

INTRODUCTION

Graphics are made to be seen, right? There are lots of ways of viewing graphics, from traditional printing technologies to electronic displays. Both printing and electronic displays have their own unique quirks, language and techniques.

In this tutorial you will learn more about printing and electronic displays for your exam.

DRAFT

DOCUMENT

Early draft version released by the DesignClass to help study. Notice any flaws? Let us know please!

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EXAM CHECKLIST

You will need to answer exam questions that will cover graphic and printing technologies.

Here is a simple checklist to help you with your studying.

- I can describe vector graphics and their features.
- I can state the name of three vector file formats.
- I can describe raster graphics and their features.
- I can state the name of three raster file formats.
- I can describe four printing technologies.
- I can describe what registration marks are for.
- I can describe what crop marks are for.
- I can describe what DTP layers are for.
- I can describe what Stock Images are and why they are used.

INK JET



The most common format of printer to be found in homes, schools or offices. They are popular because they are easy to use, reliable and the printers are inexpensive. However, printer ink is expensive, so they are only suited for short print runs or text based documents such as letters or essays.

COLOUR LASER



Laser printers are very quick and the 'cost-per-print' is actually very low. Laser printers work by 'fusing' coloured toner dust to the paper. Toner is expensive, but you get a lot of prints. However, when parts such the 'drum' and 'fuser' start to go, costs soon mount up...

SCREEN PRINTING



Screen printing is actually a very old fashioned method of printing graphics. It works by ink being squeezed through a 'mask' onto the material below. It is slow, but great for making t-shirts, posters and other novelty items.

WIDE FORMAT BANNER



Wide format printers are similar to inkjet except they use solvent based inks - bad for the environment, but vibrant and good for high coverage. Wide format printers can make huge posters or 'vehicle wraps'

OFFSET LITHOGRAPHY



Offset Lithography is fantastic for quick, high volume printing such as leaflets, books and magazines. Offset Litho can also print metallic colours and 'duplex' paper to print on both sides. However, they are expensive to setup!

physical printing

pros + cons

- ✔ printers are inexpensive to buy
- ✔ photographic quality
- ✔ can print on different paper types
- ✔ quick for short print runs
- ✘ ink cartridges are horrendously expensive
- ✘ liquid ink can take time to dry and can smudge
- ✘ only print on limited paper sizes, typically A5 to A3

pros + cons

- ✔ printers are fairly inexpensive to buy
- ✔ good quality, but not photographic
- ✔ very quick for short and medium print runs
- ✘ can only print on normal, non-gloss paper
- ✘ toner is expensive
- ✘ the expensive 'fuser' and 'drum' also need replaced
- ✘ only print on limited paper sizes, typically A5 to A3

pros + cons

- ✔ low cost print for mid-volume runs
- ✔ bright, vibrant colours
- ✔ can print on different materials - from paper to fabric
- ✘ a slow and sometimes messy process
- ✘ expensive to set up equipment
- ✘ liquid ink can take time to dry and can smudge
- ✘ cannot print photographs or high resolution graphics

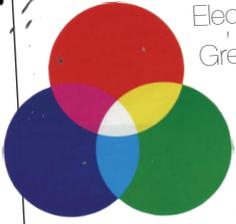
pros + cons

- ✔ can print in huge sizes
- ✔ photographic quality, including spot-colours
- ✔ can print on different paper types
- ✔ quick for short print runs of posters or displays
- ✔ printers can also cut contours of graphics
- ✘ liquid ink can take time to dry and can smudge
- ✘ solvent inks are very, very expensive

pros + cons

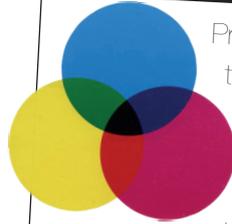
- ✔ low cost for high volume print runs
- ✔ photographic quality, including spot-colours
- ✔ can print on different paper types and sizes
- ✔ quick for large print runs
- ✘ time consuming to set up
- ✘ specialist training required
- ✘ expensive initial set-up costs

ELECTRONIC DISPLAYS



Electronic displays only use RGB or Red, Green and Blue pixels. These are normally very small LEDs that are turned on via an electrical current. When all the LEDs are turned on they make white light. We call this effect 'additive colour'. So, next time someone tells you an iPad has billions of colours, you can correct them. They only have three...

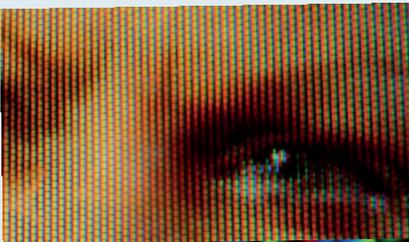
PRINT MEDIA



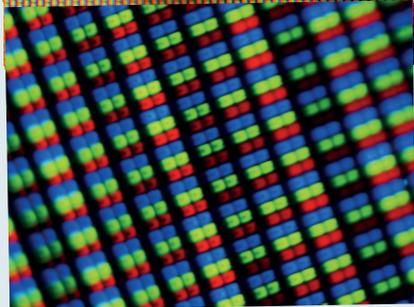
Print media uses CMYK printing. This means they use four cartridges of colour - cyan, magenta, yellow and 'key', which is usually a pure black.

