaller, lighter by using text and graphics sparingly.

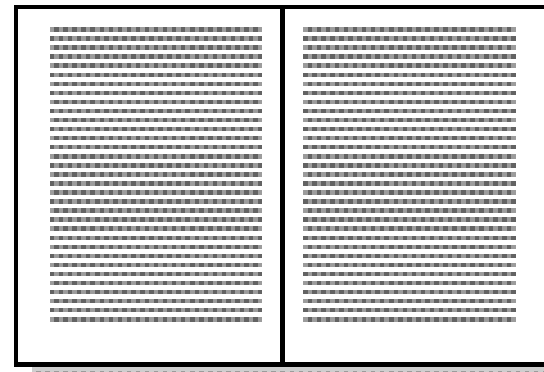
While the paper projects you create have a certain size because of the size and weight of the paper, visual mass -- how light or heavy it appears -- is also an element of the design.

The CUTYOS standard layouts work well and are especially suitable for posters, but sticking rigidly to symmetry can produce rather characterless layout. Of the two report covers below, it seems to me that the asymmetrical layout of the report on the right has a lot more going for it:



So it's always worth experimenting with a less obvious design. Also, be wary of the automatic functions offered by word-processors and DTP software, they certainly have their uses, but they can end up leading you into rather unexciting designs.

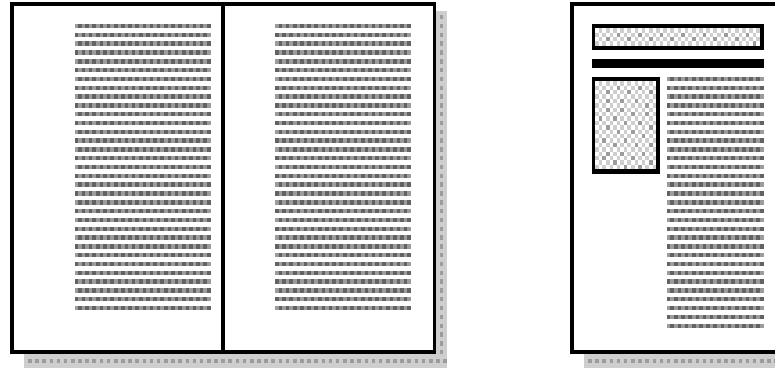
Single column



The big advantage of a single column is, of course, that it's easy to use - so easy in fact that you might as well just use a word-processor rather than a DTP system. It's also fine for large amounts of unbroken text and is therefore very economical.

Problems are that it's easy to end up with lines that are too long to be read comfortably (always avoid lines longer than 2.5 alphabets) and it's not easy to split this up comfortably with heads, subheads and illustrations.

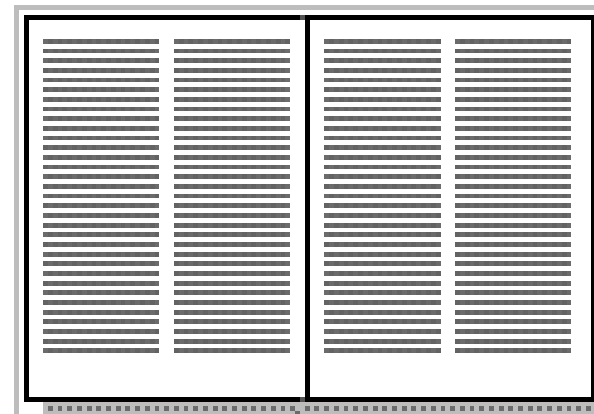
Generally, it works best at, say, A5 size (148 x 210 mm) rather than A4 (210 x 297mm).



While still keeping the economy and ease of development of a single column layout, you can make things livelier and more interesting by going for a single column which is a good deal narrower than the page.

You can use the very wide margin for heads and subheads, small illustrations, panels containing explanations or examples etc. and, with a little bit of imagination you can get something a bit more lively - the bottom example above, for example, is one of the standard templates that comes with the dtp software *Corel Ventura*.

Two columns



A two-column layout is often just as efficient as a single column layout. If you use just one column on a page, then its width is limited by the maximum length of a line to 2.5 alphabets. By using two, narrower, columns you can put more text on a page.

Like a single column, though, it can be limiting and doesn't normally allow much scope for developing a lively design, though grids like this will help:

Go through your own magazines and look at each piece and analyze mass in terms of physical size of the piece and the visual mass. Does it have a heavy, imposing look due to the size or weight of the paper or the density of text and graphics? Is it small and compact or light and airy? Hold the items in your hand to see if they feel light or heavy. Compare the physical size to the visual mass of each piece.

Texture

For desktop publishing, actual texture is the feel of the paper. Is it smooth to the touch or rough? Textures can also be visual. On the Web, especially, backgrounds that simulate familiar fabrics, stone, and other textures are common.

Certain printing and finishing techniques such as thermography and embossing can add both actual and visual textures to a printed piece.

Go through your own magazines looking for as many different types of actual and visual textures as you can find. Can you tell by looking whether a paper will be soft and smooth or rougher? Are the visual textures used in place of actual papers of that texture or do they relate in some way to the purpose of the printed piece (such as a stone texture for a tile company)? See and feel the difference in textures on embossed pieces or other types of raised printing.

Colour

Colour is everywhere. Every single piece in your Class Samples, even if it is black and white, exhibits the element of colour. Colour is used to attract attention. It can be subtle or bold.

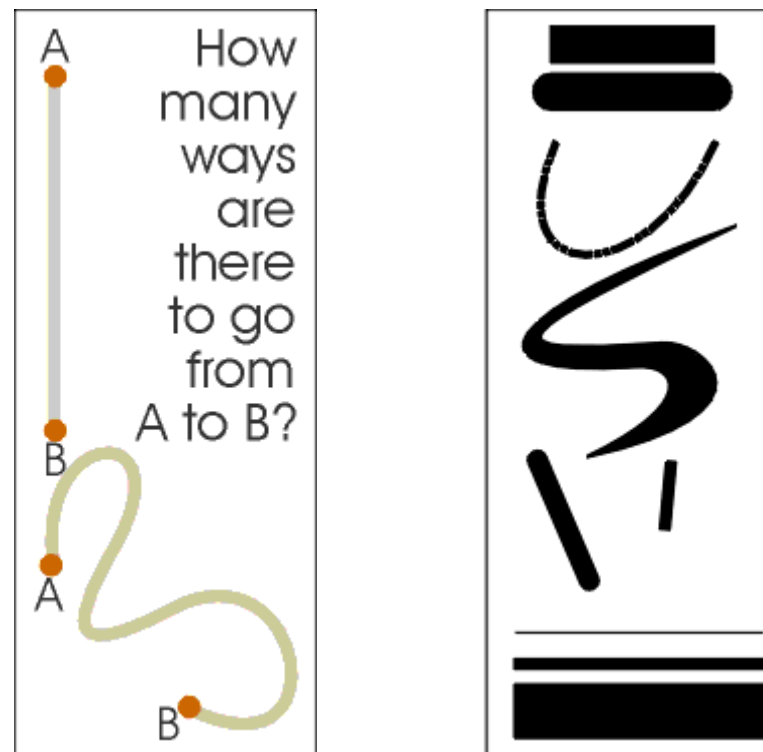
Colour can be found in the paper, the text, or the graphic elements and photos. A monochromatic colour scheme uses a single colour, perhaps in various tints, while other layouts utilize combinations of two, three, or more colours.

1. Colour can be used to elicit specific emotions and reactions. Red is typically thought of as an attention-grabbing, hot colour. Blues are more calming or convey stability. Some colour combinations are used to create a specific identity (corporate colours, school colours) or may be used in conjunction with texture to simulate the look of other objects (the look of plain paper wrapping or neon lights, for example).

