THE ABBEY SCHOOL
A BUSINESS & ENTERPRISE ACADEMY

# Knowledge Organiser

## Year 10

## Term 2

# CONTENTS

# Maths Year 10 Term 2- Linear Graphs

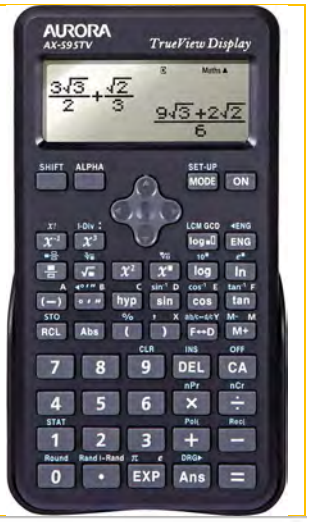
TERM FOCUS – What are the Area formulae that you need to know?
How does calculating the surface area and volume of a prism relate to your area knowledge?
How do the properties of circles help us measure objects with curved surfaces?

**Prior Learning Links**

Plotting points in Cartesian plane
Understanding algebraic expressions and solving equations
Understanding the basics of gradient
Plotting from tables

**Future Learning Links**

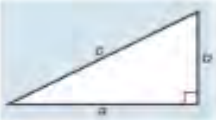
Solving simultaneous equations
Plotting graphs of relationships in maths and science




## Pythagoras

**Pythagoras' Theorem**

For a right-angled triangle,
$a^2 + b^2 = c^2$



**Trigonometric ratios (*new to F*)**

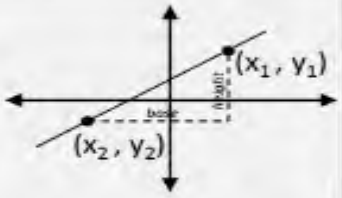
$\sin x° = \frac{opp}{hyp}$, $\cos x° = \frac{adj}{hyp}$, $\tan x° = \frac{opp}{adj}$

## Gradient of a Line

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

or

$$m = \frac{\text{height}}{\text{base}}$$




## Midpoint of two points

between $(x_1, y_1)$ and $(x_2, y_2)$

$$\left(\frac{x_1 + x_2}{2}, \frac{x_1 + y_2}{2}\right)$$

## Compound measures

**Speed**

$\text{speed} = \frac{\text{distance}}{\text{time}}$


**Density**

$\text{density} = \frac{\text{mass}}{\text{volume}}$


**Pressure**

$\text{pressure} = \frac{\text{force}}{\text{area}}$


## Compound Growth & Decay

The amount after *n* years (or days, etc.) is:

$$\text{starting amount} \times \left(1 \pm \frac{r}{100}\right)^n$$

where *r* is the rate of change.
The ± means + for growth and – for decay

## 1. How do I plot a linear graph?

**Red** | **Amber** | **Green**

Draw the graph of:

$y = x + 2$

1) Express the equation as a function machine.

$x$ → +2 → $y$

2) Complete a Table of Values.

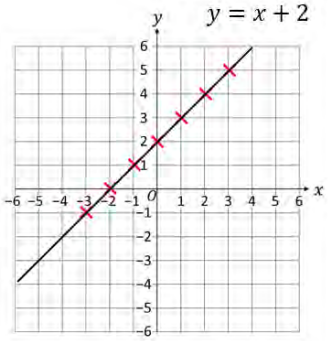
| $x$ | −3 | −2 | −1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| $y$ | −1 | 0 | 1 | 2 | 3 | 4 | 5 |

3) Plot each pair of values as coordinates.

4) Join the points to make a line.

Always label your line!

$y = x + 2$



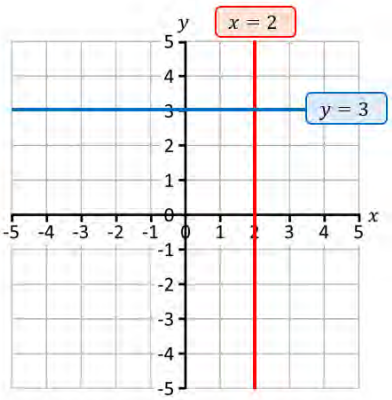
## 2. What do the graphs of y=a, x=a and y=x, y=-x look like?

Red | Amber | Green

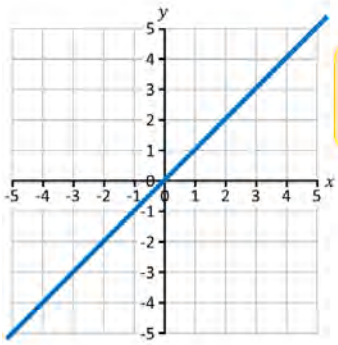
Where on the grid is the $x$ value *always* 2?

Where on the grid is the $y$ value *always* 3?

What could we call these lines?




For the graph x=a, all points on the graph have the x co-ordinate = a ( in this case a=2)
For the graph y=a, all points on the graph have the y co-ordinate =b ( in this case a=3)



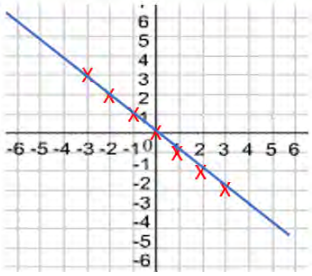

What is the name of this graph?

$y = x$

If y=x, when y=1, x=2 y=2, x=2 , etc.

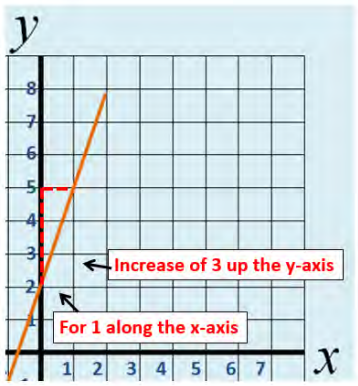
Here is an equation: y = -x
How can we plot this on a graph?

| X | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|---|
| Y | 3 | 2 | 1 | 0 | -1 | -2 | -3 |



## 3. How do I find the equation of a line from a graph?

Red | Amber | Green




$$\text{Gradient} = \frac{\text{change in y}}{\text{change in x}}$$

**3 ÷ 1 = 3**

**Gradient (m)of 3**

**y intercept (c ) = 2**

**y= 3x +2**

The general form of the equation of a linear graph

$$y = mx + c$$

Gradient (steepness)

y-intercept (where it crosses the y-axis)

Parallel lines have the same gradient

## 4. How do I draw a graph with one point and the gradient?

Red | Amber | Green

**Finding Equations of Lines from the gradient and a coordinate**

A line has a gradient of 2 and passes through the point (1 ,3). What is the equation of the line?

Equation of any line: $y = mx + c$
$m$ = gradient
$c$ = $y$-intercept

**1)** Substitute the gradient of the line into

$$y = mx + c$$

m = 2, so:

$$y = 2x + c$$

**2)** Substitute coordinate values & gradient to find $c$.

| $x$ | $y$ |
|---|---|
| (1, | 3) |

$$y = 2x + c$$
$$3 = 2(1) + c$$
$$3 = 2 + c$$
$$1 = c$$

**3)** Substitute c and m into $y = mx + c$ to form the equation.

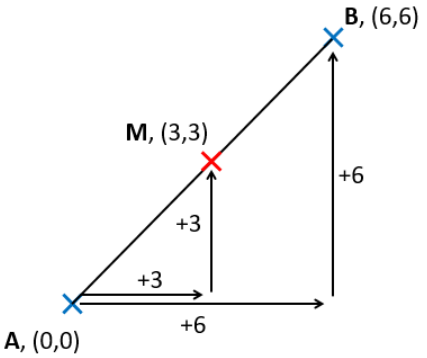
$$y = mx + c \Rightarrow y = 2x + 1$$

## 5. How do I find the midpoint of a straight line segment?

Red | Amber | Green

To find the midpoint of a line we can divide it into two.

Using coordinates, we can calculate its horizontal & vertical magnitudes (lengths) & divide each by two.




| Horizontal change | Vertical change |
|---|---|
| $\frac{+6}{2}$ | $\frac{+6}{2}$ |
| $+3$ | $+3$ |

**M**, (0+3 , 0+3)

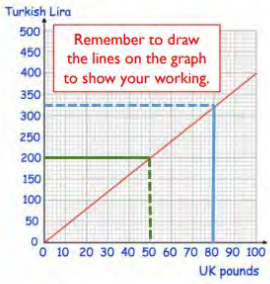
**M**, (3,3)

## 6. How do I draw and read conversion graphs?

Red | Amber | Green

**What you need to know:**

Conversion graphs




**Change £80 into Turkish lira**

1) Start at 80 on the horizontal axes as this for pounds and go up vertically until you reach the line
2) From the line, read horizontally until you get to the axis showing lira

**Change 600 Turkish lira to pounds**

As this value is not shown by the graph, we have to use a value that is to help.

1) Start at 200 on the vertical axes and go across horizontally until you reach the line. From the line, read vertically until you get to the axes.
2) 200 lira = £50
   600 lira = £150

Gradient

**Gradient**: This is the steepness of the line. The highest the number the steeper the line. We use the formula before to calculate it:

$$Gradient = \frac{difference\ in\ y}{difference\ in\ x}$$

(3, 4) and (5, 10)

Subtract the two y values.

Gradient = $\frac{10-4}{5-3} = \frac{6}{2} = 3$

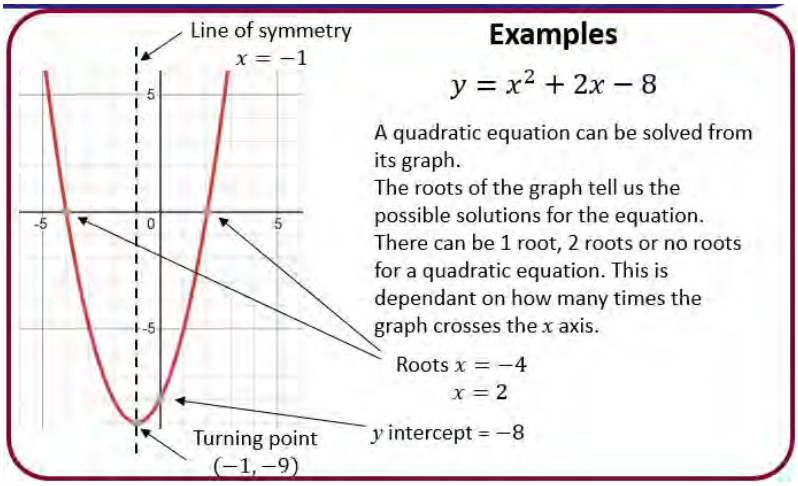
Gradient = 3

Subtract the two x values.

Notes:
When drawing conversion graphs,
They will always be STRAIGHT lines.

## 7. How do I solve a quadratic equation graphically?

Red | Amber | Green




The solutions are where the graph cuts the x-axis.
The turning point can be worked out by the following method:
Because the curve is symmetrical the turning point will be exactly half way between the two points where the curve cuts the x-axis.
If the points are x=-4 and x=2 then the mid is x=-1

To find the y co-cordinate, substitute the value of x Into the equation. So, y= $(-1)^2$ +2(-1)-8
So y= 1-2-8 = -9

Therefore the turning point is at co-ordinates of (-1,-9)

## 8. How do I factorise quadratic equations?

Red | Amber | Green

Factorise:

$x^2 + 9x + 20$

1) List number pairs with a product of +20.

1 and 20
2 and 10
4 and 5 ☆

2) Find the pair with a sum of +9.

$(x + 4)(x + 5)$

We can check by expanding the brackets.

Factorise:

$x^2 + 2x - 15$

1) List number pairs with a product of −15.

1 and −15
−1 and 15
3 and −5
−3 and 5 ☆

2) Find the pair with a sum of +2.

$(x - 3)(x + 5)$

Factorising a quadratic equation can enable us to solve it.

Example:

Solve:

$x^2 + 3x - 10 = 0$

1) List number pairs with a product of −10.

1 and −10
−1 and 10
2 and −5
−2 and 5 ☆

2) Find the pair with a sum of +3.

$(x - 2)(x + 5) = 0$

Either (x-2) = zero or (x+5) = 0 for the equation to be true. Therefore x-2=0, x=2 x+5=0, x=-5

## 9. How do I 'complete the square'?

Red | Amber | Green

## How to Complete the square

If, $y = x^2 + bx + c$

Substitute b and c below to complete the square

$$y = (x + \tfrac{b}{2})^2 + c - (\tfrac{b}{2})^2$$

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Rewrite $x^2 + 8x + 5$

in the form $(x \pm a)^2 \pm b$

1) Halve the coefficient of $x$, and place into a squared bracket. $8 \div 2 = 4$

2) Expand the brackets to calculate how you need to adjust the expression.
We need to subtract 11 to get +5.

$$(x+4)^2 = x^2 + 8x + 16$$

$-11$ $-11$

$$(x+4)^2 - 11 = x^2 + 8x + 5$$

### 10. How do I use the quadratic formula to solve equations?

Red Amber Green

**Quadratic formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Where a , b and c are the coefficients of a quadratic equation in the form $ax^2+bx+c$**

**Quadratic formula** – give your answer to 2 decimal places:

$x^2 + 4x - 2 = 0$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{16 + 8}}{2}$$

$x = 0.45$ *Or:* $x = -4.45$

**a =1, b= 4, c = -2**

### 11. How do I solve simultaneous equations?

Red Amber Green

**Two linear equations:**

$3x + 2y = 18$

$3x - y = 9$ $\times 2$

$3x + 2y = 18$

$6x - 2y = 18$ +

SSS – Same Sign Subtract
DSA – Different Sign Add

$9x = 36$

$x = 4$

Substitute in $x = 4$ into an original equation

$3x + 2y = 18$

$(3 \times 4) + 2y = 18$

$12 + 2y = 18$

$2y = 6$

$y = 3$

**One linear and one quadratic equation:**

$x^2 + y^2 = 17$

$y = x - 3$

Substitute $y = x - 3$ into $y$ in the quadratic equation.

$x^2 + (x-3)^2 = 17$

$x^2 + x^2 - 6x + 9 - 17 = 0$

$2x^2 - 6x - 8 = 0$

Solve by factorising or using the quadratic formula.

$x = 4$ *or* $x = -1$

Substitute the $x$ values into the linear equation to find the corresponding $y$ values.

*When* $x = 4$, $y = 4 - 3 = 1$

*When* $x = -1$, $y = -1 - 3 = -4$

| 12. How do I solve inequalities? | Red | Amber | Green |
|---|---|---|---|

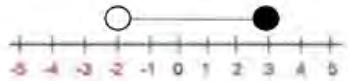
a) State the values of $n$ that satisfy:

$-2 < n \leq 3$

Cannot be equal to 2 Can be equal to 3

-1, 0, 1, 2, 3

b) Show this inequality on a number line:




On a **number line** we use circles to highlight the key values:

○ is used for less/greater than

● is used for less/greater than or equal to

**Solve** this inequality and represent your answer on a **number line:**

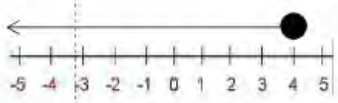
$5x - 6 \leq 14$

$+6 \quad +6$

$5x \leq 20$

$\div 5 \quad \div 5$

$x \leq 4$




**Solve** this inequality and represent your answer on a **number line:**

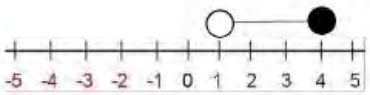
$4 < 3x + 1 \leq 13$

$-1 \quad -1$

$3 < 3x \leq 12$

$\div 3 \quad \div 3$

$1 < x \leq 4$




| Home Learning Tasks | | Date Completed |
|---|---|---|
| U960 | Factorising to solve quadratic equations of the form ax^2+bx+c=0 | |
| U601 | Solving quadratic equations graphically | |
| U665 | Solving quadratic equations using the quadratic formula | |
| U397 | Completing the square | |
| U589 | Solving quadratic equations by completing the square | |
| U509 | Reading and drawing inequalities on number lines | |
| U337 | Constructing and solving inequalities | |
| U789 | Reading and plotting coordinates | |
| U933 | Calculating midpoints | |
| U848 | Finding the equation of a straight line from two points on the line | |
| U403 | Plotting distance-time graphs | |
| U462 | Calculating speed from distance-time graphs | |
| U638 | Using and interpreting linear real-life graphs | |
| | | |
| | | |

# Biology Year 10 Term 1 – B3, Infection and Response

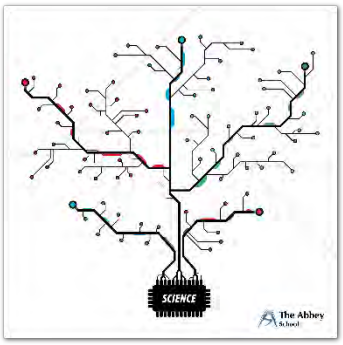
Term Focus –
Looking into what causes infection and how we can prevent it.

**Prior Learning Links**

- KS3 Science – knowing the structural adaptations if unicellular organisms.
- KS3 – Organelles that are found in living organisms (plant, animal, bacteria).
- KS3/4 Science – Understanding of non-communicable diseases.
- KS4 – The function of white blood cells.
- KS3/4 – knowing the process of photosynthesis; including the word equation.
- KS3/4 – Understanding of how plants make their food.
- KS3 – Understanding of respiration and gas exchange in plants.

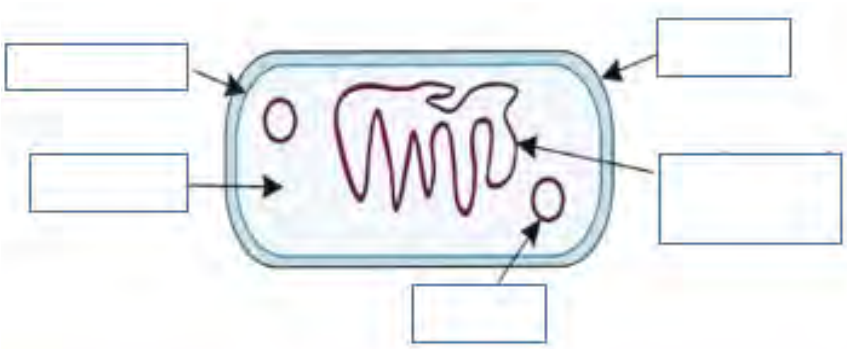
**Future Learning Links**

- GCSE Required Practical activities.
- B6 – New species, variation, extinction and adaptation.
- B7 – Ecology
- B7 – Maintaining ecosystems




## 1. Communicable Diseases

Red Amber Green



- There are **4 types** of pathogens:
  - **Bacteria**
  - **Viruses**
  - **Protist**
  - **Fungi**
- Viruses are **NOT** cells and can only replicate once they are inside a host's cell.

- Examples of eukaryotic cells include:
  - **Fungi and protists**
- Example of prokaryotic cell includes:
  - **Bacteria**

- Pathogens spread through:
  - **Drinking contaminated water**
  - **Inhaling pathogens carried in the air**
  - **Touching contaminated surfaces**

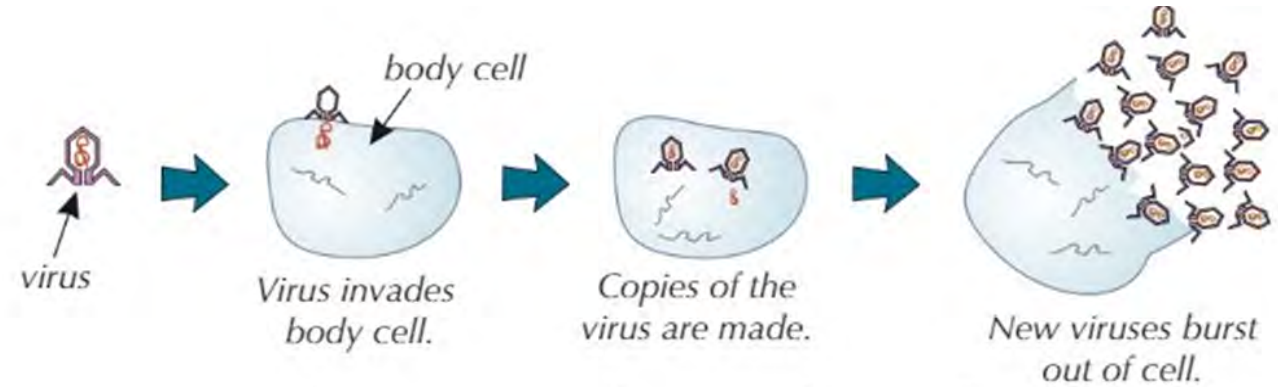
**Key terms/Definitions:**

**Pathogen:** Microorganisms that can cause disease.

**Communicable disease:** Infectious disease can be spread between individuals.

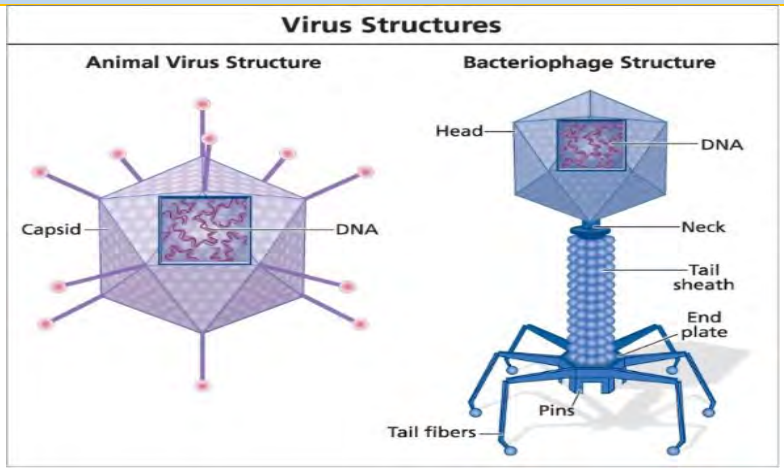
**Eukaryotic cells:** Cells that contain a nucleus and organelles, enclosed within a plasma membrane.

**Prokaryotic cells:** Cells with a single strand of DNA floating free in




**2. Viral Disease**

Red Amber Green




| Viral disease | How is it spread? | Main symptoms | Treatment |
|---|---|---|---|
| Measles | Airborne droplets from an infected person through coughing or sneezing.<br><br>Prevent through self-isolation. | Red skin rash.<br><br>High fever | No treatment, however can be vaccinated as a child. |
| HIV | Exchanging bodily fluids. E.g. unprotected sex, sharing needles. | Flu-like symptoms. | Controlled with antiretroviral drugs which stops the virus replicating in the body. |
| Tomato mosaic virus | Direct contact (touch). Leaf to leaf or a farmers hand to a new plant. | Mosaic patterns on leaves.<br><br>Stunted plant growth. | No treatment.<br><br>Remove infected plant. |

**Key terms/Definitions:**

**Virus:**
A tiny particle that causes disease in people, other animals and plants. The cell the virus invades is called the host cell.

**Measles:**
A highly contagious disease caused by a virus. Spread when an infected person breathes, coughs or sneezes.

**HIV:**
A virus that damages the cells in your immune system and weakens your ability to fight everyday infectious diseases. Spread by exchanging bodily fluids.

**Tobacco Mosaic Virus (TMV):** A virus that causes discolouration and stunted growth. Spread through direct contact from plants through its vectors.

**Vectors:**
Living organisms that can transmit infectious pathogens between humans, or animals to humans. E.g. Mosquitoes.

## 3. Fungal and Protist Diseases

Red Amber Green

| Disease | Type of disease (fungal / protist) | How is it spread? | Main symptoms | Treatment |
|---|---|---|---|---|
| Rose black spot | Fungal | Water<br><br>Wind | Black/purple spots.<br><br>Leaves turn yellow.<br><br>Leaves fall off.<br><br>Stunted growth. | Fungicides<br><br>Affected leaves to be stripped off the plant and destroyed. |
| Athlete's foot | Fungal | Direct contact<br><br>Indirect contact (shower floors) | Itchy skin.<br><br>Skin to flake off. | Antifungal creams. |
| Malaria | Protist | Vectors (mosquitoes) | Episodes of fever. | Antimalarial medicines. |

**Key terms/definitions:**

**Fungal Disease:**
Pathogens that can cause communicable diseases in humans.

**Protist Disease:**
Eukaryotic microorganisms that spread disease through vectors.

**Rose Black Spot:**
Fungus that causes black/purple spots to develop on the leaves of rose plants.

**Athlete's foot:**
A fungal infection of skin, usually occurs in between the toes. Common in individuals whose feet sweat.

**Malaria:**
A life threatening disease which is spread to humans by a vector (typically mosquitoes).

## 4. Bacterial infection and preventing disease

Red Amber Green

**Key terms/definitions:**

**Bacteria Disease:**
An illness which is caused by a bacterial pathogen. Bacteria enters the body and infects it.

**Examples of Bacteria:**
Salmonella – caused by food poisoning.
Gonorrhoea – Sexually transmitted disease

**Salmonella:**

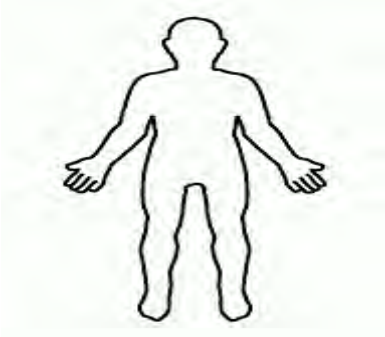
- Symptoms of salmonella include: Fever, abdominal cramp, vomiting, diarrhoea.
- Transmitted by ingesting contaminated food.
- Controlled by: Vaccinating poultry, preparing food in hygienic conditions, cooking food thoroughly.

**Gonorrhoea:**

- Symptoms of gonorrhoea include: Green discharge from the penis or vagina, painful to urinate.
- Transmitted through unprotected sex.
- Controlled by: Using a condom during sexual intercourse, treated with antibiotics.

## 5. Fighting Disease

Red | Amber | Green



**The body's defences:**

- **The skin** – acts as a barrier
- **Nose, Trachea and Bronchi** – mucus traps pathogens
- **Trachea and Bronchi** – cilia wafts mucus up to the throat.

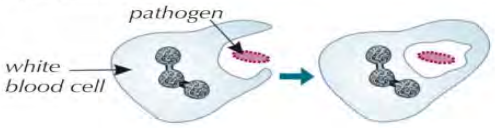
**The stomach** – HCl kills pathogens.

**White blood cells** defend the body from harmful pathogens by phagocytosis, producing antibodies, and producing antitoxins.

- **Phagocytosis** – White blood cells engulf and digest pathogens.
- **Antibodies** – lock onto invading pathogens so that white blood cells can detect and destroy them.
- **Antitoxins** – neutralise the toxins produced by bacterial pathogens.

**Antibodies** recognise pathogens as foreign to the body because pathogens have antigens on their surface. This then is detected by the white blood cells which in turn triggers the production of antibodies.

White blood cells can engulf foreign cells and digest them. This is called phagocytosis.



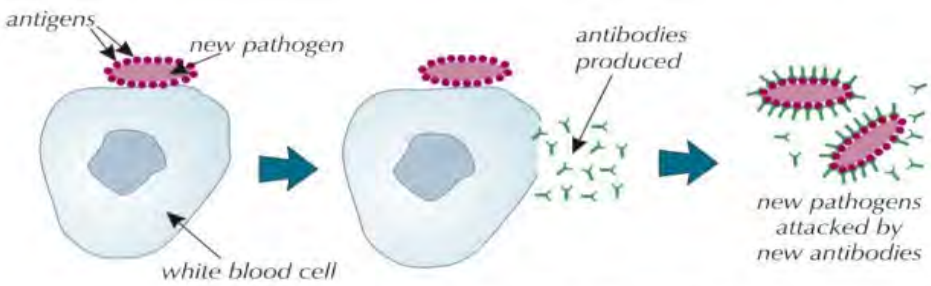




***Figure 4:*** *Diagram showing the production of antibodies.*

## 6. Fighting Disease – vaccination

Red | Amber | Green

**What are vaccinations?**

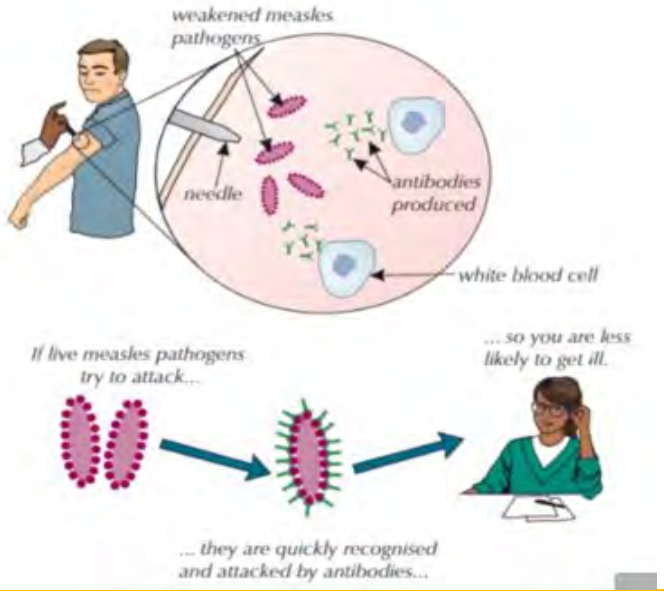
- Injecting small amounts of **dead** or **inactive** pathogens to stimulate antibody production
- This protects people, because if infected with a live pathogen, white blood cells **rapidly** produce antibodies to prevent infection.

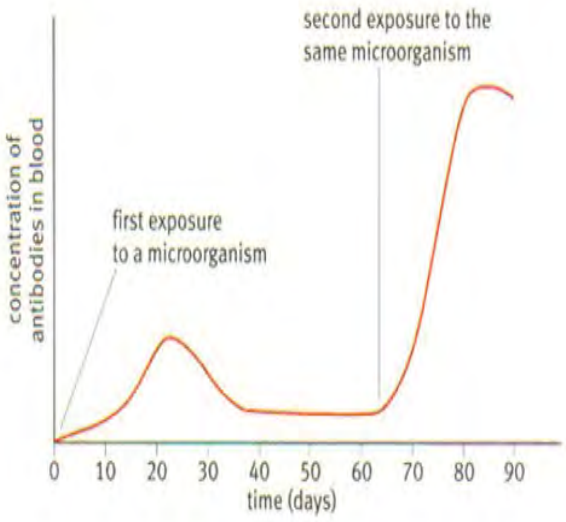
**Pros of vaccinations:**

- Reduces the spread of many infectious diseases.
- Prevents larger outbreaks of disease – these are known as epidemics.

**Cons of vaccinations:**

- They do not always work.
- A small number of people have adverse reactions to vaccinations (seizure).



**Epidemic** – Disease that affects a large number of people within a cimmunity, population or region.

**Pandemic** – This is an epidemic that has spread over multiple countries or continents (e.g. COVID-19).

## 7. Fighting Disease - Drugs

Red Amber Green

**Different Types of Drugs:**
**Drug** – A drug a chemical substance that affects the functioning of living things (altering how the mind and/or body works), drugs can produce both harmful and beneficial effects.

**Painkillers** are one type of drug and are taken by individuals to treat the symptoms of a disease but DO NOT kill the pathogen.
**Antibiotics** are a second type of drug and are taken to only kill bacteria.

**Antibiotic resistance** occurs when bacteria are able to mutate, this allows them to become resistant to an antibiotic.

**Alexander Fleming** was the first to discover antibiotics and this was accomplished accidently.

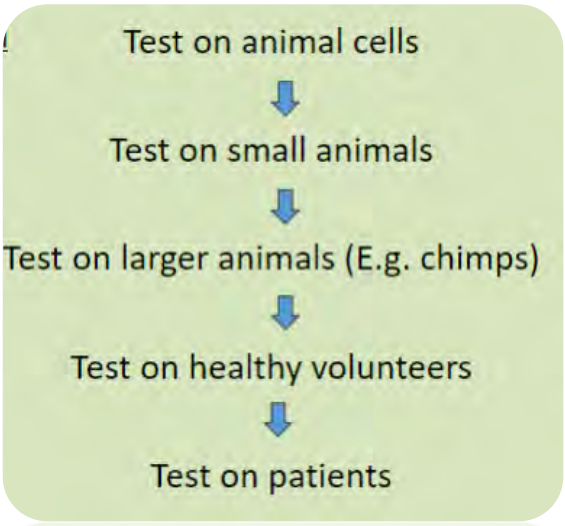
## 8. Developing Drugs

Red Amber Green

**The drug checklist:**
When creating a new drug there are a number of things that it must be tested on first:

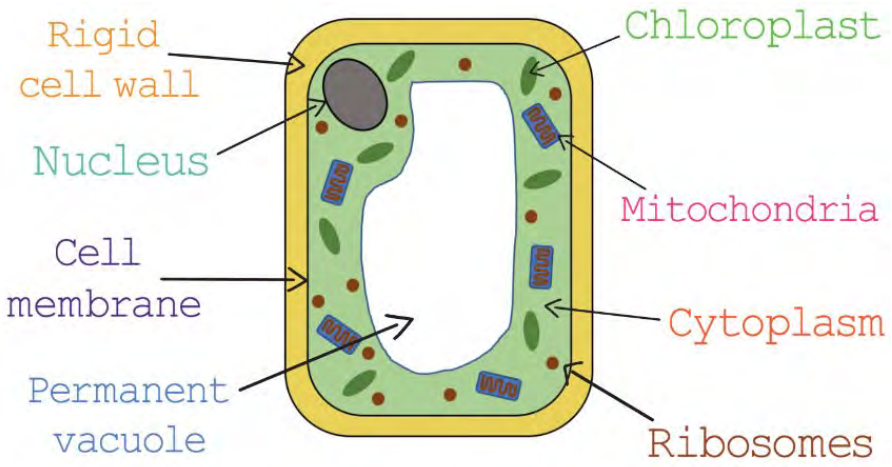
- Safe/Toxicity
- Effective against the disease (efficacy)
- At the correct dosage (optimal dose)

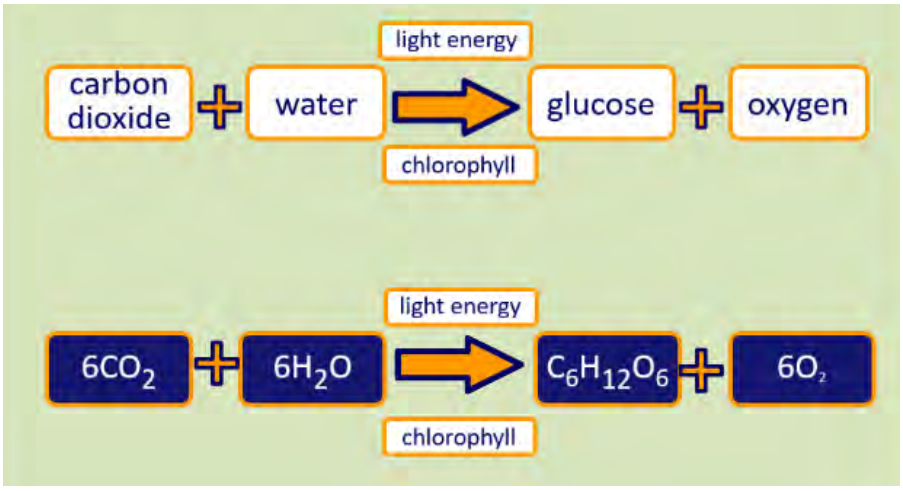
**Toxicity** – How harmful the drug is
**Efficacy** – whether the drug works and produces the desired effect.
**Optimal Dose** – the most suitable concentration with the fewest side effects.
**Side effects** – Symptoms that the drug causes which are not beneficial to the patient.
**Preclinical Trials** – Drugs are tested on human cells and tissues in the lab before tested on live animals (e.g. mice).
**Clinical Trials** – Drug passes the test on animals -> Tested on healthy human volunteers -> then tested on those with the illness.
**Placebos** – A substance that looks like the drug being tested but does not do anything.
**Blind trial** – The patient does not know whether they are getting the drug or the placebo.
**Double blind trial** – Both the patient and the doctor does not know if the patient is getting the drug or the placebo.



## 9. Basics Of Photosynthesis

Red | Amber | Green




**Key term and Function:**

**Chloroplast**
A structure in a plant cell which contains chlorophyll. The site of photosynthesis

**Mitochondria**
Site of most reactions for aerobic respiration

**Cytoplasm**
Gel-like substance in a cell wall where most chemical reactions take place.

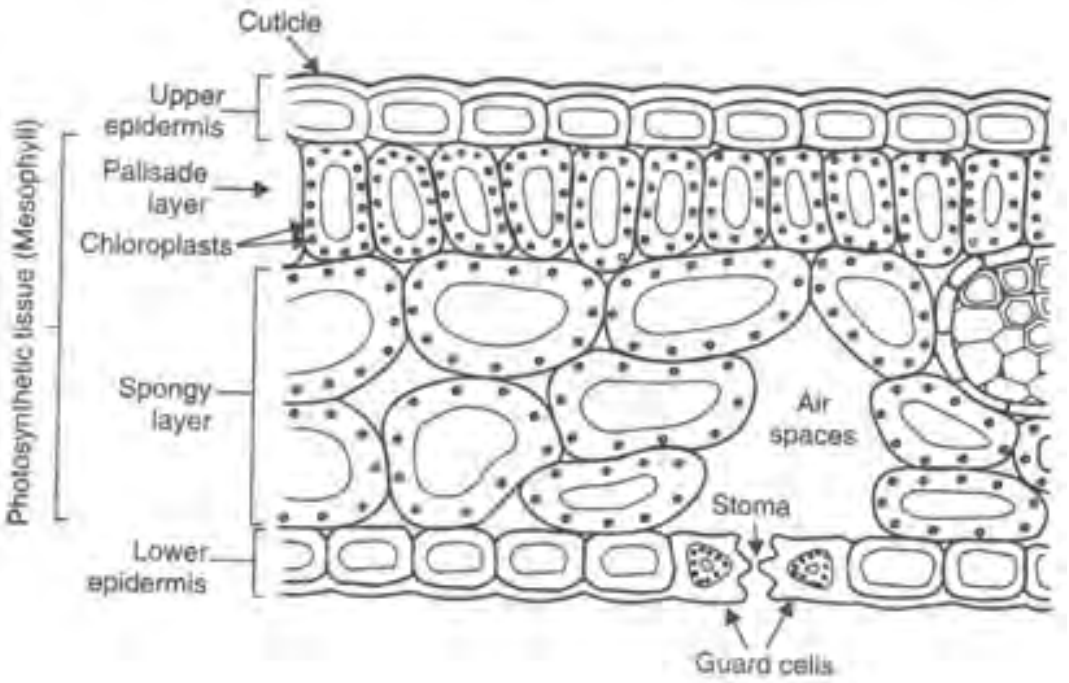
**Ribosomes**
Site of protein synthesis

**Permanent Vacuole**
Contaisn cell sap to keep the cell turgid

**Cell membrane**
Semi-permeable and controls what enters and exits the cell

**Nucleus**
Contains DNA that controls cellular activity

**Cell Wall**
Supports and strengthens the cell




**Epidermal tissue**
Waxy cuticle to prevent water loss by evaporation

**Upper epidermis tissue**
Transparent to let light pass through

**Palisade mesophyll tissue**
Contains many chloroplasts for photosynthesis

**Spongy mesophyll tissue**
Contains air spaces to allow gases to diffuse in and out of cells

**Guard cells**
Controls the opening and closing of the stomata

**Stomata**
Holes underneath the leaf which allow carbon dioxide to diffuse in and oxygen to diffuse out

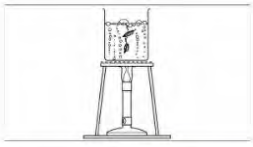
## 10. Uses of Glucose

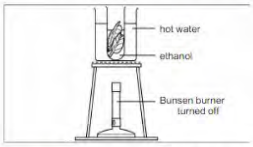
Red Amber Green

**Leaves Can be tested for starch to check if photosynthesis has taken place:**

**Method**

1. Take the two leaves and cut the end off the one that has been in the dark, so you can remember which is which.
2. Turn off the Bunsen burner. Half fill a test tube with ethanol. Place two leaves in it using forceps. Place the test tube into the beaker of hot water and leave it for 5 minutes.