When the CMY are mixed together, they create a near black equivalent. The colours, as they overlap 'subtract' from one another so this is usually called subtractive colouring.

COLOURFUL PIXEL PERFECTION



All electronic displays use pixels. The more pixels, the better the display. We describe screens in many ways - however, the most important is 'pixels-per-inch' or PPI.

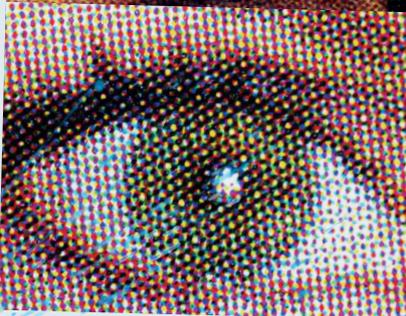


Screens can adjust colour, tint and shade by changing how bright each individual pixel is and this changes quickly - at least 24 times per second for a smooth animation!

To create 'black', pixels are turned off...



Many things control the quality of the print. Most importantly will be the quality of the image or graphic being printed. Low resolution graphics will never print well.



However, the quality of printer also has an impact. The number of 'dots-per-inch' or DPI will impact the quality of print. Better printers can also control the size of each 'dot'. Mixing dots of CMYK allows billions of colours, tints and shades to be shown.

RGB



A photograph taken by a digital camera will be recorded as RGB. The image above has been left in RGB mode (Remember, if you print these notes it will be in CMYK...)

CMYK



The same image here has been converted into CMYK. On a screen, the colours may appear less vibrant, however the tone of the colours would be more realistic when printed.

BE A MODEL

Stock photography, textures and graphics are big business. Many businesses or graphic designers do not have time to take their own photography. Research these companies and find out how much they charge!



NO WATERMARK



All graphic work is worth money! Every photo, sketch, layout design or art work can command a price. It is worth whatever someone is prepared to pay.

To protect graphics or photographs, designers will often 'watermark' their creations to prevent fraud or theft.

High quality photography, textures, typefaces and graphics can command a high price.

You need to know about protecting graphics, artwork and images for your exam...and to protect your own work!

GETTING IT PICTURE PERFECT

Not all cameras are the same. You do not need to know about photography for your exam, but may want to know more for your own graphic design work.



DIGITAL SLR

Digital SLR are the professionals choice tool for photography.

These cameras can range from hundreds to thousands of pounds... and that is just for the camera. SLR - which stands for Single Lens Reflex - can change lens for particular viewing angles. Lens are expensive, but worth it.



BRIDGING

Bridging cameras are between digital SLR and Point & Shoot. They have the same type of sensor as Point & Shoot but a full function fixed lens.

You cannot change lens like an SLR, but you have far more control over the photography you take. Bridging cameras are often not much more expensive than Point & Shoot, but are more complex to use.

Great if you are wanting to develop your skill in photography.



POINT&SHOOT

The most common of all camera types - almost every house will have a Point & Shoot camera. They range from ridiculously low cost to very expensive.

These cameras have been designed to make the image taking process very simple. They have full automatic mode that will adjust all the settings behind the scenes.

The quality of image will depend on the cost of the camera and sometimes you may be better with a camera phone...



CAMERA PHONE

Cameras on mobile phones are becoming ever more powerful and sensitive. Some camera phones use the same sensor as point-and-shoot and can achieve incredible results.

Camera phones are still not good in low light situations and the lens can distort the angles on mid-distance items. Camera phones can be fantastic for macro images - close-up shots of items.

Where ever you are, you can start building your library of stock images.

what is a graphic?

GRAPHICS WARS

VECTOR VS. RASTER

VECTOR

Vector graphics rely on plotting points - called nodes - mathematically. The computer can join these nodes to form a shape.

Enclosed shapes can be filled with a colour. Vector graphics can be scaled up to any size and will never pixilate.

Vector graphics are most commonly used for logos.

Think all graphics are the same? Think again. Graphics fall into two categories - Vector and Raster.

You are expected to know about both formats for your exam. Knowing how to use these formats can help you with your assignment and are absolutely essential if you work in any graphics industry.

RASTER

Raster images are those used to create photographs - although any graphic can be converted into a raster easily. Raster graphics work by specifying each individual pixel with a colour.

These individual pixels build an image. The more pixels, the sharper the image and the bigger the file size...