Lines

Appearance

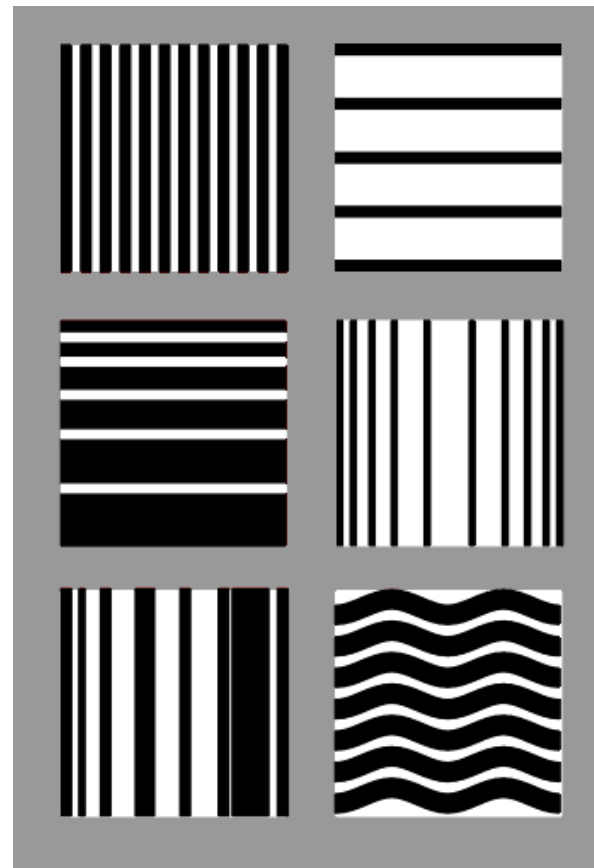
A line is a mark connecting two points. How we get from point A to point B gives the line its distinctive character and appearance. Lines can be long or short, straight or curved. Lines can be horizontal, vertical, or diagonal. Lines can be solid, dashed, thick, thin, or of variable width. The endings of lines can be ragged, blunt, or curved.



Patterns

Lines are often found in pairs or groups. Lines of the same general appearance or lines that are quite different can form a variety of patterns that create textures, suggest movement, or lead the eye — the same as single lines.

If you aren't creating original illustrations or doing logo design, your main concern with this part of the study of lines is being able to recognize these patterns in the illustrations you may select for your work and understand how these patterns may or may not project the image you want for your project. These bits of line patterns illustrate static, dynamic, and random use of lines.



Upper Left: Uniform vertical black and white lines alternate at even intervals. Static. Orderly. Conservative.

Upper Right: Uniform horizontal black lines are widely, but evenly spaced. Static. Stable. Orderly.

Middle Left: Uneven spacing of otherwise uniform lines creates the impression of movement. Dynamic. Orderly progression.

Middle Right: In this example the progression moves in from either side giving the illusion of roundness. Dynamic. Orderly progression. Dimension.

Lower Left: Varying line widths and distances create a random pattern. Dynamic. Chaotic. Disorderly.

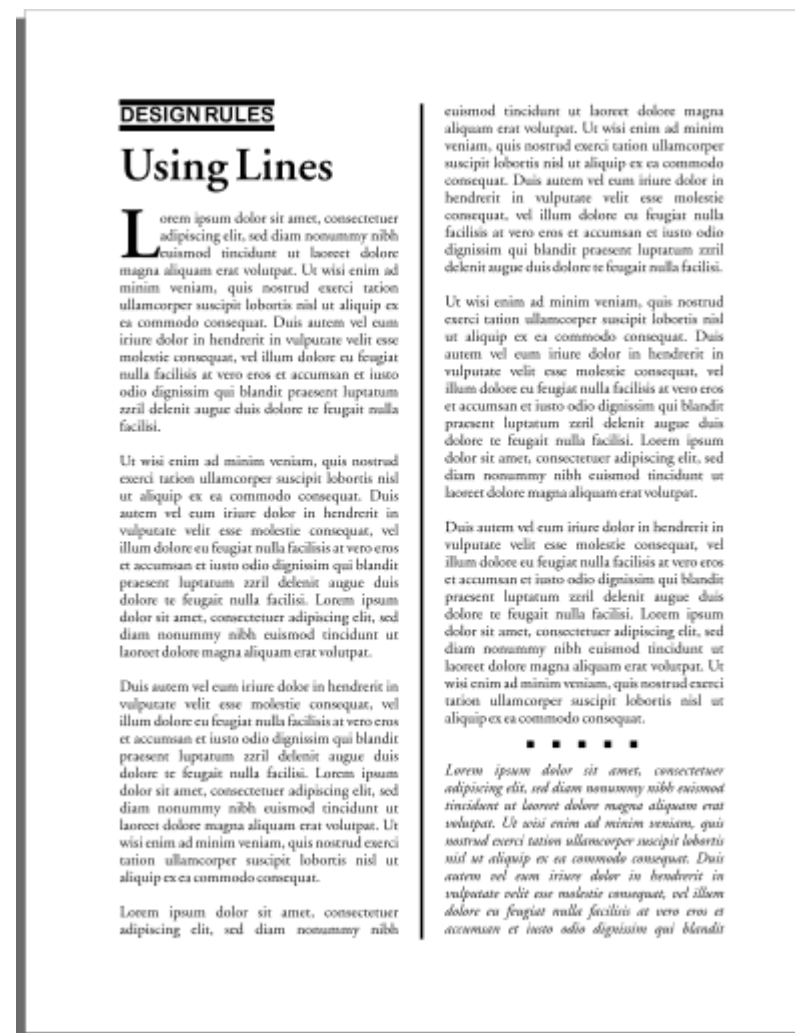
Lower Right: While the uniform size and spacing of the lines in the upper examples are static, make the lines into curves and you get movement although it is a controlled movement. Dynamic. Orderly flow.
patterns using only black or white lines that illustrate static, dynamic, or random line patterns.

Using Lines

Some ways that you might use lines in your design are to:

- Organize, connect, separate
- Create movement
- Provide texture
- Convey a mood or emotion
- Define shapes
- Provide emphasis
- Provide a framework
-

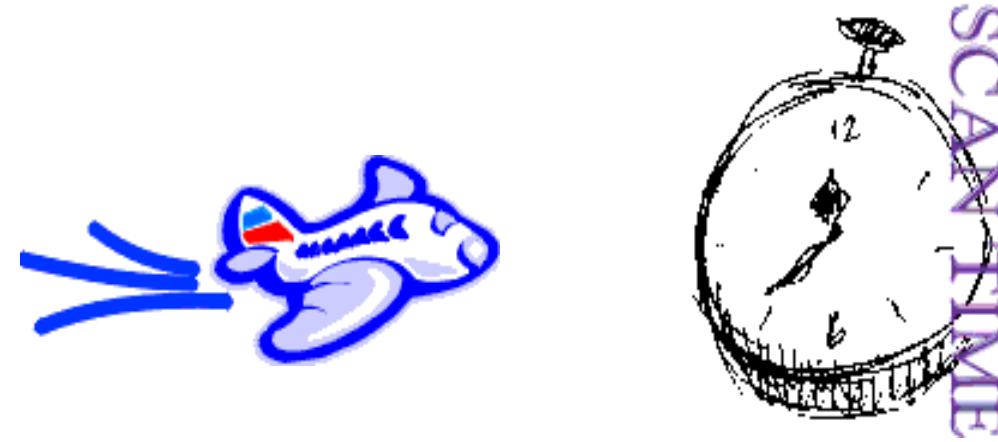
The examples below demonstrate a few of the ways lines might be used in page layout or illustration. You can probably find examples all around you as well.



In the example on the opposite page, a solid line separates columns of text, a

pair of lines set apart a phrase, and a short dotted line separates a section of text from other parts of the page.

A few simple lines added to a piece of clip art gives a sense of movement to the airplane. Short, choppy, vertical lines create a grooved texture along the edge of the timepiece sketch.



Dashed lines suggest a coupon, whether there is one or not. It causes many of us to take a second look at this ad because the familiar dashed line makes us think "I can save money!"