3. Place both leaves in a beaker of boiling water for one minute.
4. Take the leaves out of the test tube and wash them with tap water.
5. Place the leaves on a petri dish and put a few drops of iodine solution on them. If a blue-black colour appears, there is starch in the leaf.

**Plant use glucose for several reasons:**

1) Respiration
2) Makes cellulose
3) Makes amino acids for protein synthesis

Glucose + Nitrate ions = Amino Acids

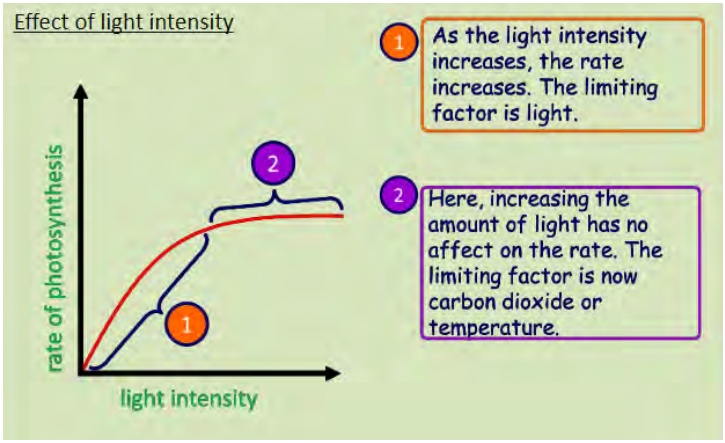
Plants convert excess glucose into two different states to be stored. They are:

1) Starch
2) Lipids

Glucose is stored as starch because glucose is soluble, however, starch is insoluble.

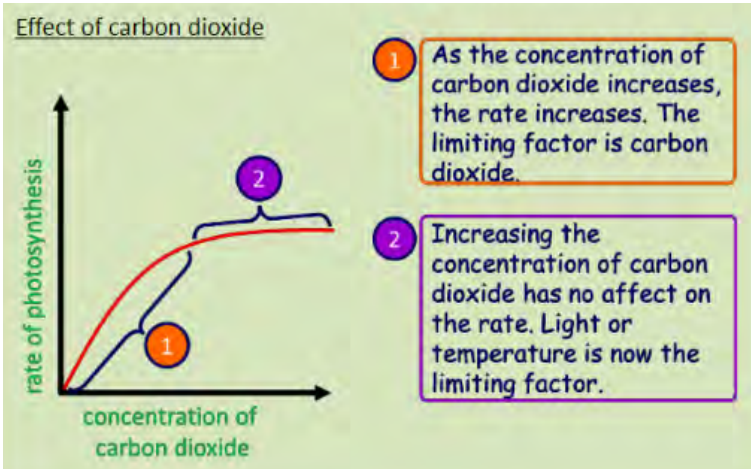
## 11. Rate of Photosynthesis

Red | Amber | Green

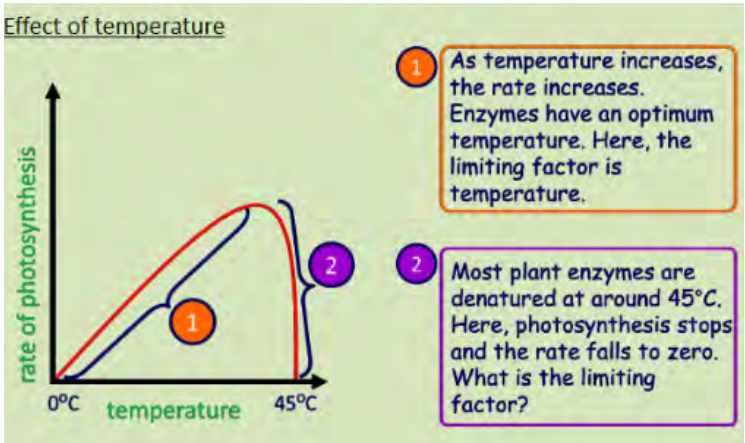



**The rate of photosynthesis is affected by three limiting factors:**

1) Light intensity
2) Volume of Carbon Dioxide
3) Temperature

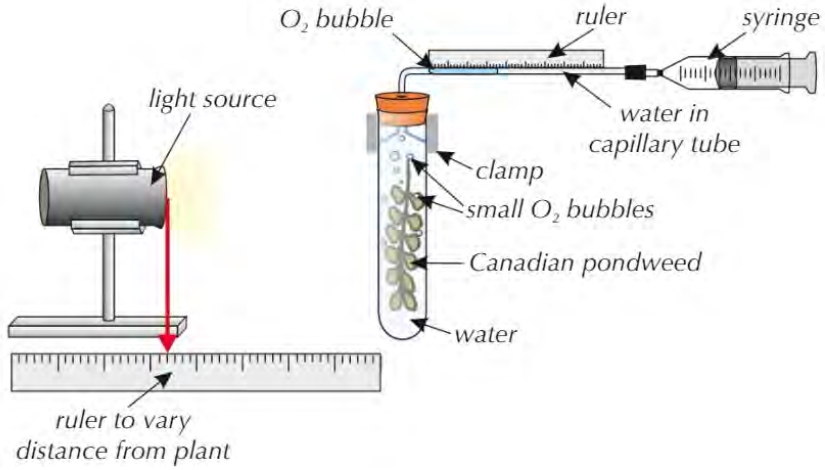



**Optimal level needs to be achieve din each of the limiting factors to achieve the highest rate of photosynthesis.**



## 12. Required Practical – Rate of photosynthesis

Red | Amber | Green



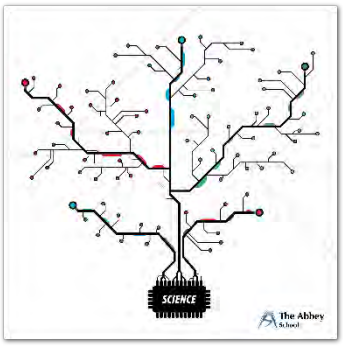

**Method for investigating the rate of photosynthesis**

Secure a boiling tube to a clamp and add sodium hydrogen carbonate solution.
Add to the boiling tube a piece of pond weed.
Using a meter ruler, place the boiling tube 10 cm away from a lamp.
Turn on lamp and wait 5 minutes to allow the pond weed to start photosynthesising.
Using the stopwatch count how many oxygen bubbles are produced in 60 seconds.
Repeat the count two more time and calculate the mean.
Repeat steps 1 to 6 by moving the boiling tube further away from the lamp by 10 cm each time until reaching a distance of 60 cm.

**HOME LEARNING TASKS**

| Task Description | Done? |
|---|---|
| What is a pathogen? | |
| What are the 4 types of pathogens? | |
| How is the trachea adapted to its function? | |
| How are pathogens spread? | |
| What are two symptoms of measles? | |
| Name 2 fungal diseases and how they can be spread. | |
| How do white blood cells defend the body from harmful pathogens? | |
| What is a pro and con of vaccinations? | |
| What is the difference between a painkiller and an antibiotic? | |
| What 3 things need to be tested when creating a drug? | |
| What is a placebo? | |
| What are the body's defences to fighting disease? | |
| What is the function of the nucleus? | |
| What is the function of the palisade mesophyll tissue? | |
| How can excess glucose be stored? | |
| What is the word and symbol equation for photosynthesis? | |
| Why is an LED bulb used during the investigation into rate of photosynthesis? | |

# Biology Year 10 Block 2 – B4, Bioenergetics, B5a, The Nervous System, B5b The Endocrine System




TERM FOCUS –
Big Ideas

**Prior Learning Links**

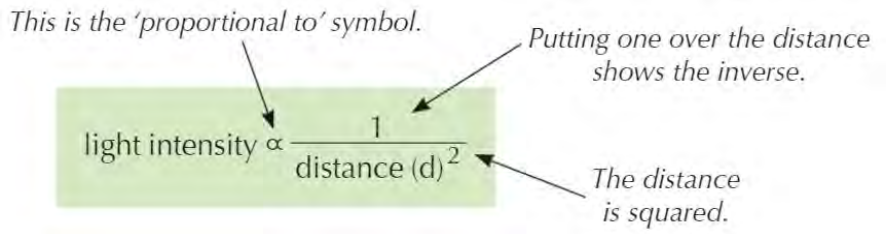
1. KS3 – Organelles that are found in living organisms (plant, animal, bacteria).
2. KS4 – Reaction time, body reacts to a stimulus.
3. KS3/4 – Factors that affect photosynthesis/plant growth.
4. KS4 – B2a – Organs, respiration, chemistry of food.

**Future Learning Links**

1. B7 – Ecology
2. B6a – Genes, reproduction.
3. GCSE required practical activities.

## 1. Inverse Square Law

**Red** **Amber** **Green**




- As the **distance increases, the light intensity decreases**.
- The distance and light intensity are **inversely proportional** to each other.

Key terms/Definitions:

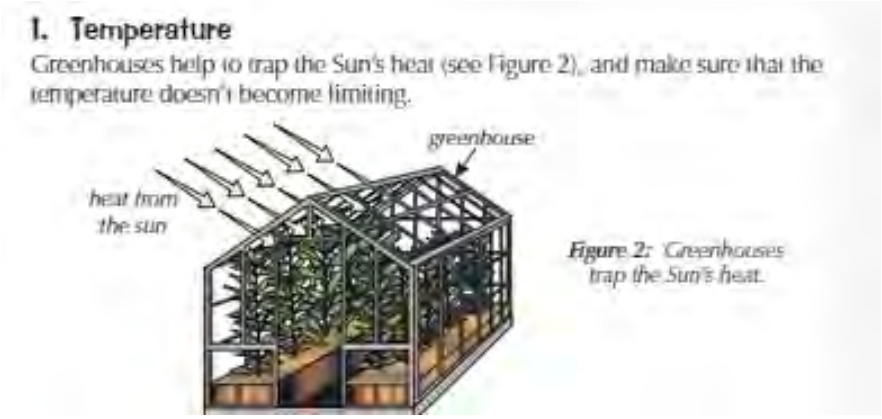
Inverse Square Law:
- As the distance increases, light intensity decreases.

Proportional symbol:
- ∝

Inverse Square Law Equation:
- Light intensity = ∝ 1 ÷ distance$^2$
-

## 2. Artificially controlling plant growth

**Red** **Amber** **Green**



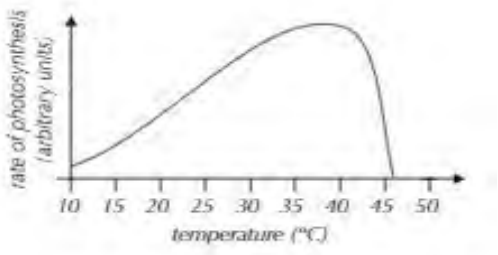

Factors that affect plant growth:
- **Temperature**
- **Light**
- **Carbon Dioxide concentration**
- **General Health of Plants (free from pests)**

Key terms/Definitions:

Greenhouse:
- A glass building in which plants that need protection from cold weather are grown.

Photosynthesis:
- How plants use light to make their own food.

Reactants of photosynthesis:
- Carbon Dioxide




**Optimum temperature for plant growth is 37 – 40 Degrees Celsius.**

- Water

Products of photosynthesis:
- Oxygen
- Glucose

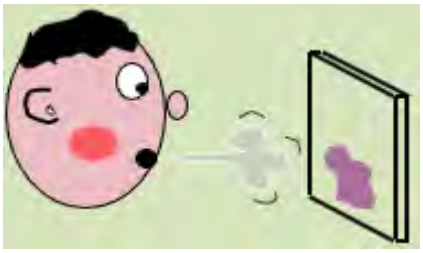
## 3. Aerobic Respiration

**Red** **Amber** **Green**

| Reaction | Reactants | Products |
|---|---|---|
| Aerobic respiration | Glucose and Oxygen | Carbon Dioxide + Water |


**Respiration:**
- All living things respire (animals, plants etc)
- The method of releasing energy from their food.
- Exothermic (Transfers energy to the surroundings)
- Used for endurance activities (long distance running).

- Limewater can be used to show Carbon Dioxide a a waste prodcut of aerbic respiration.
- When present, it turns the limewater cloudy.
- Organisms use energy for: Building larger molecules, muscle contraction, maintaining body temperature.



- A cold pane of glass can be used to show Water as another product.
- When you blow onto it, condesation creates water droplets.

Key terms/Definitions:

Respiration:
- Respiration is the process of transferring energy from glucose.

Aerobic respiration:
- Respiration that uses oxygen.

Mitochondria:
- Site of cellular respiration

Reactants of Aerobic Respration:
- Glucose
- Water

Prodcuts of Aerobic Respiration:
- Carbon dioxide
- Water
- Energy

## 4. Anaerobic Respiration

**Red** **Amber** **Green**

| Reaction | Reactants | Products |
|---|---|---|
| Anaerobic respiration | Glucose | Lactic acid |

- Anaerobic respiration usually occurs when the body is put through vigorous exercise.
- Can only be used for a limited time.
- Used in strength and power activities (sprinting).

*An oxygen debt is the amount of extra oxygen needed after exercise.*

- Anaerobic Respiration in plants looks slightly different…
- This process is called Fermentation.

glucose → ethanol + carbon dioxide

| | Aerobic respiration | Anaerobic respiration |
|---|---|---|
| Energy released | Releases **more** energy | Releases **less** energy |
| Fuel used | Glucose **and** oxygen | Glucose **only** |
| Relative speed | Slower | Faster |
| Waste product | Carbon dioxide | Lactic acid |
| How is waste removed? | Via the blood to the lungs (breathed out) | Via the blood to the liver (processed) / oxidation |
| How long can it happen for? | Unlimited time | **Limited** time |
| Does it have any negative effects? | None | Lactic acid is toxic – leads to muscle fatigue |

Key terms/Definitions:

Respiration:
- Respiration is the process of transferring energy from glucose.

Anaerobic respiration:
- Respiration without oxygen.

Reactant of Anaerobic Respiration:
- **Glucose**

Product of Anaerobic Respiration:
- **Lactic Acid**

Cytoplasm:
- The site of anaerobic respiration.

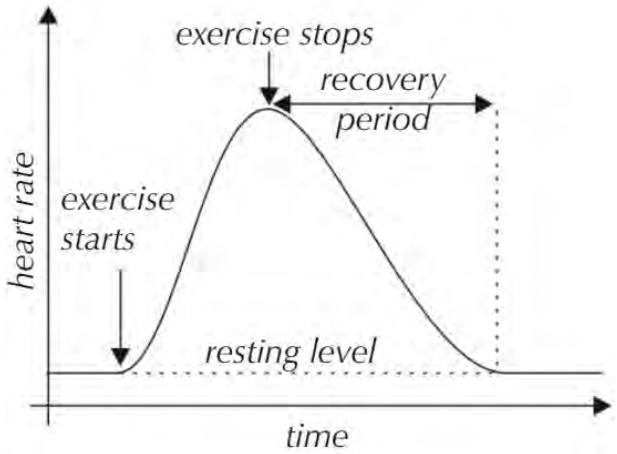
Oxygen Debt:
- The extra oxygen your body needs after exercise to react with the build-up of lactic acid and remove it from cells.

## 5. Exercise and Metabolism

**Red** **Amber** **Green**

**The recovery Period**

- During vigorous exercise the muscle fatigue. This is caused by the lack of oxygen reaching them.




Key terms/Definitions:

Metabolism:
- Sum of all chemical reactions in the body.

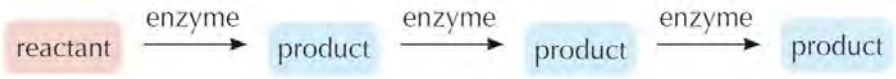
Exercise:
- activity requiring physical effort, carried out to sustain or improve health and fitness

Recovery period:
- The repayment of oxygen (oxygen debt) back to resting heart rate.

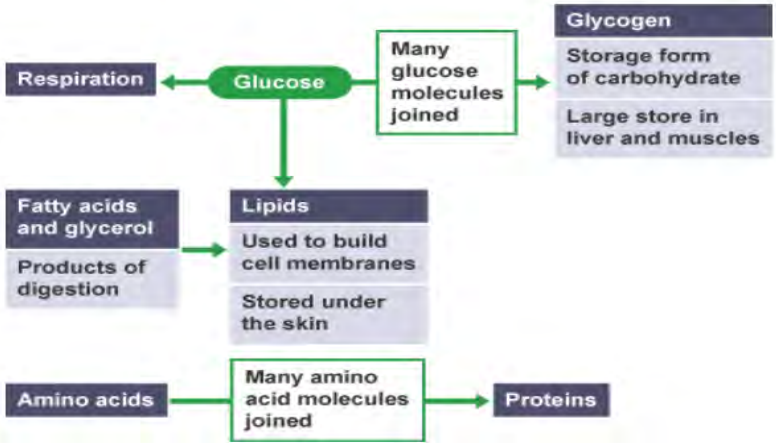
**Responses to exercise:**

- The blood flow to muscles increases and supplies them with more oxygen and glucose.
- Increases the rate that carbon dioxide is removed from muscles.
- Breathing rate increases – more oxygen enters the bloodstream.
- Breath volume increases – therefore, more oxygen enters your bloodstream.
- Arteries to muscles dilate, this means they get wider to increase the blood flow to muscles and supply them with more oxygen and glucose.
- Glycogen is converted to glucose to supply the cells.

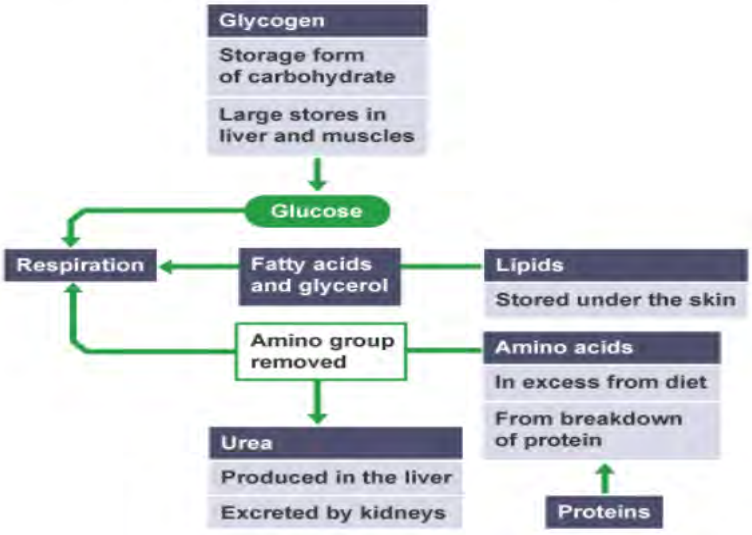
**Metabolism**




In animals, here's a summary of the reactions that build up substances following the absorption of the products of digestion:




In animals, here's a summary of the reactions that break down compounds:

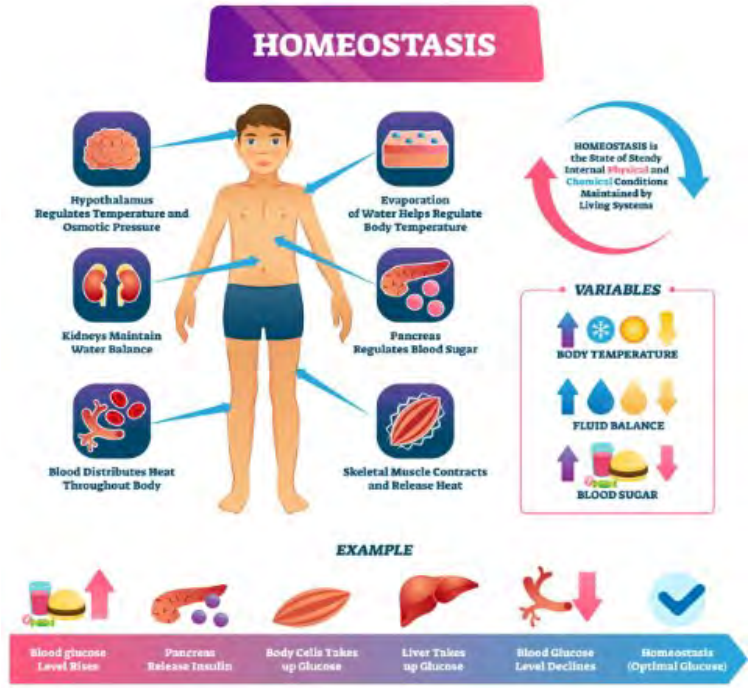


## 6. Homeostasis

Red | Amber | Green

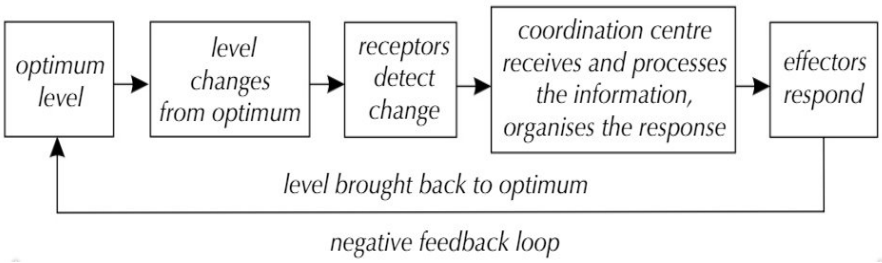
Homeostasis is the regulation of the conditions inside your body (and cells) to maintain a stable internal environment, in response to changes in both internal and external conditions.

**Receptor → Coordinator → Effector**




The conditions in your internal environment that need regulating include:

- Body Temperature (37.0 °C)
- Blood glucose
- Water content of the body.




Key terms/Definitions:

Receptors:

- an organ or cell able to respond to light, heat, or other external stimulus and transmit a signal to a sensory nerve.

Effectors:

- an organ or cell that acts in response to a stimulus

Synapse:

- A connection between two neurons.

Reflex:

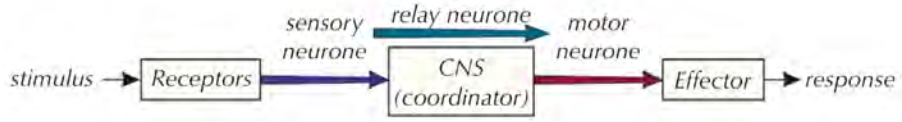
- Fast, automatic response to a stimuli.

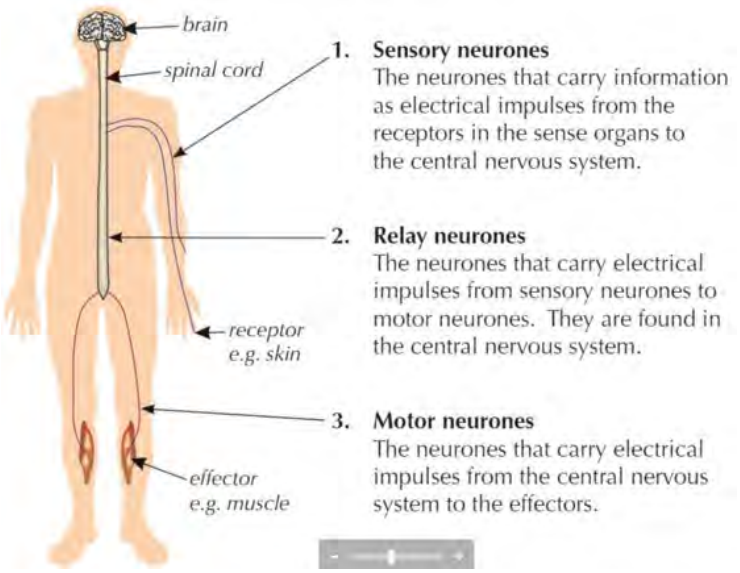
Reaction time:

- Time taken to react to a stimulus.

## 7. The nervous system

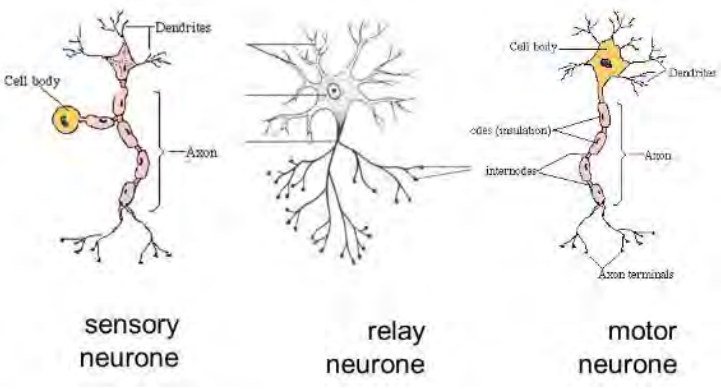
| Sense organ | Sensitive to | Receptor |
|---|---|---|
| Skin | Touch | Pain receptor in skin |
| Eyes | Light | Light receptor in the eye |
| Ears | Sound | Sound receptor in ear |
| Tongue | Taste | Taste receptors on tongue |
| Nose | Chemicals / smell | Smell receptors in nose |




**An effector can be either:**

1) A muscle that contracts
2) A gland that secretes a hormone




**Red** **Amber** **Green**

Key terms/Definitions:

Central Nervous System (CNS):

- Mastermind of the body and controls the bodies functions and responses.

Axon:

- the long threadlike part of a nerve cell along which impulses are conducted from the cell body to other cells.

Dendrites:

- short branched extension of a nerve cell, along which impulses received from other cells at synapses are transmitted to the cell body.

Myelin Sheath:

- Sleeve that's wrapped around each nerve cell. It is a protective layer of fat.

**Three types of Neuron:**

- Sensory neuron
- Relay neuron
- Motor neuron

## 8. Synapses and Reflexes

**Red** **Amber** **Green**

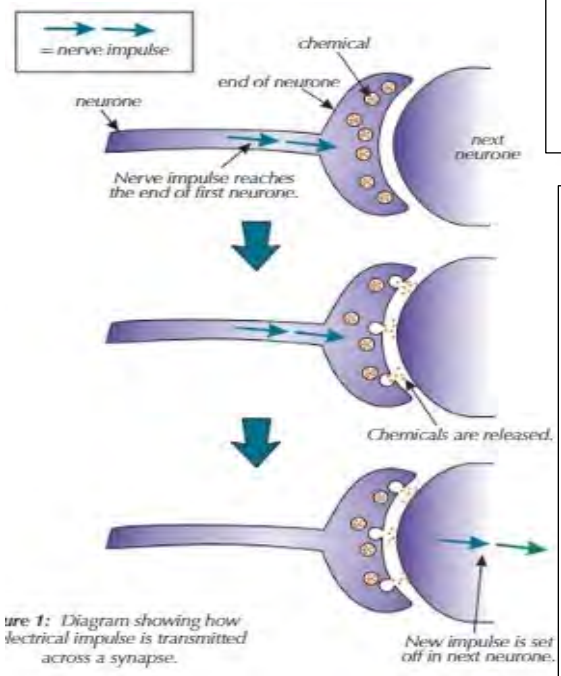
Key terms/Definitions:

napse:

- The gap between two neurones.

Reflex Arc:

- Nerve pathway followed by a reflex action




ure 1: Diagram showing how lectrical impulse is transmitted across a synapse.

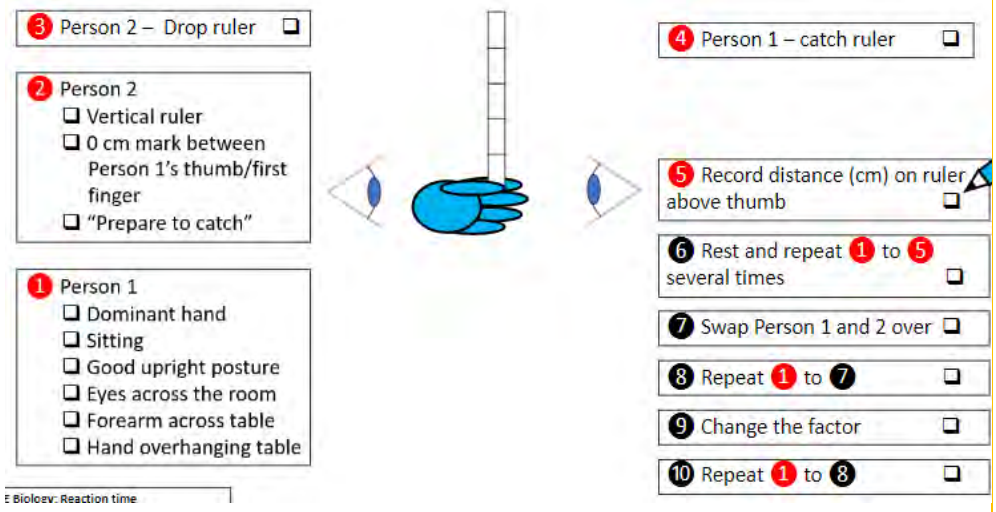
The chemicals are called neurotransmitters.

The 'gap' is called the synaptic cleft.

- Reflexes are automatic responses to certain stimuli.
- Reflexes help to reduce the chance of injury or damage.
- Reflexes can trigger the release of chemicals (hormones).
- Reflexes follow a pathway called a reflex arc.

## 9. Reaction time (required practical)

**Red** | **Amber** | **Green**




## 10. Hormones

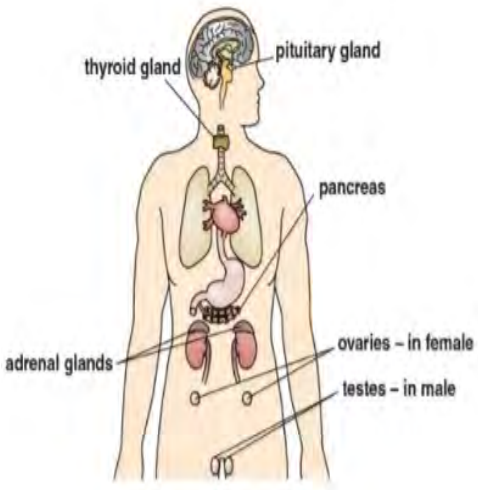
**Red** | **Amber** | **Green**

**Endocrine system:**
**This is the collection of glands that produce hormones to regulate the following:**

1. **Metabolism**
2. **Growth and development**
3. **Tissue function**
4. **Sexual function**
5. **Reproduction**
6. **sleep**

**Examples of glands include:**

- **Pineal gland**
- **Pituitary gland**
- **Thyroid gland**
- **Thymus**
- **Adrenal gland**
- **Pancreas**
- **Ovary**
- **Testes**




Key terms/Definitions:

Hormone:

- Chemical messengers released by glands into the blood and carried to a target organ or organs.

Glands:

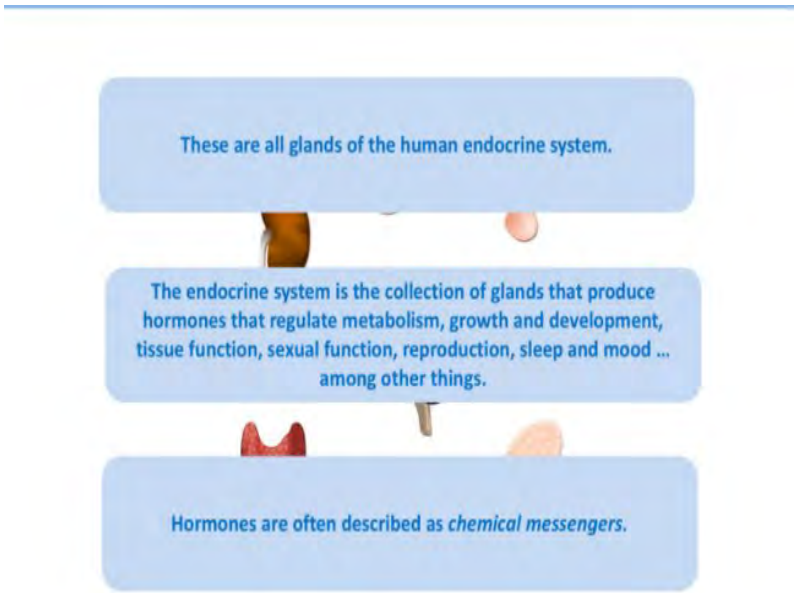
- An organ which secretes particular chemical substances for use in the body.

Insulin:

- A hormone secreted that controls your blood glucose

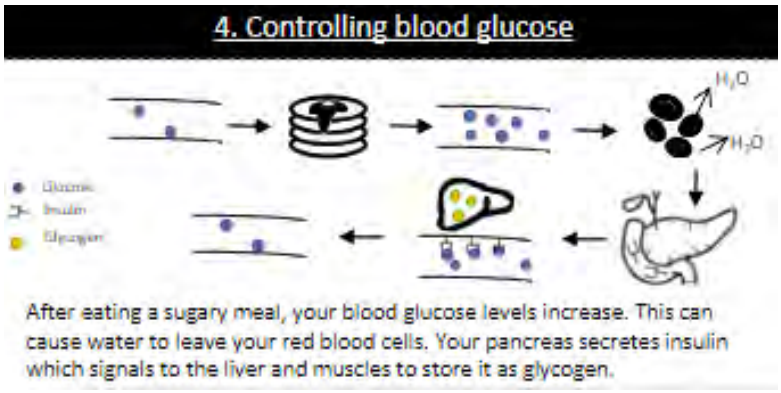
Adrenaline:

- A hormone secreted which prepares the body for fight or flight.

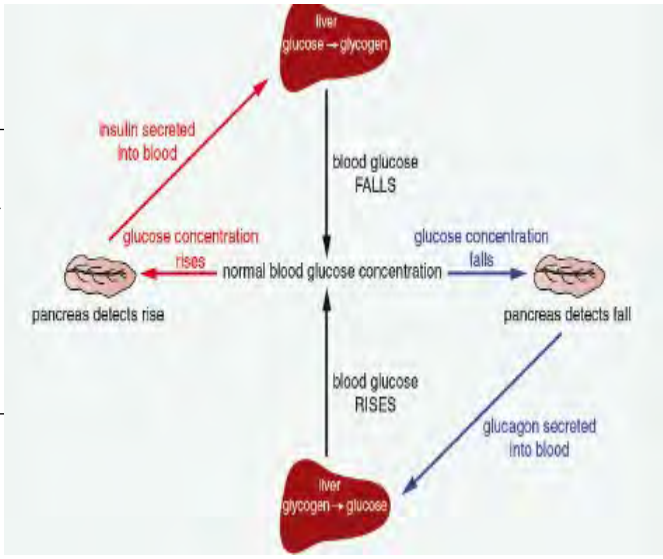



## 11. Controlling Blood Glucose

**Red** **Amber** **Green**




Insulin is released by the pancreas and plays a vital role in regulating blood sugar. It reduces the sugar in your bloodstream.




Glucagon is a hormone that is formed in the pancreas, its job is to promote the breakdown of stored glycogen into glucose to then raise sugar levels.

Key terms/Definitions:

Glucose:

- A simple sugar which is an important energy source in living organisms.

Glycogen:

- The stored form of glucose, made up of many glucose molecules connected.

Insulin:

- A hormone that regulates the level of glucose in the blood. Produced by the pancreas.

Diabetes:

- Chronic health condition that occurs when blood glucose levels are too high. There are

Symptoms of diabetes:

- Blurry vision
- Always thirsty
- Always tired
- Always hngry
- Sexual problems
- Numb or tingling hands or feet
- Wounds that won't heal
- Sudden weight loss
- Frequent urination

**5. Diabetes**

| | Type 1 | Type 2 |
|---|---|---|
| Causes | Body's immune system attacks pancreas cells | Poor diet and obesity over a long period of time |
| Effect | Pancreas no longer makes insulin | Liver cells do not respond to insulin in the blood |
| Result | Blood sugar rises | Blood sugar rises |
| Treated by | Injections of insulin | Carbohydrate controlled diet, exercise and medication |

two types; type 1 and type 2.

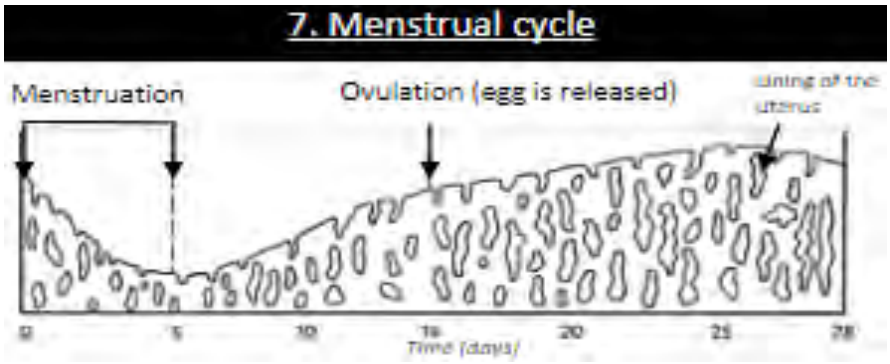
Type 1 diabetes:

- The body cannot produce enough insulin, often requires daily insulin injections and blood sugar monitoring.

Type 2 diabetes:

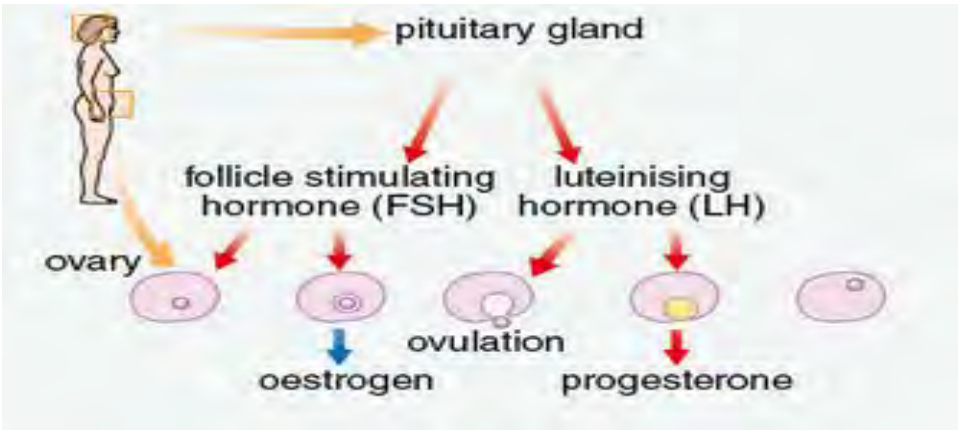
- Blood sugar becomes too high, type 2 is often lifestyle caused.