FROM RASTER TO VECTOR



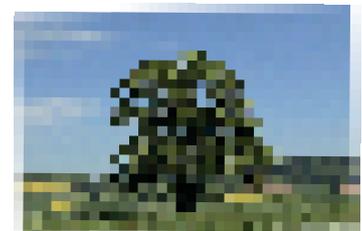
Some powerful software will allow you to change a raster image into a vector graphic. You will lose significant levels of details, however, this does allow you to create some impressive graphic effects and the images can be scaled up without loss of resolution.



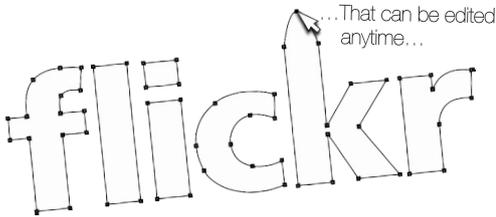
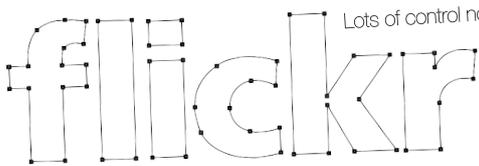
300 dpi, CMYK, (5.6 mb)



72 dpi, CMYK, (0.11 mb)



20 dpi, CMYK, (0.0026 mb)
(we're being silly now)



KNOW YOUR FILE TYPES!

VECTOR

.SVG
.DXF
.PLT
.AI
.EPS

RASTER

.BMP
.JPG
.PNG
.TIFF
.GIF

VECTOR

pros + cons

- ✔ Great for making logos or graphics that scale up
- ✔ Can be used as 'cut paths' for cutting machines
- ✘ Cannot be used for photographs
- ✘ Vectors graphics require good CAD drawing skills to make

RASTER

pros + cons

- ✔ The image type used for photography
- ✔ All software can handle raster images
- ✘ Scale up too big and it will suffer pixelation
- ✘ The file sizes can be absolutely huge!

Printing on paper is simple, right?

DOCS HAVE LAYERS - DTP DOCUMENTS HAVE LAYERS...



PREFLIGHT

Preflight is the term used when the document is ready to go to the printer!

Preflight will flatten all layers onto one layout - however retains data about layers, colour profiles and even breaks the document into C,M,Y & K layers!



IMAGE LAYER

The image layer will contain all the photographs used (unless edited).

Photographs can be very memory and process hungry. Having them on a separate layer allows the layer to be 'switched off' so they are not shown, processed and allows computers to run faster.



GRAPHIC LAYER

The principle domain of the graphic designer. They will apply any graphic effects or vector artwork to a separate layer so it can be easily edited without impacting text or stock photography.

Many powerful DTP packages will allow the graphic designer to create artwork within the same software. Otherwise, material will be imported from a vector graphics application.



BODY TEXT LAYER

Body text layers are for journalists and those not involved in the layout or graphics.

Body text is kept separate so it can be easily changed or even swapped with foreign language versions by journalists or copy editors.

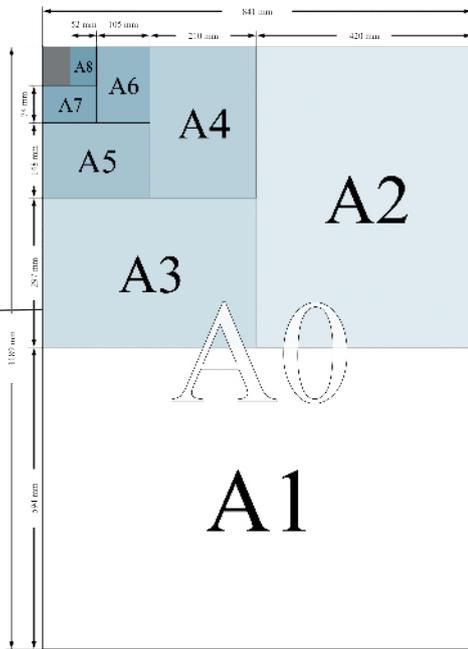


PREPRESS LAYER

Prepress layers contain all the information required to print the layout.

These will include registration marks, crop marks and possibly colour calibration and densitometry bars.

PAPER SIZE | PAPER WEIGHT | PAPER FINISH



Paper comes in a range of sizes for different jobs. Paper sizes in the UK are controlled by BSI and are based around 'A' format sizes. You will be familiar with A4 and A3. You may have noticed that A3 is twice the size of A4. This is the rule - A2 is twice the size of A3, A1 is twice the size of A2.

For offset lithography printing, where a bleed is required, oversize versions are used. These are called oversize A sizes. For example oversize A3 or 'oA3'.

Paper weights describe how heavy the paper is in grams per square meter, gsm. The heavier the paper, the thicker and firmer it will be.

Most paper used at home, school or in an office is 80 gsm - it is inexpensive. Heavier - thicker - paper is significantly more expensive. Heavier paper can be used to give a sense of quality to a document or stop ink bleeding through.