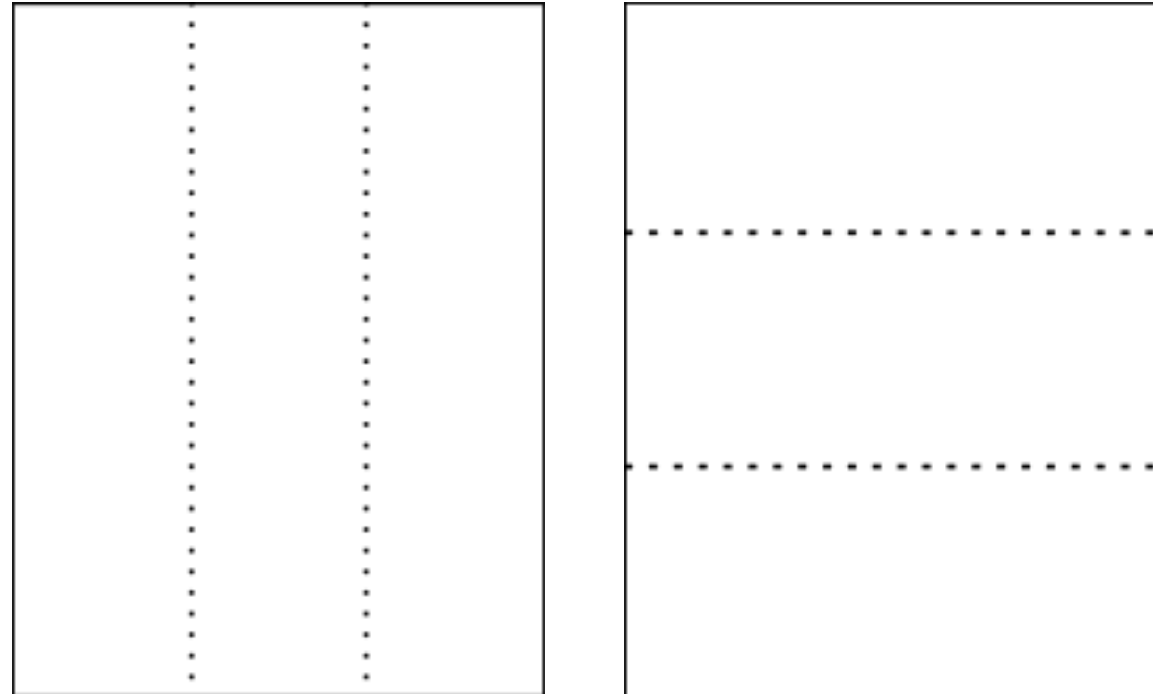
Balance

Rule of Thirds, Visual Centre, Grids

Underlying most of the layouts on the previous pages are three related aspects of page layout.

Thirds

The rule of thirds says that most designs can be made more interesting by visually dividing the page into thirds vertically or horizontally and placing our most important elements within those thirds.



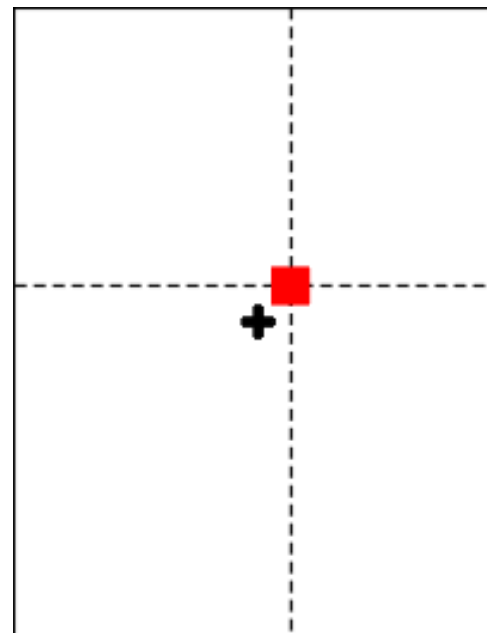
Look at these previous balance examples and see how the rule of thirds is utilized. On the following page the first example a vertically symmetrical layout the headline appears in the upper third of the page, the logo in the middle third, and the supporting descriptive text in the lower third.

Even in this example below the unbalanced asymmetrical design uses the rule of thirds with most of the 'action' in the upper 2/3rd of the layout.

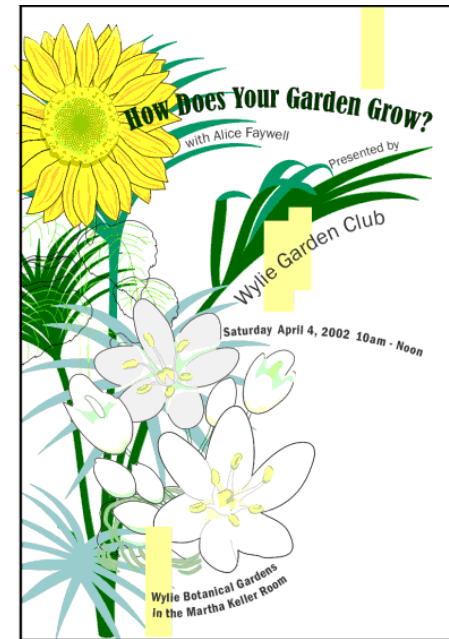


Visual Centre

Placing important elements or the focal point of the design within the visual centre of a piece is another design trick. The visual centre is slightly to the right of and above the actual centre of a page.



See how the focal or centre point of each of these designs actually falls in the visual centre of the page.



Below: It's easy to see the actual centre, it's where the four box corners meet. But the focus is on the earth.



In the example of the calendar below, the months emanate from the year located front and (visual) centre.



Grids

Roughly dividing a page into thirds or finding the visual centre are relatively easy and you don't usually have to be exact to achieve your goals. However, constructing the underlying structure of a piece is a bit more complicated — but essential for most designs. Most balanced designs (and even unbalanced ones) rely on a grid. This invisible structure (visible while working in your page layout program) helps ensure that you place all the elements in the right location to achieve balance as well as to help with continuity and consistency of design.

Grids can be simple or complex depending on the needs of the design and the designer.

Sometimes the use of a grid is obvious.

The example shown below is an asymmetrically balanced design which uses a simple three column grid to ensure that each text column is the same width

and that it is balanced by the nearly empty column on the left. The grid also dictates the margins and ensures that the page number and header appear in the same place on each page.



Below: A 5x5 grid keeps this design in line. The grid is obvious along the bottom (each square equals one grid square in this layout) but it is invisibly keeping all those random letters in order in the middle.



Shapes

Squares

The square denotes honesty and stability. Squares are familiar, trusted shapes. Because the vast majority of the text we read is set in squares and rectangles, it has become familiar, safe, and comfortable.

Squares and rectangles are probably the most common geometric shapes we encounter. A few books, especially those for kids, may be cut in irregular shapes but adult (i.e. 'serious') correspondence comes in squares -- both the physical shape of the books, magazines, newspapers, and the rectangular columns of set text.

Some designers might equate square with boring. It's true that other, unexpected shapes, can grab attention better than the simple square but don't forget the importance of comfort and familiarity. Imagine how difficult it becomes to file everyday correspondence if letterhead came in a variety of triangles or freeform shapes. Try reading an entire book with all the text set in circles. Squares and rectangles definitely have a place in design.

Some ways you can use squares and rectangles:

- To symbolize honesty, stability, equality, comfort, or familiarity. It could also symbolize rigidity or uniformity.
- Related to the first bullet item, use repeating squares to suggest familiar themes (checkerboard pattern to represent a game board, the chequered flag at the end of a race, a tablecloth).
- To highlight, organize, or set apart information using a solid or outlined box.
- Use a square unexpectedly. Set a block of text in a solid or outlined but tiled box — with or without also tilting the text.

Circles

Circles suggest infinity. They are also protective (think of protective encircling arms). They can also denote free movement such as a rolling ball or a more controlled movement such as a spinning globe. The sense of movement is often enhanced through shading or the use of lines.

Outside of logo designs, circles are less common elements of design which

makes them good for grabbing attention, providing emphasis, and breaking up familiar rectangular blocks of text. You could set text in circles or simply use a circle as the background for more traditional blocks of text.

Some ways you can use circles:

- To symbolize infinity and protectiveness. Circles could also suggest something well-rounded or complete. Similar to protectiveness, circles could also imply security.
- Related to the first bullet item, use circles to suggest familiar themes (bullet holes, a stack of cannonballs, a bunch of grapes -- or just about any round fruit or vegetable, a target, the earth).
- To highlight, organize, or set apart information using a solid or outlined circle. Try a freeform circle that looks like it was drawn with a marker or pen to highlight important text.
- Replace the letter O or other 'round' letters in text with a circular shape that suggests that letter. Try an orange in the word Orange or a basketball, baseball, or soccer ball to replace an O or other letter in the nameplate of a sports newsletter.

Triangles

Triangles suggest action. They are dynamic. Triangles may convey either conflict or strength. Triangles can direct movement (up, down, left, right — depending on which way they 'point') but rather than moving themselves, they point the way for the reader.

Triangles are suggestive of many different shapes and ideas. They can represent a religious Trinity, a pyramid, a flag or pennant, an arrow, a beacon.

Some ways you can use triangles:

- To symbolize action or conflict. In a logo, a triangle might be better suited to a growing, dynamic high tech company than the more stable, familiar square, for example.
- Related to the first bullet item, use triangles to suggest familiar themes (flag, pyramid, arrow or pointer). A single or a series of triangles can point the eye to important information or act as an arrow to get readers to turn the page.

- To highlight, organize, or set apart information using a solid or outlined triangle. Use a triangle to suggest progression. Place it behind a 'Top 10' list or the steps to accomplish a specific task.
- Replace the letter A or V in text with a triangular shape that suggests that letter. Try a wedge of pie for the letter A in the phrase Amy's Desserts.

Mass and Size

Defining Mass

As stated in the introduction, mass equals size. Each piece you create has a physical mass. The physical mass or size is the actual dimensions of the piece — height, width, thickness/weight (of paper), and depth (3D objects).