**12.** Menstrual Cycle **Red** **Amber** **Green**




- **Follicle stimulating hormone (FSH)**
  - **Causes the egg to mature**
- **Luteinising hormone (LH)**
  - **Stimulates the release of the egg**
- **Oestrogen and Progesterone**
  - **Growth and maintenance of uterus lining**

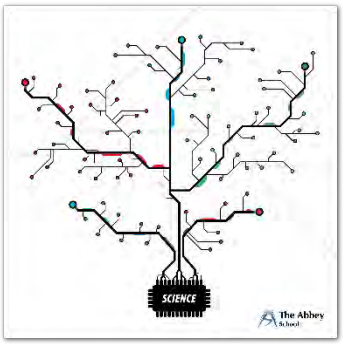
- **Oestrogen is the female reproductive hormone and produced by the ovaries. Stimulates eggs production.**
- **Testosterone is the male reproductive hormone and is produced by the testes. Stimulates sperm production.**



| HOME LEARNING TASKS | |
|---|---|
| **Task Description** | **Done?** |
| What are the 4 factors that affect plant growth? | |
| What is the equation for anaerobic respiration? | |
| List the major glands in the human body. | |
| What are the three types of neurons? | |
| What is the difference between aerobic and anaerobic respiration?<br>What is the male and female reproductive hormones and where are they produced?<br>What is the role of insulin?<br>What is the role of glycogen? | |
| What is the difference between type 1 and type 2 diabetes? | |
| Explain the process of the body reacting to a stimulus, using the words: Receptor, CNS and Effector. | |
| Write the method for the ruler drop reaction time test. | |

# Chemistry Year 10 Term 1 – Acids and Alkalis

Term Focus –




**Prior Learning Links**

- Properties of acidic, alkaline and neutral substances.
- pH scale.
- Formation of ions
- Physical and chemical reactions
- Rates of reaction and reversible reactions
- Concentration and volume

**Future Learning Links**

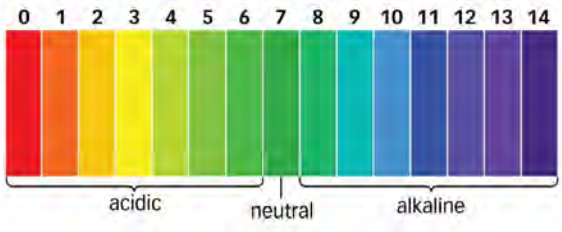
- Stoichiometric calculation
- Rates of reaction
- Factors affecting rates of reaction
- Qualitative and quantitative analysis
- Environmental chemistry

**KEY VOCABULARY**

| | |
|---|---|
| Acid | Metal carbonate |
| Alkali | Metal oxide |
| $H^+$ ion | Salt |
| $OH^-$ ion | Ore |
| Indicator | Oxidation |
| Neutralisation | Reduction |
| Concentration | Redox |
| Solute | Half equation |
| Solution | Ionic Equation |
| Solvent | Electrode |
| Ionise | Anode |
| Strong acid | Cathode |
| Weak Acid | Electrolyte |

## 1. Acids and Alkalis

Red Amber Green




**Neutralisation** Reaction: Acid + Alkali → Salt + Water

**Ionic** Equation: $H^+ + OH^- \rightarrow H_2O$

$H^+$ = Acidic solution

$OH^-$ = Alkaline solution

**Key terms**

**Ion:** An atom that has lost or gained electrons to become a charged particle.

**Ionic equation:** An equation that shows only the ionic particles that react and the products they form.

**$XX_{(s)}$:** Substance is in a solid state.

**$XX_{(l)}$**: Substance is in a liquid state.

**$XX_{(g)}$**: Substance is in a gaseous state.

**$XX_{(aq)}$**: Substance is dissolved in water

How acidic or alkaline a solution is can be measured on the pH scale

A neutral substance has a pH of 7, an acidic substance has a pH less than 7 and an alkaline solution greater than 7

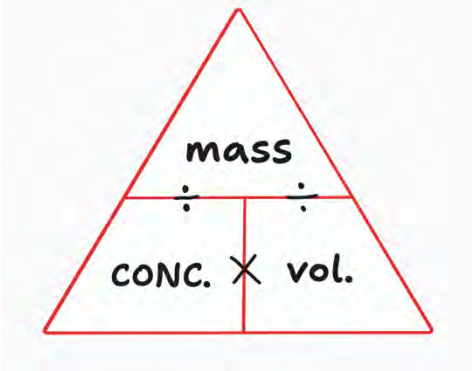
pH of a solution can be measured using either a universal indicator or a pH probe.

Hydrogen ions ($H^+$) make a solution acidic and hydroxide ions ($OH^-$) make a solution alkaline.

In a neutralisation reaction between an acid and alkali, hydrogen ions ($H^+$) react with hydroxide ions ($OH^-$) to produce water.

## 2. Concentration

Red Amber Green




**Key terms**

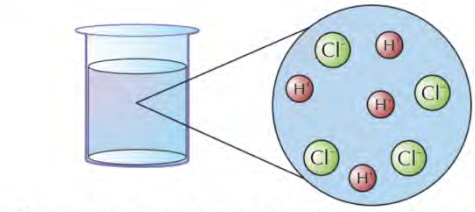
**Concentration:** The amount of a substance in a given volume. Measured in mol/$dm^3$ or g/$dm^3$

**1 $dm^3$ =** 1 litre = 1000 ml = 1000 $cm^3$

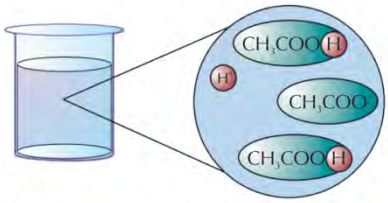
**Concentration (g/$dm^3$)** = mass of solute (g) / Volume of solution ($dm^3$)

## 3. Strong and Weak Acids

Red Amber Green




Hydrochloric acid completely dissociates: HCl → $H^+ + Cl^-$




Ethanoic acid partially dissociates:

$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$

**Key definitions**

**Strong Acid:** An acid that completely ionises (dissociates) in water. (H)

**Weak acid:** An acid that only partially ionises (dissociates). (H)

**Examples of strong acids are**: Nitric acid ($HNO_3$) and Sulphuric acid ($H_2SO_4$)

**Examples of weak acids are:** Ethanoic Acids ($CH_3COOH$) and Carbonic acid ($H_2CO$). (H)

If you multiply the concentration of $H^+$ ions in a solution by 10, the pH will decrease by 1. (H)

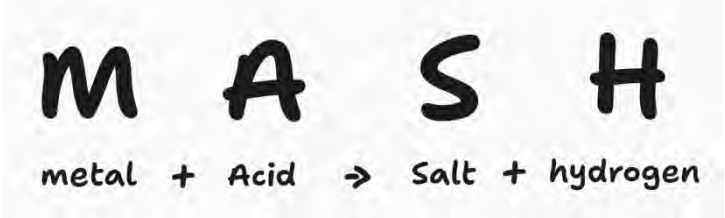
Therefore solutions of a strong acid will have a lower pH than a solution of a weak acid with the same concentration. (H)

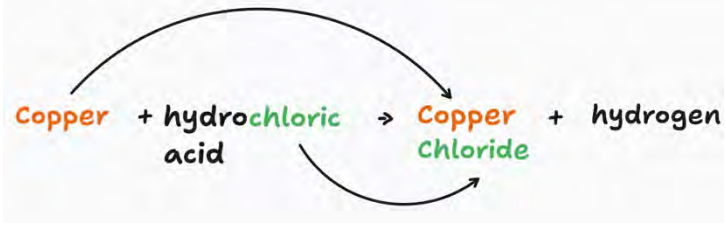
Acid concentration measures the amount of acid dissolved in a fixed volume of water. (H)

Acid strength is a measure of what proportion of $H^+$ ions dissociate in water. (H)

## 4. Reactivity of Metals with Acids

Red Amber Green




**Key terms**

**Metal oxide** = MO

**Metal hydroxide** = MOH

**Metal carbonate** = $MCO_3$

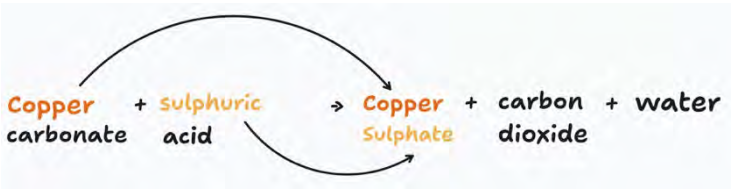
**Key reactions**

You must know the products of the reactions between metals, metal oxides, metal hydroxides and metal carbonates with acid.

**M**etal + **A**cid → **S**alt + **H**ydrogen

Metal oxide/ Hydroxide + Acid → Salt + Water

Metal Carbonate + Acid → Salt + Carbon dioxide + Water

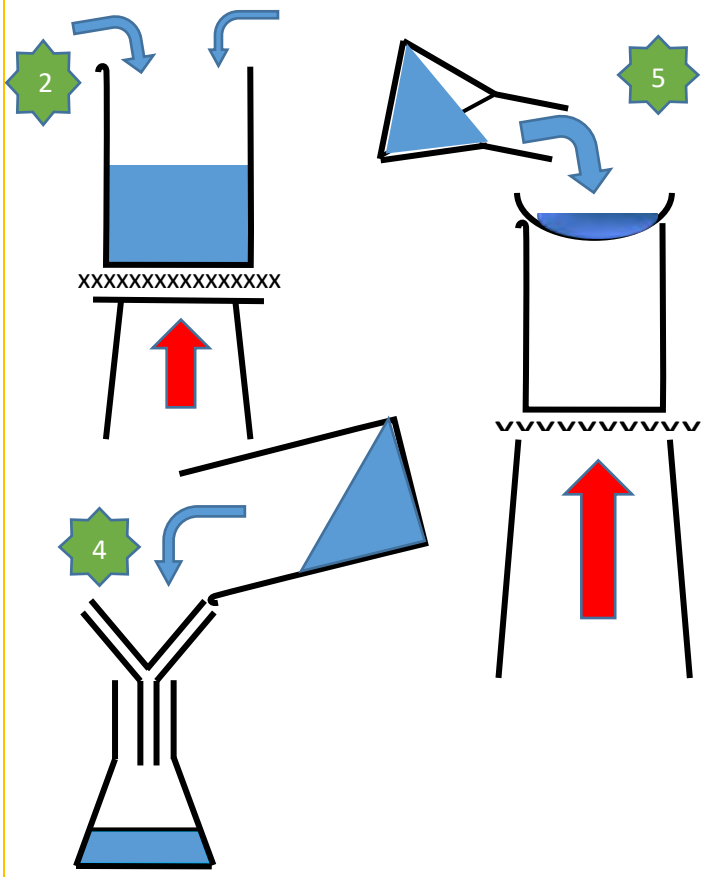



You must also be able to name the salt produced in these reaction

Metal + Hydro**chloric** acid → Metal **Chloride** + Hydrogen
Metal + **Sulphuric** acid → Metal **Sulphate** + Hydrogen
Metal + **Nitric** acid → Metal **Nitrate** + Hydrogen

## 5. Required Practical 8

Red Amber Green

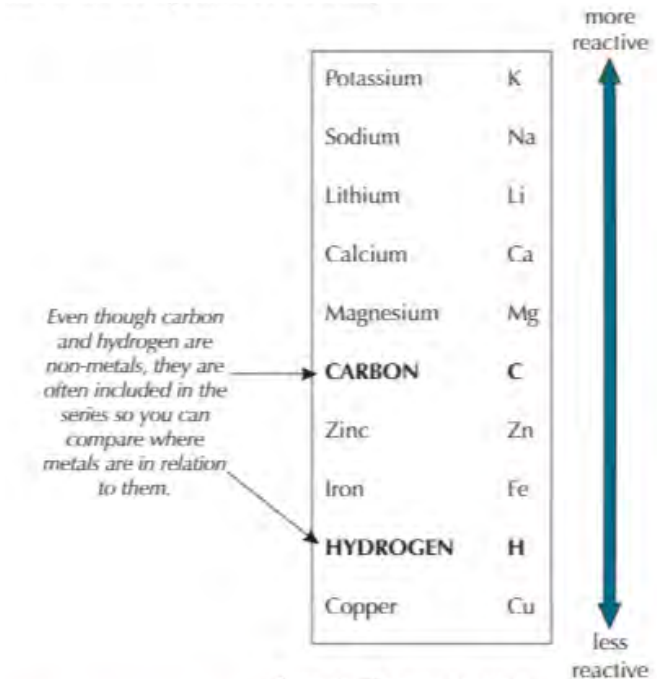



**Making soluble salts Required Practical:**

1. Put the acid in a beaker and gently warm using a Bunsen burner.
2. Add the insoluble metal oxide and stir until it has fully reacted and dissolved
3. Keep adding the insoluble reactant until it is in excess. You will know it is in excess when there is some reactant left in its solid form that will not react.
4. Use filter paper in a funnel to filter out the excess undissolved reactant into a conical flask.
5. Transfer the salt solution to an evaporating basin and heat gently in a water bath until most of the water has evaporated.
6. Leave the solution to cool and the salt crystals should form.

## 6. Reactivity of Metals

Red Amber Green




The reactivity series is a list of metals placed in order of reactivity

The reactivity of a metal is determined by how easily it forms positive ions.

Carbon and Hydrogen are often included in this series even though they are not metals because it is convenient to be able to compare their reactivity with other metals.

When a metal reacts with acid, salt and hydrogen gas are produced. The more reactive the metal the faster bubbles of hydrogen will be produced.

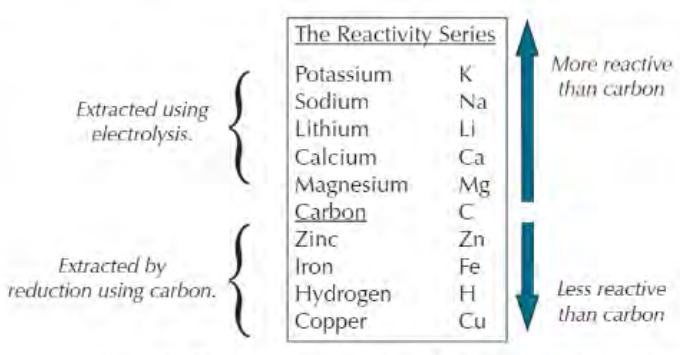
When a metal reacts with a compound that contains a lesson reactive metal, this metal will be displaced. For example:

**Iron** + **Copper** Sulphate → **Iron** sulphate + **Copper**
$Fe_{(s)}$ + $CuSO_{4(aq)}$ → $FeSO_{4(aq)}$ + $Cu_{(s)}$

If the metal within the compound is more reactive then no reaction will occur.

## 7. Metal oxides and redox

Red Amber Green




Some elements like Gold and Silver are found as themselves in the earth but most metals are found in compounds that need extracting.

When a metal reacts with Oxygen it forms a metal oxide

**Oxidation** can be defined as an element gaining an oxygen atom.

**Reduction** can be defined as a compound losing an oxygen atom.

If a metal is lower than carbon in the reactivity series it can be extracted by a reduction reaction with carbon. For example:

**Iron oxide + Carbon → Iron + Carbon dioxide**

**$2Fe_2O_3$ + 3C → 4Fe + $3CO_2$**

Here the Iron has been reduced because it has lost an oxygen.

If a metal is above carbon in the **reactivity series, it must be extracted by electrolysis.**

## 8. Redox Reactions

Red Amber Green

**Displacement reaction:**

Zinc + Copper Sulphate → Zinc Sulphate + Copper

Zn + $Cu^{2+}$ $SO_4^{2-}$ → $Zn^{2+}$ $SO_4^{2-}$ + Cu

**Half equations:** $Zn \rightarrow Zn^{2+} + 2e^-$ (Oxidation)

$Cu^{2+} + 2e^- \rightarrow Cu$ (Reduction)

**Reaction of metal and acid:**

$Fe_{(s)} + 2HCl_{(aq)} \rightarrow FeCl_{2(aq)} + H_{2(g)}$

**Half equations:** $Fe_{(s)} \rightarrow Fe^{2+}_{(aq)} + 2e^-$ (Oxidation)

$2H^+_{(aq)} + 2e^- \rightarrow H_{2(g)}$ (Reduction)

**Ionic equation:**

$Fe_{(s)} + 2H^+_{(aq)} \rightarrow Fe^{2+}_{(aq)} + H_{2(g)}$

**Key Definitions**

**Redox Reaction:** A reaction where one substance in reduced and another substance in oxidised.

**Displacement reaction:** A reaction where a more reactive element replaces a less reactive element in a compound.

**Half equation:** An equation which shows how electrons are transferred when a substance is reduced or oxidised.

**Oxidation:** When substances lose electrons.

**Reduction**: When substances gain electrons.

**OIL RIG**: Oxidation is Loss Reduction is Gain.

Oxidation and reduction can also be described in terms of losing and gaining electrons. (H)

Substances that lose electrons in a reaction are described as being oxidised and substances that gain electrons are described as being reduced. (H)

If in a reaction, there are species that are oxidised and reduced then this is a redox reaction. (H)

Examples of redox reactions are displacement reactions and reactions of metals with acids. (H)

To identify which species has been oxidised in an equation first identify each elements ionic charge in solution. The ion whose charge has increased (lost electrons) has been oxidised, and the ion whose charge has decreased (gained electrons) has been reduced. (H)

## 9. Electrolysis

Red Amber Green


**Electrolysis of lead bromide (Higher)**

*Forms solid metal Lead*

At Cathode: $Pb^{2+}_{(aq)} + 2e^- \rightarrow Pb_{(s)}$

*Positive ion reduced at cathode*

*Forms gaseous bromine*

At Anode: $2Br^-_{(aq)} \rightarrow Br_{2(g)} + 2e^-$

*Negative ion oxidised at anode*

**Key definitions**

**Electrolysis:** The process of breaking down a substance using electricity.
**Electrolyte:** A liquid or solution used in electrolysis to conduct electricity between the two electrodes.
**Electrode:** An electrical conductor which submerged in the electrolyte during electrolysis.
**Anode:** Positively charged electrode.
**Cathode:** Negatively charged electrode.

In dissolved or molten ionic compounds, the ions are free to move.

When an electric current is passed through a liquid or dissolved ionic compound that compound decomposes (ions separate). This is called electrolysis.

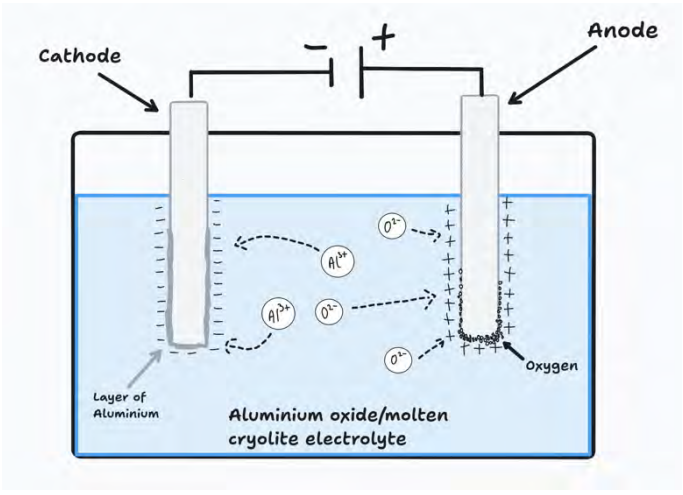
In **electrolysis** the positive ions move towards the negative electrode **(cathode)** and negative ions move towards the positive electrode **(anode).**

At the **cathode** positive ions are **reduced**. (H)
At the **anode** negative ions are **oxidised**. (H)

At the **cathode** the metal ions react to form the metal element.
At the **anode** the non-metal ions react to form the non-metal element.

## 10. Electrolysis of Metal Ores

Red Amber Green




**Half equations (Higher)**

Negative electrode: $Al^{3+} + 3e^- \rightarrow Al$

Positive electrode: $2O^{2-} \rightarrow O_2 + 2e^-$

**Key terms**

**Ore:** A naturally occurring solid material from which a metal can be extracted.
**Bauxite**: The main ore of aluminium.
**Cryolite**: a less commonly occurring ore of aluminium with a lower melting point.

Electrolysis must be used to extract metals from their ore if the metal is more reactive than carbon

Extracting metals using electrolysis is very expensive as It requires a lot of energy to melt the metal ore in order to allow the ions to move.

Aluminium is extracted from its ore (Bauxite) using electrolysis.

Bauxite is purified to give Aluminium oxide which is dissolved in molten cryolite in order to lower the ores melting point.

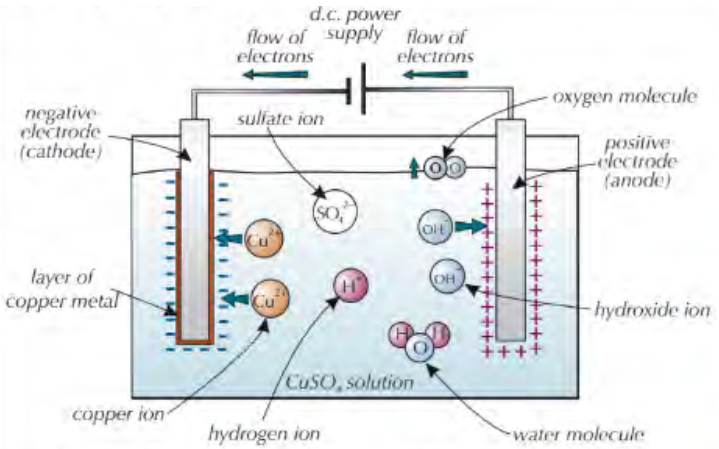
Aluminium will form at the cathode and oxygen will form at the anode.

Electrodes are made of carbon (graphite) as they are good conductors of electricity.

Sometimes the oxygen reacts with the carbon in the electrode to make carbon dioxide, this means the electrode may need replacing.

## 11. Electrolysis of aqueous solutions

Red Amber Green




**Key terms**

**Aqueous solution:** Solution containing a substance dissolved in water.

**$H^+$:** Positively charged Hydrogen ion

**$OH^-$:** Negatively charged Hydroxide ion

When carrying out electrolysis on an aqueous solution $H^+$ and $OH^-$ ions will also be present.

Only one ion can move to each electrode to forms the products.

The products formed at each electrode depends on the reactivity of the ions.

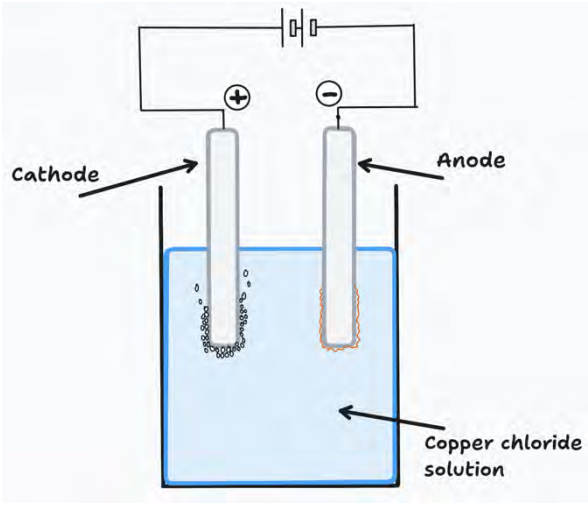
In an aqueous solution the least reactive positive ion will always move to the anode.

In an aqueous solution $OH^-$ ions will always move to the cathode unless there are halide ions present ($Cl^-$, $Br^-$, $I^-$).

When $OH^-$ ions reach the cathode oxygen and water is produced.

## 12. Required Practical 9

Red Amber Green




**Chlorine:** Damp litmus paper turns white.

**Hydrogen:** Makes squeaky pop sound with a lit splint.

**Oxygen:** relights a glowing splint.

**Electrolysis of aqueous solution practical**

1. use a measuring cylinder to add 40 ml of copper chloride solution into a beaker
2. place two graphite rods into the copper sulfate solution - attaching one electrode to the negative terminal of a dc supply, and the other electrode to the positive terminal
3. place two small test tubes over each electrode to collect any gases produced
4. turn on the power supply and observe what happens at each electrode
5. test any gas produced by holding a piece of blue litmus next to the electrode, or by holding a lit splint next to it
6. record your observations and the results of your tests
7. rinse the electrochemical cell apparatus and collect a new set of electrodes
8. repeat steps 1–6 using sodium chloride solution

**HOME LEARNING TASKS**

| Task Description | Done? |
|---|---|
| Define an acidic and alkaline solution. | |
| Define a displacement reaction and give an example. | |
| Calcium carbonate is made into a solution with a concentration of 2.5 g/dm$^3$. Calculate the mass of calcium carbonate dissolved in 300 ml of water. | |
| Write the half equation for the reaction that occurs at the anode when molten aluminium oxide undergoes electrolysis. State whether this reaction is a reduction or oxidation reaction. | |
| Describe a method for making and extracting zinc nitrate salt in a solution. | |
| Describe a method for verifying the products of the electrolysis of Zinc chloride solution. Remember to state the products at each electrode and how you will test for these products. | |

# Science Year 10 Term 2 – C7, C8 & C9 – Organic Chemistry, Chemical Analysis & Chemistry of Atmosphere.

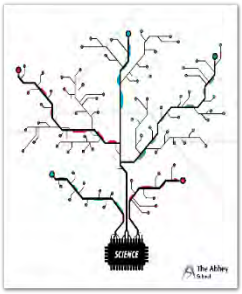
TERM FOCUS –
Big Ideas: How can we make crude oil useful?
How can we test for different substances?
What affects the composition of the atmosphere?

**Prior Learning Links**

Organic Chemistry
Basic Organic Functional Groups: Understand the structures and properties of hydrocarbons.
Naming Organic Compounds: Revise IUPAC nomenclature rules for naming alkanes, alkenes, and other functional groups.
Chemical Analysis
Chromatography: Separation techniques.
Chemistry of the Atmosphere
Major components of the atmosphere, including nitrogen, oxygen, argon, carbon dioxide, and trace gases.
Understand the greenhouse gases and their role in climate change.
Air Pollution: Sources, effects of pollutants like sulphur dioxide, nitrogen oxides, and particulate matter.

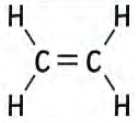
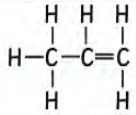
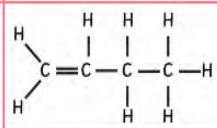
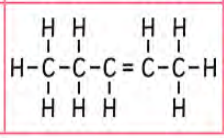
**Future Learning Links**

1. KS3 Science Investigations
2. GCSE Required Practical Activities
3. GCSE Science Investigations




**LESSON 2 & 3 Hydrocarbons – alkenes /Reactions of the alkanes and alkenes** | **Red** | **Amber** | **Green**

## Alkenes (Chemistry Only)

| Name of Alkene | Structural Formula | Molecular Formula |
|---|---|---|
| ethene |  | $C_2H_4$ |
| propene |  | $C_3H_6$ |
| butene |  | $C_4H_8$ |
| pentene |  | $C_5H_{10}$ |

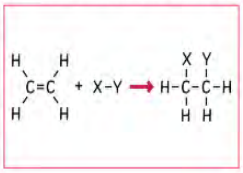
Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is $C_nH_{2n}$.

Alkenes are **unsaturated hydrocarbons**. In a chemical reaction, the double bond of the alkenes can break. This allows other molecules to bond to it. Note that alkenes all have the suffix '**ene**'.

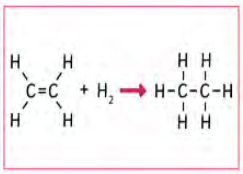
## Reactions of Alkenes (Chemistry Only)

Alkenes, just like alkanes, also undergo **combustion** reactions. Alkenes rarely combust completely and tend to undergo **incomplete combustion**. When burning in the air, they produce a smoky flame.

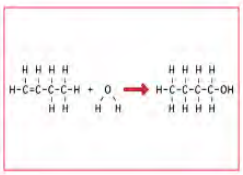
**Alkenes** have the functional group **C=C**. This double bond between the carbon atoms is able to undergo an addition reaction. This means that the double bond can break and will accept another molecule. **Alkanes** are **unable** to take part in **addition reactions** as their functional group is **C-C**. This means the bond cannot break in order to accept a new molecule.



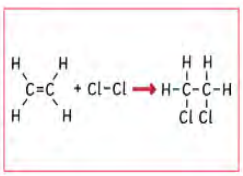
**Alkenes** are able to **react** with **hydrogen** in an addition reaction called **hydrogenation**. This particular reaction **requires** a **catalyst**.



**Alkenes** can also **react** with **water** to **produce** an **alcohol**. This is called a **hydration reaction**. The type of compound produced contains a hydroxyl group (-OH), this compound is an alcohol. The reaction **requires** a **high temperature** (300°C) and a **catalyst**.

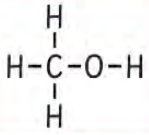
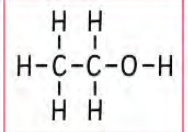
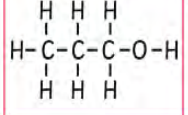
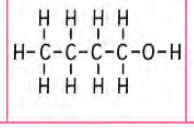


Addition reactions also occur with the **group 7 elements**, the **halogens**. The reaction is called a **halogenation reaction**. When an **alkene reacts** with a **halogen**, an **alkyl halide** is produced.



## Alcohols (Chemistry Only)

Alcohols all belong to the **same homologous group**. This is a group of organic compounds that have the same functional group (**-OH, hydroxyl group**) and that have similar chemical properties but different physical properties to each other. Note that alcohols all have the suffix '**ol**'.

| Name of Alcohol | Structural Formula | Molecular Formula | Uses |
|---|---|---|---|
| methanol |  | $CH_3OH$ | chemical feedstock |
| ethanol |  | $C_2H_5OH$ | alcoholic drinks, fuels and solvents |
| propanol |  | $C_3H_7OH$ | fuels and solvents |
| butanol |  | $C_4H_9OH$ | fuels and solvents |

## LESSON 3 Fractional distillation of crude oil

Red | Amber | Green

### Crude Oil

**Hydrocarbons** are compounds that are made up of the elements **hydrogen** and **carbon** only.

Crude oil is a **non-renewable resource**, **a fossil fuel**. Crude oil is made up of a mixture of compounds, most of which are long- and short-chain hydrocarbons.

Most of the compounds in crude oil are hydrocarbons called **alkanes**. The alkanes form a **homologous series**. This is a family of hydrocarbons that all share the **same general formula** and have **chemical properties** that are **similar**.

Alkanes are held together by **single bonds**.

The general formula for an alkane is $C_nH_{2n+2}$.

They differ from the neighbouring alkane with the addition of a $CH_2$.

Alkanes are **saturated hydrocarbons**. This means that all their bonds are taken up and they cannot bond to any more atoms.

Alkanes have **similar chemical properties** but have **different physical properties** due to differences in chain length. The longer the chain, the higher the boiling point of the hydrocarbon.

The first four alkanes are: methane, ethane, propane and butane.

A mnemonic to help you remember the order of the alkanes: **m**ice **e**at **p**aper **b**ags.

### Fractional Distillation

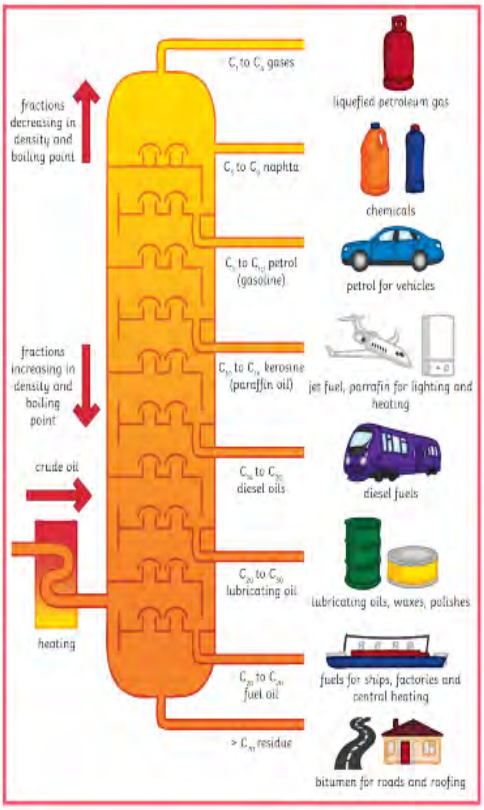
Fractional distillation is used to **separate** a mixture of long-chain hydrocarbons in crude oil into smaller, more useful fractions.

Hydrocarbons have different boiling points depending on their chain length. **Each fraction contains hydrocarbons of a similar chain length**. These fractions will boil at different temperatures due to the difference in sizes of the molecules. The different parts of crude oil are called fractions because they are a small part of the original mixture.

**Crude oil** is heated and enters at all column called a **fractioning column**. The column is **hot at the bottom** and decreases in temperature toward the top. As the crude oil is heated, it begins to evaporate and its vapours begin to rise up through the column. These vapours condense at the different fractions.

**Short-chain hydrocarbons** are found at the **top** of the column. This is because shorter chain molecules are held together by **weak intermolecular forces** resulting in low boiling points. These shorter chain hydrocarbons leave the column as gas.

**Long-chain hydrocarbons** are found at the bottom of the column and are held together by **strong intermolecular forces**, resulting in high boiling points.




| Name of Alkane | Structural Formula | Molecular Formula |
|---|---|---|
| methane |  | $CH_4$ |
| ethane |  | $C_2H_6$ |
| propane |  | $C_3H_8$ |
| butane |  | $C_4H_{10}$ |

### Combustion

**Complete combustion** occurs when there is **enough oxygen** for a fuel to burn. A hydrocarbon will react with oxygen to produce carbon dioxide and water.

**Incomplete combustion** occurs when there **isn't enough oxygen** for a fuel to burn. The products in this reaction are water and poisonous **carbon monoxide**.

## LESSON 4. Cracking crude oil

Red | Amber | Green

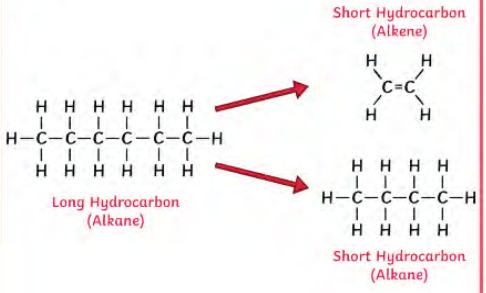
### Cracking

Cracking is an example of a **thermal decomposition reaction. Long-chain** hydrocarbons can be **broken** down into **shorter**, more useful hydrocarbon chains.

Cracking can be carried out with a catalyst in **catalytic cracking** or with steam in **steam cracking**.

Catalytic cracking involves heating a hydrocarbon to a high temperature (550°C) and passing over a hot catalyst.

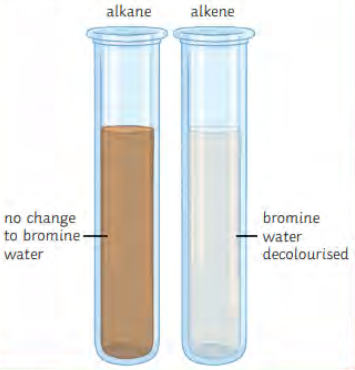
**Cracking** of a long-chain hydrocarbon **produces** a **short-chain alkane** and an **alkene**.




### Test for Alkanes

Bromine, when added to an **alkane**, will **remain brown/orange**. Alkanes are saturated hydrocarbons, they have no double bonds which could be broken to accept the bromine molecule and so remain orange.

Bromine, when added to an **alkene**, will **change from brown/orange to colourless**. This is because alkenes are unsaturated hydrocarbons. The double bond breaks and the bromine molecule is accepted.




### Making Polymers

The fractional distillation of crude oil and cracking produces an array of hydrocarbons that are **key** to our **everyday lives.**

Alkenes are used to produce plastics such as poly(ethene) which is used to make plastic bags, drinks bottles and dustbins. Poly(propene), another polymer, forms very strong, tough plastic.

| Short-Chain Molecules | Increasing Chain Length → | Long-Chain Molecules |
|---|---|---|
|  | As chain length increases, the **boiling point** of the hydrocarbon chains also increases. → |  |
| thin  | **Viscosity** describes how easily a substance can flow e.g. treacle is very viscous. → | thick  |
|  | **Flammability** is a measure of how easily a substance burns. → |  |

| | |
|---|---|
| In chemistry what is a "pure" substance? | A substance made of a single element or compound |
| How can pure substances be distinguished from impure ones? | By their melting/boiling points |
| What is a formulation? | A complex mixture designed as a useful product |
| What is chromatography? | A process to separate the constituents of a mixture |
| How is the Rf value calculated? | distance moved by spot/distance moved by solvent |
| How can hydrogen be tested for? | Makes a squeaky pop when lit a splint is placed in it |
| How can oxygen be tested for? | Relights a glowing splint |

## PURITY

A pure substance consists only of one **element** or one **compound**

Pure substances have a sharp **melting point** but mixtures **melt** over a range of temperatures. This difference is most easily seen when the temperature of a liquid is measured as it cools and **freezes**.

## FORMULATIONS

A **formulation** is a mixture which has been designed as a useful product. Formulations are all around us, for example:

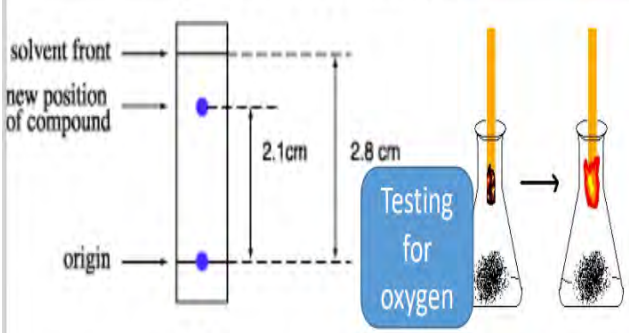
- fuels
- cleaning products
- paints

In a formulation, every chemical has been added in a carefully measured amount. Each chemical has a specific purpose in the formulation.

