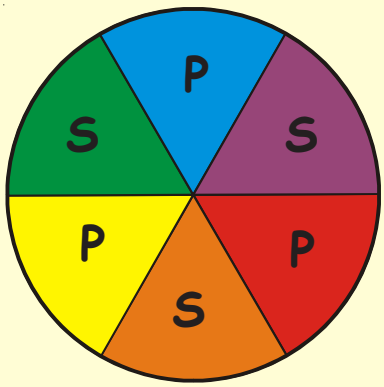
Student's Name: Date:

Colour

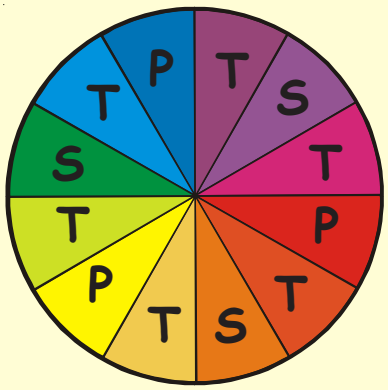
The use of colour is a very important part of designing.
Colour can affect people in many different ways. Some colours can affect our moods, making us feel angry or calm. Red, for example, has an oppressive effect, orange can be aggressive and exciting, green is neutral and yellow gives a cheerful effect.
Some colours appear to be nearer than others, they stand out while others recede into the distance. These are all important factors for the designer to consider when making decisions about the use of colour.

The Colour Wheel

The colour wheel shows how the primary colours of paint – red, yellow and blue – work together.



The secondary colours lye opposite the primaries. Red opposite green, yellow opposite purple and blue oposite orange. These pairs are called complementary colours.
Complementary colours contrast strongly.
Red is the brightest colours on the wheel.
Yellow and purple are the palest and the darkest respectively.
Blue and orange are the coldest and warmest colours on the wheel.
Designers use complementary colours to make information stand out, or to create a bold impact. Colours that are next to each other on the colour wheel are called harmonic colours. Harmonic colours blend together, creating a soft effect.
The wheel can be divided into two halves according to the 'temperature' of the -colours. The colours in the top half give the effect of coldness and the colours in the bottom half give the impression of warmth.
The wheel can be divided up further to include the tertiary colours as shown to the right.



Approaching and Receding

Warm colours appear to come forward towards the viewer, while cold colours give the opposite effect and appear to recede into the distance.
Reds appear to reduce space whilst blues make the space seem larger. Perhaps you have noticed that after redecorating a room at home- changing the colour made it feel either larger or smaller?

Colour and weight

In the same way that colours can make objects appear to be larger or smaller they can also make them appear to be lighter or heavier. This is useful when a designer wants to give the visual impression that an object is lighter or heavier than it really is.

Colour

Colour and emotion

Whether you're conscious of it or not, you are constantly reacting to the colours that surround you. As we have already mentioned colours can be divided into warm colours (reds, oranges and yellows) and cool colours (greens and blues). Experiments have shown that people feel warmer in a room painted red than in a room painted blue, even if the temperature is exactly the same in both. Harsh primary colours attract people initially, but then start to jar and upset them.



Designers for fast-food companies often make the most of this, using colours like red and yellow which draw us into the restaurant but don't make us want to stay, keeping turnover high.

Some colours have a powerful effect on their own. Red stimulates the nervous system and makes us breathe in more deeply. It also gives the illusion of advancing towards us, and is widely used in packaging to make products stand out. Blue is considered relaxing and makes us exhale. Bright yellow attracts with its energy but looked at for too long becomes upsetting and shrill. Yellow is the most visible colour – yellow cars have fewer collisions than any other cars on British roads.

Colour Association

Colours are associated with certain situations. Sometimes this is a deliberate or conscious association and at other times it is unconscious. Red is associated with potentially dangerous situations. Red is also used as a warning. Red flags are used to warn people that it is unsafe to swim in the sea and red lights are used at traffic lights to warn drivers of danger and tell them to stop. Green is used to signify the opposite, that it is safe. A green man lights up at pedestrian crossings to show that it is safe to cross the road.



Yellow and black signs alert us to hazards.

Most machines such as lathes, bandsaws and drills in workshops have coloured operating buttons. The start button is always green and the stop button is always red.

Motor cars use a system of colour-coded warning lights. Green usually indicates that something is switched on (e.g a heated rear screen or an indicator). Orange or amber lights are used to give warnings that there is likely to be a problem, such as a low fuel or water level, and red lights are used to warn the driver of a more serious problem (e.g a loss of oil pressure in the engine or a brake failure) and to tell them to stop immediately.



From a young age, we all learn rules about particular colours. When children are taught that the red tap is hot and the blue tap is cold, or that red means stop and green means go, they are building up a colour code for life.

We rely heavily on our expectations about colour because they give us information. Colour tells us where to go – coloured signs on a journey, coloured lines on a map. If designers break these 'rules' people become confused and can be put at risk.

Absorption and Reflection

When light falls on an object the light waves which are the same colour as the object are reflected off it. The lighter the object is the more light is reflected. The other colours which make up the light are absorbed by the object and transformed into heat.

Absorption and reflection are very important functions of colour which a designer must consider carefully. Some colours would be unsuitable for certain objects and products. Black would not be a suitable colour for a refrigerator, because it would absorb heat and the motor inside the appliance would have to work much harder to keep the food cool.