Additionally, each element within the design (graphics, photos, lines, text blocks) have their own mass relative to the whole piece. For example, a photo that is physically 3 inches by 5 inches can appear smaller or larger depending on the physical size of the paper it is printed on and the size and proximity (closeness) of other items on the page.

Some ways to use mass within your designs:

- **to accommodate information, content** Example: To present all the desired or needed information comfortably a designer may create a bi-fold rather than the usual single business card.
- **to accommodate normal size restraints or expectations** Example: The postal service has limitations on the height and width of different types of envelopes. If a designer ignores those requirements it could incur additional mailing costs for the client.
- **to convey a mood or provide emphasis** Example: A place that is physically large (such as an amusement park) or a business that offers a huge assortment of products may use brochures or other marketing pieces that are larger (physical dimensions) or heavier (weight) than normal to carry out the 'bigger' or 'more' theme.
- **to create contrast** Example: A designer might design a full-page magazine ad using a single small image in the middle of the page with lots of white space. The contrast between the size of the page and the size of the

content (image) draws attention to the image and can create a specific mood (depending on other elements) such as conservative, elegant, lonely, or open.

Measuring the Size of Your Design

What is large? What is small? In graphic design and desktop publishing there are many ways to specify size. This part of the class on mass focuses on the mechanics of size and common measurement systems used in desktop publishing..

What you learn here is critical to DTP.

To keep from getting lost, bookmark this page now. You can come back to this page if you get 'lost' in the many pages and supplemental materials covering size and measurements.

Auxiliary Materials: **Size Matters**

This multiple page complex covers the following topics:

Type Sizes

Using Picas in Page Layout,

Paper Sizes ,

Image Sizes

Conversion Tools.

In addition to the main coverage of each topic you'll find that many pages have a *Glossary* section with related terms, or *How-to* pages related to that topic. These pages are not included in the 'page count' for those topics but are important supplemental information. Review them.

It will take several days or even longer to absorb all this information.

Texture

Paper Textures & Finishes

Paper is often something we take for granted. It's just 'there.' Sometimes we have no choice about the type of paper on which our designs are printed. Normally we can't dictate the paper used for ads in newspapers or magazines. Even when we do have a choice, we're limited by budget, printing requirements, or other factors. However, paper can be an important textural element in our desktop published documents.

Some papers just 'feel' better than others. Grab up some paper from around you. Get a newspaper, a magazine, some paper from your printer, and a few different samples from your Class Samples. Close your eyes and touch the different surfaces. Can you identify the general type of paper (newsprint, etc.) simply by touch? Probably so. But also consider how they feel to your touch — smooth, rough, slightly patterned, fuzzy, bumpy, slick, shiny, dull, warm or cold. Familiarize yourself with some of the various surfaces and finishes used in paper. Some may be familiar to you already. Others will be new.

- Antique Finish
- Cast-Coated Paper
- Cockle Finish
- Dull Finish
- Eggshell Finish
- English Finish
- Felt Finish
- Glazed Finish
- Granite Finish
- Laid Finish
- Linen Finish
- Machine Finish
- Machine Glazed
- Matte Finish
- Mottled Finish
- Natural Finish
- Onionskin Paper
- Parchment Paper

Design Concept & Texture

Varying paper surfaces can dramatically or subtly alter the mood you want your designs to convey. An exercise from *Using Design Basics To Get Creative Results* by Bryan L. Peterson uses the example of a piece of jewellery placed against two totally different surfaces — a shiny tile of black Formica vs. a piece of cement.

Translate this same concept to paper and imagine a photograph of a well-preserved vintage automobile printed on extremely smooth, glossy paper or printed on a rough, peppy surface. Neither one is necessarily better or worse. It depends on the mood you want to convey. Increased contrast between the image (and its visual texture) and the actual surface of the paper can create interest in your design.

When selecting paper, choose a texture that is related to the concept of your design and doesn't overwhelm or get in the way of the message. While you can make a bold statement with texture, sometimes a subtle texture that stays 'in the background' is most appropriate. Make sure that your texture works with your choice of type and images so that text does not become unreadable or images unrecognizable.

It may be necessary to use a bolder typeface if your paper is rough or strongly patterned.

Here is an example of paper texture from an assignment.

Unexpected contrast: In a brochure promoting a computer-related service: "The grey colour also evokes a high-tech, sterile mood, although I might expect a glossier surface to go along with that, rather than the sensual feel of the textured stock." — Student ID S011203

My comments: "...the softer texture may indeed have been meant to soften and humanize the high-tech image."

Visual Textures

Everything around us has a texture. Sometimes we can simulate those textures with paper, but more often the textures we create in our designs are visual rather than tactile. However, those visual textures can be just as provocative or full of meaning as actual textures we can touch.

It's extremely easy to find or create visual textures for your designs. There are four basic ways to incorporate visual texture.

Objects within a photograph



Textures: fairly smooth surface of the chalk; rough surface of the cement

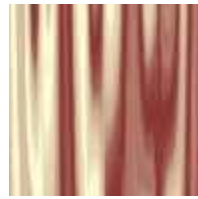


Textures: smooth glass bottles; fabric of the potholders



Textures: worn wooden mallet; grass

Images created with photo-editing software. These textures may mimic actual textures or be imagined textures



Texture: mimics drapes or folds in a satiny fabric



Texture: simulates a rough, rocky surface



Texture: random soft circles create an imaginary texture

Digitized images of actual textures (from scans, digital photos)



Texture: a straw mat



Texture: piece of door mat made from old tires



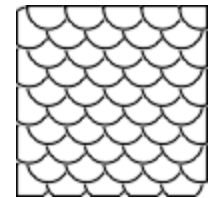
Texture: tree bark

Symbolic textures created with lines or shapes

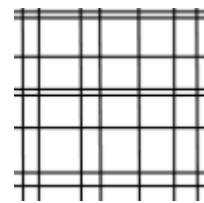
These patterns suggest various textures and are similar to the use of symbols or icons to represent ideas or objects.



Texture: wavy lines could symbolize water, waves, rolling terrain



Texture: overlapping circles give the look of fish scales



Texture: a grid of lines could simulate plaid or linen fabrics, wire mesh, or other textures

You can enhance or alter the appearance of visual textures depending on the actual texture of the paper used. Keep this interaction in mind when using texture. While you can easily simulate a rough texture on smooth paper, using a 'slick' visual texture on some rough papers changes the visual appearance.

As with paper textures, choose textures that relate to the concept of the piece and are appropriate to the design. Just as some paper textures can interfere with the readability of text, so can visual textures used as backgrounds.

Use caution when placing text over heavy or busy visual textures. Go through your Class Samples with an eye on visual texture.

Colour

Value

Value is present in all design. It is the lightness or darkness of an object, regardless of colour. Value is relative to the background colour and other items on the page.

Use value to:

- **Increase/Decrease Contrast**

The greater the difference in value between an object and its background, the greater the contrast



Choose the value that creates the amount of contrast and effect that you want for your design. In the above examples, the lighter value recedes into the light background. The design with the greatest contrast makes the darker object more dominant.

- **Create Movement**

Objects of the same value create a static design with all objects equal in visual importance. Introducing varying values gives the page a more dynamic appearance and creates a 'pecking order' among the objects. Some stand out while others recede.



Mix elements of different values to add visual movement to your design or to create a hierarchy of importance.

• **Lead the Eye**

By creating a pattern of dark to light values, even when the objects are equal in shape and size, it leads the eye in the direction of dark to light.



In the above example, the first set of all dark lines are static. The middle example leads the eye in a downward direction (dark to light).

Reversing the values of the lines leads the eye upward.

Use colour to change the effect of value:

Colour has the power to override the effects of value. In a high contrast black & white design, introducing a single, small bit of colour will change the focus and balance of the design.



The eye is drawn to that spot of colour even if other elements are designed to draw the eye in some other direction or the objects are otherwise equal.

That's the power of colour.

Layout : grids and columns

Grids

Most designers will set up a page grid before they start whacking elements down on a page. Of course, if you're using a computer, it's quite easy to stick stuff on a page and move it around in a fairly random fashion until you've got something you like the look of. Generally speaking, though, that approach is likely to result in some pretty awful pages and, over a lengthy document, may well result in a total hotchpotch which simply confuses the reader.

To determine the grid appropriate for your design is no easy business, but it's worth investing some time in it. Here are a few pointers you might find useful:

- **Number of lines per page** - it's normally helpful if the number of lines you can fit on each page in your chosen font is divisible by the number of grid sections you intend to have. It's well worth devoting some time to flowing some text ('printer's Latin' for example) on to a page and getting a printout in various column widths and different font sizes (if you're working in a college, it's worth asking whether they already have something of that sort). You can easily be surprised - for example:

This is 12pt face.