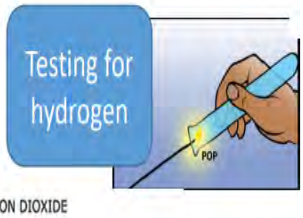
| 1. Keywords | |
|---|---|
| Pure substance | A single element or compound not mixed with any other substance. They have a specific melting and boiling point |
| Melting point | The temperature at which a solid turns to a liquid |
| Boiling point | The temperature at which a liquid turns to a gas |
| Formulation | A mixture that has been designed as a useful product eg fuels, cleaning agents, medicines and fuels |
| Chromatography | Use to separate mixtures and identify substances |
| Rf | (distance moved by substance)/(distance moved by solvent) |

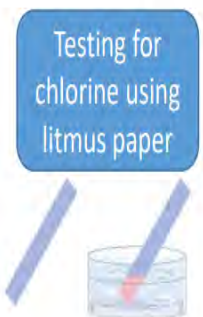
| | |
|---|---|
| Pure substance | A single element or compound that is not mixed with any other substance. |
| Formulation | A mixture that has been designed as a useful product. |
| Chromatography | A technique that can be used to separate mixtures and the identify substances. |

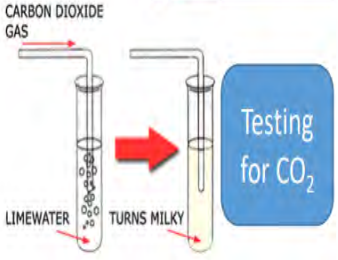
| | |
|---|---|
| Pure substance | A single element or compound that is not mixed with any other substance. |
| Formulation | A mixture that has been designed as a useful product. |
| Chromatography | A technique that can be used to separate mixtures and the identify substances. |

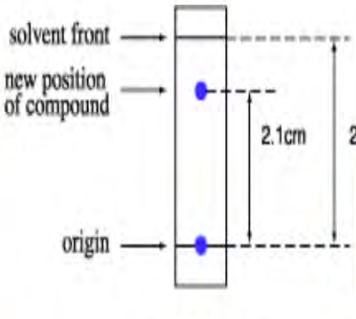



$R_f = \frac{2.1}{2.8} = 0.75$



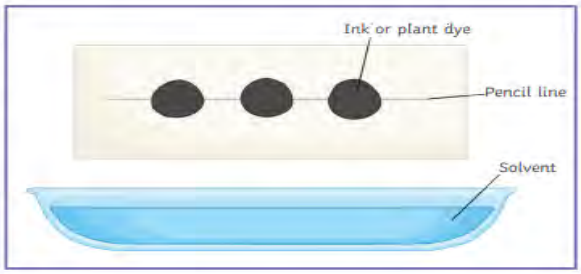

$R_f = \frac{2.1}{2.8} = 0.75$



## Chromatography

Paper chromatography is a separation technique that is used to **separate** mixtures of **soluble substances**. How soluble a substance is determines how far it will travel across the paper.

In chromatography, there are **two phases**: the mobile and **stationary** phase.

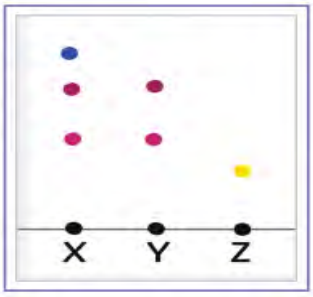



The **mobile phase moves** through the stationary phase. The **solvent** is the **mobile phase**. It moves through the paper carrying the different substances with it.

The **stationary phase** in paper chromatography is the **absorbent paper**.

Separation of the dissolved substances produces what is called **chromatogram**. In paper chromatography, this can be used to **distinguish** between those substances that are **pure** and those that are **impure**. **Pure substances** have **one spot** on a chromatogram as they are made from a single substance. **Impure substances** produce **two or more spots** as they contain multiple substances.

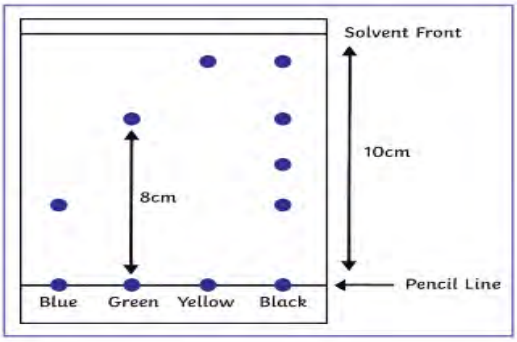
By calculating the **$R_f$ values** for each of the spots, it is possible to identify the unknown substances. Similarly, if an unknown substance produces the **same number** and **colour of spots**, it is possible to match it to a known substance.




## $R_f$ Value

$$R_f = \frac{\text{distance travelled by substance}}{\text{distance travelled by solvent}}$$

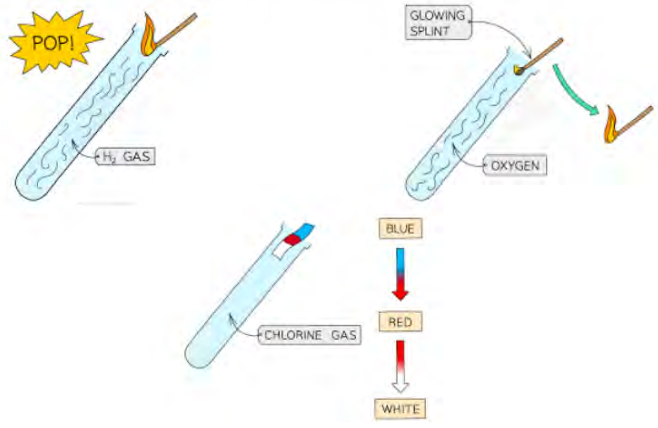
Different compounds have different $R_f$ values in different solvents. The $R_f$ values of known compounds can be used to help identify unknown compounds.




## C8 – Chemical analysis LESSON 4 Tests for common gases

Red | Amber | Green

| 2. Identification of common gases | | |
|---|---|---|
| Gas | Test | Observation |
| Hydrogen | Burning splint | Squeaky pop |
| Oxygen | Glowing splint | Relights |
| Carbon dioxide | Limewater | Goes cloudy |
| Chlorine | Damp Litmus paper | Bleached (goes white) |




### GAS TESTS

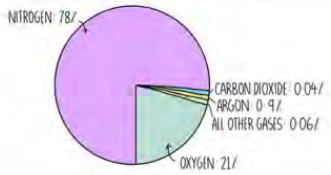
Specific gases can be identified by the following tests:

- Oxygen - place a glowing splint into the gas and it will relight
- Carbon Dioxide - bubble the gas through lime water and it will turn cloudy
- Hydrogen - place a lit splint in the gas and you will hear a popping sound
- Chlorine - place damp litmus paper into the gas and it will be bleached.

## C9 – Chemistry of the atmosphere LESSON 1-Evolution of the atmosphere

Red | Amber | Green

| 1. Composition of the earths atmosphere now | |
|---|---|
| 79% | Nitrogen |
| 20% | Oxygen |
| 1% | Other gases including $CO_2$ |




| 2. Evolution of the atmosphere | | |
|---|---|---|
| Time | Atmosphere | reason |
| 4 billion years a go | Nitrogen, Carbon dioxide and water vapour (like mars) | Volcanic erruptions |
| | Nitrogen, Carbon dioxide decreases | Earth cools and water vapour condenses. Carbon dioxide dis-solves into the oceans |
| 2.7 billion years ago | Increasing oxygen decreasing car-bon dioxide | Photosynthesising or-ganisms evolved |
| | Reducing oxygen to modern levels | Animals evolved and began respiring the oxygen |

| 3. Climate change | |
|---|---|
| Greenhouse gases | Gases which increase the temperature of the atmosphere Eg Carbon dioxide, methane, water vapour |
| Greenhouse effect | When excess greenhouse gases absorb and radiate IR radiation back to the earth warming it |
| Man-made climate change | The leading theory that human activities are causing an increase in global temperature |
| Carbon footprint | Total amount of carbon dioxide emitted over the life of a product, service or event |
| Global dimming | Particulates block the light from the sun slightly, reducing global temperature |
| Acid rain | Gases dissolve in rain causing damage to buildings, statues, lakes and trees |

| 4. Atmospheric pollutants from combustion | | |
|---|---|---|
| Pollutant | Source | Effect |
| Carbon dioxide | All combustion | Global warming |
| Carbon monoxide | Incomplete combustion | Toxic, breathing problems |
| Carbon particle (Soot) | Incomplete combustion | Breathing problems, global dimming |
| Sulfur dioxide | Burning sulphur, impurities in fossil fuels | Acid rain |
| Oxides of nitrogen | Vehicle engines | Acid rain |

**C9 – Chemistry of the atmosphere LESSON 2- Greenhouse gases and climate change** | **Red** | **Amber** | **Green**

# Chemistry Knowledge Organiser
## C13 - The Earth's atmosphere

| Key Terms | Definitions |
|---|---|
| Greenhouse Layer | The layer of gases which absorb infra red radiation emitted from the Earth |

### The Atmosphere

For 200 million years, the amount of different gases in the atmosphere have been much the same as they are today:

- 78% nitrogen
- 21% oxygen
- The atmosphere also contains small proportions of various other gases, including carbon dioxide, water vapour and noble gases.

### The Greenhouse Effect

The Earth has a layer of gases called the **Greenhouse layer.** These gases, which include carbon dioxide, methane and water vapour, maintain the temperature on Earth high enough to support life.

The greenhouse layer allows the short wave infrared radiation emitted by the Sun to pass through it but absorbs the long wave infra red radiation which is emitted by the Earth. This is how it insulates the Earth.

Some human activities increase the amounts of greenhouse gases in the atmosphere. These include:

- combustion of fossil fuels
- deforestation
- methane release from farming
- more animal farming (digestion, waste decomposition)


### The Evolution of the Atmosphere

Scientists are not sure about the gases in the early atmosphere, as it was so long ago (4.6 billion years) and the lack of evidence. Many scientists believe the early atmosphere was made up of mainly carbon dioxide, water vapour and small amounts of methane, ammonia and nitrogen, released by **volcanoes. There was little or no oxygen around at this time.** The early Earth was very hot, but as it cooled the water vapour in the atmosphere condensed and **formed the oceans.**

As the oceans formed, carbon dioxide dissolved in the ocean. The carbon dioxide formed carbonates and precipitated out (formed solids). This process reduced the amount of carbon dioxide in the atmosphere.

Approximately 2.7 billion years ago, plants and algae evolved. This decreased the amount of carbon dioxide in the atmosphere and increased the amount of oxygen in the atmosphere.

When sea animals evolved they used the carbon dioxide in the ocean to form their shells and bones (which are made of carbonates). When these sea creatures died their shells and bones became limestone (calcium carbonate), which is a sedimentary rock.

Once enough oxygen was in the atmosphere, it could support animals, which carry out respiration. These processes have caused the levels of gases in the atmosphere to be where they are today.

### Changes in the atmosphere

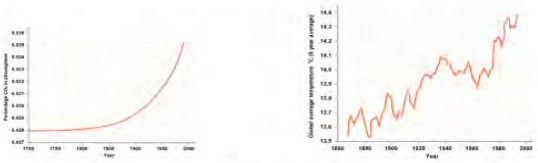
Recent activity by humans has changed the composition of the atmosphere. Combustion of fossil fuels has increased the amount of carbon dioxide in the atmosphere as well as other harmful gases such as nitrous oxides, which are made by nitrogen reacting with oxygen in the air.
**Sulphur** is also present in many fuels, this has increased the amount of sulphur dioxide which causes acid rain. Carbon particles can also released as can carbon monoxide from incomplete combustion.

**C9 – Chemistry of the atmosphere LESSON 3 AND 4 Carbon footprints/Air pollution.** | **Red** | **Amber** | **Green**

# Chemistry Knowledge Organiser
## C13 - The Earth's atmosphere

### The Enhanced Greenhouse Effect

In the last 100 years humans have added to the greenhouse layer through combustion of fossil fuels, increased farming and deforestation. Many scientists believe this has lead to a **rise in global temperature.**



However, this is such a complex system that misunderstandings of it can lead to **inaccurate or biased** opinions being reported in the media.

### Consequences of Climate Change

An increase in average global temperature is a major cause of **climate change.**
The potential effects of global climate change include:
- sea level rise, which may cause flooding and increased coastal erosion
- more frequent and severe storms
- changes in the amount, timing and distribution of rainfall
- water shortages for humans and wildlife
- changes in the food producing capacity of some regions
- changes to the distribution of wildlife species.

Students should be able to discuss the scale, risk and environmental implications of global climate change.

### Waste water and Sewage

Water water from houses and farming needs to **be treated** before it can be released into rivers and lakes. It is firstly filtered to remove large particles and is then left so that the sediment drops to the bottom. The "sludge," this is the name given to the sediment at the bottom, is then anaerobically digested (broken down by bacteria) to make methane gas. Any remaining **effluent** is broken down by aerobic respiration. The water is then released back into the rivers and lakes.

| Key Terms | Definitions |
|---|---|
| Carbon Footprint | The **carbon footprint** is the total amount of carbon dioxide and other greenhouse gases released over the life of a product |
| Carbon Neutral | There is no net increase in **carbon dioxide in the atmosphere** |

### Carbon Footprint

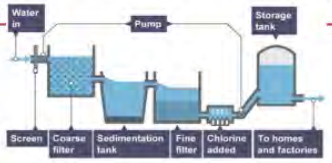
The **carbon footprint** is the total amount of carbon dioxide and other greenhouse gases released over the life of a product. Many people or businesses look to reduce their carbon footprint by:
- increased use of alternative energy supplies
- energy conservation
- carbon capture and storage
- carbon taxes and licences

People also try to **offset** their carbon by planting trees.
If something is carbon neutral, this means that there is no net increase in **carbon dioxide in the atmosphere** when it is used.

### Water

Water of appropriate quality is **essential for life**. For humans, drinking water should have low levels of dissolved **salts and microbes.** Water that is safe to drink is called **potable water**.
The methods used to produce potable water depend on available supplies of water and local conditions.
In the United Kingdom (UK), rain provides water with low levels of dissolved substances (fresh water) that collects in the ground and in lakes and rivers, and most potable water is produced by:
- passing the water through filter beds to remove any solids
- sterilising to kill microbes, using chlorine or UV light

In some parts of the world there is not enough fresh water so the salt has to be removed from water. This process is called **desalination.**
Desalination can be done by distillation or reverse osmosis. This requires a **large amount of energy.**

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| 1. | Red | Amber | Green |
|---|---|---|---|

**HOME LEARNING TASKS**

| Task Description | Done? |
|---|---|
| Look, cover, write the definition of keywords used in topic C7 -Organic chemistry. | |
| What is the general formula for alkanes, and how do their boiling points change with increasing chain length? | |

**C7: Organic Chemistry**

Describe the process of fractional distillation and its role in separating hydrocarbons in crude oil.
What are the key differences between alkenes and alkanes in terms of structure and reactivity?
Explain how the addition of hydrogen to alkenes can produce alkanes and identify the type of reaction involved.

**C8: Chemical Analysis**

What is the purpose of chromatography, and how can it be used to identify substances in a mixture?
Describe how to perform a flame test to identify metal ions and provide examples of colour changes for specific ions.
Explain the principles of titration and how it can be used to determine the concentration of a solution.
What are the limitations of using physical properties (like boiling point or melting point) to identify pure substances?

**C9: Chemistry of the Atmosphere**

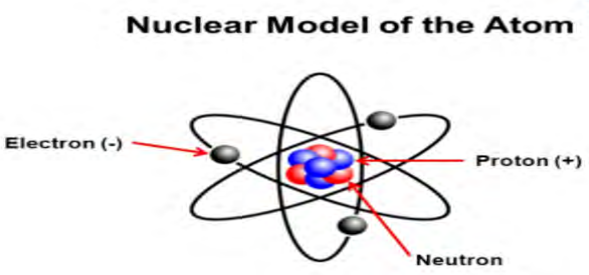
What are the main components of the Earth's atmosphere, and how have they changed over geological time?
Describe the greenhouse effect and its role in climate change.
Explain how human activities, such as burning fossil fuels, contribute to air pollution and its effects on health and the environment.
What are the consequences of acid rain, and how is it formed?

| | |
|---|---|
| Think of one experiment that you have done in the last term and write a conclusion question for it. | |

# Science Year 10 Term 1 – P4 & P5a – Atomic Structure & Forces

TERM FOCUS –
Big Ideas: What do we know about atoms and their interactions?

**Prior Learning Links**
Particle knowledge AND model gained in KS2 Science.
Atoms in general are made of a **nucleus** and **electrons** that move around the nucleus.
Most of the mass of the atom is concentrated in the nucleus, which is in turn made up of **protons** and **neutrons**.
The numbers of the individual particles can tell us the identity of a particular atom and determine its properties.
KS2/3 Science – The Scientific Method
KS2/3 Science – Evaluating experiments and planning for the future




**Future Learning Links**
1. KS3 Science Investigations
2. GCSE Required Practical Activities
3. GCSE Science Investigations

***Support Resources***
***GCSCEPOD***
ATOMIC STRUCTURE
https://members.gcsepod.com/shared/podcasts/chapter/89166

NUCLEAR RADIATION
https://members.gcsepod.com/shared/podcasts/chapter/89167

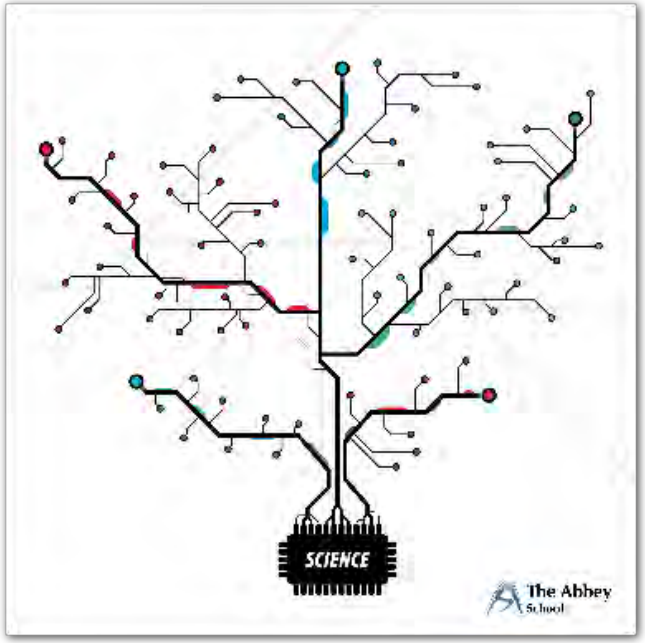
FORCES AND INTERACTION

https://members.gcsepod.com/shared/podcasts/chapter/89170

WORK DONE & ENERGY TRANSFER.

https://members.gcsepod.com/shared/podcasts/chapter/89204

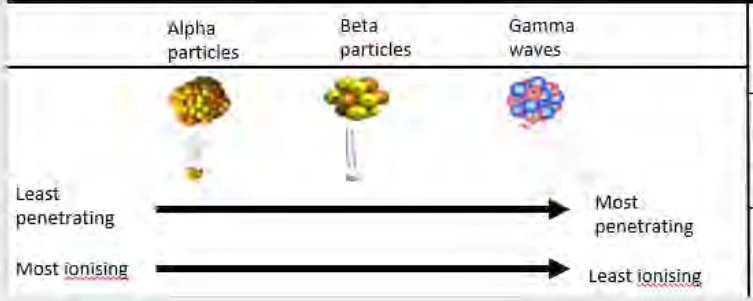
bbc bitesize Resources
Atomic structure
Atomic structure - GCSE Physics (Single Science) - BBC Bitesize
Forces
Force - GCSE Combined Science - BBC Bitesize



| 1. **The History of the Atom**<br><br>**LQ: How has our understanding of the atom developed over time?** | **Red** | **Amber** | **Green** |
|---|---|---|---|

| Key term/question | Definition/answer |
|---|---|
| 1. What are the three subatomic particles? | Protons, neutrons and electrons |
| 2. Which subatomic particles are found in the nucleus? | Protons and neutrons |
| 3. Which subatomic particle orbits the nucleus? | Electrons |
| 4. The mass number is .. | number of protons and neutrons. (Big number) |
| 5. The atomic number is... | number of protons and therefore the number of electrons (Small number) |
| 6. Define ion. | An atom gains of lose electrons to become charged. |
| 7. What is an isotope? | Same element with the same number of protons, but different number of neutrons. |
| 8. What is the structural difference between Carbon- 12 and Carbon-14? | Number of neutrons |
| 9. What are the three types of radioactive decay? | Alpha, Beta, Gamma |
| 10. What is an alpha particle composed of? | A helium nucleus: two protons and two neutrons. |
| 11. What is a beta particle? | A fast-moving electron |
| 12. How does beta decay occur? | A neutron in the nucleus turns into a proton and electron. The proton remains and the electron is ejected. |
| 13. What is gamma radiation? | An electromagnetic wave emitted from the nucleus |
| 14. What was Rutherford's experiment and why was it important? | Rutherford fired alpha particles at a thin sheet of gold. 1 alpha particle in 8000 bounced back, disproving the plum pudding model and it suggested that atoms have a dense nucleus. |
| 15. What is irradiation? | When an object is exposed to radiation |
| 16. What is contamination? | When radioactive material gets on an object. |
| 17. How is radiation measured? | Using a Geiger-Muller counter. (In Becquerels: Bq) |

## 3. Radioactive Decay




## 4. Nuclear equations

Alpha decay: $^{226}_{88}Ra \rightarrow {}^{222}_{86}Rn + {}^{4}_{2}He$

Beta decay: $^{8}_{3}Li \rightarrow {}^{8}_{4}Be + {}^{0}_{-1}e$

Gamma decay: $^{60}_{28}Ni \longrightarrow {}^{60}_{28}Ni$

## 1. Subatomic particle properties

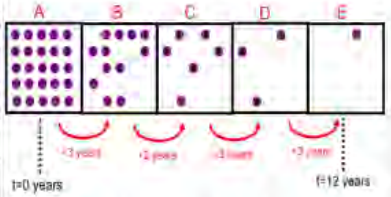
| | |
|---|---|
| What is the mass of a proton? | 1 |
| What is the mass of a neutron? | 1 |
| What is the mass of an electron? | 0 (1/2000) |
| What is the charge of a proton? | +1 |
| What is the charge of a neutron? | 0 |
| What is the charge of an electron? | -1 |

## 2. Timeline of the atom

| Date | Model of the atom | Diagram |
|---|---|---|
| 1805 | Indivisible spheres | |
| 1897 | Plum pudding model | |
| 1909 | Nuclear model following Rutherford's experiment | |
| 1913 | Bohr model | |
| 1919 | Bohr model with protons in the nucleus | |
| 1932 | Bohr with neutrons and protons in the nucleus | |

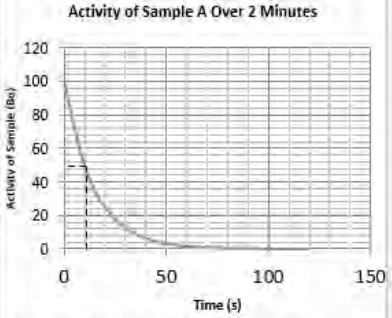
# P4 - Atomic structure

## 5. Half-life



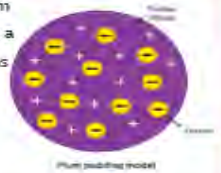

**Half life:** The time taken for the number of radioactive nuclei/decay events to decrease by half.

### Calculating half-life from a graph.




1. Choose two values from the activity/number of nuclei (Y axis). One number should be half of the other. E.g 100 and 50.
2. Use a ruler to draw across to the plotted line for each value.
3. Use a ruler to draw down to the time (X axis)
4. Find the difference in time, which shows the half life. In the example the half-life is 10 seconds.

## Developing the Model of the Atom

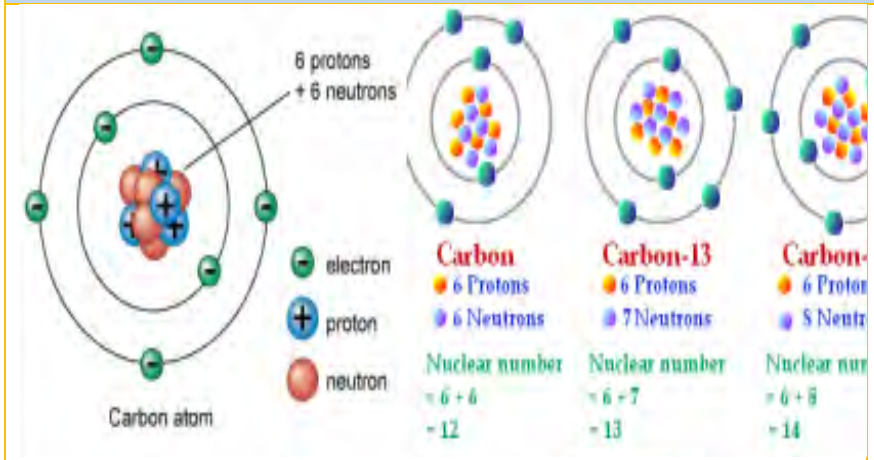
| Scientist | Time | Contribution |
|---|---|---|
| John Dalton | Start of 19th century | Atoms were first described as solid spheres. |
| JJ Thomson | 1897 | Thomson suggested the plum pudding model – the atom is a ball of charge with electrons scattered within it.  |
| Ernest Rutherford | 1909 | Alpha Scattering experiment – Rutherford discovered that the mass is concentrated at the centre and the nucleus is charged. Most of the mass is in the nucleus. Most atoms are empty space.  |
| Niels Bohr | Around 1911 | Bohr theorized that the electrons were in shells orbiting the nucleus.  |
| James Chadwick | Around 1940 | Chadwick discovered neutrons in the nucleus. |

| Key term/question | Definition/answer |
|---|---|
| 1. What are the three subatomic particles? | Protons, neutrons and electrons |
| 2. Which subatomic particles are found in the nucleus? | Protons and neutrons |
| 3. Which subatomic particle orbits the nucleus? | Electrons |
| 4. The mass number is … | Number of protons and neutrons. (Big number) |
| 5. The atomic number is… | number of protons and therefore the number of electrons (Small number) |
| 6. Define ion. | An atom gains of lose electrons to become charged. |
| 7. What is an isotope? | Same element with the same number of protons, but different number of neutrons. |
| 8. What is the structural difference between Carbon- 12 and Carbon-14? | Number of neutrons |

## 2. The structure of the atom

**LQ: What do modern scientists understand about an atom's structure?**

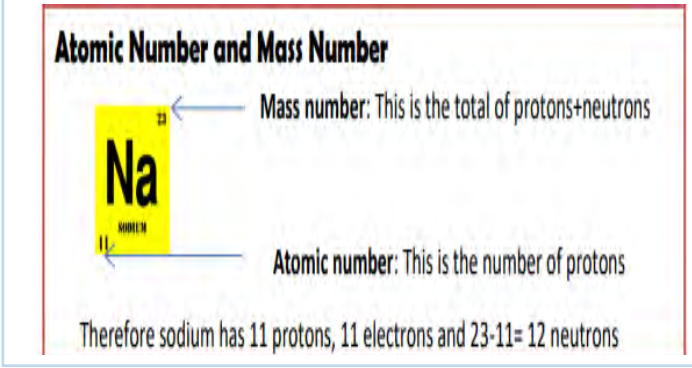
**Red** | **Amber** | **Green**




### Isotopes

An isotope is an element with the same number of protons but a different number of neutrons. They have the same atomic number, but different mass numbers.

| Isotope | Protons | Electrons | Neutrons |
|---|---|---|---|
| $^{1}_{1}H$ | 1 | 1 | 0 |
| $^{2}_{1}H$ | 1 | 1 | 1 |
| $^{3}_{1}H$ | 1 | 1 | 2 |

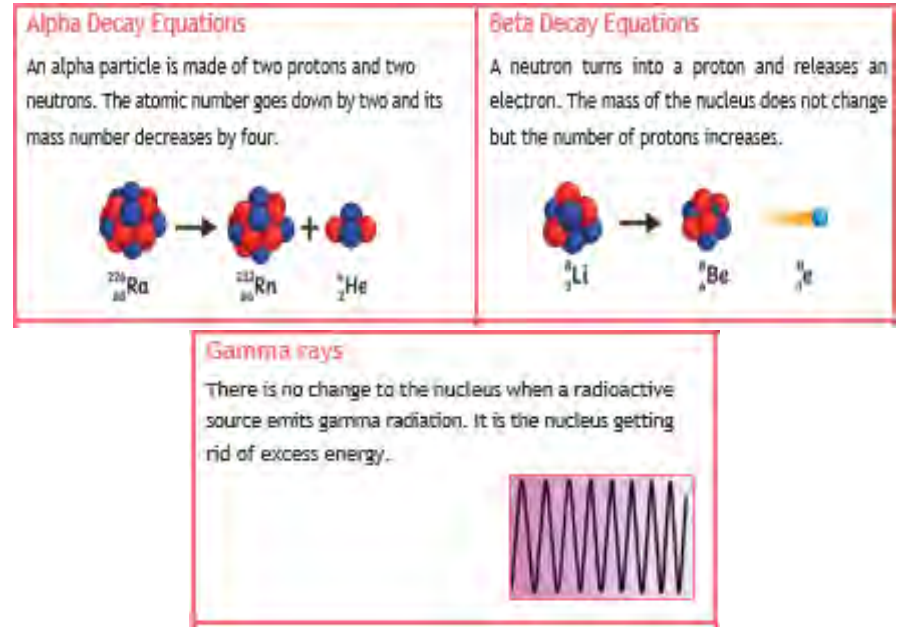


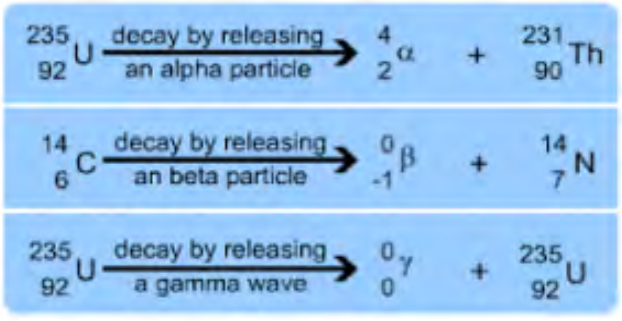

Some isotopes are unstable and, as a result, decay and give out radiation. Ionising radiation is radiation that can knock electrons off atoms. Just how ionising this radiation is, depends on how readily it can do that.

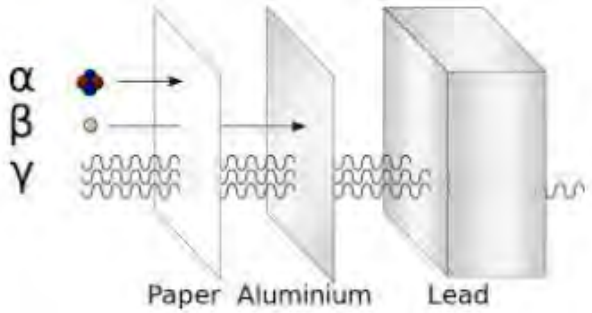
**3. Radioactivity**
**LQ: How can unstable atoms become stable through radioactive decay?**

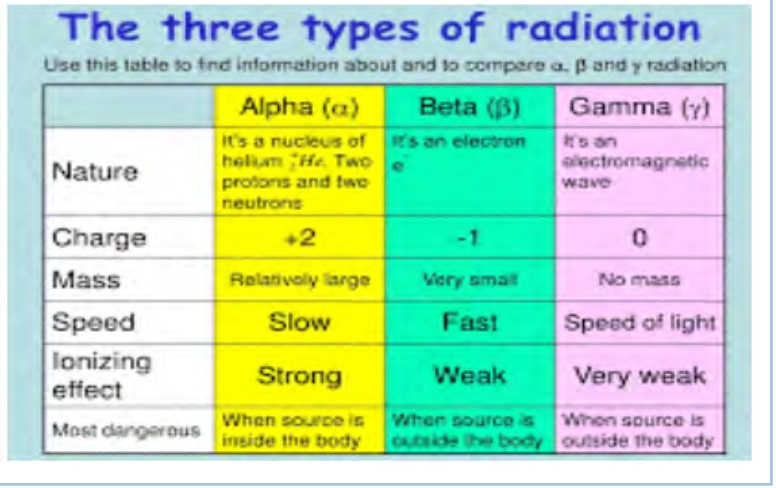
| Red | Amber | Green |
|---|---|---|

| Key term/question | Definition/answer |
|---|---|
| 9. What are the three types of radioactive decay? | Alpha, Beta, Gamma |
| 10. What is an alpha particle composed of? | A helium nucleus: two protons and two neutrons. |
| 11. What is a beta particle? | A fast-moving electron |
| 12. How does beta decay occur? | A neutron in the nucleus turns into a proton and electron. The proton remains and the electron is ejected. |
| 13. What is gamma radiation? | An electromagnetic wave emitted from the nucleus |
| 14. What was Rutherford's experiment and why was it important? | Rutherford fired alpha particles at a thin sheet of gold. 1 alpha particle in 8000 bounced back, disproving the plum pudding model and it suggested that atoms have a dense nucleus. |
| 15. What is irradiation? | When an object is exposed to radiation |
| 16. What is contamination? | When radioactive material gets on an object. |
| 17. How is radiation measured? | Using a Geiger-Muller counter. (In Becquerels: Bq) |
| | |



**4. Activity and Half-life**

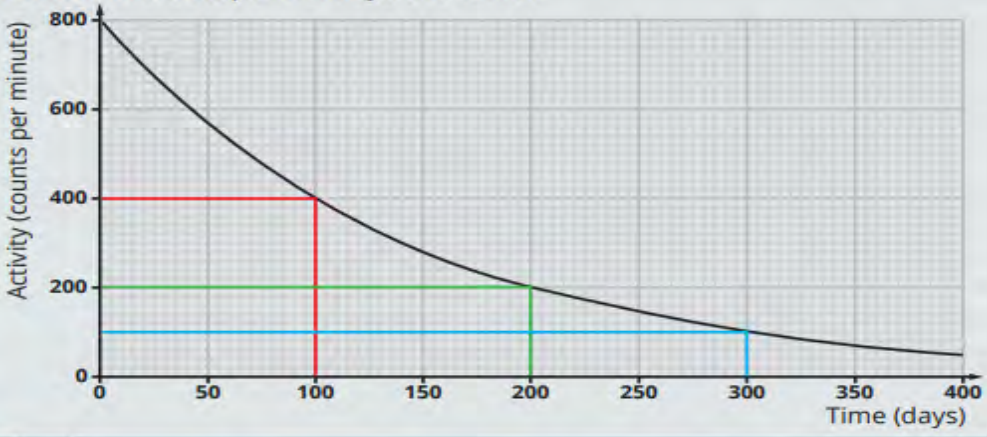
**LQ: How does the radioactive substance's activity change over time?**

| Red | Amber | Green |
|---|---|---|

**Half-life**

Half life is defined as the **time** it takes for the activity of a radioactive source to **halve**, or the **time** it takes for **half** the radioactive nuclei to decay.

The half life for the radioactive source shown on the graph below is **100 days**. The time it takes for the activity to halve from 800 to 400 counts per minute(cpm) is 100 days, it takes the same time to halve from 400 to 200 cpm and from 200 to 100 cpm. The half-life of a radioactive isotope is always the same.




**Calculations using half-life**

At the start, 100% of the source has not decayed, after 1 half life this will be 50% and after 2 half lives 25%.

100% $\xrightarrow{1\text{ half-life}}$ 50% $\xrightarrow{2\text{ half-lives}}$ 25% $\xrightarrow{3\text{ half-lives}}$ 12.5%

You can use the half-life of a material and this method to calculate the age of a sample or to predict the amount of a sample that will be left after a certain time.

For example, strontium-90 has a half-life of 29 years. The time it takes for the number of radioactive nuclei to drop to $\frac{1}{8}$ of its original value can be calculated using this technique.

1 $\xrightarrow{1\text{ half-life}}$ $\frac{1}{2}$ $\xrightarrow{2\text{ half-lives}}$ $\frac{1}{4}$ $\xrightarrow{3\text{ half-lives}}$ $\frac{1}{8}$

Three half-lives would be; 3 × 29 years = 87 years

**5. Irradiation and contamination**

**LQ: What is the difference between irradiation and contamination?**

| Red | Amber | Green |
|---|---|---|

**Radioactive decay**

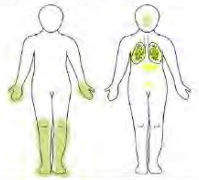
Of the two isotopes of carbon shown above, only carbon-12 is stable. Carbon-14 is **unstable because of an imbalance between the number of protons and neutrons in its nucleus**. This means it will try to become more stable by releasing some radiation. This is called decaying.

This is a **random process** as it is impossible to guess when a nucleus will decay but estimations can be made from the probability. This is similar to throwing several dice, you cannot guess which will land on 6 each time but you would expect roughly one sixth to land on 6.

Due to its random nature, any measurements of radiation should be taken over a **long time** or **repeated** several times **to reduce the effect of random fluctuations**.

## Irradiation and Contamination

- What is the difference?
- Irradiation involves exposure to ionising EM waves (UV, X-rays, gamma rays) and alpha or beta particles.
- Contamination involves radioactive material (which produces ionising radiation) being physically transferred.
- e.g. alpha sources outside the body are harmless because our skin is a barrier to alpha particles. However, if radioactive alpha sources (like radon) are airborne they can be breathed in and then produce alpha particles in the lungs where they can do damage.

| Contamination | Irradiation |
|---|---|
| This is when the source is inside the body, or on your skin and will affect you all of the time.  | This is when a source outside the body affects you – but only when you are near it.  |

| ATOMIC STRUCTURE TRIPLE<br>LQ: What do modern scientists understand about an atom's structure? | Red | Amber | Green |
|---|---|---|---|

## Section 8: Key Terms

| | |
|---|---|
| Background radiation | Background radiation **is around us all of the time**. It comes from:<br>• **natural sources** such as **rocks** and **cosmic rays** from space<br>• **man-made sources** such as the **fallout** from **nuclear weapons testing** and **nuclear accidents**. |
| Radiation dose | A measure of the **amount of exposure** to **radiation**, measured in **sieverts (Sv)**. |
| Radioactive isotopes | Isotopes **used in medicine** for **medical imaging**, **treatment of cancer** and as **tracers** to monitor organs. |
| Radioactive tracers | **Trace** the **flow of a substance** through an organ. |
| Nuclear Fission | **Splitting of** an atom's **nucleus** into **two smaller nuclei** and the release of two or three neutrons and energy. |
| Nuclear Fusion | is the **joining** of **two light nuclei** to form a **heavier nucleus**. In this process some of the **mass** may be **converted** into the **energy of radiation**. |

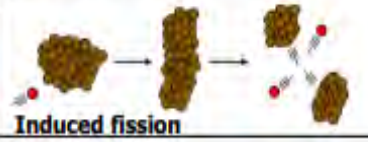
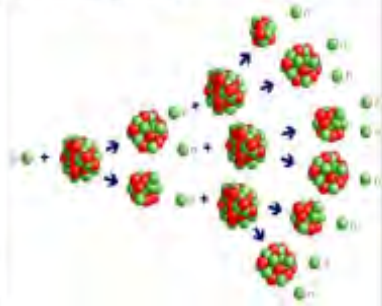
## Section 9: Radioactive isotopes and medicine

**Used** in medicine **for medical imaging**, **treatment of cancer** and **tracers** to monitor/explore internal organs. How useful the radioactive isotope is depends on it's half life and the type of radiation given out.

| | |
|---|---|
| Radioactive tracers | Radioactive Tracers (like radioactive Iodine) contain a **radioactive isotope** that **emits gamma** radiation. **Radioactive Iodine** is used because:<br>• Half life of 8 days (lasts lone enough for test but decays completely after a few weeks).<br>• Emits gamma so can be detected outside the body.<br>• Decays into a stable product. |
| Gamma Cameras | Take **images** of **internal body organs**. Before image is taken, patient is injected with solution containing a gamma-emitting radioactive isotope. The solution is absorbed by the organ and the camera detects the gamma radiation. The half life of the radioactive isotope **should not be** too **long** (to avoid unnecessary risks) **or too short** (so a useful image produced). |
| Gamma beams | **Gamma** beams (or radioactive implants) can **destroy cancer cells** in a tumour. |

## Section 10: Nuclear Fission

Nuclear fission is the **splitting of a large and unstable atom's nucleus** (e.g. uranium or plutonium) into two smaller nuclei and the release of neutrons and energy.

| | | |
|---|---|---|
| Induced fission | Energy is released in a nuclear reactor because of nuclear fission. In induced fission, the nucleus of an atom is struck by a neutron, causing the nucleus to split into two smaller fragment nuclei. Energy is also released. |  <br>**Induced fission** |
| Nuclear fission in **Power Stations** | • Unstable nuclei are **bombarded with neutrons**.<br>• The nuclei undergo fission and split.<br>• **Two smaller nuclei are formed** plus neutrons.<br>• **Energy is released**.<br>• Released neutrons cause more nuclei to split which produces a **chain reaction**.<br>• The reaction is **controlled** using **control rods** which **absorb the neutrons** (slowing down the chain reaction).<br>• A coolant removes the heat energy, usually to produce steam. |  <br>**Chain reaction** (extremely dangerous if not controlled). The explosion caused by a nuclear weapon is caused by an **uncontrolled** chain reaction. |

## Section 11: Nuclear fusion

Process of forcing the nuclei of two atoms close together forming a single larger nucleus. The two nuclei collide at high speed. Energy is released when the nuclei fuse together. The **suns core releases energy** due to the **nuclear fusion** reaction of **hydrogen nuclei into helium nuclei**.

| Nuclear fission | Nuclear fusion |
|---|---|
| Been used for over 50 years. | A **developing technology**. Needs to be at a **high temperature** and **pressure** for reaction take place and generate energy. |
| Uses uranium (only found in some parts of world) | Hydrogen fuel easily available as present in sea water |
| Produces radioactive waste which has to be stored safely and securely. | Reaction product helium is stable. |

**Topic 5 Forces**
**L1: Contact and Non-contact Forces & L2: Weight ,mass and Gravity**
**LQ: What is the difference between contact and non-contact forces?**
**LQ: How can gravity and mass be used to calculate weight?**

| Red | Amber | Green |
|---|---|---|
| | | |

## Scalar and vector quantities

Scalar quantities have only a magnitude. Vector quantities have a magnitude and direction.

| Scalar | Vector |
|---|---|
| Distance | Displacement |
| Speed | Velocity |
| mass | Acceleration |
| Temperature | Force |
| Pressure | Weight |
| Volume | Momentum |
| Work | |

## Contact and Non-contact Forces

Forces are always the result of objects **interacting** with each other. For instance, the force of gravity keeping this piece of paper on the desk is the result of the interaction between the Earth's mass and the paper's mass. All forces can be classified as contact or non-contact forces.