Sometimes a non-reflective surface is required. This might be the area surrounding the screen on a TV set or the instrument panel on a motor car. Black does not reflect light and so is very suitable for this purpose.

The choice of colour can be very important when designing packaging, especially if the package is to contain goods which are delicate or perishable. Pre-packed food could be damaged if the colour of the package is likely to absorb light and transform it into heat.

White objects will reflect all light and so keep fairly cool even on a hot summer's day. If you were to touch a white object that has been exposed to very bright sunlight it will not feel any hotter than the surrounding air. This is why white or light-coloured clothes are comfortable to wear on a hot day. Sportspeople have traditionally worn white clothes to play cricket and tennis for many years.

Black absorbs all light and so black objects can become too hot to touch when left in bright sunlight for any length of time.

Colour Interaction

Colour interaction refers to the way colours appear to the eye. The human eye cannot see colours on their own, it always sees them in relation to at least one other colour. The way colours are seen can be affected by their background or by adjacent colours.

Doctors and opticians use charts and diagrams which make use of the interaction of colour to test eyesight. Colour blindness can be detected in this way. Colour blindness is an eyesight condition which affects about 10% of all men, but rarely affects women. It can range from a slight difficulty in identifying certain shades of red, to the point where red and green look the same.

A person suffering from severe colour blindness would not be able to tell red from green or blue from brown.

Graphic designers need to consider this, especially when producing electrical wiring instructions and safety signs which rely heavily on the use of colour.

Colour Fusion

Dots of colour can interact and produce a visual mixing effect. In the 19th Century a group of painters used a variation on this method, known as the 'pointillist technique'.

If you look closely at a large coloured advertisement or examine a coloured photograph in a magazine with a magnifying glass, you will see that it consists of thousands of tiny dots of these colours.



The large numbers of tiny dots make it impossible for the human eye to identify them as individual colours and so it presents them as a 'mixed' colour. The cyan and yellow dots combine and give the impression of green, while magenta and cyan appear to us to produce violet.

Printing

Colour printing makes use of the principle of optical fusion of colour. The range of colours is produced from dots of three colours, similar to the primary colours used in painting. They are known as the 'process' colours and consist of a blue colour called cyan, a red colour called magenta and yellow.

There are a number of different printing methods to suit different materials and sizes of print run.

Offset Lithography.

Offset Lithography uses an oil based ink. A colour scanner is used to break down the image into four 'colour separations' which come together to form the complete colour picture. A photographic film is produced for each of the four printing colours. These films are then used to make printing plates.
In offset lithography each plate is wrapped around a cylinder and coated with the appropriate colour ink by a roller. The image on the plate holds the ink like the raised part of a rubber stamp. The image is transferred to a rubber blanket wrapped around a second cylinder which then rolls the image onto the paper.
This process is repeated for all four colours in turn, with black printed last to give a sharp finish.
The process is used for runs of 1000 or more such as magazines, packaging, books etc. A large press can print up to 35,000 sheets an hour!

Flexography

Flexography uses a printing plate made of flexible rubber. It can be used to print on materials which arent completely flat such as plastic bottles. It is quicker than lithography and is used for largeprint runs of 5000+ for things such as packaging and carrier bags.

Gravure

Gravure uses an etched brass printing plate. It gives a high quality and is fast but is expensive. It is used for large print runs of things such as postage stamps.

Screen Printing

Screen printing involves a stencil on a fine mesh which has ink squeezed through it onto the material below. It is cheap but is only suitable for small print runs where fine detail is not required. It can be used on a variety of surfaces including textiles and can be used for things such as T shirts.

Digital Printing

Digital Printing is done using inkjet and lase printers. It is cheap and easy to set up but copies are expensive compared to other techqiues so is only suitable for short print runs of hudreds rather than thousands.

Q4U2 do.

1. What are the three primary colours in printing?

2. What are the secondary colours?

3. Give some examples of colour association?

4. Why do the designers of fast food restaurants sometimes use red an yellow in their interiors?

5. Describe some of the effects that the use of particular colours can have in the design of consumer products.

6. List the five printing processes we have looked at and give an example of a suitable use for each.

AQA General Certificate of Secondary Education

Design and Technology: Product Design

Unit 1 Written Paper

To help you prepare for the written exam

Q. 1 Identify the card or board which is most suitable for packaging hot food. [1 mark]

A Duplex board
B Foam core board
C Foil lined board
D Solid white board

Q. 2 When packaging is cut out 'nesting' is used to ensure that minimal material is wasted. A piece of material measures 60mm by 40mm. A triangle pattern measures 18mm (height) by 18mm (base). The first triangle has been placed on the material. Repeat the triangle pattern to ensure that as many as possible fit on the material. [1 mark]

Q. 3 Calculate the amount of material wasted when producing the shapes you have drawn above. Assume no material is wasted when cutting. [3 marks]

Q. 4 State two reasons why corrugated cardboard is used as packaging for cooked pizzas. [2 marks]

Exam Advice

You may be asked a question about colour but they are not very common. However, you are almost certain to be given a 'design question'. When you are designing you should think carefully about your use of colour and annotate your drawings to explain your choices.

List of CGP Revision questions;

E12 Using Materials Efficiently

Colour