As you can easily see by comparing it with the text alongside both 10pt and 12pt have their baseline on a 12pt body.

This is 12pt face.

As you can easily see by comparing it with the text alongside both 10pt and 12pt have their baseline on a 12pt body.

- You can use the same exercise to work out how many words in a given font can be fitted into a column centimetre of a given column width.
- **Complexity of content** - if your content is to include relatively little artwork, few panels containing comments, quotations and so on, then you may not need a grid at all. If it is to be fairly complex, then it's a good idea to have a number of panels in your grid, even if your basic page is to be a single column of text.

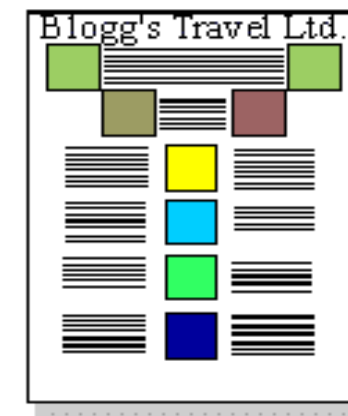
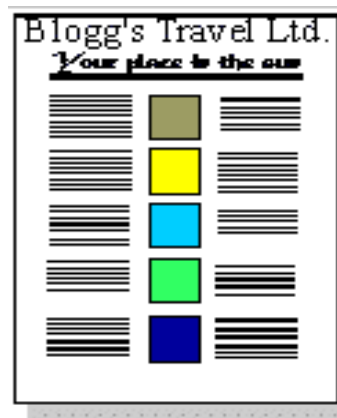
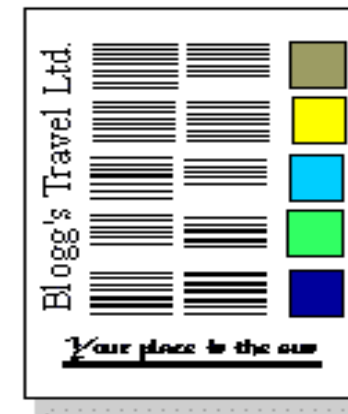
- **Margins** - a function of how much you need to fit on to each page, which of course will vary from one production to another, but the following general rules are often followed:
- **Foreedge** (also known as outside margin): should be an average of head (top margin) and foot (bottom margin)
- **Foot** (also known as bottom margin): should always be bigger than the head (top margin), probably at least 50% bigger (this is due to the so-called optical centre - due to an optical illusion, we tend to see the centre of a page as being slightly higher than the actual centre. Thus, if elements are situated exactly equally on either side of the optical centre, we tend to see them as too low down. For that reason, when setting up a page, we normally set up the bottom margin around 50% bigger than the top margin)
- **Back** (also known as inside or gutter margin): the two back margins taken together should be roughly as wide as the foreedge (when setting up the back margin, you should bear in mind how your work is to be bound - some bindings 'eat up' a large amount of paper)

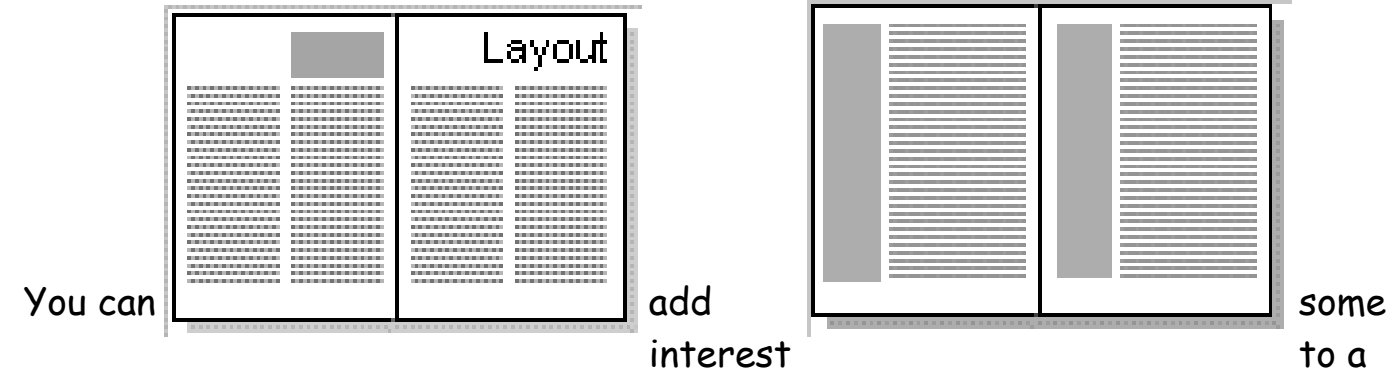
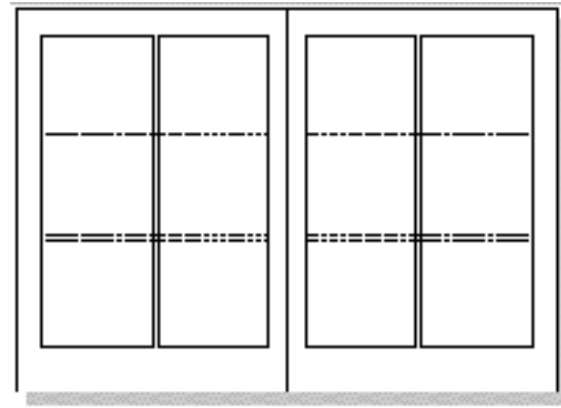
Master pages - most desktop publishing systems will provide you with master pages. It's on those pages that you should set up your grid once you've decided what it should be.

Symmetry versus Asymmetry

It's certainly a good idea to work to grids, but following them slavishly can result in pretty dull design. Similarly, It's not a bad idea to start off with an idea of a symmetrical design, but producing symmetrical pages all the time can end up boring.

You'll sometimes come across the CUTYOS rule for organizing elements on a page. Designs following those rules are produced in the shapes of those letters and look like this:

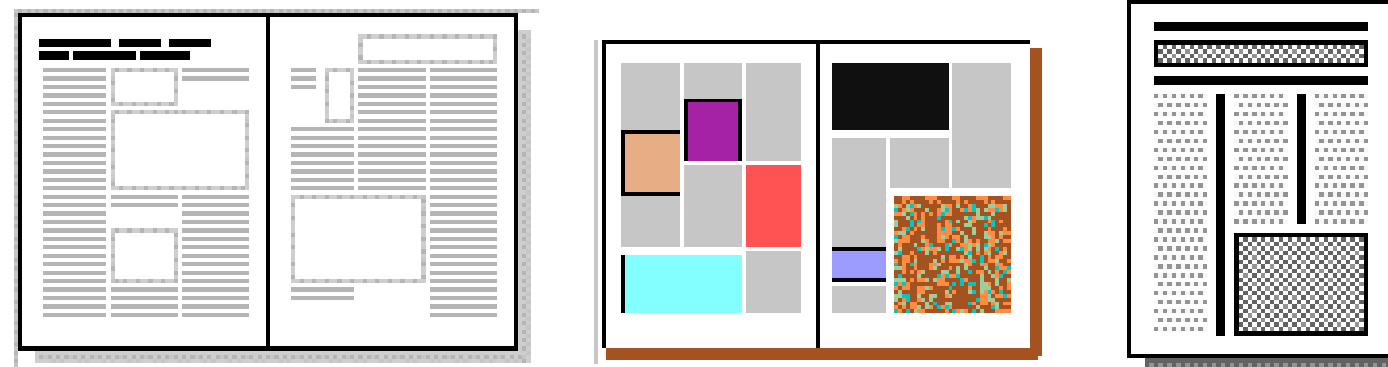




two-column layout by reducing the height of the columns and reserving the space for headings graphics. It can look a bit odd, though, if there's nothing there, though you can militate against that by having a running head on every page.

You can also add interest by using two columns of differing widths. The problem is that this only really works if the two columns are somehow different in content, for example if the narrow column is providing a running commentary on the wider one.