Examples of contact forces: friction, air resistance, tension, the normal contact force. Examples of non-contact forces: gravitational force, electrostatic force and magnetic force.

## MASS AND WEIGHT

**Mass** means how much matter an object contains, whereas **weight** is the force on an object due to gravity. Mass is measured in **kg**, whereas weight is measured in **N**. Mass is measured using a **balance,** whereas weight is measured using a **newton meter**. Mass does not vary depending on gravitational field strength, whereas weight does depend on gravitational field strength.

### Gravity

Gravity is a force that acts between any two objects with mass. W = mg is the equation that relates weight to mass and gravitational field strength. On Earth g = 10 N/kg. Gravity is the force that holds objects in orbit.

### The Wmg triangle


W = weight

m = mass

g = gravitational field strength

| | |
|---|---|
| $W = mg$ | $W = m \times g$ |
| $m = \frac{W}{g}$ | $m = W \div g$ |
| $g = \frac{W}{m}$ | $g = W \div m$ |

| Key Terms | Definitions |
|---|---|
| Quantity | Anything that can be given a numerical value. |
| Magnitude | Size of a quantity. E.g. a distance of 5 metres has a higher magnitude than 2 metres. |
| Scalar | Describes quantities that only have a magnitude (size). E.g. speed (how fast something is moving). |
| Vector | Describes quantities that have a magnitude AND a specific direction. E.g. velocity (speed in a particular direction) |
| Force | A vector quantity. Forces are pushes or pulls that act on an object. Forces have size and direction. Forces are the result of objects interacting with each other. |
| Contact forces | For these forces to act, the interacting objects have to be physically touching. |
| Non-contact forces | For these forces to act, the interacting objects don't have to be touching (they are physically separate). |
| Resultant force | The single overall force acting on an object. It has the same effect as all the forces acting on the object all together. The resultant force is the vital thing in working out how an object will move. If there is a resultant force, the object's speed will change; or the shape of the object will change; or the direction of the object will change. If the resultant force is nothing (the forces cancel out), the object will keep doing what it was doing – either not moving at all, or moving along at a steady speed. |

Challenge question: How do forces shape the movement of objects in the world?

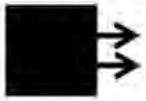
Suggested reading: GCSCEPOD https://www.bbc.co.uk/bitesize/topics/z4brd2p/articles/zs3896f

Forces - GCSE Physics (Single Science) - BBC Bitesize

| L3: Resultant Forces (some higher content).<br>LQ: How can the resultant of two forces be calculated? | Red | Amber | Green |
|---|---|---|---|

## The Resultant Force

In real life, there are usually a few forces acting on any particular object. All the forces can be shown with vectors (arrows – see above). When we take all the forces into account, we can draw just one vector arrow to show a single force, which has the same effect on the object as all the other forces acting at once. This is simplest when the forces are in a straight line:



two forces are acting; by adding them we get the resultant force....

this time, the forces are opposite in direction, and are different in magnitude. We subtract one from the other to get the resultant force...

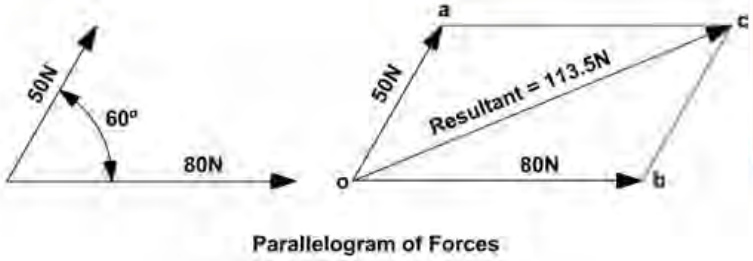
## Resultant Force continued

If the forces acting on an object are equal in magnitude and opposite in direction, then the resultant force ends up being ZERO. You can say the forces are balanced. Reading the definition above should make it clear that a resultant force of zero means that an object's movement will not change. So if it was moving to start with, a resultant force of zero means it keeps moving at the same speed. Also, zero resultant force means the direction can't change.

The resultant force is.... nothing!

## Free body diagrams

Free body diagrams are used to describe situations where several forces act on an object. Vector diagrams are used to resolve (break down) a single force into two forces acting at right angles to each other




Parallelogram of Forces

## Resultant force – The parallelogram rule (Higher only)

The parallelogram of force is used to find the resultant force when the forces don't act in the same line. To find the resultant force you:

1. Work out the scale
2. Copy out one force to scale so it follows on the other force at the same angle as the original
3. Repeat for the other force. The forces should meet and create a parallelogram.
4. Draw the resultant force between this point and the point the objects act from.
5. Measure the size of this arrow.
6. Use the scale to determine the magnitude of the force

## Work done and energy transfer

'Work' has a particular meaning in physics. If work has been done, energy has been transferred. Work is always done as a result of a force acting on an object. The amount of work can be calculated using W= Fs.

For example, if a force of 1000N makes the car move 200m to the left ...

The work done is W= 1000 x 200 = 200 000 J
This means 200 000 J of energy was transferred.

## Work done against Frictional Forces

When objects move, they are almost always moving against a frictional force – so the friction arrow is opposite to the direction of motion. Doing work against friction causes an energy transfer to heat (thermal) energy. This raises the temperature of the object and the surroundings.
There are frictional forces even when objects move through the air – air resistance.

## Example


In this example, a force of 10 N causes the box to move a horizontal distance of 2 m, so:

$W = F \times d$

$W = 10 \times 2$

$W = 20\ J$

## Distance vs. Displacement

Displacement is different to distance because it involves the direction that an object has moved. The displacement is always measured in a straight line from start to end of a journey, missing out any wiggles along the way.

| Key Terms | Definitions |
|---|---|
| Work done | The measure of how much energy is transferred when a force makes an object. You can say: 'a force does work on an object when it makes it move'. Doing work always involves the transfer of energy. This is a scalar quantity. |
| Joule | The unit joule (J) is how the amount of energy transferred by doing work is measured. 1 joule = 1 newton metre (thanks to the equation, below). |
| Distance | How far an object moves. It does not include direction , so distance is a scalar quantity. |
| Displacement | The distance an object moves from where it started. This is measured in metres. It is a vector quantity, because it includes the direction an object moved. |
| Friction | A contact force that results when two objects move past each other. They have to be touching. |

| Equation | Meanings of terms in equation and units |
|---|---|
| $W = F\,s$ * | ***W = work done (joules, J) F = force (newtons, N) s = distance (metres, m) – aka displacement*** |

## Distance vs. Displacement Diagram

Look how displacement is simply a straight line from A to B.
Distance is the total, with visits to C and D during the journey.

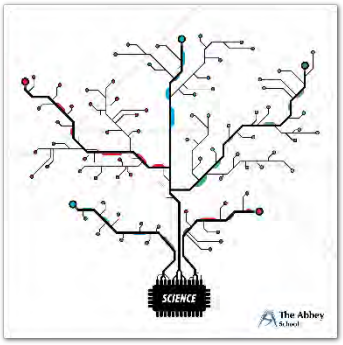
| HOME LEARNING TASKS | |
|---|---|
| **Task Description** | **Done?** |
| Look, cover, write the definition of keywords used in topic 1-history of an atom.<br>Draw a timeline showing the history of the atom, starting with the ancient Greeks in 500BC, and ending with the nuclear model. | |
| Describe the plum pudding model of an atom<br>Compare the plum pudding to the current nuclear model of an atom. | |
| Write a definition of: mass number, atomic number and an isotope.<br>A doctor weighs 600 N. A lift moves her 40 m to the top floor of a hospital. Calculate the work done on the doctor by the lift.<br>In a scrum, a rugby team pushes the other team backwards 5 m using a force of 1000 N. Calculate the work done moving the other team.<br>A sample has a half-life of 8 hours. It has an initial activity of 200 Bq. Calculate the activity of the sample after 1 day. | |
| Write a description of the three different radiation sources in terms of: their ionising ability, how far they travel, and what they are stopped by.<br>A nucleus emits a gamma ray; what happens to the mass and charge of the atom?<br>Give the definition of an isotope.<br>Give the definition of half-life. | |
| | |

# Physics Year 10 Block 2 – Forces

TERM FOCUS – Forces and Motion
Big Ideas – How do forces affect shape, size and motion?

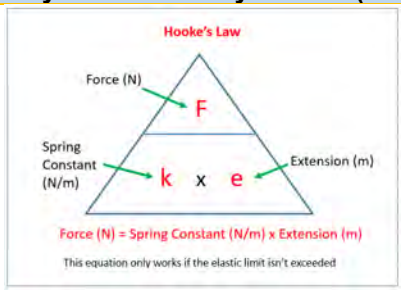
**Prior Learning Links**
1. KS3 Forces topic
2. KS3 Motion topic
3. KS3 Energy transfers

**Future Learning Links**
1. A Level Physics – Mechanics
2. A Level Maths – Motion
3. World of work




## 1. Describe how forces applied to an object may cause it to elastically or inelastically deform (Grade 4 – 7)

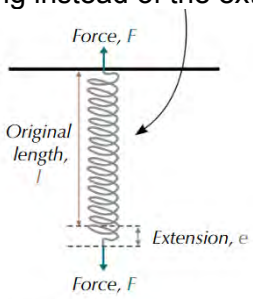
Red | Amber | Green




The equation can be written out like this:

$$Force = Spring\ constant \times Extension$$
$$F = ke$$

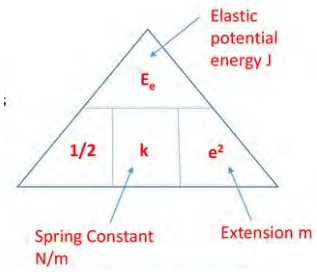
Hooke's Law is used to calculate the forces on a spring. The common mistake made is to use the length of the spring instead of the extension:




Elastic potential energy is the amount of energy stored in a spring. This can be used to push something forwards e.g. the energy stored in the elastic of a catapult or it can be used to absorb the energy of an impact e.g. the springs in a car's suspension.

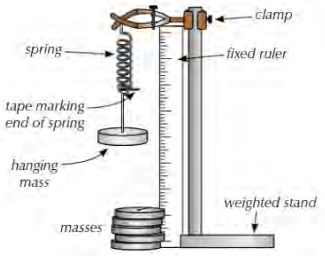
The equation can be written out like this:

$$E.P.E. = {}^{1}/_{2} \times Spring\ Constant \times Extension^2$$
$$E.P.E. = {}^{1}/_{2}\ ke^2$$




## 2. How does an object which can be elastically deformed behave when a force is applied? (Grade 3 – 6)

Red | Amber | Green



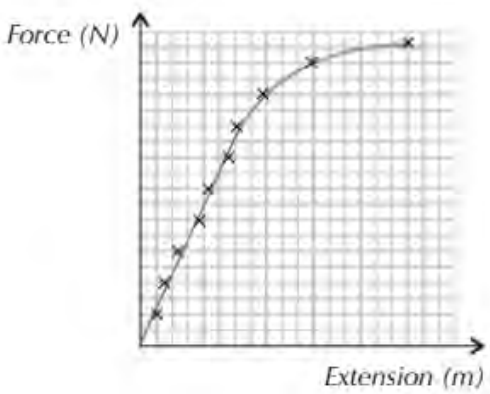

1. Set up the apparatus shown in the diagram.
2. Calculate the weight of the mass by using:
$$W = mg$$
3. Measure the original length of the spring and the new length when the mass is added.
4. Calculate the extension of the spring by:
$$Extension = New\ length - Original\ length$$

## 3. What is the relationship between force and extension on a spring? (Grade 3 – 6)

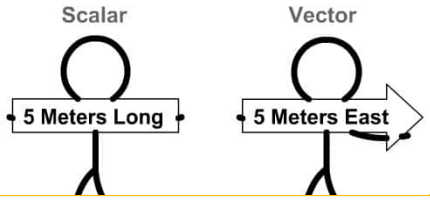
Red | Amber | Green

When the data is plotted as a line graph, there should be a straight line, passing through the origin. This is because the Force (N) and Extenstion (m) are directly proportional to each other.

This graph bends towards the top – this is because the spring has been over stretched and is not behaving elastically any more. This can lead to permanent deformation of the spring and eventually snapping.



**4. What is the difference between vector and scalar quantities? (Grades 2 – 4)** | Red | Amber | Green




A scalar is a quantity that has size or magnitude only. This is the picture on the left.

A vector is a quantity that has both magnitude and direction. This is the picture on the right.

**Common scalar quantities:**

1. Distance – measured in metres
2. Speed – measured in metres per second
3. Mass – measured in kilograms
4. Temperature – measured in degrees Celsius
5. Current – measured in Amps

**Common vector quantities:**

1. Displacement – measured in metres
2. Velocity – measured in metres per second
3. Acceleration – measured in metres per second$^2$
4. Force – measured in Newtons

**Common speeds of objects:**

A person walking — 1.5 m/s
A person running — 3 m/s
A person cycling — 6 m/s
A car — 25 m/s
A train — 55 m/s
A plane — 250 m/s

**5. How is acceleration different to speed? (Grades 4 – 9)** | Red | Amber | Green

$$a = \frac{\Delta v}{t}$$

a = Acceleration, measured in m/s$^2$
$\Delta$v = Change in velocity (sometimes written a v – u, where v is the final speed and u is the initial or starting speed), measured in m/s
t = time measured in seconds

**Worked example:**
A car accelerates from 10m/s to 15 m/s in 2.5s. What is its acceleration?

$$a = \frac{15 - 10}{2.5} = \frac{5}{2.5} = 2m/s^2$$

$$v^2 - u^2 = 2as$$

v$^2$ = Final speed measured in m/s
u$^2$ = Initial (starting) speed measured in m/s
a = acceleration measured in m/s$^2$
s = distance in m/s

**Worked example:**
A car accelerates at 5m/s$^2$ from 20m/s to 40m/s. How far did it travel whilst accelerating?

$$v^2 - u^2 = 2as$$

Rearrange to give:

$$s = \frac{v^2 - u^2}{2a} = \frac{40^2 - 20^2}{2 \times 5} = \frac{1600 - 400}{10} = \frac{1200}{10}$$

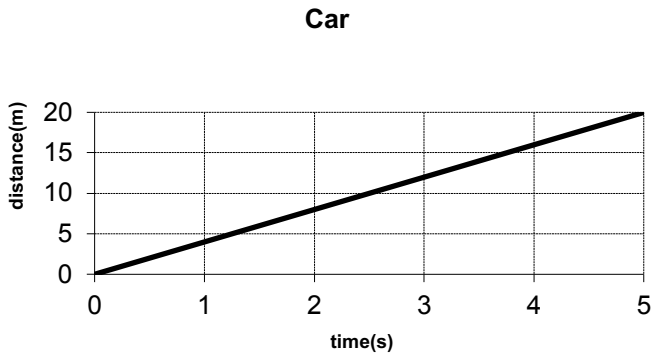
$$s = 120m$$

## 6. How are changes in distance represented on a graph? (Grades 4 – 9)

Red | Amber | Green

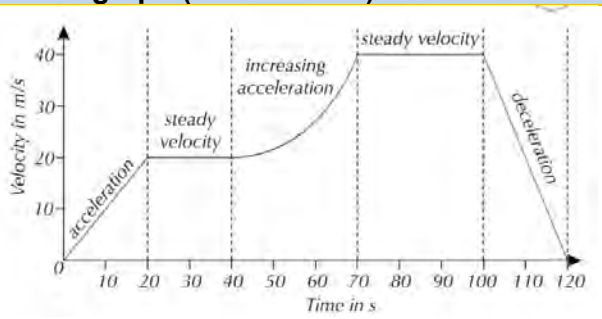
The speed of an object can be measured using the distance time graph.
The gradient of the graph is used to find the speed.
The gradient is found by dividing the change in the y axis (distance in metres) by the x axis (time in seconds)
Measure from a point low down on the graph that can be read easily (a place where the line sits exactly on two numbers from the graph axes and do the same from a point higher up on the graph.

$$Speed = \frac{Change\ in\ distance}{Change\ in\ time} = \frac{20-0}{5-0} = 4m/s$$




## 7. How is a velocity-time graph different to a distance-time graph (Grades 4 – 9)

Red | Amber | Green

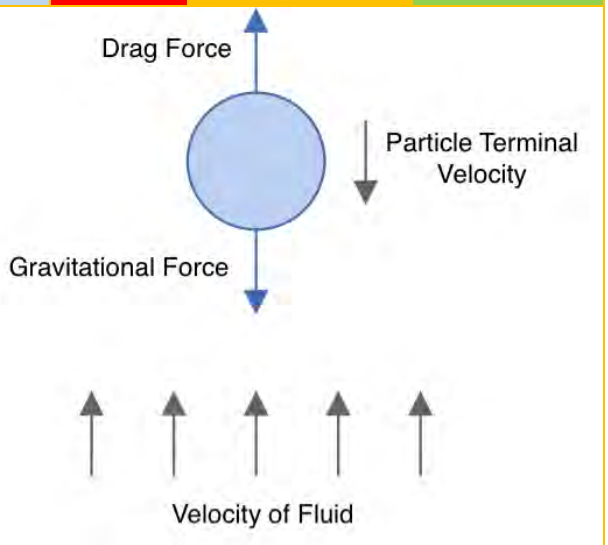



- The different gradients on this graph mean different things.
- An increasing gradient means that the object is accelerating.
- A flat line means that the object is travelling at a steady speed.
- A curved line means that the object is going through a changing acceleration.
- A decreasing gradient means that the object is slowing down.

## 8. What is terminal velocity (Grades 4 – 7)

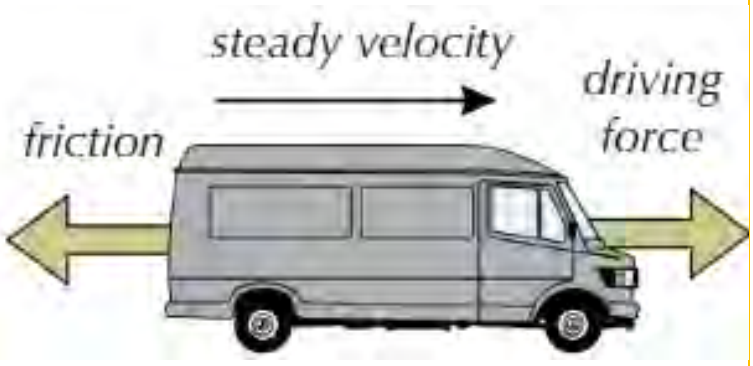
Red | Amber | Green

- Terminal velocity is reached when an object's forces are completely balanced – any force (such as gravity) pulling the object down and accelerating it, is the same as any force trying to slow the object down (such as air resistance).
- This can also happen in fluids for example an object falling through a tube of oil. The force of gravity pulling down is balanced by the drag force pulling back up again.



## 9. What is Newton's first law (Grades 3 – 6)

Red | Amber | Green




Newton's first law states:

"An object will stay at rest, or an object motion will stay at the same speed and direction unless another force acts on it."

A book that is still on a table will not move unless a force is applied to make it move.

The van on the left is travelling at a constant speed because the driving force equals the friction forces – there is no net force so the object stays at the same speed and direction unless a force acts on it.

## 10. How are force, mass and acceleration linked (Grades 4 – 9)

Red | Amber | Green

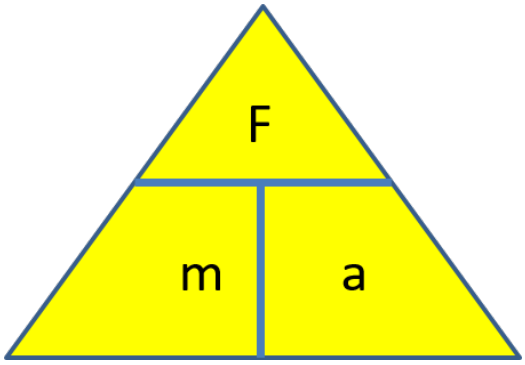
Newton's Second law of motion states:

"The acceleration of a moving object depends on its mass and the force acting on it."

Worked example:
A horse of mass 1500kg puts a force onto the ground of 750N with each hoof. What is the acceleration of the horse?

[Remember for this question that horses have 4 hooves, so the force will be multiplied by 4]

$$F = ma \rightarrow a = \frac{F}{m} = \frac{4 \times 750}{1500} = \frac{3000}{1500} = 2m/s^2$$




## 11. How can we experimentally test Newton's Second law of Motion (Grades 1 – 9)

Red | Amber | Green

**Required practical 6 – Investigating Motion**

**Watch the YouTube video clip explaining how to set up and complete this required practical activity.**

## 12. What is Newton's Third Law? (Grades 4 – 9)

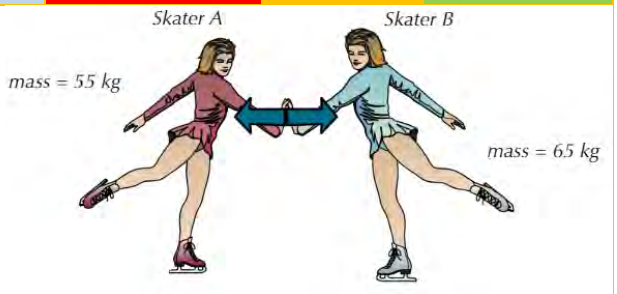
Red | Amber | Green

Newton's Third Law of Motion states:

"For every action there is an equal and opposite reaction."

When the two skaters push on each other, they feel a push in return and so both will move backwards.

This can also apply when objects are stationary, for example if a person pushes on a wall, the wall pushes back with an equal sized force in the opposite direction even though neither the wall nor the person moves.



| HOME LEARNING TASKS | |
|---|---|
| **Task Description** | **Done?** |
| 1. Practice recall of the equations in lessons 1, 5 and 10. Use look cover write check to help with this. | |
| 2. Use each of the equations from lessons 5 & 10 using numbers from the table in lesson 4. | |
| 3. Draw a terminal velocity diagram for a parachutist falling through the air with labelled forces and a diver falling through the sea with labelled forces | |
| 4. Draw a sketch version of a distance-time graph for your journey to school – include things like accelerating each time you start moving, stopping at junctions, decelerating every time there is a need to stop. | |
| 5. Describe the method used to obtain motion data from lesson 11. | |
| 6. Explain the different forces and accelerations felt by a parachutist from leaving the plane down to the ground having opened their chute. | |

# History Year 10 Term 2 – The Weimar Republic 1918-1929

By November 1918, the First World War had been going on for four years. The German army was still deadlocked against the armies of the Allies (including Britain, France and the United States). The Allies were gradually gaining the upper hand, but Germany was still undefeated on the battlefield. However, back at home, the German state was crumbling. Demonstrations, strikes, revolts and mutinies had broken out across the country. Between November 1918 and July 1919, in a series of events known as the German revolution, the Kaiser abdicated and a new German state – the Weimar Republic – was formed. Nevertheless, the new Weimar Republic was crippled from the start. It carried wounds inflicted by four years of warfare. It was resented by a large part of the German people. It was also governed under a flawed constitution – the Weimar Republic had a difficult birth.

**Prior Learning Links**

- Year 8 Term 5 – Weimar & Nazi Germany

**Future Learning Links**

- Year 10 Term 2-3: Completion of investigation into Weimar & Nazi Germany detailing the rise of the Hitler and the establishment of a dictatorship.
- Year 12 Paper 1: Germany 1918-1989 provides an investigation in breadth and depth of the Weimar Republic and Nazi Germany

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**GCSE Pod**

## KEY VOCABULARY

### Historical Skills Vocabulary

**Cause –** the reason for something happening
**Change** – when things are different to how they were before
**Consequence** – the result of something happening
**Continuity** – the opposite of change; when something stays the same or continues
**Difference** – the ways in which things are different to one another
**Factor** – something that can affect, or determine an event or outcome
**Inference -** a conclusion drawn about something using the information you already have about it
**Interpretation** – an historian's particular view on an event/period or the significance or importance of certain features/factors in this event/period
**Rate of change** – the pace at which change occurs; e.g. very quickly or slowly
**Reliability –** the degree to which something can be trusted or relied upon as accurate
**Significance –** the importance of something
**Similarity –** the quality of being similar, or the same
**Trend** – when there are a number of similar and related changes continuing in the same direction over a period of time
**Turning point** – a significant change happens – something that is different from what has happened before and which will affect the future

### Paper 3 GCSE: Weimar & Nazi Germany 1918-1939 Core Vocabulary

**Abdicate**: To give up a position of power or responsibility, especially a throne or royal office.
**Authoritarian**: Favoring or enforcing strict obedience to authority at the expense of personal freedom.
**Chancellor**: The head of the government in some countries, such as Germany or Austria.
**Coalition**: An alliance for combined action, especially a temporary alliance of political parties forming a government.
**Constitution**: A set of fundamental principles or established precedents according to which a state or other organization is governed.
**Culture**: The ideas, customs, and social behavior of a particular people or society.
**Communist**: A person who supports or believes in the principles of communism, where all property is owned by the community and each person contributes and receives according to their ability and needs.
**Democracy**: A system of government by the whole population, typically through elected representatives.
**Dictatorship**: A form of government in which a single person or a small group possesses absolute power without effective constitutional limitations.
**Economy**: The system by which a country's money and goods are produced and used.
**Fascism**: A political system based on a very powerful leader, state control of social and economic life, and extreme national pride, often involving the suppression of political opposition.
**Ideology**: A system of ideas and ideals, especially one that forms the basis of economic or political theory and policy.

| | |
|---|---|
| | **Left Wing**: The liberal, socialist, or radical section of a political party or system.<br>**Liberal**: Open to new behavior or opinions and willing to discard traditional values; often associated with policies favoring individual freedoms and government intervention to achieve social equality.<br>**Mutiny**: Refusal to obey the orders of a person in authority, especially by soldiers or sailors against their officers.<br>**Prejudice**: Preconceived opinion that is not based on reason or actual experience; bias. |

**American loans**: Financial assistance provided by the United States to Germany to stabilize its economy, particularly through the Dawes and Young Plans.
**Armistice**: An agreement to stop fighting, which ended the fighting in World War I on November 11, 1918.
Article 48
**Bauhaus**: An influential German school of art, design, and architecture founded in 1919, promoting modernist ideas.
**Dawes Plan**: A 1924 plan to resolve Germany's World War I reparations by restructuring payments and securing foreign loans.
**Expressionism**: A cultural movement in art and cinema during the Weimar period that emphasized emotional experience over physical reality.
**Friedrich Ebert:** Leader of the SPD, and first Chancellor of the Weimar Republic
**Freikorps**: Paramilitary groups composed of World War I veterans, often used to suppress communist uprisings in post-war Germany.
**Gustav Stresemann**: A leading German politician and statesman who served as Chancellor and Foreign Minister, instrumental in stabilizing Weimar Germany.
**Hyperinflation**: An extremely rapid and excessive rise in prices, which occurred in Germany in 1923, severely devaluing the German mark.
**Kaiser Wilhelm II**: The last German Emperor and King of Prussia, whose abdication in 1918 led to the establishment of the Weimar Republic.
**Kapp Putsch**: A 1920 coup attempt by right-wing elements, including the Freikorps, to overthrow the Weimar government.
**Kellogg-Briand Pact**: A 1928 international agreement in which signatory states promised not to use war to resolve disputes or conflicts.
**League of Nations**: An international organization established after World War I, which Germany joined in 1926 under Stresemann's leadership.
**Locarno Pact**: A series of agreements signed in 1925, in which Germany, France, Belgium, Great Britain, and Italy mutually guaranteed peace in Western Europe.
**Occupation of the Ruhr**: The 1923 invasion and occupation of the Ruhr Valley by French and Belgian troops in response to Germany's failure to pay reparations.
**Proportional Representation:** An electoral system which promotes a fair representation of all parties voted for – they are represented in proportion to the number of votes they received
**Reichstag:** Part of the Weimar Republic's Parliament – the governing and law-making chamber of Germany. Members were elected at least once every four years
**Revolution of 1918-1919**: A period of political turmoil in Germany that led to the abdication of the Kaiser and the establishment of the Weimar Republic.
**Rentenmark**: A new currency introduced in 1923 to stabilize the German economy and end hyperinflation.
**Spartacists**: A Marxist revolutionary group that led the Spartacist uprising in January 1919, seeking to establish a communist state in Germany.
**Stab-in-the-back myth**: The belief propagated by right-wing factions that Germany lost World War I due to internal betrayal rather than military defeat.
**Treaty of Versailles**: The 1919 peace treaty that ended World War I, imposing harsh reparations and territorial losses on Germany.
**Women's suffrage**: The right of women to vote, which was granted in Germany with the establishment of the Weimar Republic.
**Young Plan**: A 1929 program for settling German reparations debts after World War I, which reduced the total amount and extended the payment period.

| **1. What were the key events leading to the abdication of the Kaiser and the establishment of the Weimar Republic?** | **Red** | **Amber** | **Green** |
|---|---|---|---|
| **Can you describe the impact of the First World War on Germany and its society?**<br>**Can you explain the reasons behind Kaiser Wilhelm II's abdication in 1918?**<br>**Are you able to summarize the events of the German Revolution of 1918-19?** | | | |

| | | | |
|---|---|---|---|
| **2. What were the main features of the Weimar Constitution?** | **Red** | **Amber** | **Green** |
| **Can you identify the strengths of the Weimar Constitution?**<br>**Can you analyse the weaknesses and potential problems within the Weimar Constitution?**<br>**Are you able to compare the Weimar Constitution with the previous autocratic rule under the Kaiser?** | | | |
| **3. How did the armistice and the end of World War I influence the political landscape in Germany?** | **Red** | **Amber** | **Green** |
| **Can you explain the terms of the armistice and their implications for Germany?**<br>**Are you able to discuss the immediate political changes that occurred after the armistice?**<br>**Can you evaluate the impact of the armistice on public sentiment in Germany?** | | | |
| **4. Why was the Weimar Republic unpopular in its early years?** | **Red** | **Amber** | **Green** |
| **Can you describe the 'stab in the back' theory and its proponents?**<br>**Are you able to explain the key terms of the Treaty of Versailles and their effects on Germany?**<br>**Can you assess how the Treaty of Versailles contributed to the Republic's unpopularity?** | | | |
| **5. What were the significant threats to the Weimar Republic from the left and right?** | **Red** | **Amber** | **Green** |
| **Can you detail the goals and actions of the Spartacist uprising?**<br>**Can you explain the role and impact of the Freikorps in the early Republic?**<br>**Are you able to analyse the events and significance of the Kapp Putsch?** | | | |
| **6. What were the causes and consequences of the hyperinflation crisis of 1923?** | **Red** | **Amber** | **Green** |
| **Can you identify the reasons behind the French occupation of the Ruhr and its effects on Germany?**<br>**Are you able to explain how hyperinflation affected various groups within German society?**<br>**Can you evaluate the overall impact of the 1923 economic crisis on the stability of the Weimar Republic?** | | | |
| **7. How did Gustav Stresemann contribute to the economic recovery of the Weimar Republic?** | **Red** | **Amber** | **Green** |
| **Can you describe the introduction and impact of the Rentenmark?**<br>**Are you able to explain the significance of the Dawes and Young Plans in stabilizing the economy?**<br>**Can you assess the role of American loans and investment in the Weimar economic recovery?** | | | |
| **8. What were Stresemann's achievements in foreign policy, and how did they influence domestic policy?** | **Red** | **Amber** | **Green** |
| **Can you explain the importance of the Locarno Pact for Germany?**<br>**Are you able to describe Germany's entry into the League of Nations and its implications?**<br>**Can you analyze the impact of the Kellogg-Briand Pact on Germany's international standing?** | | | |
| **9. How stable was the Weimar Republic by 1929?** | **Red** | **Amber** | **Green** |
| **Can you discuss the economic and political indicators of stability in the late 1920s?**<br>**Are you able to evaluate the extent of support for the Weimar Republic among the German population?**<br>**Can you identify remaining weaknesses and potential threats to the Republic's stability?** | | | |
| **10. How did living standards change in Germany during the Weimar period?** | **Red** | **Amber** | **Green** |
| **Can you describe changes in wages and employment rates between 1924-1929?**<br>**Are you able to explain the developments in housing and urban living conditions?**<br>**Can you assess the effectiveness of unemployment insurance introduced during this period?** | | | |
| **11. What changes occurred in the role and status of women in the Weimar Republic?** | **Red** | **Amber** | **Green** |
| **Can you describe the changes in employment opportunities for women?**<br>**Are you able to explain the role of women in politics during the Weimar period?**<br>**Can you analyze the shifts in social and leisure activities for women in the 1920s?** | | | |
| **12. How did cultural life in Germany evolve during the Weimar years?** | **Red** | **Amber** | **Green** |
| **Can you identify key developments in Weimar architecture and their significance?**<br>**Are you able to describe important movements in Weimar art and their main characteristics?**<br>**Can you evaluate the impact of cinema on German culture during the Weimar Republic?** | | | |

| **HOME LEARNING TASKS** | |
|---|---|
| **Task Description** | **Done?** |
| Use 'Look, Cover, Write, Check' to learn the Weimar 1918-1929 Vocabulary | |
| Complete GCSE Pod Tasks 1-7 using the QR code at the top of the page | |
| Create a concept map with three areas: political challenges, economic challenges, and constitutional challenges. In each section, provide detail for how this area challenged the Weimar Republic. You must also include detail on how the Weimar Republic responded to/dealt with this challenge, and an overall evaluation of how significant the threat was of this type of challenge. | |
| **Exam Style Question:** Describe two features of the Weimar Republic. (4 marks) | |
| **Exam Style Question:** Explain why the Weimar Republic was increasingly unpopular from 1918-1929. (12 marks) | |
| **Exam Style Question:** 'Economic challenges were the most significant threat to the stability of the Weimar Republic' How far do you agree with this statement? (16 marks) | |

# Subject Year 10 Term 2 – Weimar & Nazi Germany 1918-1939: The Rise of Hitler & the Nazi Party

In this unit, you will explore the origins and rise of Adolf Hitler and the Nazi Party from 1919 to 1933 within the broader context of Weimar and Nazi Germany. You will learn about key events such as the Munich Putsch, the Wall Street Crash, and Hitler's appointment as Chancellor. You will examine how Hitler gained support, manipulated events like the Reichstag Fire, and used legal and violent means to consolidate power. Through this, you will develop critical thinking skills, source analysis, and the ability to assess the impact of political, social, and economic factors on historical events.

**Prior Learning Links**

- Year 8 Term 5 – Weimar & Nazi Germany
- Year 10 Term 1 – Weimar & Nazi Germany

**Future Learning Links**

- Year 10 Term 2-3: Completion of investigation into Weimar & Nazi Germany detailing the rise of the Hitler and the establishment of a dictatorship.
- Year 12 Paper 1: Germany 1918-1989 provides an investigation in breadth and depth of the Weimar Republic and Nazi Germany

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## KEY VOCABULARY

**KEY WORDS**

**Cause –** the reason for something happening
**Change** – when things are different to how they were before
**Consequence** – the result of something happening
**Continuity** – the opposite of change; when something stays the same or continues
**Difference** – the ways in which things are different to one another
**Factor** – something that can affect, or determine an event or outcome
**Inference -** a conclusion drawn about something using the information you already have about it
**Interpretation** – an historian's particular view on an event/period or the significance or importance of certain features/factors in this event/period
**Rate of change** – the pace at which change occurs; e.g. very quickly or slowly
**Reliability –** the degree to which something can be trusted or relied upon as accurate
**Significance –** the importance of something
**Similarity –** the quality of being similar, or the same
**Trend** – when there are a number of similar and related changes continuing in the same direction over a period of time
**Turning point** – a significant change happens – something that is different from what has happened before and which will affect the future

**Paper 3 GCSE: Weimar & Nazi Germany 1918-1939 Core Vocabulary**

**Authority** – The power or right to give orders, make decisions, and enforce obedience.
**Authoritarian**: Favoring or enforcing strict obedience to authority at the expense of personal freedom.
**Chancellor**: The head of the government in some countries, such as Germany or Austria.
**Coalition**: An alliance for combined action, especially a temporary alliance of political parties forming a government.
**Collapse** – A sudden failure or breakdown of an organization or system.
**Consequence** – The result or effect of an action or decision, often something negative.
**Constitution**: A set of fundamental principles or established precedents according to which a state or other organization is governed.
**Dictator** – A leader with total power over a country, typically one who has obtained control by force.
**Economic** – Relating to the economy, the system by which goods and services are produced, distributed, and consumed.
**Ideology** – A system of ideas and ideals, especially one that forms the basis of economic or political theory and policy.
**Influence** – The capacity to have an effect on the behaviour or decisions of someone or something.
**Opposition** – Resistance or dissent expressed in action or argument against something.
**Reorganise** – To arrange or structure something in a new way to improve it.
**Support** – Assistance or backing provided to someone or something, especially in political or social contexts.

**Paper 3 GCSE: Weimar & Nazi Germany 1918-1939 Specific Vocabulary**

1. **Bamberg Conference** – A 1926 meeting where Hitler reasserted his control over the Nazi Party and unified its direction.
2. **Communist Party** – A political party advocating for communism, which gained support in Germany during the economic crisis.

3. **Depression** – A severe and prolonged downturn in economic activity, like the Great Depression that started in 1929.
4. **Enabling Act** – A 1933 law that gave Hitler the power to pass laws without the Reichstag, marking the start of his dictatorship.
5. **Führer** – A title used by Adolf Hitler, meaning "leader," which symbolized his total control over Germany.
6. **German Workers' Party (DAP)** – The precursor to the Nazi Party, which Hitler joined in 1919.
7. **Gestapo** – Nazi Germany's secret police, tasked with suppressing opposition to Hitler's regime.
8. **Goebbels, Joseph –** Nazi minister for propaganda
9. **Göring, Hermann -** A key figure in the Nazi Party, Hermann Göring played a significant role as the founder of the Gestapo and as the head of the Luftwaffe (German Air Force). He was instrumental in consolidating Nazi power, overseeing economic and military strategies, and was second in command after Hitler.
10. **Hindenburg** – President of Germany who appointed Hitler as Chancellor in 1933.
11. **Himmler, Heinrich** – As head of the SS (Schutzstaffel) and one of Hitler's closest allies, Heinrich Himmler was responsible for overseeing the Nazi regime's security forces, including the Gestapo. He played a central role in organizing the Holocaust and enforcing terror within Germany and occupied territories, making him one of the most feared figures in the regime.
12. **Lebensraum** – A key Nazi ideology that promoted territorial expansion for Germans, meaning "living space."
13. ***Mein Kampf*** – A book written by Hitler outlining his political ideology and future plans for Germany.
14. **Munich Putsch** – A failed 1923 coup attempt by Hitler to seize power in Bavaria, leading to his imprisonment.
15. **Nazi Party (NSDAP)** – A political party led by Hitler that promoted nationalism, anti-Semitism, and dictatorship.
16. **Propaganda** – Biased information used to promote a political cause or viewpoint, widely used by the Nazi Party.
17. **Reichstag** – The German Parliament, where key political decisions were made before and during Hitler's rise.
18. **Reichstag Fire** – A 1933 event where the German parliament building was set on fire, which Hitler used as an excuse to crack down on communists.
19. **Rohm, Ernst –** Early member of the German Workers Party. Used his connections with the military to establish the SA, the paramilitary wing of the Nazi party.
20. **SA (Sturmabteilung)** – Also known as the Brownshirts, a paramilitary group used by the Nazis to intimidate opponents.
21. **SS (Schutzstaffel)** – Hitler's elite personal bodyguard, which later became one of the most powerful organizations in Nazi Germany.
22. **Twenty-Five Point Programme** – The Nazi Party's political platform, which outlined its goals, including anti-Semitism and anti-communism.
23. **Von Papen, Franz** – Appointed Chancellor in the chaos of 1932. Von Papen believed he could harness the power of the Nazis to his own gain, and keep Hitler under his thumb. Von Papen proposed a new government with Hitler as Chancellor, and himself as Vice-Chancellor in 1933 – propelling Hitler to his first position of real power.
24. **Von Schleicher, Kurt –** A rival for power with Adolf Hitler, von Schleicher was a German general and the penultimate chancellor of the Weimar Republic.
25. **Wall Street Crash** – The 1929 stock market crash in the United States, which had global economic effects, including in Germany.

| | | | |
|---|---|---|---|
| **1. What influenced Hitler's early political career?** | **Red** | **Amber** | **Green** |
| **Can you explain Hitler's experiences during World War I?**<br>**Are you able to describe how Hitler joined the German Workers' Party?**<br>**Can you identify key ideas in the Twenty-Five Point Programme?** | | | |
| **2. Why did Hitler attempt to seize power in 1923?** | **Red** | **Amber** | **Green** |
| **Can you explain the reasons for the Munich Putsch?**<br>**Are you able to describe the key events of the Putsch?**<br>**Can you evaluate the consequences of the failed coup?** | | | |
| **3. How did the Nazi Party change after the Munich Putsch?** | **Red** | **Amber** | **Green** |
| **Are you able to explain how Hitler reorganized the Nazi Party?**<br>**Can you describe the significance of the Bamberg Conference of 1926?**<br>**Can you assess why the Nazi Party had limited support in the late 1920s?** | | | |
| **4. What impact did the Wall Street Crash have on Germany?** | **Red** | **Amber** | **Green** |
| **Can you explain the link between the Wall Street Crash and German unemployment?**<br>**Are you able to describe how the economic crisis affected political stability?**<br>**Can you assess how this crisis influenced support for the Nazis?** | | | |
| **5. Why did people support Hitler and the Nazi Party?** | **Red** | **Amber** | **Green** |
| **Can you identify the main reasons people were attracted to the Nazi Party?**<br>**Are you able to explain the role of Nazi propaganda and the SA?**<br>**Can you evaluate how Hitler's leadership style influenced public opinion?** | | | |

| 6. How did Hitler become Chancellor of Germany in 1933? | Red | Amber | Green |
|---|---|---|---|
| **Can you explain the significance of the 1932 Presidential and Reichstag elections?**<br>**Are you able to describe the roles of Hindenburg and von Papen in Hitler's appointment?**<br>**Can you evaluate why Hitler's opponents underestimated him?** | | | |
| **7. Who started the Reichstag Fire and how did it benefit Hitler?** | **Red** | **Amber** | **Green** |
| **Can you describe the events of the Reichstag Fire?**<br>**Are you able to explain how Hitler used the fire to target communists?**<br>**Can you assess how the fire contributed to Hitler's consolidation of power?** | | | |
| **8. How did Hitler consolidate power after becoming Chancellor?** | **Red** | **Amber** | **Green** |
| **Can you explain the significance of the Enabling Act?**<br>**Are you able to describe the process by which Hitler dismantled opposition?**<br>**Can you evaluate how Hitler's actions after 1933 turned Germany into a dictatorship?** | | | |
| **9. What role did the SS and Gestapo play in Nazi control?** | **Red** | **Amber** | **Green** |
| **Can you describe the role of the SS in maintaining Nazi control?**<br>**Are you able to explain how the Gestapo suppressed opposition?**<br>**Can you evaluate how terror and policing reinforced Nazi power?** | | | |
| **10. How did the Nazis manipulate the legal system to control Germany?** | **Red** | **Amber** | **Green** |
| **Can you explain how the Nazis used laws to consolidate their power?**<br>**Are you able to describe the effects of the Enabling Act on democracy?**<br>**Can you assess how the legal system was used to silence opposition?** | | | |
| **11. How did economic conditions influence the Nazi rise to power?** | **Red** | **Amber** | **Green** |
| **Can you explain how hyperinflation and unemployment affected the Weimar Republic?**<br>**Are you able to describe the economic promises made by the Nazi Party?**<br>**Can you evaluate the role of the Great Depression in Hitler's rise?** | | | |
| **12. What was the significance of Nazi propaganda in building support?** | **Red** | **Amber** | **Green** |
| **Can you describe how Goebbels and the Nazi Party used propaganda?**<br>**Are you able to explain the impact of Nazi slogans, posters, and speeches?**<br>**Can you evaluate how propaganda shaped public perception of Hitler and the Nazis?** | | | |

**HOME LEARNING TASKS**

| **Task Description** | **Done?** |
|---|---|
| Use 'Look, Cover, Write, Check' to learn the Medieval Medicine Vocabulary | |
| Complete GCSE Pod Tasks using the QR code at the top of the page | |
| Create a timeline/living graph of the growth of the Nazi Party showing X axis: Key events, Y axis: Popularity of the Nazi party at this time. | |
| **Exam Style Question:** What can you infer from Source A about the early development of the Nazi Party? (4 marks)<br>**Source A: From The Memoirs of Ernst Röhm, published in 1928. I introduced all my army friends to the German Workers' Party.**<br>*This was how we built up the movement in the early days. In February 1920, the Party presented its policies to the public for the first time in the Twenty-Five Point Programme. From that day on, the Party membership began to increase so much that we had to move the meetings to much larger venues. After overcoming his opponents within the Party in 1921, Adolf Hitler was elected the first leader of the renamed National Socialist German Workers' Party* | |
| **Exam Style Question:** Study interpretation 1 and 2. They both give different views on the extent of support for the Nazis in the year 1924-1928. What is the main difference between these views? (16 marks) | |

| **Interpretation 1: From Germany: The Third Reich 1933–45 by G Layton, published in 1992**. | **Interpretation 2: From Spartacus Education, a history website.** |
|---|---|
| After the Munich Putsch, Hitler realised that he had to make the Nazi Party capable of gaining power by winning elections. In 1926, he re-established his control over the Nazi Party. The Nazi Party was reorganised. New groups were created to attract support, like the Hitler Youth. The Party was taking shape and its membership was increasing. In the 1928 election the Nazis gained votes in rural areas. They had also started to target the middle classes with their propaganda. | The Weimar government brought inflation under control and the economy began to improve. Because of this, the German people started to believe in the democratic system and were not interested in Hitler's ideas. Hitler claimed he was no longer trying to start a revolution and said he was willing to compete with other political parties in democratic elections. However, this policy of taking part in elections was unsuccessful. The Nazi Party won 14 seats in the December 1924 election. In the 1928 election they only won 12 seats; less than 3% of the people voted for the Nazi Party. |

| | |
|---|---|
| **Exam Style Question:** How far do you agree with Interpretation 2 about support for the Nazi Party in the years 1924–28? Explain your answer, using both interpretations and your knowledge of the historical context. (16 marks) | |

# Geography Year 10 Term 2 – Economic Development in the UK

This topic explores the UK's changing economy, looking at how different sectors have developed over time. As the UK transitioned from an industrial powerhouse in the 19th and early 20th centuries, it now operates in a post-industrial economy where service-based (tertiary) and knowledge-based (quaternary) industries dominate. Students will examine key concepts like the north-south economic divide, the importance of sustainable industries, the role of transport infrastructure in economic growth, and the environmental impacts of industrial activities.

**Prior Learning Links**

- Year 8 Term 2 Economic World in KS3 examines the economy in the UK (nationally) before examining globally (The Middle East).

**Future Learning Links**

- Economic development and change in Nigeria
- Urban change in Rio

**KEY WORDS**

- **Sustainable**: Meeting present needs without compromising future generations.
- **De-industrialisation**: The decline of manufacturing industries in an area.
- **Post-industrial**: An economy no longer dominated by manufacturing, but by services and technology.
- **Primary Sector**: Jobs involving extraction of raw materials (farming, fishing, mining).
- **Secondary Sector**: Jobs involving manufacturing or construction.
- **Tertiary Sector**: Service-based jobs (teaching, retail, healthcare).
- **Quaternary Sector**: Knowledge-based jobs (research, IT, science).
- **Hi-tech**: High technology industries, often in science parks.

## 1. What industries can you work in, and how does that affect the economy?

Red | Amber | Green

**Overview of sectors:**

The UK's economy is divided into four sectors:

- **Primary:** Involves extracting raw materials (e.g., agriculture, mining). It was historically significant in the UK but has greatly declined.
- **Secondary:** Focuses on manufacturing and construction (e.g., making cars, producing steel). This sector has also declined due to de-industrialisation, with many factories moving abroad to lower-wage countries.
- **Tertiary:** Involves services like retail, healthcare, and banking. This sector has grown rapidly, accounting for most UK jobs today.
- **Quaternary:** Involves high-tech industries, research, and development (e.g., IT, biotechnology). As the UK continues to innovate, this sector is expanding quickly.

**Economic evolution:** As a country develops, it usually shifts from primary and secondary sectors to tertiary and quaternary. The UK is an example of this shift, moving away from heavy industries to focus on finance, technology, and services

## 2. What is a post-industrial economy, and how has it changed the UK?

Red | Amber | Green

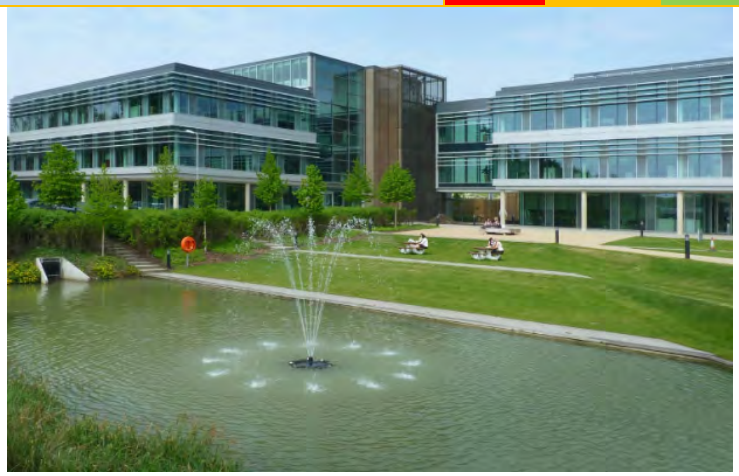
**Industrial decline:**
Since the 1800s, the UK has seen a decline in industries like coal mining, shipbuilding, and textiles, which formed the backbone of its economy. This decline was driven by factors such as globalisation, cheaper labour in other countries, and technological advancements.

**Post-industrial UK:**
In recent decades, the UK's economy has shifted towards tertiary and quaternary industries. Today, services (e.g., banking, tourism) and high-tech sectors (e.g., computer science, pharmaceuticals) dominate. Cities like London are global financial hubs, while places like Cambridge are renowned for scientific research. This transition has helped the UK remain competitive in a globalised world.

## 3. What are science parks, and why are they located near universities?

Red | Amber | Green

**Definition:**
Science parks are areas that house technology-based companies, often located near universities to benefit from academic research and highly skilled graduates. They promote collaboration between businesses and academia, allowing companies to innovate and develop cutting-edge technology.



**Why universities?**
Universities provide access to research facilities, expertise, and innovation, which help companies stay at the forefront of new technologies. Being located close to universities also allows companies to hire skilled graduates directly. Examples include Cambridge Science Park, which is near the University of Cambridge, a hub for tech and pharmaceutical research.

## 4. What are the environmental impacts of industry, and how can it be made more sustainable?

Red | Amber | Green

**Environmental impacts:**
Industries can have major environmental consequences, such as air and water pollution, habitat destruction, and greenhouse gas emissions. For example, factories that rely on fossil fuels contribute to climate change, while mining can degrade ecosystems.

**Sustainable industries:**
Sustainable practices aim to reduce environmental harm. These include using renewable energy, recycling waste, and adopting cleaner technologies. Case studies like Nissan's Sunderland plant show how industries can adopt sustainable practices (e.g., electric vehicles) while remaining economically viable. Torr Quarry, Somerset, is an example of sustainable limestone extraction, where environmental impacts are minimised through careful management.

## 5. How are transport and the economy linked?

Red Amber Green

**Transport networks and economic growth:**
Efficient transport systems, including roads, railways, airports, and ports, are essential for economic development. They allow goods and services to be transported quickly, promote trade, and improve connectivity within and between countries. For example, Heathrow Airport serves as a key hub for global trade and tourism, while HS2 aims to link northern and southern UK cities, promoting regional economic growth.


**Infrastructure and development:**
Developing new transport infrastructure creates jobs, boosts economic activity, and helps attract businesses. The construction of projects like the HS2 high-speed rail line shows how transport can reduce regional disparities in economic development, connecting the north and south of the UK more efficiently.

## 6. Why is the UK divided in half?

Red Amber Green

**The North-South Divide:**
There is a significant economic divide between the north and south of the UK. Southern regions, especially around London, have seen faster economic growth, more job opportunities, and higher wages compared to the north, where industries like coal mining and manufacturing once thrived but have since declined. However, cities like Manchester and Liverpool are now experiencing regeneration and growing service industries.

**Case studies:**
London's financial sector contrasts with the industrial history of northern cities. However, northern cities are catching up through initiatives like the Northern Powerhouse, designed to stimulate economic growth in the region.

## 7. How are rural landscapes in the UK changing?

Red Amber Green

**Population growth vs shrinkage:**
Rural landscapes in the UK are changing due to varying population trends. In areas near cities, like southern England, population growth has led to the expansion of commuter belts. Villages are turning into commuter towns, increasing demand for housing and services. In contrast, some rural areas in Scotland or northern England are experiencing depopulation as young people move to cities for better job opportunities.

**Changing land use:**
As rural populations grow or shrink, land use changes. More housing developments are needed in areas with growing populations, while depopulated areas may see farmland or traditional industries replaced by tourism or renewable energy projects.

| HOME LEARNING TASKS | |
|---|---|
| **Task Description** | **Done?** |
| 1. Revise key terminology | |
| 2. Job sector questionnaire | |
| 3. Sustainable business plan | |
| 4. UK Transport research project | |

Religion Year: 10
Peace + conflict Term: 2

## Big Questions

1. Is it acceptable to use violence?
2. Should we forgive others?
3. Are there any universal laws?

## Is nuclear war acceptable?

Buddhists believe in prevention and solving a conflict (a pacifist approach.) However, out of compassion, right speech and right action injustice must be challenged. This is important because war doesn't always bring peace and in the modern world there is the threat of nuclear war/terrorism.

Already at its first meeting ever in 1948, the World Council of Churches (WCC) proclaimed that nuclear weapons are "a *sin against God and a degradation of man*". - However, Christian believe that violence is acceptable in war when it follows the laws set out in the just war theory.

"Even if thieves carve you limb from limb with a double-handed saw, if you make your mind hostile you are not following my teachings". *Majjhima-Nikkaya 1:28-20 – Buddhism.*

## What is the Just War theory?

The **Just War theory** was first developed by **St Thomas Aquinas**. Aquinas was one of the most influential **theologians** of the last 1,000 years. The theory set out conditions against which to judge whether or not a war should be waged (**jus ad bellum**) and if it could be justified, and how it should be waged (**jus in bello**).

**Aquinas's conditions for a Just War – jus ad bellum**

1. The war must have a just cause – e.g against invasion, or for self-defence - and not to acquire wealth or power.
2. The war must be declared and controlled by a proper authority, e.g the state or ruler.
3. The war must be fought to promote good or avoid evil, with the aim of restoring peace and justice after the war is over.

**Later conditions developed by other Christians - jus in bello**

1. The war must be a last resort when all peaceful solutions have been tried and failed, e.g negotiation.
2. The war should be fought with 'proportionality', with just enough force to achieve victory and only against legitimate targets, i.e civilians should be protected.
3. The good which is achieved by the war must be greater than the evil which led to the war.

**Ahimsa** is the principle of 'non-harm'. Most Buddhists try to practice ahimsa in their everyday lives and believe that it is wrong to show violence at any time. This means that it is possible that a Buddhist may therefore refuse to fight under any circumstances. Some Buddhists are **pacifists**, even when it comes to self-defence.

**How do Buddhists help victims of war?**

Buddhists may help refugees and victims of war in the following ways:

1. providing food and shelter for those who are displaced (forced to leave their home)
2. arranging or providing medical care for the sick and injured
3. setting up schools
4. creating a safe house for street children
5. educating villagers to protect them from human trafficking

The Tibetan Buddhist Charitable Aid is a recognised charity which has helped improve the lives of the children of Tibet. The charity has helped child **refugees** in Nepal by building a Tibetan Youth Centre. The centre relies on volunteers who offer mental health counselling, practical training for job skills and employment counselling.

**Desmond Dost (1919-2006)**

Desmond Dost was an American Christian. He believed strongly in the 10 commandments. He fought in the army in WW2 without ever using a weapon. He saved 50-100 people. He believed that God protected him. Despite the danger he was in he would not ever kill because the 10 commandments state "thou shall not kill".

**Key words:**

Retaliation – to pay back for harmful action

Terrorism – use of violence and threats to intimidate, especially for political purposes to create a state of fear in a population.

Violence – causing harm to someone.

War – armed conflict between two or more sides.

Weapons of mass destruction – weapons which cause uncontrollable and untold damage – for example, nuclear weapons.

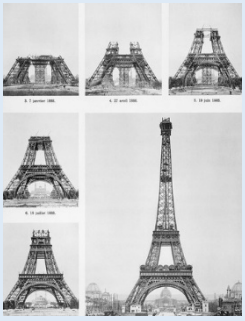
Nuclear weapons – a weapon of mass destruction.

# Subject Art Year 10 Term 1 & 2
# 'Structures'

Term Focus – ***Select and hone skills acquired in Year 9 through the theme 'Structures'*** *(2D/3D)*

*In **art**, the term **structure** pertains to the arrangement and mutual relation of the part of the body, object or composition. **Structure** refers to the relation of parts, to the relative proportions of the component elements. It also refers to the underlying skeleton which supports the whole figure, giving form to flesh. Investigate how artists use manmade and natural structures to inspire artwork.*

*Use knowledge of the theme to select and develop personal and meaningful ideas".*



**Prior Learning Links**

In Year 9 students revisited and built upon drawing, printmaking, painting and 3D skills acquired in Year 8. They continued to repeat and further embed processes of recording, developing, refining, evaluating and realising intentions. This repetition of processes will progress through Year 10 while students embark on more sustained, independent projects in which they will hone their skills and respond to given themes, beginning with 'Structures'.

**Future Learning Links**

Students will continue responding to the theme 'Structures'. The focus will shift more towards developing ideas, experimenting with media and completion of one or more final pieces.

[The Ultimate Guide on Different Art Mediums – ARTDEX]

| KEY VOCABULARY | |
|---|---|
| **KEY WORDS** | **KEY SUBJECT TERMINOLOGY** |
| ***I will be expected to recall keywords learned in previous projects and use them in the appropriate context.***<br><br>*Shape/Form/Scale/Texture/Tone/Colour/ Composition/Primary Source/Secondary Source* | Record<br>Develop<br>Refine<br>Realise<br>Evaluate |

| 1. Can you describe the process of development in artists work? | Red | Amber | Green |
|---|---|---|---|

***Develop ideas through investigations, demonstrating critical understanding of sources (AO1):***

**I will learn to confidently develop…**

- and hone my observation skills using a range of media, techniques and processes.
- my knowledge and understanding of 2D/3D styles and techniques

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently record…**

- images and information appropriate to a given theme of Structures
- building on my knowledge and understanding of how artists use materials and imagery to create meaningful work

**I will learn how to confidently evaluate…**

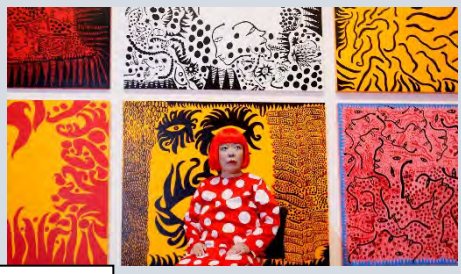
- artists using analytical writing skills and forming opinions

Kate Malone

Barbara Hepworth

James Rosenquist

Georgia O'Keeffe



Yayoi Kusama

| **2. How can the study of other artists help you find your own direction in the development of ideas?** | **Red** | **Amber** | **Green** |
|---|---|---|---|

***Develop ideas through investigations, demonstrating critical understanding of sources (AO1):***

**I will learn how to confidently develop…**

- and hone my observation skills using a range of media, techniques and processes.
- my knowledge and understanding of 2D/3D styles and techniques
- my drawing and planning skills
- ideas in response to a given theme, linking to artists work.
- my higher order thinking skills

In this example, the student is clearly showing how Georgia O'Keeffe is influencing their own work. Consider how you could be inspired by Georgia O'Keeffe?

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently record…**

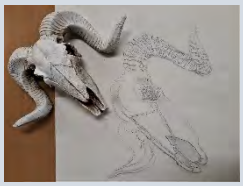
- images and information appropriate to a given theme of Structures
- using wet and dry media
- using drawing and photography
- building on my knowledge and understanding of how artists use materials and imagery to create meaningful work
- ideas for a work of art specialising in 2D or 3D

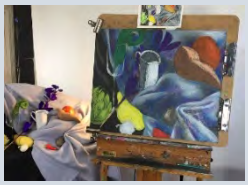

| 3. Why are primary sources are the richest form of research? | Red | Amber | Green |
|---|---|---|---|

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently record…**

- images and information appropriate to a given theme of Structures
- using wet and dry media
- using drawing and photography
- building on my knowledge and understanding of how artists use materials and imagery to create meaningful work
- ideas for a work of art specialising in 2D or 3D



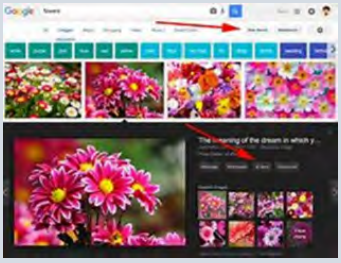


| 4. How can Secondary sources enrich the development of ideas? | Red | Amber | Green |
|---|---|---|---|

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently record…**

- images and information appropriate to a given theme of Structures
- using wet and dry media
- using drawing and photography
- building on their knowledge and understanding of how artists use materials and imagery to create meaningful work
- ideas for a work of art specialising in 2D or 3D



| 5. Can you list 5 different ways you could record observations of the subject matter? | Red | Amber | Green |
|---|---|---|---|

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently record…**

- images and information appropriate to a given theme of Structures
- using wet and dry media
- using drawing and photography
- building on their knowledge and understanding of how artists use materials and imagery to create meaningful work
- ideas for a work of art specialising in 2D or 3D

Take a photograph, Do a drawing, make a collage, write it down, print it, paint it, model it in 3D….

| 6. Why should you plan a wide range of ideas before selecting a final one? | Red | Amber | Green |
|---|---|---|---|

***Develop ideas through investigations, demonstrating critical understanding of sources (AO1):***

**I will learn how to confidently develop…**

- and hone my observation skills using a range of media, techniques and processes.
- my knowledge and understanding of 2D/3D styles and techniques
- my drawing and planning skills
- ideas in response to a given theme, linking to artists work.
- my higher order thinking skills

This is a James Rosenquist inspire collage. Consider how you could be inspired by James Rosenquist?

| 7. Why is it important to annotate work as it progresses? | Red | Amber | Green |
|---|---|---|---|

***Record ideas, observations and insights relevant to intentions as their work progresses (AO3):***

**I will learn how to confidently evaluate…**

- *analysing and reflecting on the development of my own work*
- *making connections between my own artists' work*
- *suggesting ways I could I improve*

| 8. How can the refining process help you to fully realise intentions? | Red | Amber | Green |
|---|---|---|---|

***Refine work by exploring ideas, selecting and experimenting with media, materials, techniques and processes (AO2):***

**I will learn how to confidently refine…**

- by selecting and experimenting with a range of 2D/3D media and techniques
- by selecting ideas to adapt and improve e.g. adjustments to size, colour and composition.
- through developing a piece of work from one media into another

Notice how the same idea has been adjusted and made slightly different in each one. This is called REFINING.

***Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language (AO4):***

***I will learn how to confidently realise intentions…***

- using 2D/3D techniques and processes

## EVALUATING ARTISTS' WORK

**Think!**

**See?**

**Know?**

**Think?**

1. Describe the piece of art you are looking at
2. What is the name of the artist or type of art?
3. What art movement or culture does the art link to?
4. Research and list 5 or more things about the artist or culture?
5. What important things have happened in the country that the art comes from?
6. What has influenced the art E.g. other artists, people, personal experiences, society, culture, politics, gender, colour, pattern, movement, religion, travel, places, objects etc.
7. Describe the materials used to make the art
8. How has the art been produced?
9. What is being communicated through the art?
10. Which of these words best describes the mood of the picture? EMOTIONAL/POWERFUL/BUSY/SLOW/PEACEFUL/WARM/COLD/HAPPY/SAD/CALM/ INTENSE/SCARY can you think of any other words?
11. What do you like or dislike about the picture? Explain your reasons…

## ANNOTATING YOUR OWN WORK

**Think!**

**What?**

**How?**

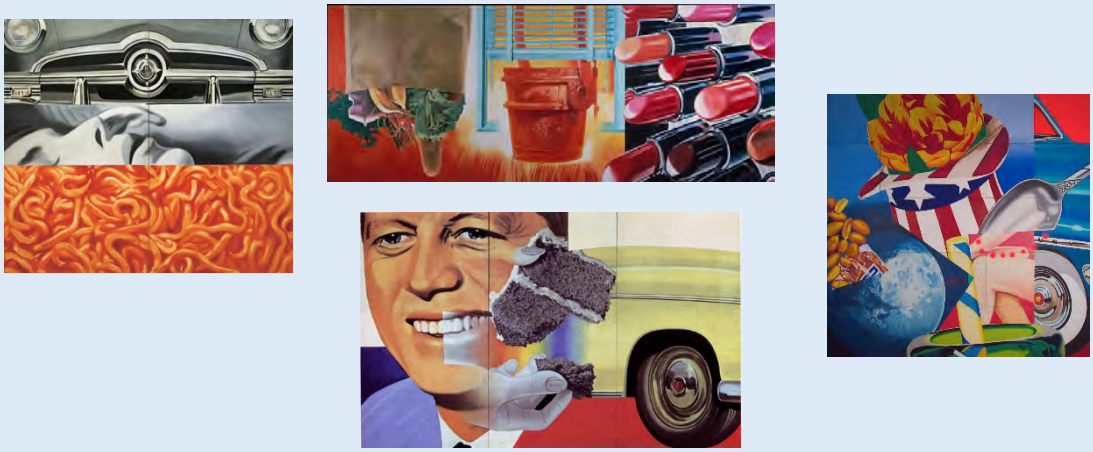
**Why?**

- In this artwork I was trying to…
- The artist/culture that has influenced my work is…
- The source I have used is…
- I found the source I used at…
- In this artwork I used the technique of...
- The media I have used is...
- I like/dislike this piece because...
- My idea links to the theme because…
- I can improve this piece by…
- I could develop this work further by...

## END OF PROJECT EVALUATION

1. Describe each stage of the project from start to finish
2. What media did you use to produce your work? E.g. Paint/Pencil/Clay etc.
3. Describe how you used different techniques in your project? E.g. painting/drawing/modelling with clay etc.
4. Which artist's culture have you looked at?
5. Write down 2 or more similarities between your work and the artist's work.
6. Which piece of your work best shows the Artist's style or the influence of another culture and why?
7. Describe some of your own ideas…

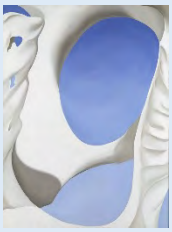
8. Have you used a primary or a secondary source?
9. Have you included the secondary source in your work? Where did you find it?
10. Imagine your final piece was displayed in a public place.... Describe the effect looking at your work might have on people and society. E.g. relax them, make them feel sad, curious, happy, angry, thoughtful, surprised, confused, nostalgic etc. explain why e.g. because of your use of colour, images, content, arrangement? etc.
11. Explain any other influences on your work e.g. personalities *(including your own)*, places, memories, objects, politics, events, activities, religion, fact, fiction etc.
12. Describe how your work links to the project theme?
13. Explain what you have done well…
14. Explain how you could improve…
15. What would you do differently, if you were to repeat any part of this project?

| Task Description | Done? |
|---|---|
| ***Homework- tasks linked to 'Structures' (2 hours per cycle)*** | |
| <u>Can you describe the process of development in artists work?</u><br><br>Complete tonal drawing of these **Barbara Hepworth** Sculptures, use light to heavy pressure and directional shading to make them appear 3D on the page:<br><br>  | |
| <u>Can you describe the process of development in artists work?</u><br><br>Complete a detailed colour pencil drawing from one of these pictures by **James Rosenquist:**<br><br>  | |

Can you describe the process of development in artists work?

Complete a detailed colour pencil drawing from one of these pictures by **Georgia O'Keeffe:**



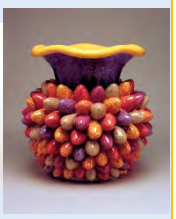


Can you describe the process of development in artists work?

Complete a detailed colour pencil drawing from one of these pots by **Kate Malone:**







Can you describe the process of development in artists work?

Complete a detailed colour pencil drawing from one of these artworks by **Yayoi Kusama:**







Can you describe the process of development in artists work?

Choose your favourite artist from above and evaluate the work using the 'Evaluating Artists Work' questions from above

<u>How can the study of other artists help you find your own direction in the development of ideas?</u>

**Yayoi Kusama has been in the news recently with her 'Pumpkin' Sculpture, complete the following tasks:**

- Describe 3 ways you could design and create your own sculpture inspired by Yaoi Kusama's art
- Which Organic forms do you think have inspired these sculptures?

  ……
- Design your own sculpture inspired by organic forms and Yayoi Kusama

**If you are able to access the internet go to the link below and read about the 'Pumpkin'. Answer the following questions:**

- How tall is the Pumpkin Sculpture?

  ……
- Where is it?

  ……
- What is permanently installed at Benesse Art Site Naoshima Japan?

  ……
- What are her pumpkins always covered with?

  ……
- What does Kusama admire about pumpkins?


Yayoi Kusama: Pumpkin - Serpentine Galleries





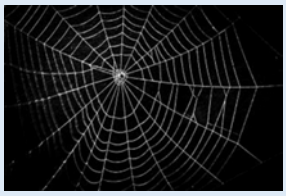

<u>Why are primary sources are the richest form of research?</u>

- Draw 3 things in the room, this called drawing from a PRIMARY SOURCE

- Draw the view through the window this is also called drawing from a PRIMARY SOURCE

<u>How can Secondary sources enrich the development of ideas?</u>

Draw examples of natural structures in 3 ways e.g. Pencil Tone, Colour Pencil, Biro, Paint etc.

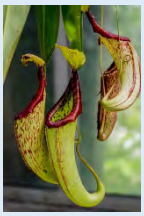










<u>How can Secondary sources enrich the development of ideas?</u>

Draw examples of manmade structures in 3 ways e.g. Pencil Tone, Colour Pencil, Biro, Paint etc.




**Can you match the themes to the pictures?**

Street, Field, Famous Buildings, Water, Mechanical, Transport, Castles



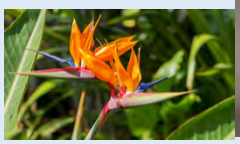

Can you list 5 different ways you could record observations of the subject matter?

List the 5 different ways to record shown earlier in this KO and then try at least two different ways to record a natural and a manmade structure

Why should you plan a wide range of ideas before selecting a final one?

- Zoom in and enlarge one of these natural forms in the style of Georgia O'Keeffe
- Annotate your work using the 'Annotating my work' section above






Why should you plan a wide range of ideas before selecting a final one?

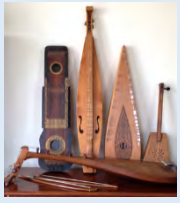
- Use a piece of tracing paper to trace sections of these manmade structures so they all overlap and merge together in the style of James Rosenquist (if you don't have tracing paper try to do free hand)
- Annotate your work using the 'Annotating my work' section above
- As an extension you could make a collage of pictures you have printed or from a magazine.




Can you guess the theme connecting these pictures?

Why should you plan a wide range of ideas before selecting a final one?

- Simplify details from these musical instruments and see if you can design 3 different sculptures inspired by Barbara Hepworth
- Annotate your work using the 'Annotating my work' section above



Why is it important to annotate work as it progresses?

- Use the fruit pictures below to help you design 3 different pots inspired by Kate Malone
- Annotate your work using the 'Annotating my work' section above

How can the refining process help you to fully realise intentions?

Choose what you feel is your best idea and develop it in 3 different ways .e.g. different media, resize, change parts etc. this is called refining

How can the refining process help you to fully realise intentions?

Draw your best idea to a high standard

**Dance Year 10 Term 2**
**Dance – INFRA**

**Term Focus**

You will learn how to:

- Explore practically and theoretically Infra. Infra is a work from the written exam paper which requires analysis and evaluation. This is 1 out of 6 works which need to be explored.
- Perform to peers using knowledge developed of physical, expressive, mental and technical skills.
- Evaluate your own work and the work of others using correct terminology.
- Develop the link between the knowledge developed through practical exploration and how this applied to exam style questions from a theoretical standpoint.

**Prior Learning Links**

- Students will have developed a foundation of physical, expressive, mental and technical skills. Students will need to continue to develop their understanding of these skills in preparation for their practical exam in Y11. Finesse and confidence of these skills is essential.
- The skills pupils have learned previously with regards to performance and choreography will be applied to the exploration of each anthology work.

**Future Learning Links**

- There are 6 anthology works in total. Students will look apply their skills to a second work next term in order to develop a practical and theoretical understanding which they can apply to the written paper of the exam.

**KEY VOCABULARY: PHYSICAL SKILLS**

**Physical Skills enable a dancer to physically complete the action therefore giving an effective performance.**

**TOP TIP: We use BASIC SPEC FM to help us remember these skills.**

| | |
|---|---|
| **Balance** | A steady or held position achieved by an even distribution of weight. |
| **Alignment** | The correct placement of body parts in relation to each other. |
| **Stamina** | The ability to maintain energy over a period of time. |
| **Isolation** | An independent movement of part of the body. |
| **Control** | The ability to stop and start movement, change direction and hold shape efficiently. |
| **Strength** | Muscular Power. |
| **Posture** | The way the body is held. |
| **Extension** | The lengthening of muscles or limbs. |
| **Coordination** | The ability to move 2 or more body parts at the same time efficiently. |
| **Flexibility** | The range of movement at a joint. |
| **Mobility** | The ability to move fluently from movement to movement. |

## KEY VOCABULARY: EXPRESSIVE SKILLS

**Expressive Skills are aspects that contribute to performance artistry and that engage the audience.**

**TOP TIP: We use FAT FROGS POUNCE MASSIVELY SIDEWAYS SOUTH to help us remember these skills.**
**FFPMSS**

| | |
|---|---|
| **Facial Expressions** | The use of the face to show mood, character or feeling. |
| **Focus** | The use of the eyes to enhance performance or interpretative qualities. |
| **Projection** | The energy the dancer uses to connect with and draw the audience in. |
| **Musicality** | The ability to make the unique qualities of the accompaniment evident in performance. |
| **Sensitivity to Other Dancers** | Awareness of and connection to other dancers. EG: Timing. |
| **Spatial Awareness** | Consciousness of the surrounding space and its effective use . |

## KEY VOCABULARY: MENTAL SKILLS

**Mental Skills are aspects of a performance/rehearsal process that allow a dancer to be able to get to the point where they are able to perform.**

**TOP TIPS**

**PERFORMANCE: We use MCFLURRIES CAN CAUSE COUGHING to remember the skills for performance.**
**MMCCC**

**PROCESS: We use MASSIVE SNAILS PLAY RANDOMLY ROUND CAVES to recall mental skills for process.**
**MSPRRC**

Performance

| | |
|---|---|
| **Movement Memory** | The automatic recall of learned material without conscious thought. |
| **Commitment** | Dedication to a performance. |
| **Concentration** | The power to focus all of one's attention |
| **Confidence** | The feeling or belief that one can have in one's performance or work |

Process

| | |
|---|---|
| **Mental Rehearsal** | Thinking through or visualising the dance. |
| **Systematic Repetition** | Repeating something in an ordered way. |
| **Plan a Rehearsal** | Organisation of when to go over material |
| **Response to Feedback** | Implementing changes and making improvements based on feedback given to you. |
| **Rehearsal Discipline** | Attributes ans skills required for refining a performance. Use of an effective rehearsal and time. |
| **Capacity to Improve** | Being open to make changes and take on feedback to improve a performance. |

## KEY VOCABULARY: TECHNICAL SKILLS

**Technical Skills refer to the accuracy of content performed in a stylistic way.**

**TOP TIP: We use DARRTS to remember technical skills.**

| | |
|---|---|
| **Dynamic Content** | How a movement is performed.<br>Speed and Flow. |
| **Action Content** | What the movement itself is - The 5 basic body actions. |
| **Relationship Content** | How movement can be performed when the dancers interact - Contact, mirroring, lead and follow, complementary, contrast, action and reaction, formations, counterpoint and accumulation. |
| **Rhythmic Content** | Repeated patterns or sounds. |
| **Timing Content** | The use of counts when matching movements to sounds and/or other dancers. |
| **Spatial Content** | Where the movement is performed - Levels, size, pathway, direction and design. |

**What are the key facts linking to *Infra*?** Red Amber Green

**Key Facts:**

**Choreographer:** Wayne McGregor

**Performed by:** The Royal Ballet

**Performance:** First performance 13 November 2008 at the Royal Opera House, London

**Dancers:** 12 – 6 male, 6 female

**Dance Styles:**

- **Contemporary ballet**
- McGregor's style is distinctive for its speed and energy and for the dynamic, angular, sinuous and hyperextended movements that push dancers to physical extremes

**Structure:** The ballet comprises solos, duets and ensembles with many arresting moments. For example, 6 couples dance duets in six squares of light and a crowd surges across the stage, unaware of one woman's private grief.