Three columns

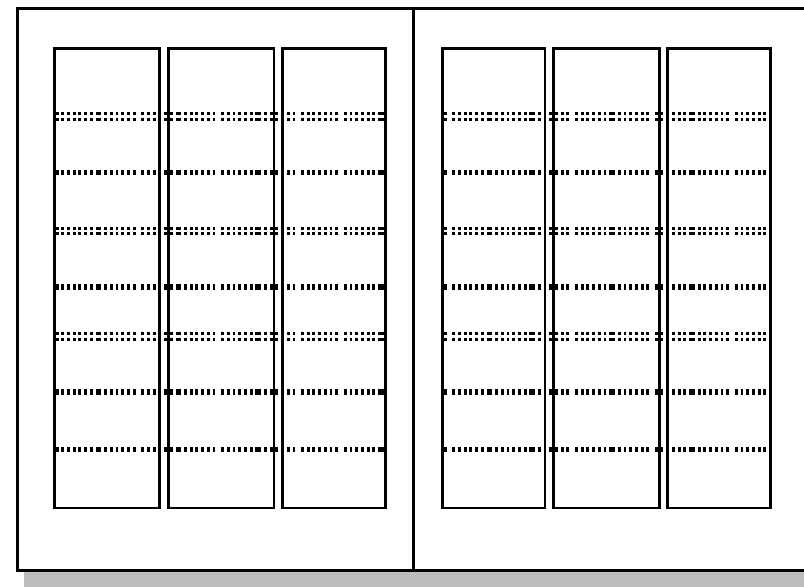


A three column page is excellent for the production of a lively, interesting layout. It is particularly useful where a lot of artwork has to be combined with text.

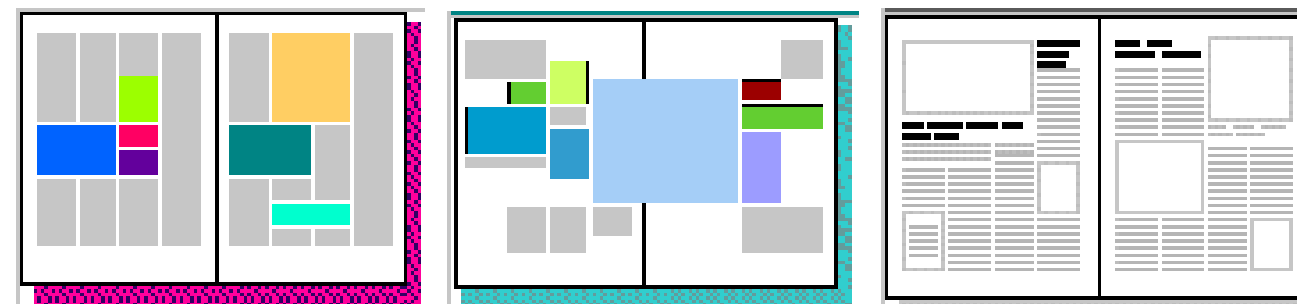
The relatively narrow columns will probably force you to use a fairly small font and layout can start to get confusing if you're not careful. The use of a fair amount of white space often helps to make the overall layout comprehensible.

Like the two-column layout, this one can quite usefully be mixed with headings spanning the whole page. For example, the bottom example above is one of the standard layouts offered by *Corel Ventura*.

This is a fairly typical grid you might use for three columns:

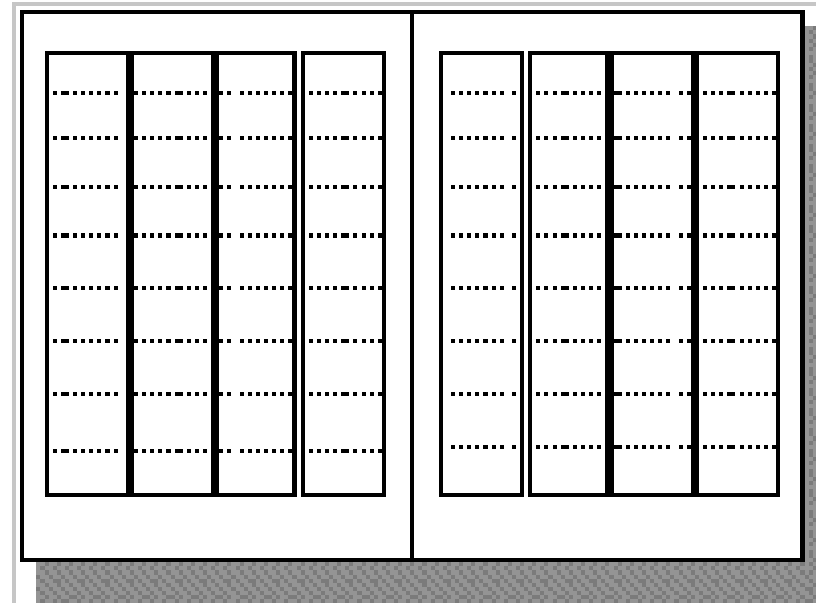


Four columns



A four column layout can readily be lively and interesting, but it can all too easily turn out to be hopelessly confusing. It works well with lists of things, so it could be good for, say, an index or an encyclopedia.

Here's an example of a fairly typical grid:



The pages above are based on that grid. It can be difficult to use on A4 paper because the columns are getting so narrow that you'll have to use a fairly small font and you may well end up with quite a lot of hyphenation which will make reading difficult.

Nevertheless, if you have the patience to work with it, it can produce interesting designs, especially if, as with three columns, you're willing to use plenty of white space. It can also be readily combined with two-column layout, a combination which works quite well for magazines.

Thumbnail Sketches

Thumbnail sketches are simple idea sketches which will help the designer to obtain an attractive and acceptable final result. The client can see the ideas and then choose the layout which he or she prefers.

Thumbnail sketches serve these three primary purposes; they:

1. Graphically preserve ideas;
2. Visually portray ideas; and
3. Compare two or more ideas visually.

Preparation of these sketches should begin immediately after the desired product has been selected and after completion of the pre-layout planning sheet. Copy selection precedes thumbnails; therefore, one of the responsibilities of the designer is to obtain all the copy that will appear on the final product. The originator of the planned printed product should have this information readily available.

Design Elements and Principles

The principles and elements of good design and page layout include proportion, balance, rhythm, emphasis, colour, lines, shapes, and textures. Additional components may be considered graphic design principles or ways to achieve a well-designed page layout including alignment, white space, contrast, and repetition.

Elements of Design

From an online design class, definitions and graphic depiction of lines, shapes, texture, and other design components.

Element of Design: Lines

From our online Design Basics Course, these lessons define and explore the appearance, patterns, and uses of lines in desktop publishing and graphic design projects.

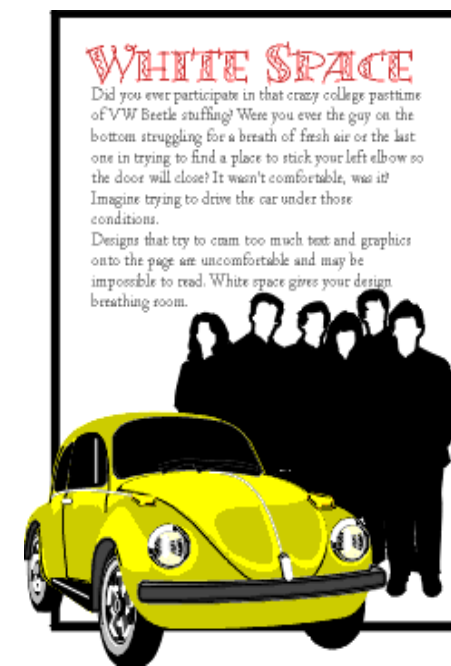
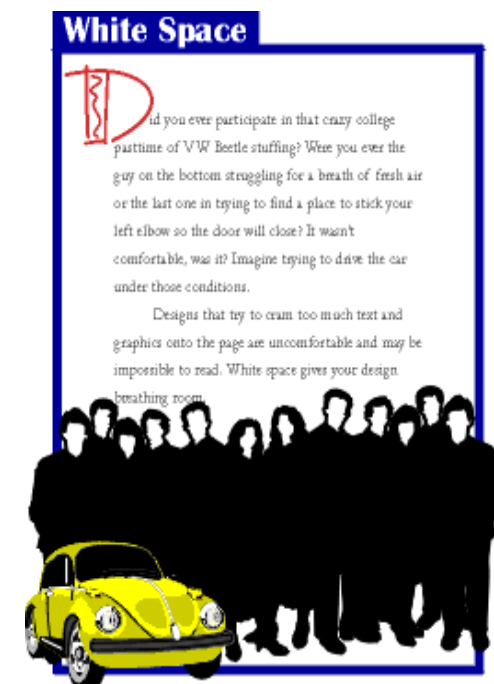
White space doesn't have to be white. The large block of black created by the graphic of people adds a large block of black **white space**. Multiplying the number of people and reducing the size of the car in the second "White Space" example provides additional **contrast** and reinforces the theme of the copy.

Additional leading, larger margins, deeper paragraph indents all add white space or breathing room to the design.

The oversized drop cap is another element of **contrast** and also helps to **balance** the page with the large, dark elements at the bottom of the page. The drop cap style, reversed title, and blue box are consistent with the rest of the series.

In the next series of lessons we will look at each principle of design in more detail and explore ways to incorporate each into your designs. We'll also touch on the ways that your software can simplify some related tasks, such as using style sheets to aid repetition and consistency or using leading and other spacing features to improve proximity, unity, and distribution of white space.

Typography & Page Layout



Design Elements

Shape

Circles, squares, rectangles and triangles are the basic shapes. The most familiar shape is the square (rectangle) used in DTP. The square denotes honesty and stability.

Circles suggest infinity, protection and movement.

Triangles suggest action but they can also convey either conflict or strength.

Mass/Weight

Mass is size. Mass can be physical and visual. 3 factors should be considered in mass.

Function - The size of the printed piece.

Attraction - The contrast of large and small items.

Organisation - The most important items should be the largest.

Texture

Paper type - There are various surfaces and finishes from newsprint, glossy paper, woven, vellum etc.

Visual textures - Photographs of objects (glass paper, glass).

Photo-editing can be used to mimic textures (rough surface using dots).

Scanning the actual materials (straw mat, gravel).

Lines or shapes (wavy lines representing water).

Element of Design: Shape

From our online Design Basics Course, these lessons define geometric, natural, and abstract shapes with emphasis on the meanings and use of basic geometric shapes of square, circle, triangle.

Principles of Design

From notes for a design class, definitions and graphic depiction of balance, contrast, proportion, and other layout considerations.

Alignment - Principle of Design

Alignment is a design principle for page layout and good formatting. See an example including aligning objects on the page and type alignment.

Balance - Principle of Design

Balance, a design principle for page layout, defined and illustrated. Types of balance and how to achieve a balanced page.

Consistency - Principle of Design

Definitions and examples of how to achieve consistency and unity in design and its importance.

Contrast - Principle of Design

How to achieve contrast in your design and page layout and why it's important.

Grids for Desktop Publishing

Learn what a grid is, formats for grids, and how to put together basic and complex grids, leading grids, and layouts. Use grids to provide page-to-page consistency, unify and align page elements, and provide design continuity across related documents.

Proximity - Principle of Design

Grouping like objects and separating unlike elements is using proximity in design to show relationships and importance.

White Space - Principle of Design

Put white space into your design to give it some breathing room and make it less cramped, confusing, or overwhelming.

Frames: You've Been Framed

Effective use of boxes & borders in your desktop documents and Web pages.

Page Layout Principles

From a DTP class, guidelines on white space, consistency, grids, and other principles of good page layout and design.

Principles of Design

Visually, there is very little originality in design — it is usually a rearrangement of an idea observed and recorded previously. No matter how simple the design may be, there are certain principles that must be applied.

Appreciation of their importance will be slowly gained by observation and practice together with good judgement. This will produce satisfactory results without the need for any mathematical calculations.

Principles of design should always be incorporated in any graphic design project to assist its communicating and graphic interest, however in the planning of a basic design, the designer must produce a job to suit the class of work, the copy, and the tastes of the customer.

To develop a *sense of design* use the three 'eyes':

1. *Visual-eyes*: Examine closely all types of printed material, i.e. physically see/look at what everyone else is/has done. (What catches or eludes your attention, and why?)
2. *Critic-eyes*: Separate the good from the bad. (What provokes the ad? What motivates you? Those things that don't catch your eye — why?)
3. *Analy-eyes*: Select the element that makes it a good design.

There are three essential qualities needed to become a competent designer:

Vision. — To be able to detect an idea and then to toss it around in your head (objects, tones, shapes, colours — everything around you).

Imagination. — To be able to use an idea effectively, i.e. brainstorm the idea and bring it to a state where it can work.

Judgement. — To be able to assess the idea's value and correct place and use, i.e. limitations always arise after you come up with an idea.

The Principles of Design are qualities or characteristics inherent in any art form, such as balance, harmony, contrast, variety, and action. These principles must be used in any design if it is to be in any way effective. Not all of them, however, will be used in the one design.

Whatever principles the designer may adopt, the ultimate result must be a design that can be easily read and clearly understood. Careful control of the principles of design is necessary to successfully project an intended image.

Balance

This is the result of an arrangement of one or more elements in the design so that visually, they equal each other. Every object in nature has structural balance, from the symmetry of a flower petal to the chambers of a snail's shell.

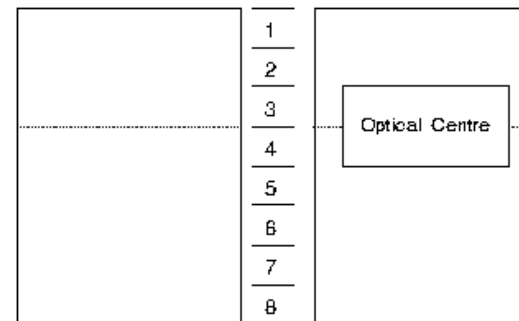
The balance needed every time we perform any form of physical movement is automatically maintained by a built-in equilibrium that we take for granted.

Man-made structures, even if not formally equal on all sides, must maintain a balance in relation to a perpendicular surface. Doubtless the Leaning Tower of Pisa will someday fall when a greater portion of its weight shifts off balance. Sound must also be balanced, both in its production and in its reproduction.

Achieving a physical balance is simple: the weight of one object must be counter-balanced by the weight of another on the opposite end of a fulcrum. If, however, the objects are of different materials, the masses may not appear to be balanced. Because steel is heavier than wood, for example, a large piece of wood is needed to balance a small piece of steel.

Physical balance can be measured by use of a balance scale; there is no agreed scientific method, however, for determining the weights of shapes in the arts. Instead, balance is determined by weighing the objects visually.

For graphic design, the visual centre of any typical A4 page of the business world is not the actual physical centre but what is termed the Optical Centre. This visual point of balance can be determined mathematically as being located three-eighths from the top of the page, five-eighths from the bottom.



Mathematical Balance.

For a single sheet design, type and images are easily positioned vertically to ensure an even amount of space on either side of the design to achieve balance. When positioned evenly across the horizontal axis, the elements appear, to the eye, to actually sit lower down on the page.

Regardless of the design style of work that is to be produced, Optical Centre must always be carefully considered during the initial design stages for a printed piece to work successfully.

One of the most fundamental differences in a design is whether balance is symmetrical (centred) or asymmetrical (off-centre). The choice between them profoundly affects the layout and feeling of a design.

The selection of which is the more desirable should be based on which of the two is going to achieve the result you need to get a particular sort of information over to a particular readership.

Symmetrical Balance

Symmetrical (or formal) balance has elements of equal weight as well as tone placed on both sides of an imaginary vertical line on the page and gives the feeling of permanence and stability.

Any symmetrical layout is likely to produce a more static, restful design. However, because a centred layout is so static, it is very easy to make it pleasantly innocuous but boring.

Magazine Analysis/Graphic Design

Design Elements and Principles

When designing any type of graphic it is very important to think of how the graphics is Positioned on the page. The layout of any graphic takes a number of factors into consideration. The factors come under the term Design Elements and Principles. The following text will give a brief explanation on each followed by exemplars of how they are applied

Design Principles

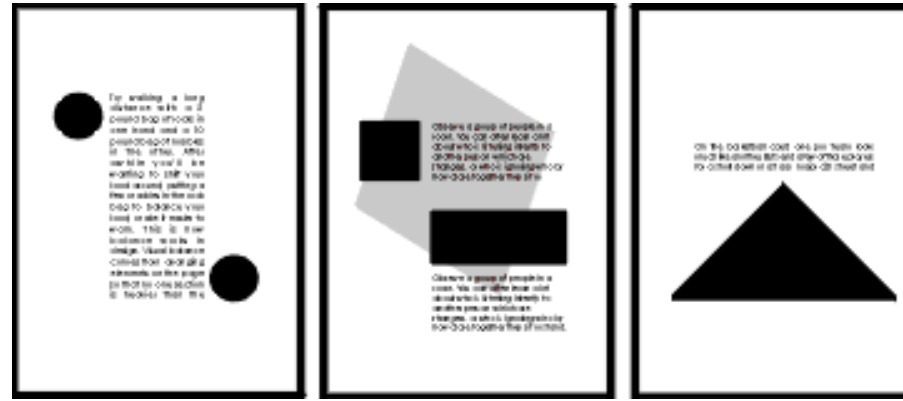
Generally, all the principles of design apply to any piece you may create. How you apply those principles determines how effective your design is in conveying the desired message and how attractive it appears. There is seldom only one correct way to apply each principle.