**1. What was the choreographic approach for the work?** Red Amber Green

**Choreographic Approach:**

McGregor uses three methods to generate movement vocabulary for the piece:

1. SHOW a phrase to the whole or part of the cast – dancers watch and either recreate the phrase exactly or create a version.
2. MAKE a phrase on a target dancer or dancers – others watch and copy or develop.
3. TASK – set a choreographic task for dancers to complete or pose a choreographic problem for dancers to solve. Typically the task or problem involves imagery as a stimulus for creating movement.

The movement vocabulary is then structured into longer "sentences" and "paragraphs". Finally he works musically with the structure and pieces it all together like a jigsaw.

**2. What are the stimuli and choreographic intentions of the work?** Red Amber Green

**Stimuli / Choreographic Intention:**

The difference between a stimulus and a choreographic intention is, a stimulus is the starting point or inspiration for the dance whereas the choreographic intention is what the dance is actually about.

Example:
Stimulus – A computer – This is the inspiration.
Intention – Cyber Bullying – This is what the dance is about.

Computer > On the Internet > Social Media > Cyber Bullying

**Stimuli:**

The title *Infra* comes from the Latin word for 'below' and the work presents a portrait of life beneath the surface of the city. This abstract ballet delves beneath the surface to present a moving meditation on human interactions.

"*Under the brown fog of a winter dawn. / A crowd flowed over London Bridge, so many."* T.S. Eliot: *The Wasteland.*

**Choreographic Intent:**

*Infra* is about seeing below the surface of things. Quite literally in this case, below Julian Opie's design. You can see people, walking in the street. *Infra* is about people and the choreography has found a pedestrian language which is recognizably human. When you look at a body on stage, you have some understanding of what that body is doing. The piece is about inferences. It infers particular types of relationships and therefore the emotional content implies itself.

One of McGregor's choreographic aims is to help the audience's eye in watching a complex structure. But in *Infra*, McGregor has purposefully left open the full visual field to let the audience make their own selections.

| **3. How do the costumes in *Infra* contribute to the audience's understanding of the work?** | Red | Amber | Green |
|---|---|---|---|

**Costume:**

- Designed by Moritz Junge

Colour:

- Flesh, white and grey colours

Garment/Material:

- Fitted shorts, vests, t-shirts
- One female dancer wears a short wrap-around skirt
- One male dancer wears long trousers
- Street clothes are worn for the brief appearance of the crowd

Footwear:

- Females wear pointe shoes

**Contribution:**

- Monochrome colours reflect dark and depressing nature of those living below the poverty line in a city
- Top of the body is covered and bottom exposed, to focus on the legs of the dancers
- Serious mood created. Monochrome colours complement the use of white lighting
- Tight fitting costumes and bare legs sculpt the lines of the dancers' bodies
- The use of black shorts for most of the dancers creates a sense of uniformity
- One male dancer wears trousers but no top to highlight his masculinity and male gender

| 4. How does the aural setting in *Infra* contribute to the audience's understanding of the work? | Red | Amber | Green |
|---|---|---|---|

**Aural Setting:**

Aural setting is also known as music or accompaniment.
- Composed by Max Richter
- Performed by The Max Richter Quintet with Jonathan Haswell

Instruments:
- Strings
- Piano
- Electronic sounds

Speed/Dynamics:
- Changes in dynamics
- Use of silence

**Contribution:**
- Use of everyday sounds such as a train whistle to highlight the stimulus of life below the surface of a city
- Use of strings instruments creates a somber and sad mood
- Classical string instruments complement the classical ballet dance style
- Provides structure to the performance

| 5. How does the physical setting in *Infra* contribute to the audience's understanding of the work? | Red | Amber | Green |
|---|---|---|---|

**Physical Setting:**

Performance Environment:
- Proscenium arch/theatrical setting

Set Design:
- By artist Julian Opie
- An 18m LED screen is placed high on the back wall, running the width of the stage
- Mesmerizing flow of electronic walking figures

Lighting:
- See below – also a separate entity

**Contribution:**
- Performing below the LED screen represents life beneath the surface
- Lack of props/set enhances the focus on the dancers
- Darkness with light focusing only on dancers' bodies creates a serious mood
- Black set and white lights complement the monochrome costumes
- LED screen shows animations of everyday people walking across, suggesting a city location
- As they are underneath the screen, the people could be living in basements or homeless and living under bridges

| 6. How does the lighting in *Infra* contribute to the audience's understanding of the work? | Red | Amber | Green |
|---|---|---|---|

**Lighting:**

Designed by Lucy Carter

Type of Lighting:
- Spotlights

Colour:
- White

Intensity:
- Dim

**Contribution:**
- Spotlights highlight specific action
- Shadows/silhouettes created to symbolise the anonymity of city life
- Lights towards the floor only to suggest 'below' or 'low'
- White rectangles dictate dance space
- Intense mood

| **7. How does the movement content and use of dancers in *Infra* contribute to the audience's understanding of the work?** | Red | Amber | Green |
|---|---|---|---|

**Use of Dancers:**
- 6 male, 6 female
- Makes 6 couples

**Movement Content:**
Action (extensions, turns, jumps, balances)
Dynamics (contrasting – movements range from swift and aggressive to slow and gentle)
Space (dancers move in sequences across a range of space, from confined individual space to the whole stage)
Relationships (vary between partners – some mirror, some contrast and some ignore each other)
Choreographic Devices (unison, repetition, canon, contact work, solos)

**Contribution:**
- Suggests masses moving together
- Highlights dancers
- Creates contrast
- Adds interest
- Compliments music
- Creates structure
- Shows relationships amongst dancers
- Shows emotions
- Adds to mood
- Suggests theme
- Highlights individual stories

HOME LEARNING TASKS

| Task Description | Done? |
|---|---|
| How does the physical setting support the audience's understanding of Infra? (6 marks) | |
| How does the movement content support the audience's understanding of Infra? (6 marks) | |
| How does the costume support the audience's understanding of Infra? (6 marks) | |
| Discuss how the aural setting and lighting in the work contribute to the mood of the piece? (12 marks) | |
| Discuss how the costume and staging/set in Infra contribute to the stimulus of the work (12 marks) | |
| Discuss how the choreographic content AND staging/set contribute to the theme of 'beneath the surface in Infra (12 marks) | |

# Media Year 10 Term 2 – Introduction to Component 1B

Term Focus –

| Prior Learning Links | Future Learning Links |
|---|---|
| • Theory lessons completed terms 1-6 in Year 9<br>• Term 1 Year 10 | • Year 10 term 3+4 |

**KEY VOCABULARY**

**KEY WORDS/ SUBJECT TERMINOLOGY**

**Convention** – Something we would expect to see, for example a convention of an action film would be explosions. A product convention would be something we expect to see in a certain product, e.g. a film poster would usually have the title of the film
**Genre**- A way of categorising media texts based on shared conventions
**Sub-Genre**- Breaking down a genre into more specific genre types
**Hybrid Genre**- Two or more genres combined
**Narrative**- The way a story or plot is told to an audience
**Linear**- In time order
**Non-linear**- not in time order
**Intertextuality**- When a media text uses a reference from another

## 1. What is the Media Coursework?

Red Amber Green

**The Media coursework is split into two components (parts).**

**Component 1 is the theory component and Component 2 is the practical component. Each is worth 30% of your final grade:**

**Component 1- 30%**
**Component 2- 30%**
**Component 3 (Exam) – 40%**

**For each component you will get a 'Brief' provided by the exam board. This will contain a theme that you need to stick to when completing the tasks needed.**

**Component 1 is split into 2 sections Learning Aim A and Learning Aim B. We are going to continue with Learning Aim B.**

## 2. What is Learning Component 1 Learning Aim B?

Red Amber Green

**In Learning Aim B you are expected to analyse two different Media products.**

**You can select the media products from any media platform.**

**E.g. <u>Publishing products</u>, <u>interactive products</u> or <u>broadcast products</u>.**

**Once you have selected 3 products you need to analyse the following:**

- **Genre**
- **Narrative**
- **Character types/Narrative Structures**
- **Representation**

**We have covered Representation in LA A so this KO will focus the other parts of learning aim. You would need to be able to apply the knowledge from this term in your coursework.**

## 3. What is genre?

Red Amber Green

**This bit is actually quite straight forward. Genre is a way of 'categorising' media products. Therefore we can group similar media products together based on similar themes and conventions.**


**For example, horror.**

**Conventions of horror might include:**

- **Blood and gore**
- **Violent death**
- **Scary and intense moments**
- **Jump scares**

**If we see these things then we know we are consuming horror.**

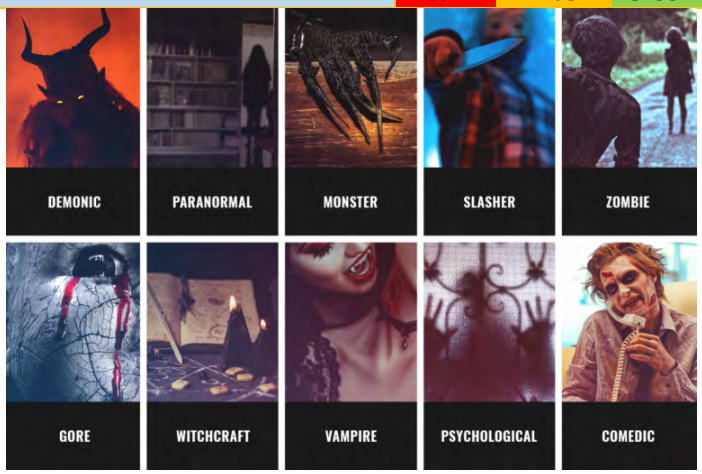
**Clearly for publishing, interactive and broadcast products you may notice variations in the different elements but the idea is the same**

## 4. What is sub-genre?

Red Amber Green

**Within different genres we can actually be more specific with the types of genres.**

**These are known as sub-genres. Here are some examples of horror sub genres:**




**Can you think of some examples of different films from each sub-genre?**

**The conventions of the sub-genres differ but most will still have the basic horror conventions as well.**

## 5. What is a hybrid genre?

Red Amber Green


**This one is pretty easy…**

**When you put two or more genres together you get a hybrid genre.**

**Shaun of the Dead is a good example of a hybrid of Horror, Comedy and Romance.**

**You will see conventions of all of these in the film**

## 6. What is Steve Neal's Genre Theory?

Red Amber Green

**Media Theorist Steve Neal came up with a basic idea about how genre is used in media products.**

**To put it simply, it can be summarise as the following:**

***'Genre is examples of repetition and difference'***

**This means that in films for example, there needs to be enough conventions of the genre present for fans of the genre to be satisfied, but there must be new things in there too, so that audiences are not bored.**

**Imagine you are watching a horror film but it did not contain any of the conventions of horror- you would be disappointed!**

**But equally, if you watched a horror film and had all the conventions but nothing new or different then you would also be annoyed!**

**Therefore films (and other products) have to change and adapt to keep audiences interested but also have enough conventions to keep fans of the genres satisfied too.**

**Scan the QR code opposite to watch a video explaining this.**

## 7. What is narrative? What are linear and non-linear narratives?

Red Amber Green

**Narrative is the way that a story unfolds in a media product. It is the way the media producer tells us that story.**

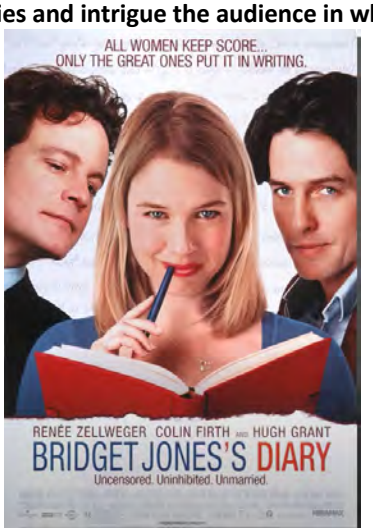
**The most basic thing to look out for is a <u>linear</u> narrative. This is when the story is told to us in chronological (time) order.**

**Sometimes however, we see things is different orders, using flashbacks or flash forwards. This then makes the narrative <u>non-linear</u>.**

## 8. What is an enigma code and action code?

Red Amber Green

**An enigma code is a narrative device that media producers use to help tell stories and intrigue the audience in what is happening.**




**It makes the audience ask a question such as:**

- **Who is that?**
- **What are they doing?**
- **What are they looking at?**
- **What does it mean?**
- **Why is that there?**

**In the poster opposite we might ask things like:**

- **Which of the two men will she end up with?**
- **What is going on in the diary that he is looking at**

**These questions engage us with the product and the narrative.**

**When an enigma code poses a question, an action code answers it. It allows us to see something happening and moves the plot forward.**

## 9. What is intertextuality?

Red Amber Green

**Have you ever watched a film, played a game etc and been reminded of another media product?**

**This is intertextuality.**

**Where one media product references another.**

**Sometimes it is not done deliberately but just happens naturally because the person making the media product has been inspired by other products over the course of their lifetime.**

**This is known as <u>indirect intertextuality</u>.**

**However sometimes it is done on purpose (direct intertextuality). There can be many reasons for this.**

- **To create meaning- if an audience sees/hears something like another product, then they might understand it quicker**
- **For homage- this is where the producer is paying tribute to the original product**
- **An Easter Egg- this is just an extra bonus for people who understand the reference**
- **Parody- A media text can make fun of another for comedy purposes (to be funny)**

## 10. Who are Propp's character types? Red Amber Green

**Vladamir Propp noticed that a number of different character types often came up in different narratives. Each plays a specific role in the story.**

| Character Type | Definition | Example |
|---|---|---|
| The hero | Leads the narrative. Usually searching for something or on some form out quest and succeeds | Shrek – *Shrek*<br>John McClane – *Die Hard* |
| The Villain | Struggles against hero. Shown to be morally bad – drives audience away from them, making them support hero. | Lord Farquaad – *Shrek*<br>Hans Gruber – *Die Hard* |
| The donor | Gives hero something special to help with the quest. Doesn't't exactly have to be physical. | Dragon – *Shrek*<br>Viper – *Top Gun* |
| The helper | The helper supports the hero – similar to donor. Usually appears at critical moments and gives support and guidance. Physical help can highlight that hero's can have limits. | Donkey – *Shrek*<br>Ron & Hermione – *Harry Potter* |
| The princess | May take 2 forms – object/reward - deliberately done by hero. Could be seen little in the movie, or could be an important character. | Princess Fiona - *Shrek* |
| The princess' father | Gives the task to hero. Key figure for hero to perruade as father is protective of daughter. Could also be in competition with the hero. Propp said that they can be hard to distinguish. | The King - *Shrek* |
| The dispatcher | The character who sends the here on a mission – may be a family member and can also be combined with another role | Lord Farquaad – *Shrek* |
| The false hero | Appears to act heroically throughout movie, and can be mistaken for the actual hero. | Prince Charming - *Shrek* |

## 11. What are Todorov's Five Stages of Narrative? Red Amber Green

**Todorov noticed that narratives often follow the same patterns. Events in stories would often play out in the same order. He noticed 5 stages and gave each stage a name:**

### APPLYING TODOROV'S THEORY

**It is acceptable if the stages do occur but not in the order stated in the previous slide. Each stage can vary in length in time:**

| Stages in Todorov's Theory | Events from *Shrek* |
|---|---|
| Equilibrium | Shrek lives alone in the swamp, with no friends or worries. |
| Disruption | Fairytale creatures appear at Shrek's swamp, after they were kicked out of their homes by Lord Farquad. |
| Recognition of Disruption | Shrek is annoyed by the creatures, and sets out to confront Farquad, who is seeking a wife. |
| Attempt to Fix Disruption | Farquad sends Shrek on a mission to rescue Princess Fiona from a dragon. Shrek and Fiona fall in love, but Fiona must marry Farquad to remove a curse. |
| New Equilibirium | Shrek and Fiona declare their love for each other, Fiona assumed the form of an ogress, Farquad is eaten by the dragon, and the film ends with Shrek and Fiona's wedding. |

Red Amber Green

| HOME LEARNING TASKS | |
|---|---|
| **Task Description** | **Done?** |
| Find The Media Insider on YouTube and watch his video on Narrative Theory | |
| Find The Media Insider on YouTube and watch his video on Intertexuality Theory | |
| Research a genre and see how many different products you can find related to it- divide into sub-genres | |
| Apply Propp and Todorov to a film you know- do they fit? | |
| Read the sample answers to Learning Aim B on OneNote | |
| | |

# Subject Year 10 Term 2 – Theme Good food

Term Focus – ***Food related causes of ill health. Symptoms and signs of food-induced ill health.***
***How to prepare and make dishes. How to plan production.***
***Factors affecting Menu planning. Presentation techniques***

| **Prior Learning Links** | **Future Learning Links** |
|---|---|
| • Hospitality and Catering WJEC<br>• KS3 learning of related subjects | Hospitality and catering WJEC |

**KEY VOCABULARY**

| **KEY WORDS** | **KEY SUBJECT TERMINOLOGY** |
|---|---|
| • bacillus cereus<br>• campylobacter<br>• clostridium perfringens<br>• e-coli<br>• listeria<br>• salmonella<br>• staphylococcus aureus<br>• food labelling laws<br>• food safety legislation | • creativity<br>• garnish and decoration<br>• portion control<br>• accompaniments.<br>• grating*<br>• hydrating* juicing*<br>• kneading**<br>• laminating (pastry)***<br>• marinating*<br>• mashing* measuring** melting*<br>• melting using bain-marie***<br>• mixing**<br>• piping***<br>• proving*<br>• puréeing**<br>• rub-in**<br>• rolling ** |

| **1.** **What are the causes of food related ill health?** | **Red** | **Amber** | **Green** |
|---|---|---|---|

cereals (gluten) • crustaceans •dairy products •eggs • fish • fruit and vegetables • lupin • molluscs • nuts • peanuts • sesame seeds soya • wheat.

**Food intolerance:**

- gluten
- lactose
- aspartame
- MSG.

Foodborne illnesses may result from any of the following sources:

- **Bacteria:** These may be present in raw and undercooked meat, fish, and poultry; unpasteurized dairy products; contaminated fruits and vegetables; and contaminated drinking water.
- **Viruses:** Viruses are transmitted to the body through food contaminated by viral particles.
- **Parasites:** Contaminated water and soil can transmit harmful parasites to fresh produce, seafood, meat, poultry, and other foods.
- **Prions:** These infectious proteins are associated with "mad cow disease" and can come from eating parts of cattle, such as the brain tissue.
- **Naturally occurring chemicals:** Naturally occurring toxins in mushrooms, staple foods such as corn and cereal, and mould on grains can cause long-term health complications.
- **Environmental pollutants:** Byproducts of plastic production and waste management, as well as heavy metals such as lead and mercury found in water and soil, can contaminate foods and lead to foodborne illnesses.

## 2. How can food related causes of ill health be avoided?

Red | Amber | Green

**A food allergy is where your body reacts to certain foods. It's often mild, but can be very serious for some people.**
**Symptoms of a food allergy can affect any part of the body, including different parts of the body at the same time.**

Common symptoms of a food allergy include:

- feeling dizzy or lightheaded
- itchy skin or a raised rash (hives)
- swelling of the lips, face and eyes (angioedema)
- coughing, wheezing, breathlessness, noisy breathing or a hoarse voice
- sneezing or an itchy, runny or blocked nose
- feeling sick or being sick
- tummy pain
- diarrhoea

You may get symptoms straight after eating the food you're allergic to, or days later.

**A food intolerance is when you have difficulty digesting certain foods or ingredients in food. It's not usually serious, but eating the food you're intolerant to can make you feel unwell.**

Common symptoms include:

- diarrhoea
- bloating
- farting
- tummy pain

But there are lots of other possible symptoms, including headache, feeling tired or exhausted, feeling sick, constipation, joint pain or rashes.

Symptoms can last for a few hours or days.



| 3. | **What are the visible and non-visible signs and symptoms of food induced ill health?** | Red | Amber | Green |
|---|---|---|---|---|


Symptoms of food poisoning include:

- feeling sick (nausea)
- diarrhoea
- being sick (vomiting)
- stomach cramps
- a high temperature of 38C or above
- feeling generally unwell – such as feeling tired or having aches and chills

The symptoms usually start within a few days of eating the food that caused the infection.

| 4. | **How do we produce dishes to meet the requirements of the NEA (non exam assessment)?** | Red | Amber | Green |
|---|---|---|---|---|

Learn about the importance of nutrition and how cooking methods can impact on nutritional value. • Learn how to plan nutritious menus as well as factors which affect menu planning. You will learn the skills and techniques needed to prepare, cook and present dishes as well as learning how to review your work effectively

| 5. | **What factors must be considered in the planning of a menu?** | Red | Amber | Green |
|---|---|---|---|---|

• cost
• portion control
• balanced diets/current nutritional advice
• time of day
• clients/customers.

Learners should know and understand the following factors when planning menus:

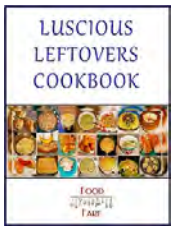
• equipment available – the type of equipment required to produce a menu, specialist equipment, hand-held and electrical equipment.
• skills of chef – preparation, cooking and presentation, related to the needs of the dishes/menu/customer.
• time available – and type of provision e.g., service, location, size, standards – the production of dishes/menu in the time allowed. How to prepare, cook and present more than one dish at the same time.
• environmental issues – conservation of energy and water – how can the production of dishes be sustainable by using less energy and reducing consumption of water? Learners should know and understand the following terms:

**How can the 3 R's be taken into consideration?**
**Reduce, reuse, recycle.**

Red | Amber | Green

**6.**






The best ways to reduce your food waste:• Plan your meals• Buy accordingly• Compost your leftovers• Include leftover meals in your schedule• Keep track of your food• Measure your meals• Freeze what can be frozen• Get into batch cooking• Create back-up options• Get recipe boxes

**7. Which presentation techniques would make dishes more attractive to the customer?**

Red | Amber | Green

One of the keys to eye-catching presentations is playing with vibrant colours and bold contrasts. Feature ingredients with bright natural hues like:
**Deep Greens** — Spinach, arugula, fresh herbs, lettuce leaves, zucchini, fresh peas, and green beans.
**Rich Reds** — Fresh tomatoes, red bell peppers, English radishes, red beets, radicchio, red leaf lettuce, and sliced red meats cooked med-rare.
**Sunny Yellows** — Squash, yellow zucchini, golden beets, corn, and yellow beans.
**Earthy Browns** — Mushrooms, jacket potatoes, taro, Jerusalem artichokes, and seared or slow-cooked meats.

**8. How can accompaniments enhance the presentation of dishes**

Red | Amber | Green

What is food accompaniment?

Food accompaniment is the side dish that serves with the main dish, it complements the main food and enriches its taste and flavour.  Food accompaniment can be an integral part of the dish or served separately.

| **HOME LEARNING TASKS** | |
|---|---|
| **Task Description** | **Done?** |
| Make a dish using meal leftovers (Tesco real foods is a good website for recipes) | |
| Posh up your dinner.  Use presentation techniques or accompaniments to give a lift to a regular meal | |
| Design packaging for an everyday food item. Show how allergies are made aware of on these labels. | |
| Use a recipe of your choice, list the allergens in the ingredients and state if there are possible alternatives | |
| Choose 3 basic cooking methods, describe them, list 4 meals made by these methods. | |
| | |

# Subject Photography Year 10 Term 2 – ‘Conceal and Reveal’

Term Focus – *To understand the design process. To enable students to recognise the value of having a clear starting point, as an industry, to focus creative thinking. To develop their awareness of Abstract/Macro photography. To take inspiration from objects, surfaces etc. that students wouldn’t have considered photographing before.*

*In term 1 students were introduced to the key elements of visual language used in photography; line, shape, form, tone, colour, pattern and texture. To understand the key principles of visual language used in photography; compositional rules of thirds and odds, filling the frame, viewpoints, balance, symmetry and repetition. Understand the photography elements of lighting, exposure, shutter speed, aperture, focus and depth of field. To know the genres of photography. To use a digital SLR camera using different modes such as AV and TV. Use a card reader to import photographs. Know how to create a contact sheet in photoshop. Save a photograph as a jpeg. Insert a photograph into a presentation.*

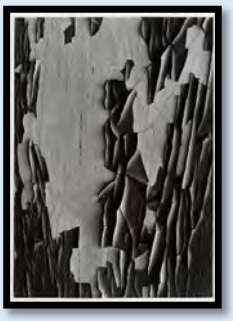
## Future Learning Links

**Continue sustained project ‘Conceal and Reveal’**

Marc Anderson and Kaleidoscope

*Developing knowledge of Macro Photography and broadening awareness of distortion through Kaleidoscope photography, More advanced Photoshop skills- layers, quick selection tool, transform, line, shape, blending modes etc.*

**Scaffolding the design process for proceeding coursework projects.**



## KEY VOCABULARY

### KEY WORDS

**Photo Manipulation**- *involves **transforming or altering** a photograph using various methods and techniques to achieve desired results.*
**Digital Image Manipulation-** Transforming or altering photographs digitally. There are a number of software applications available such as Photoshop, used to digitally manipulate photographs.

*Macro, Extreme Close up, Close up, Viewpoint Bird’s-eye View, Worm’s-eye View, Eye-Level Straight/Pure Photography, Urban Surfaces Decaying Surfaces*

**Photo shop tools and techniques-** *layers, quick selection tool, transform, line, shape, blending modes etc.*

Photography is an art of observation.

**Revealing** the beauty that is around us, you want the viewer to gaze at your photographs not **glance!**

**“Taking an image, freezing a moment, reveals how rich reality truly is”.**

**-Anonymous**

### KEY SUBJECT TERMINOLOGY

**Abstract Photography:** taking a subject and forcing the viewer to look at it in a different way e.g. ‘close-up’. The subject could lose all literal meaning and be reduced to only elements of shape, light, pattern, texture, tone or colour. The entirety of the subject is obscured or unseen.
**Macro- Photography:** photographing objects that are very **close-up** to the lens. Up-close photographs of everyday objects can easily form the basis for some interesting **abstract compositions**.
**Texture:** photography utilises the visual quality of the **surface of and object.**
**Observation:** will define your work. It will give life and breath to the stories you capture and the beauty you create.
**Fill the frame:** simply means to **fill** your photograph with more of the subject. So instead of having negative space, or worrying about composition you’re going to get closer (that’s where your feet come in, WALK, move closer) and snap it a little closer up.
**Black and White photograph:** is a monochromatic image where all colour has been removed.

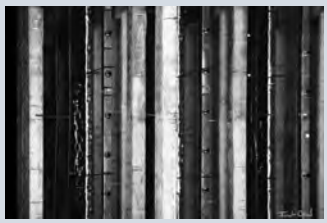
## 1. Can you describe the process and development of Photographers' work?

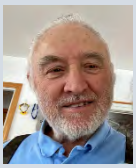
Red | Amber | Green

**I will learn:**

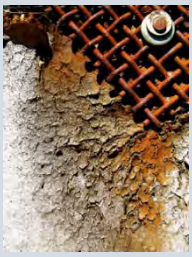
- How to identify and analyse the use of the elements and principles of visual language in the characteristics of Bill Mangold and Aaron Siskind.

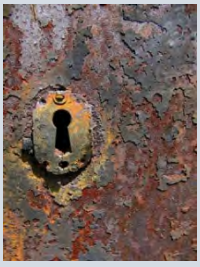
Aaron Siskind- has photographed images of peeling off images, paint. Siskind's work focuses on the details of things as flat surfaces. Most of Siskind's images are close ups. Siskind's images are also black and white I guess Siskind's uses black and white because it makes the image stand out. The image would look totally different if it was in black and white. The photograph wouldn't stand out if it was in colour.





**Bill Mangold-** Bill Mangold is a photographer who takes images which reveal the surface textures of various objects. Bill Mangold takes black and white and colour photographs. He often photographs his subjects from close-range. He is interested in capturing the light that falls on the surfaces of these objects. He often notices exciting colour combinations like orange rust on blue paintwork. Sometimes the colours are complimentary (e.g. orange and b;lue, yellow and purple, red and green). He is also interested in harmonious colours (e.g. blue and green). His black and white photographs must have been taken with a wide aperture setting because they use shallow depth of field.



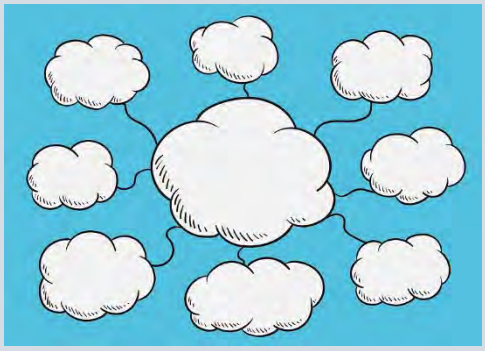


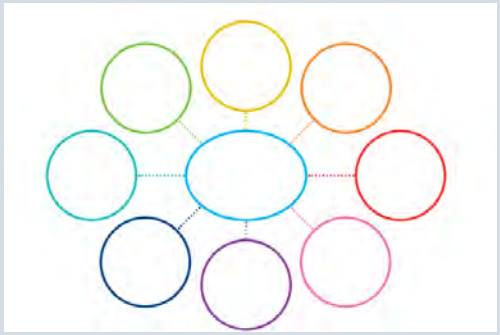

Texture - Hatice portfolio (weebly.com)

## 2. Why is it important to research and mind map the theme before developing ideas?

**I will Learn:**

- How to mind-map the theme and produce a visual mood board for conceal and reveal textured photography.



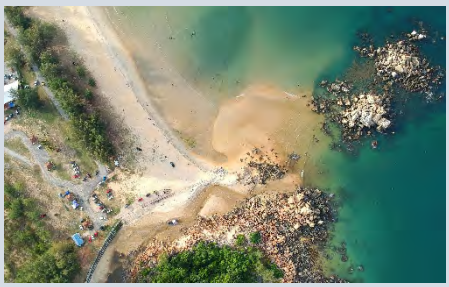


**Extreme Close Up:** Emphasises a small area or detail of the subject, such as the eye(s) or mouth.


**Close-Up:** Fills the screen with part of the subject, such as a person's head/face.

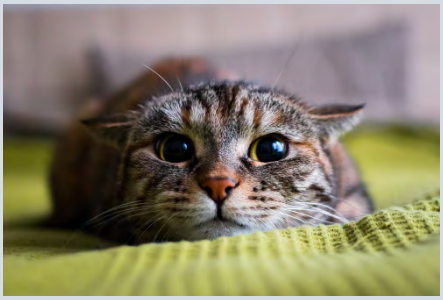
**Viewpoint:** the angle, direction or stance from which you choose to shoot each image.

**Bird's-eye View:** photographing a subject from above- a **high viewpoint**


**Worm's-eye View:** photographing from below- a **low viewpoint**

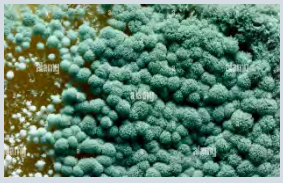
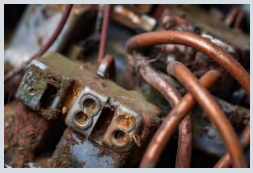

**Eye-Level:** directly looking at the subject




**Straight/Pure Photography:** refers to photography that attempts to depict (show) a scene or subject in sharp focus and detail

**Urban Surfaces:** belong to, or relating to, a town or city

**Decaying surfaces: rotting** as a result of bacterial, fungal, or chemical action; decomposing.


**3. What is Macro photography and how can it be used to reveal interesting textures?**

**I will learn :**

- How to use the camera on a 'Macro' setting while creating abstract compositions

Macro photos are images in which the magnification of the subject is life size or greater. Macro photography is often used to describe images where there is a slightly larger subject and all the traits of extreme close up photography are present – focusing on the detail to achieve a dramatic effect. It's all about showing something small much larger than it is in real life – an extreme close-up of something like an insect, flower or food. A full-frame insect in a five-by-seven-inch photo or a four-inch product shot of a cornflake go well above life size. Macro and close-up photos allow us to view these subjects from a new perspective. They unlock details which are hard or impossible to see otherwise – such as the antennae on a grasshopper or the contours of orange peel.



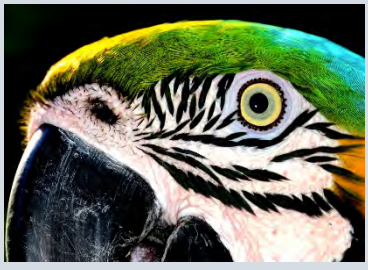
What is macro photography? 5 macro photo tips | Adobe

Ten steps for setting up your camera for great macro photography — Allan Walls Photography

- How to develop my observational skills, photograph objects that I would not have considered photographing before-**revealing** interesting textures, decayed surfaces that appear beautifully abstract.

- To become increasingly confident when using a camera and I will be considering viewpoints and angles

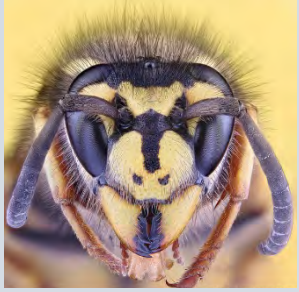
Worm's Eye View



Eye Level

Bird's Eye View

Extreme Close-Up



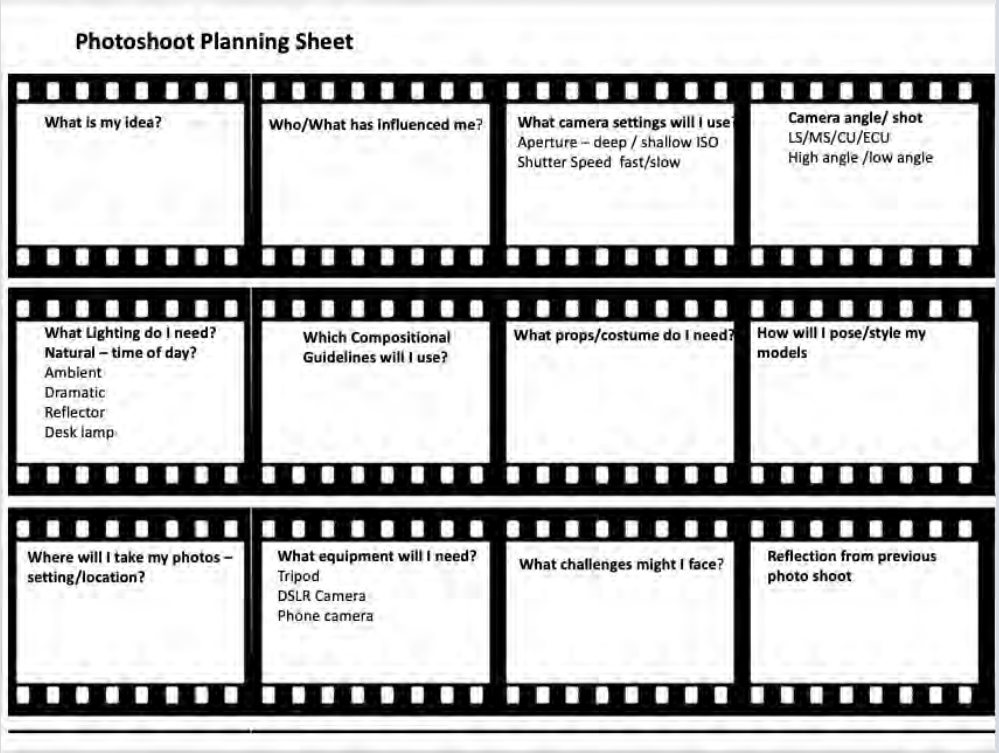
- How to notice and photograph ‘urban and natural surfaces’




| **4. How can the study of other photographers help you find direction in your own work?** | **Red** | **Amber** | **Green** |
|---|---|---|---|

**I will learn:**

- How to plan and annotate own ideas and photoshoots whilst considering the characteristics of Bill Mangold’s and Aaron Siskind’s work.