Balance

Try walking a long distance with a 2 kilo bag of rocks in one hand and a 10 kilo bag of marbles in the other. After awhile you'll be wanting to shift your load around, putting a few marbles in the rock bag to balance your load, make it easier to walk. This is how balance works in design. Visual balance comes from arranging elements on the page so that no one section is heavier than the other. Or, a designer may intentionally throw elements out of balance to create tension or a certain mood.

Symmetry Elements on one side each exactly elements on the other side (vertical or horizontal).

Asymmetry not symmetrical. This allows for greater variety with an odd or mismatched number of different elements.



Proximity/Unity

Observe a group of people in a room. You can often learn a lot about who is listening intently to another person, which are strangers, or who is ignoring who by how close together they sit or stand. In design, proximity or closeness creates a bond between people and between elements on a page. How close together or far apart elements are placed suggests a relationship (or lack of) between otherwise disparate parts. Unity is also achieved by using a third element to connect distant parts.

Alignment

Can you imagine how difficult it would be to find your car in a crowded parking lot if everyone ignored the parking lot stripes and parked in every which direction and angle? Imagine trying to get out of there! Alignment brings order to chaos, in a parking lot and on a piece of paper. How you align type and graphics on a page and in relation to each other can make your layout easier or more difficult to read, foster familiarity, or bring excitement to a stale design.

Repetition/Consistency

What if Stop signs came in pink squares, yellow circles, or green triangles, depending on the changing whims of a town and a few of its residents? Imagine the ensuing traffic jams and accidents. Repeating design elements and consistent use of type and graphics styles within a document shows a reader where to go and helps them navigate your designs and layouts safely.

White Space

Did you ever participate in that crazy pastime of Fiat Panda stuffing? Were you ever the guy on the bottom struggling for a breath of fresh air or the last one in trying to find a place to stick your left elbow so the door will close? It wasn't comfortable, was it? Imagine trying to drive the car under those conditions. Designs that try to cram too much text and graphics onto the page are uncomfortable and may be impossible to read. White space gives your design breathing room.

Contrast

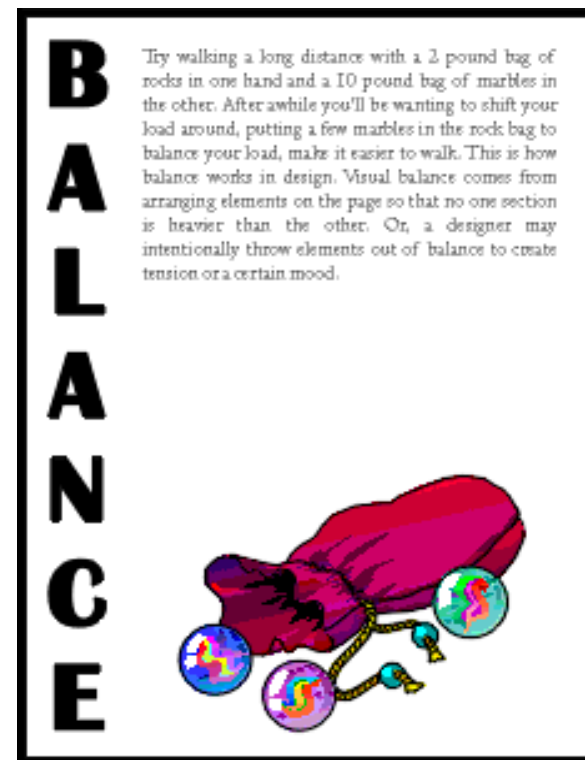
On the basketball court, one pro team looks much like another. But send a few of those players for a stroll down most any major city street and something becomes apparent — those players are much taller than your average guy on the street. That's contrast. In design, big and small elements, black and white text, squares and circles, can all create contrast in design.

The Big Picture

Illustrating Principles of Design

The examples you'll find here demonstrate varying degrees of each of the six principles of design in a before and after format. View them individually and as a whole to see how different principles are applied. How might you do any of these differently?

You can create balance with the three elements (text block, graphic, vertical text) here but in the first example they appear to be just random elements with no **unity** or **balance**. In the second "Balance" example the text block and graphic are resized to bring them closer together and better balance each other.

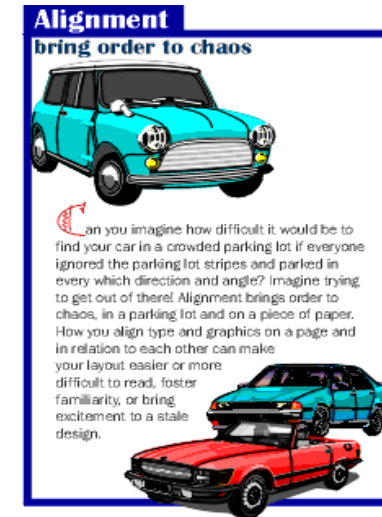
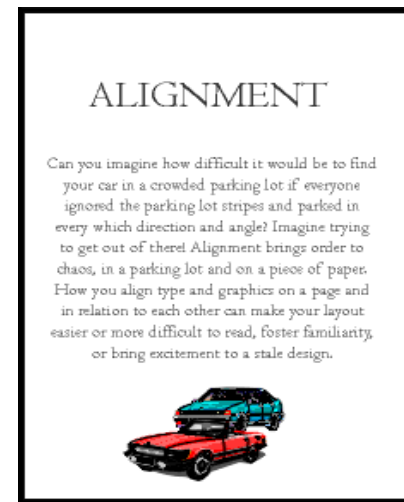


To tie the elements together, move them closer together (resizing helps accomplish this). Notice that the graphic (one of the marbles) slightly overlaps the box enclosing the vertical text, **unifying** the two elements. Reversing the word "balance" out of the blue box also adds more **contrast** to the composition. The increased leading in the text block redistributes the **white space** in a more balanced manner.

The graphic anchors the bottom of the page, but the four text elements all float on the page with no apparent connection to each other (**proximity/unity**). The change in the headline (font change, reversed out of blue box) along with the subheading pulled in closer provides **balance** with the graphic on the bottom. The spacing between the two paragraphs of text is reduced slightly as well.

There is nothing inherently wrong with centred headlines, text, and graphics. They lend a formal tone to a layout. But, for this series of layouts something a bit more informal is called for. Also, large blocks of centred text are usually harder to read.

In the second "Alignment" example below, text **alignment** is left-aligned, ragged right, wrapped around the bottom graphic which is aligned more to the right, opposite an added graphic that is aligned to the right to help **balance** the overall design.



Within the second "Repetition" example, the headline is repeated three times using graphics that tie in with the copy in the text blocks. The **repetition** of the colours in the shapes and headline text that are in the copy help to reinforce the theme. Overlapping the graphic and text elements **unifies** the elements of the design.




Another aspect of **consistency** that can be seen when viewing all 6 of the "after" examples is the blue borders, blue reversed boxes, and the typeface (Britannic Bold) used for the names of all the principles of design. The drop cap used in three examples (Bermuda LP Squiggle) is another element of **consistency**.

In the first example there isn't enough **contrast** between the headline and text due in part to size but also because the two different serif faces used are too similar (not obvious from the small graphic, trust me, they are different typefaces).

Contrast

On the basketball court, one pro team looks much like another. But send a few of those players for a stroll down most any major city street and something becomes apparent — those players are much taller than your average guy on the street. That is contrast.

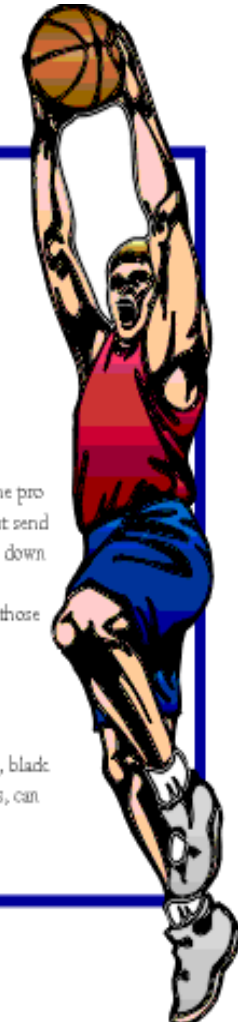
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That oversized graphic provides real **contrast** and reinforces the copy (tall basketball players). Dropping the text down to the bottom portion of the page also reinforces the 'towering' aspect of the graphic. The reversed text in the blue box, the blue border, and the drop cap carries through the overall unifying elements found throughout the series. Additionally, the round shape of the drop cap and its colour echo the shape and colour of the basketball in the graphic. The drop cap and the reversed text on the left side plus the left-aligned text help to **balance** the large graphic element.