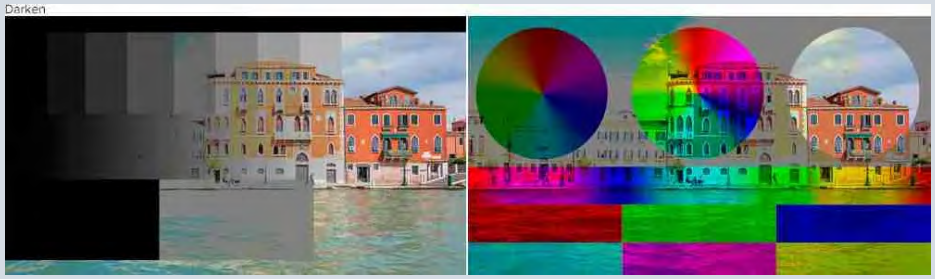


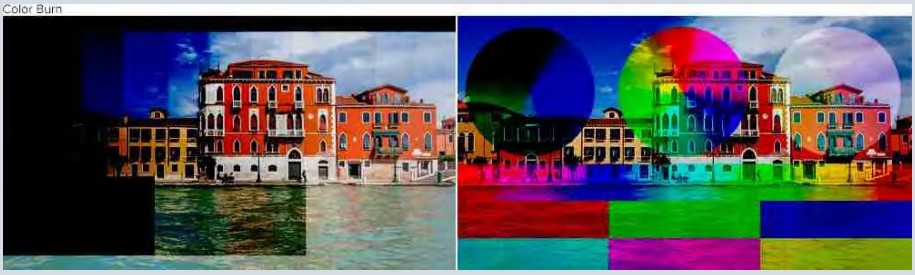

| **5. How can Photoshop be used to create inspired work from Aaron Siskind and Bill Mangold?** | | | |
|---|---|---|---|

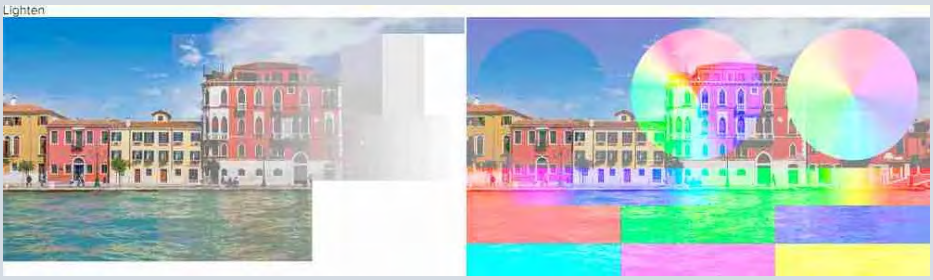
**I will learn:**

- How to use Photoshop to create inspired work from Aaron Siskind and Bill Mangold

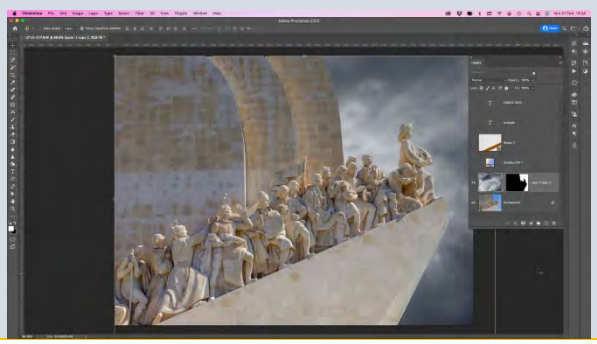

[Adobe Photoshop Tutorial: EVERY Tool in the Toolbar Explained and Demonstrated (youtube.com)]

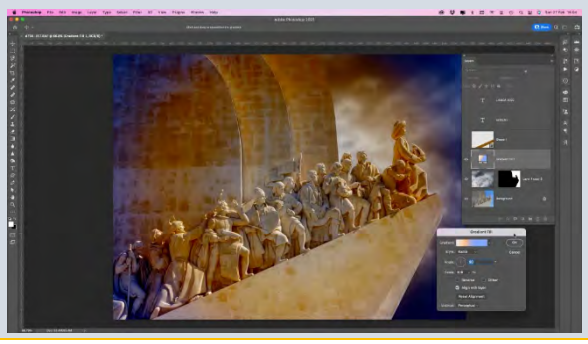


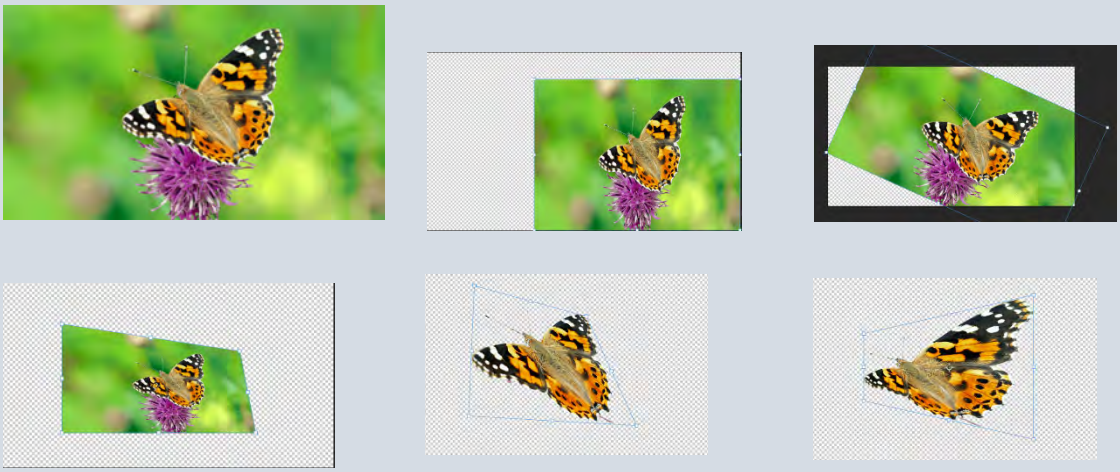

[Blending Modes Explained - The Complete Guide to Photoshop Blend Modes (photoshoptrainingchannel.com)]





Layers explained: what they do and how to use them - Life after Photoshop

TRANSFORM TOOL Examples- From left to right:
Original Butterfly, Resized Butterfly, Rotated Butterfly
Skewed Butterfly, Distorted Butterfly, Changed Perspective Butterfly



5 Easy Ways to Transform an Image in Photoshop (Guide) (photoshopbuzz.com)

## Writing Help

### ANALYSING OTHERS' WORK

**Structure your response using the following headings:**

**FORM**
What is going on in the art work/photography? Explain objectively and honestly (this is what you see)
Imagine you are trying to explain the art work to someone over the telephone and transcribe that message (write it down)

**PROCESS**
What has the artist used to make the artwork? Consider materials and media. If a photograph, what are the lighting considerations? Has it been presented in a special way i.e. as an installation?
What formal elements appear?
Are there any recognisable types of composition e.g. Rule of Thirds, Rule of Odds, Symmetry, Repetition?

**CONTENT**
Having researched further and understood the wider context, discuss the ideas behind the artwork and the intentions of the photographer to the best of your ability. Consider the mood of the work and how it has been achieved.
Do you recognise the associated genres?

**CONTEXT- Understanding the wider context and underlying themes gleaned from research and used to inform your opinion**

**This could include-** *Biographical information about the artist, Political events of the time e.g. Wars, Suffragettes*

*Social & Cultural Norms e.g. fashion movements*

*Ideologies, Technology, comparing other artists from the time*

*Consider past work and common trends in career*

*Art movements such as Bauhaus or Futurism*

*How does the work fir in to the history of Art* and Photography?

*Quotes and key points by specialists and academics*

**RESEARCH- Research using a variety of secondary sources and collecting comments, quotes and discussion points**

*Books, Magazines, Periodicals, Newspapers, Galleries, Museums, Internet, Radio, TV/DVD*

**QUESTIONING- Start with writing down key words and simple questions to get initial primary response and raise further areas for research**

**What?** The Artwork

**Who?** Subject Matter

**Where?** Location

**When?** Process

**Why?** Meaning

**ANNOTATING YOUR OWN WORK**

**Think?**

**What is it that you have done?**

*e.g.* ***This is a photograph of****…….(subject/object)* ***considering****…….(techniques such as frame, viewpoint, direct light, natural light, diffused, composition, cropping, macro, movement).*

**Was there anything you felt that didn't work well?**

Write a sentence describing what didn't work well and why.
***I feel that****…… **did not work well because**…….. (is the photography in focus? Could the composition be improved? Cropped, should you have used a different viewpoints, lighting dull or not effective? More direct light)*

**Evaluate what was successful? What is it that you liked about it and why?**

*Use of colour-complementary, texture, line, detail, viewpoint lighting etc****. I felt that worked because I used……***

**When annotating your work make sure you used photography keywords**

**CONNECTIVES- Connective help our writing to flow- Try using these connectives to improve your written work.**

**ADDITION**
And
Also
In addition
Further
Furthermore
As well as
And then

**COMPARISON**
Similarly
In comparison
Otherwise
In contrast
Alternatively
Despite this

**ILLUSTRATION**
For example
For instance
In other words
To show that
Such as
As revealed by
Analysis shows

**SUMMARY**
In brief
On the whole
Summarising
Overall
To sum up
Evidently
In conclusion

**OPINION**
It would seem
It appears
Obviously
Possibly
It seems likely
Presumably
In conclusion

**BALANCE & CONTRAST**
However
Nevertheless
Alternatively
Yet
whereas

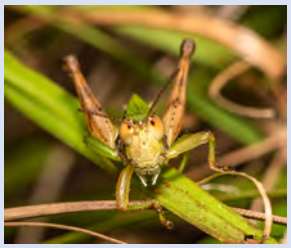
| Task Description | Done? |
|---|---|
| **Homework will be set every two weeks linking to the project theme**<br><br>Below are some additional tasks you can complete with or without a camera: | |
| **Without a camera task-** Look at the artist examples for Big Question no 1 choose your favourite and describe it using the analysing others work in the writing help section.<br><br>**With a camera task-** take some photographs of your own inspired by the theme surface and texture | |
| **Without a camera task- l**abel the different parts of the DSLR pictures below: LENS, LENS CAP, VIEWFINDER, FLASH, LENS RELEASE BUTTON, ISO, MODE DIAL, POWER SWITCH, SHUTTER BUTTON, LCD SCREEN, MEMORY CARD SLOT<br><br>  | |

**READ ME**

**Macro photos are images in which the magnification of the subject is life size or greater. Macro photography is often used to describe images where there is a slightly larger subject and all the traits of extreme close up photography are present – focusing on the detail to achieve a dramatic effect. It's all about showing something small much larger than it is in real life – an extreme close-up of something like an insect, flower or food. A full-frame insect in a five-by-seven-inch photo or a four-inch product shot of a cornflake go well above life size. Macro and close-up photos allow us to view these subjects from a new perspective. They unlock details which are hard or impossible to see otherwise – such as the antennae on a grasshopper or the contours of orange peel.**

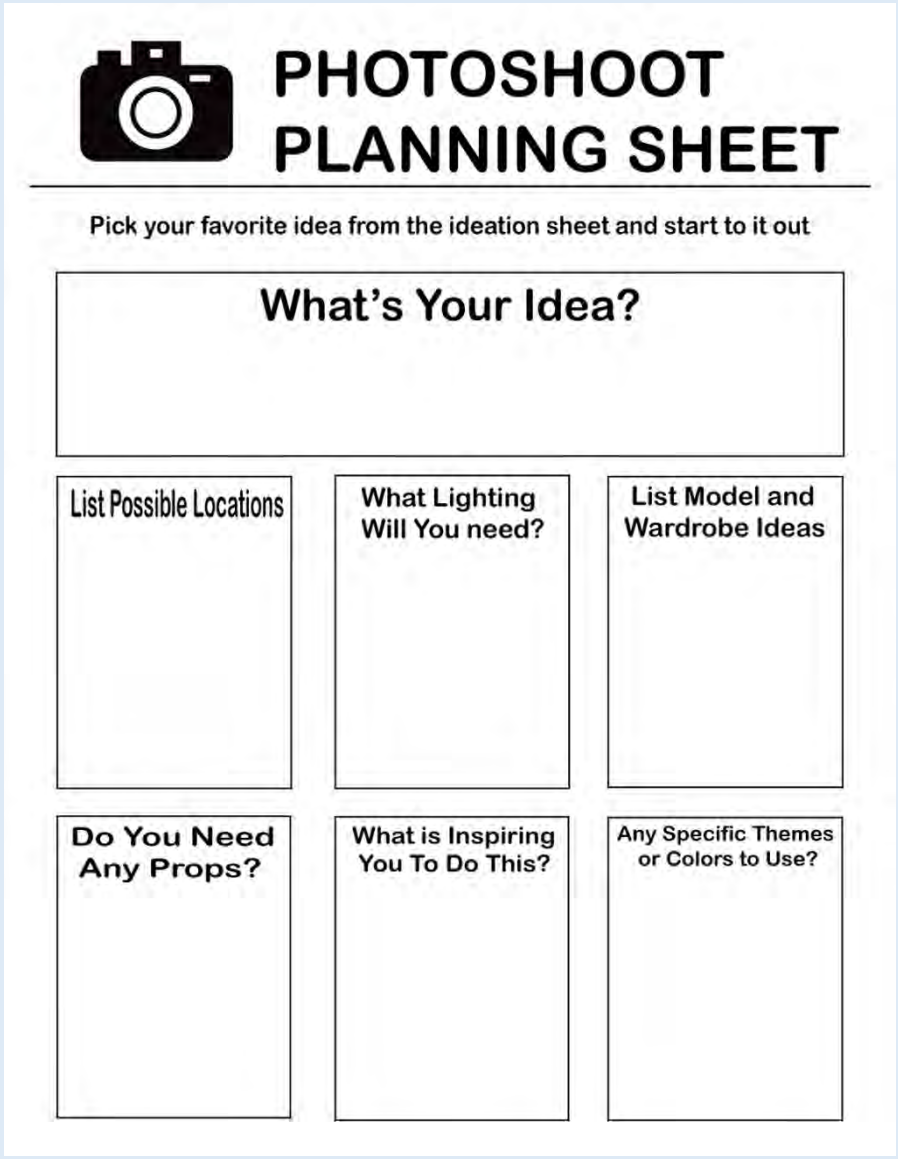
**COMPLETE ME**

**Macro ..... are images in which the ..... of the subject is life size or greater. ..... photography is often used to describe images where there is a slightly ..... subject and all the traits of extreme ..... are present – focusing on the detail to achieve a ..... effect. It's all about showing something small much ..... than it is in real life – an extreme close-up of something like an ....., flower or food. A full-frame insect in a five-by-seven-inch photo or a four-inch product shot of a ..... go well above life size. Macro and close-up photos allow us to view these subjects from a new perspective. They unlock .....which are hard or impossible to see otherwise – such as the antennae on a ..... or the contours of orange peel.**



**Without a camera task-** Which of the formal elements is being shown in the pictures below? Go on the internet and find 10 pictures linked to the formal elements and make a collage like the one below using copy and paste.
**With a camera task-** take pictures looking for examples of the formal elements make a collage if you can

**Without a camera task-** Use the worksheet below to help you plan a photo shoot linked to the them surfaces and textures…



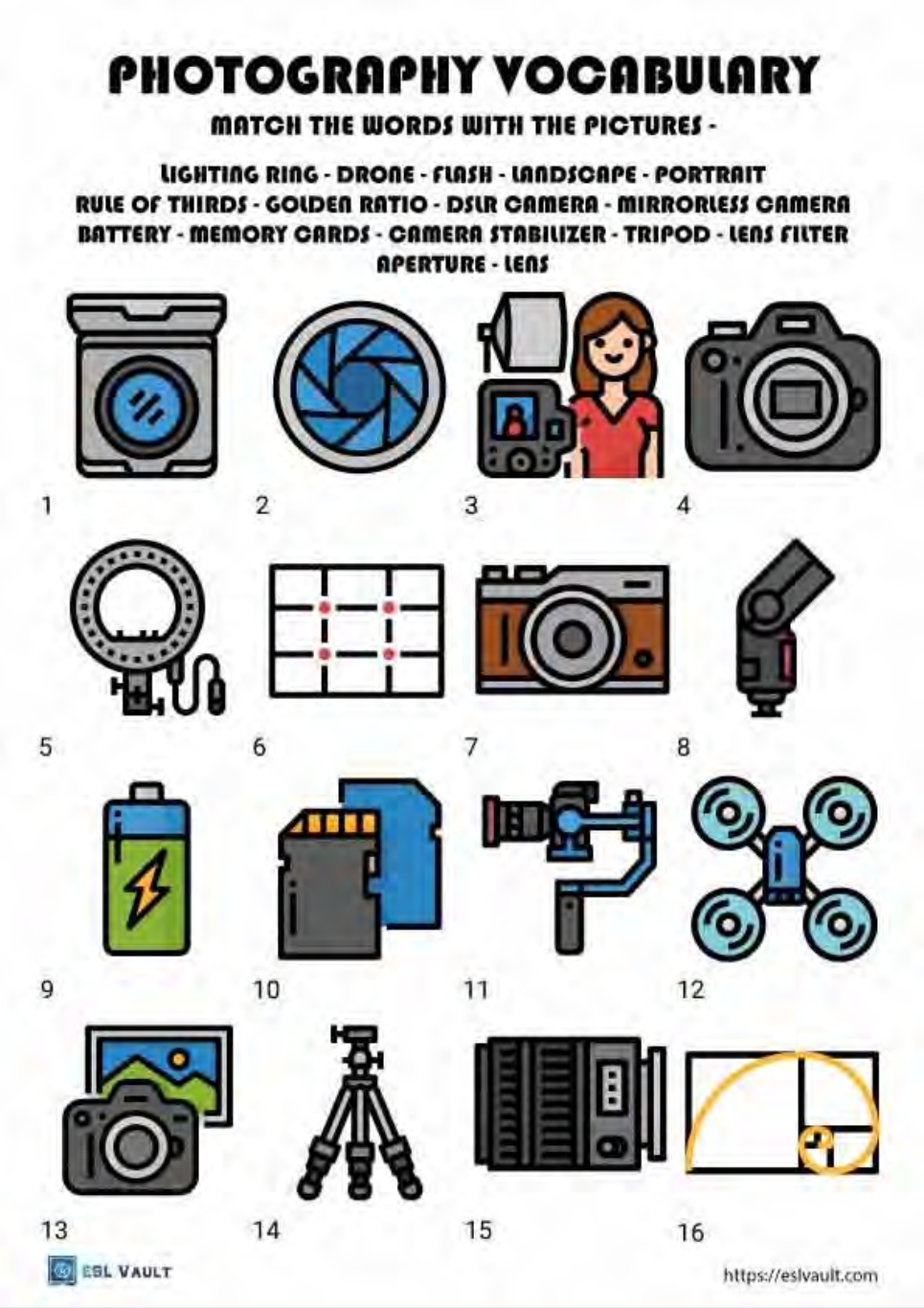
# PHOTOSHOOT PLANNING SHEET

Pick your favorite idea from the ideation sheet and start to it out

## What's Your Idea?

| | | |
|---|---|---|
| List Possible Locations | What Lighting Will You need? | List Model and Wardrobe Ideas |
| Do You Need Any Props? | What is Inspiring You To Do This? | Any Specific Themes or Colors to Use? |

**Without a camera task-** complete the worksheet below…



**Without a camera task-** complete the worksheet below

# photography

| E | P | H | L | I | M | O | O | R | K | R | A | D | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M | O | L | M | T | L | E | T | W | M | L | I | F | O |
| T | H | L | O | E | O | I | H | I | H | G | I | L | T |
| M | S | S | N | E | L | E | G | L | A | G | E | A | S |
| A | O | O | G | P | E | K | I | P | R | A | M | T | I |
| A | T | O | M | O | D | E | L | G | D | O | T | I | M |
| P | O | A | R | I | S | T | T | C | L | L | L | G | H |
| E | H | K | U | K | S | E | F | A | I | O | O | I | I |
| R | P | N | R | R | G | T | O | M | G | W | I | D | G |
| T | F | R | H | M | O | R | S | E | H | K | D | O | H |
| U | L | A | U | N | A | M | I | R | T | E | U | E | K |
| R | O | D | T | E | H | H | H | A | I | Y | T | O | E |
| E | S | O | L | A | T | K | D | I | N | T | S | H | Y |
| D | I | P | T | R | I | P | O | D | G | A | A | D | S |

DIGITAL
HIGHKEY
LENS
STUDIO
ISO
MODEL
CAMERA
HARDLIGHT
LOWKEY
SOFTLIGHT
PHOTOSHOP
APERTURE
TRIPOD
MANUAL
FILM
DARKROOM
LIGHTING

Play this puzzle online at : https://thewordsearch.com/puzzle/232185/

**Without a camera task-** complete the worksheet below…

# PHOTOGRAPHY - WORD SCRAMBLE GAME

Put the letters into the correct order.

**PHOTO, IMAGE, CAMERA, LENS, FOCUS, MACRO, ZOOM, SHUTTER, TRIPOD, VIEW, FLASH, BACKGROUND, CONTRAST, CROP, CAPTURE, FILM, TONE, BRIGHTNESS**

| | |
|---|---|
| 1. FMLI | ..... |
| 2. MAIGE | ..... |
| 3. TOPHO | ..... |
| 4. ATNRCTOS | ..... |
| 5. ESRHUTT | ..... |
| 6. MROCA | ..... |
| 7. SOCFU | ..... |
| 8. TNEO | ..... |
| 9. ETCRAPU | ..... |
| 10. RPCO | ..... |
| 11. SIEBSRHTGN | ..... |
| 12. DIRTPO | ..... |
| 13. IVEW | ..... |
| 14. BRNKCDUOAG | ..... |
| 15. SENL | ..... |
| 16. ZOOM | ..... |
| 17. HALFS | ..... |
| 18. RACEAM | ..... |

**Without a camera task-** Guess the image
**With a camera task-** take close-up photos of things like you see in the images
*Kiwi, Car, Spaghetti, Snowflake, Sand, Butterfly, Tiger, Shell*








| | |
|---|---|
| | |
| **Without a camera task-** choose a photo from the KO and analyse it using the writing help<br>**With a camera task-** Macro Photography Ideas - Top 20 from easy to hard — The School of Photography - Courses, Tutorials & Books | |

# Spanish Year 10 Term 2 – Healthy Living

Term Focus – This term looks at talking about what makes a healthy lifestyle.
You will be able to:
- Talk about your diet
- Talk about physical health
- Compare past and future lifestyles

**Prior Learning Links**
- Knowledge of food and drink (Year 8)
- Talking about how you feel (Year 7)
- Body parts (Year 8)

**Future Learning Links**
- Using the future tense
- Using the conditional tense
- Giving complex opinions

## 1. What do you eat normally? Red Amber Green

**¿Qué comes normalmente ?** (What do your normally eat?)

| | | | | | |
|---|---|---|---|---|---|
| **Normalmente,** (Normally,) | **para el desayuno** (for breakfast,)<br>**para la comida,** (for lunch,)<br>**para la merienda,** (for a snack,)<br>**para la cena,** (for dinner,)<br>**cuando tengo hambre,** (when i'm hungry,) | **como** (I eat)<br>**tomo** (I have) | **pan** (bread)<br>**pollo** (chicken)<br>**pescado** (fish)<br>**arroz** (rice) | **queso** (cheese)<br>**fruta** (fruit)<br>**verduras** (vegetables)<br>**huevos** (eggs) | **pasta** (pasta)<br>**helado** (ice cream)<br>**dulces / caramelos** (sweets)<br>**un bocadillo** (a sandwich) |
| | **cuando tengo sed,** (when i'm thirsty,) | **bebo** (I drink) | **café** (coffee)<br>**vino tinto** (red wine) | **leche** (milk)<br>**té** (tea) | **agua** (water) |

| | | | | |
|---|---|---|---|---|
| **Es un plato típico** (It's a typical dish)<br>**Es un plato popular** (It's a popular dish,) | **de** (from) | **México** (Mexico)<br>**Argentina** (Argentina)<br>**España** (Spain) | **Perú** (Peru)<br>**Chile** (Chile)<br>**Cuba** (Cuba) | **y está(n) hechos con…** (and it / they are made with)<br>**y consiste(n) en…** (and it / they consist of) |

| | | | | |
|---|---|---|---|---|
| **Me gustaría probar…** (I would like to try…) | **porque es** (because it)<br>**porque parece** (because it seems) | **porque suena** (because it sounds) | **rico** (tasty)<br>**delicioso** (delicious) | **dulce** (sweet) |

## 2. Do you lead a healthy lifestyle? Red Amber Green

**¿Llevas una vida sana ?** (Do you lead a healthy lifestyle?)

| | | | | |
|---|---|---|---|---|
| **Por la mañana** (In the morning)<br>**Por la tarde** (In the afternoon)<br>**Por la noche** (In the evening)<br>**Durante el día** (During the day) | **Todos los días** (Everyday)<br>**Algunos días** (Some days)<br>**Primero** (Firstly)<br>**Luego** (then) | **hago los deberes** (I do my homework)<br>**me levanto** (I get up)<br>**me visto** (I get dressed)<br>**termino las clases** (I finish class) | **tomo el desayuno** (I have breakfast)<br>**vuelvo a casa** (I return home)<br>**me acuesto** (I go to bed)<br>**duermo bien** (I sleep well) | **llevo una botella de agua** (I carry a bottle of water)<br>**hago ejercicio** (I do exercise)<br>**me relajo** (I relax)<br>**entreno** (I train) |
| **El fin de semana** (At the weekend)<br>**Los domingos** (On Sundays) | **Después** (Afterwards)<br>**Finalmente** (Finally) | **Suelo** (I usually) | **comer verduras** (eat vegetables)<br>**beber mucha agua** (drink lots of water) | **hacer meditación** (meditate)<br>**acostarme temprano** (go to bed early) |

## 3. What's up? Red Amber Green

**¿Qué te pasa ?** (What's up with you?)

| | | | | | |
|---|---|---|---|---|---|
| **Ayer** (Yesterday) **La semana pasada** (Last week) | **me rompí** (I broke my) **me corté** (I cut) **me quemé** (I burned) | **El brazo** (arm) | **La mano** (hand) | **La rodilla** (knee) | **Los ojos** (eyes) |
| | | **El estómago** (stomach) | **La cabeza** (head) | **La pierna** (foot) | **Los dedos** (toes) |
| **Me duele(n)** (My… hurts) | | **El pie** (foot) | **La garganta** (throat) | **Los oídos** (ears) | **Los dientes** (teeth) |
| **Le… duele(n)** (His / Her… hurts) | | **La boca** (mouth) | **La nariz** (nose) | | |

| | | | |
|---|---|---|---|
| **Debes** (You must) | **quedarte en la cama** (stay in bed) | **comprar medicinas en la farmacia** (by medicine at the pharmacy) | **relajarte** (relax) |
| **Necesitas** (You need) | **descansar** (rest) | **evitar el sol** (avoid the sun) | **ir al médico / hospital** (go to the doctor's / hospital) |
| **Tienes que** (You have to) | **dormir** (sleep) | **recuperarte** (recover) | |

***Plural body parts must use the plural form with an 'n' → me duelen las piernas**

## 4. What was your life like when you were younger? Red Amber Green

**¿Cómo era tu estilo de vida cuando era más joven?** (What was your life like when you were younger?)

| | | |
|---|---|---|
| **Antes,** *(Before),* **Cuando era más pequeño,** *(When I was smaller),* **Cuando era más joven,** *(When I was younger),* **Cuando tenía diez años,** *(When I was 10 years old),* | **me levantaba temprano** *(I used to wake up early)* **me acostaba tarde** *(I used to go to bed late)* **no era muy activo** *(I wasn't very active)* **no tenía mucha energía** *(I didn't have much energy)* **no tenía una vida sana** *(I didn't have a healthy life)* | **bebía demasiado café** *(I used to drink too much coffee)* **me gustaba comer dulces** *(I used to like eating sweets)* **no hacía suficiente ejercicio** *(I didn't do enough exercise)* **siempre estaba cansado y enfermo** *(I was always tired and sick)* |

| | | | |
|---|---|---|---|
| **Sin embargo, ahora** *(However, now),* **Por el contrario, ahora** *(On the other hand now),* | **Me siento mucho mejor** *(I feel much better)* **Soy bastante activo** *(I am quite active)* | **y no** *(and I don't)* **y ya no** *(and I no longer)* | **como comida rápida** *(eat fast food)* **hago nada para mantenerme en forma** *(do nothing to stay in shape)* **bebo bebidas con azúcar** *(drink sugary drinks)* **me levanto tarde como antes** *(get up late like before)* |

## 5. What is the imperfect tense? Red Amber Green

The Imperfect tense is a past tense that is used for two main reasons:

1. To **describe** things in the past → **There were** lots of people in the restaurant.
2. To talk about things that **regularly happened** in the past → When I was little, **I used to play** everyday.

## 6. How do I form the imperfect tense? Red Amber Green

We use the imperfect tense to talk about what you **used to do in the past**. To form the imperfect, you follow these steps:

1. Find the infinitive verb
2. Remove the -AR, -ER or -IR
3. Add the ending from the table that matches the person you are talking about

e.g. I used to play → jugar – ar + aba = jugaba

| | -AR verbs | -ER / -IR verbs |
|---|---|---|
| **I** | **aba** | **ía** |
| **You (singular)** | **abas** | **ías** |
| **He / She / It** | **aba** | **ía** |
| **We** | **ábamos** | **íamos** |
| **You (plural)** | **abais** | **íais** |
| **They** | **aban** | **ían** |

## 7. How are you going to change your lifestyle? Red Amber Green

**¿Cómo cambiarás tu estilo de vida?** (How are you going to change your lifestyle?)

| | | |
|---|---|---|
| **Si dejo de comer / beber / fumar,**<br>*(If I stop eating / drinking / smoking),*<br>**Si duermo al menos ocho horas,**<br>*(If I sleep for at least 8 hours),*<br>**Si practico más deporte,**<br>*(If I practise more sport),*<br>**Si tengo una vida más activa,**<br>*(If I have a more active life),* | **me sentiré más feliz**<br>*(I will feel happier)*<br><br>**mi salud física mejorará**<br>*(my physical health will improve)*<br><br>**mi salud mental mejorará**<br>*(my mental health will improve)* | **dormiré mejor**<br>*(I will sleep better)*<br><br>**me levantaré con más energía**<br>*(I will wake up with more energy)* |
| **Para cambiar esta mala costumbre,**<br>*(To change this bad habit),*<br>**Para mejorar mi dieta / salud,**<br>*(To improve my diet / health),* | **dormiré más tiempo**<br>*(I will sleep longer)*<br>**beberé más agua**<br>*(I will drink more water)*<br>**no usaré el móvil**<br>*(I will not use my mobile)* | **iré al gimnasio**<br>*(I will go to the gym)*<br>**evitaré beber alcohol y fumar**<br>*(I will avoid drinking alcohol and smoking)*<br>**empezaré a practicar deporte**<br>*(I will start practising sport)* |

## 8. What is a subordinate clause? Red Amber Green

To put it simply, a subordinate clause is a part of a sentence. A subordinate clause doesn't make sense on its own in a sentence, but adds more detail to the sentence itself.

**For example:**

**If I practise more sport, my physical health will improve. → 'If I practise more sport' doesn't make sense on it's own, and needs the second half of the sentence to make sense.**

## 9. How do I form the simple future tense? Red Amber Green

We use the simple future tense to talk about what you **will** do or what **will** happen. To form the simple future, you follow these steps:

4. Find the infinitive verb
5. Add the ending from the table that matches the person you are talking about

e.g. I will play → jugar + é = jugaré

| | |
|---|---|
| **I** | **é** |
| **You (singular)** | **ás** |
| **He / She / It** | **á** |
| **We** | **emos** |
| **You (plural)** | **éis** |
| **They** | **án** |

**10. What is the role play task?** Red Amber Green

In your speaking exam you, you will have a role play task that is supposed to mimic a real-life scenario that you might find yourselves in when in a Spanish speaking country. You will be given some prompts to prepare before the speaking section actually begins. On the right is an example:

The role play task is worth 10 marks. You will get 2 marks for each bullet point that you are able to answer correctly.

**You are at a doctor's surgery in Spain. You are the patient, and your teacher is the doctor.**
**Task:**
- Give your name and where you are from
- Say what is hurting you
- Say what your plans are for tomorrow
- Ask a question about medicine
- Ask a question about the cost

**You will have to do a role play task for this term's mid-term assessment!**

**11. What is a conjunction?** Red Amber Green

**Definition: A word used to link two clauses or sentences.**

Key Conjunctions: y (and), también (also), sin embargo (however)

**12. What is an intensifier?** Red Amber Green

**Definition: An intensifier is used <u>before</u> an adjective to add detail.**

Key intensifiers: muy (very), bastante (quite), un poco (a little), demasiado (too)

**HOME LEARNING TASKS**

| **Task Description** | **Done?** |
|---|---|
| Can you write a short paragraph talking about your diet? | |
| Can you write a short paragraph to say whether you lead a healthy life or not? | |
| Can you write a write short sentences saying what is wrong with you? | |
| Can you ask questions to a doctor? | |
| Can you write a paragraph about what you will do in the future to improve your life? | |
| Can you use the sentence builders above to write sentences answering the questions? Can you improve these by adding conjunctions and intensifiers? | |

# French Year 10 Term 2 – Healthy Living

Term Focus – This term looks at talking about what makes a healthy lifestyle. You will be able to:

- Talk about your diet
- Talk mental health and what you do to look after it
- Talk about physical health
- Compare past and future lifestyles

**Prior Learning Links**

- Knowledge of food and drink (Year 8)
- Talking about how you feel (Year 7)
- Body parts (Year 8)
- Future and imperfect tense (Year 9)

**Future Learning Links**

- Using the future tense
- Using the conditional tense
- Giving complex opinions

## 1. What do you normally eat?

Red Amber Green

**Qu'est-ce que tu manges normalement ?** (What do your normally eat?)

| | | | | | |
|---|---|---|---|---|---|
| **Normalement,** (Normally,)<br>**D'habitude,** (Usually,) | **pour le petit-déjeuner** (for breakfast,)<br>**à midi,** (at midday,)<br>**après les cours,** (after school,)<br>**quand j'ai faim,** (when i'm hungry,) | **je mange** (I eat)<br>**je prends** (I have) | **du pain** (bread) | **du fromage** (cheese) | **des olives** (olives) |
| | | | **du poulet** (chicken) | **des fruits** (fruit) | **des pâtes** (pasta) |
| | | | **du poisson** (fish) | **des légumes** (vegetables) | **de la glace** (ice cream) |
| | | | **du boeuf** (beef) | **des oeufs** (eggs) | **un sandwich** (a sandwich) |
| | **quand j'ai soif,** (when i'm thirsty,) | **je bois** (I drink) | **du café** (coffee)<br>**du vin rouge** (red wine) | **du lait** (milk)<br>**du thé** (tea) | **du lait de coco** (coconut milk)<br>**de l'eau** (water) |

## 2. What are partitive articles?

Red Amber Green

The partitive article refers to an unspecified quantity of food, liquid, or some other uncountable noun. English has no equivalent article – the partitive is usually translated by the adjectives "some" or "any," or may be left out entirely.

| | |
|---|---|
| **Masculine** | Du |
| **Feminine** | De la |
| **Plural** | Des |
| **Before a noun beginning with a vowel** | De l' |

## 3. How do you feel today?

Red Amber Green

**Comment tu te sens aujourd'hui ?** (How do you feel today?)

| | | | | | |
|---|---|---|---|---|---|
| **Comment ça va aujourd'hui?** (How are you today?) | **Ça va** (it's going) | **bien** (well) | **très bien** (very well) | | |
| | **Ça ne va pas bien** (it's not going well) | | | | |
| **Quel est le problème?** (What is the problem?)<br>**Qu'est-ce qui ne va pas?** (What's wrong?) | **Je me sens** (I feel) | **calme** (calm) | **fatigué** (tired) | **inquiet** (worried) | **stressé** (stressed) |
| | | **en colère** (angry) | **heureux** (happy) | **triste** (sad) | |

## 4. What should you do? Red Amber Green

| **Qu'est-ce qu'il devrait faire ?** (What should you do?) | | | |
|---|---|---|---|
| **On devrait**<br>(You should)<br><br>**Il faut**<br>(You must)<br><br>**Tu dois**<br>(You must) | **être calme / patient**<br>(be calm / patient)<br>**écouter un peu de musique**<br>(listen to some music)<br>**faire de la cuisine**<br>(do some cooking)<br>**parler avec quelqu'un**<br>(speak to somebody) | **aller au lit**<br>(go to bed)<br>**aller faire une promenade**<br>(go for a walk)<br>**expliquer le problème**<br>(explain the problem)<br>**essayer d'en parler avec…**<br>(try to talk about it with…) | **chercher en ligne**<br>(search online)<br>**éviter de passer trop de temps devant des écrans**<br>(avoid spending too much time in front of screens) |

## 5. Are you ok? Red Amber Green

| **Vous allez bien ?** (Are you ok?) | | | | |
|---|---|---|---|---|
| **J'ai eu un accident**<br>(I had an accident) | **où je me suis cassé**<br>(where I broke my) | **le bras**<br>(arm)<br>**le dos**<br>(back) | **le nez**<br>(nose)<br>**le pied**<br>(foot) | **la jambe**<br>(leg)<br>**la main**<br>(hand) |
| **J'ai vraiment mal**<br>(I have a really sore)<br><br>**J'ai très mal**<br>(I have a very sore) | **au coeur**<br>(heart)<br>**au dos**<br>(back)<br>**au nez**<br>(nose) | **au pied**<br>(foot)<br>**au ventre**<br>(stomach)<br>**à la bouche**<br>(mouth) | **à la gorge**<br>(throat)<br>**à la jambe**<br>(leg)<br>**à la main**<br>(hand) | **à l'oreille**<br>(ear)<br>**à la tête**<br>(head) |
| **Vous voulez un rendez-vous pour quand ?**<br>(When would you like an appointment) | **demain après-midi**<br>(tomorrow afternoon)<br>**aujourd'hui**<br>(today) | **lundi**<br>(Monday)<br>**mardi**<br>(Tuesday) | **mercredi**<br>(Wednesday)<br>**jeudi**<br>(Thursday) | |
| **Le rendez-vous est à quelle heure ?**<br>(What time is the appointment?) | **C'est à**<br>(It's at) | **deux heures**<br>(two o'clock) | **trois heures**<br>(three o'clock) | |
| **Quelle est l'adresse, s'il vous plait ?**<br>(What is the address please) | **C'est dans la rue (du Marché)**<br>(It's in the (Market) street) | **au numéro**<br>(at number) | **dix**<br>(10) | |

## 6. What is the role play task? Red Amber Green

In your speaking exam you, you will have a role play task that is supposed to mimic a real-life scenario that you might find yourselves in when in a French speaking country. You will be given some prompts to prepare before the speaking section actually begins. On the right is an example:

The role play task is worth 10 marks. You will get 2 marks for each bullet point that you are able to answer correctly.

**You are at a doctor's surgery in France. You are the patient, and your teacher is the doctor.**

**Task:**

- Say what the problem is
- Say how painful it is
- Say when you are returning to England
- Ask a question about what you need to do
- Ask a question about if you need to see a doctor in England

**You will have to do a role play task for this term's mid-term assessment!**

## 7. What are you going to do to improve your life? Red Amber Green

| **Qu'est-ce que tu feras pour améliorer ta vie ?** (What will you do to improve your life?) | | | |
|---|---|---|---|
| **À l'avenir, pour améliorer ma vie** (In the future, to improve my life)<br><br>**Afin d'être plus en forme** (in order to be in better shape)<br><br>**Pour réduire le stress,** (In order to reduce stress) | **j'aiderai les autres** (I will help others)<br>**j'aurai plus de patience** (I will have more patience)<br>**j'aurai une meilleure attitude** (I will have a better attitude)<br>**j'écouterai le prof** (I will listen to the teacher)<br>**je ferai plus d'exercice** (I will do more exercise)<br>**je ferai plus d'efforts en…** (I will make more effort in…) | **j'irai plus souvent au centre sportif** (I will go to the gym more often)<br>**je jouerai au tennis** (I will play tennis)<br>**je mangerai mieux** (I will eat better)<br>**je passerai moins de temps sur les réseaux sociaux** (I will spend less time on social networks) | **je penserai moins à moi** (I will think less about myself)<br>**je serai plus actif** (I will be more active)<br>**je serai plus gentil** (I will be kinder)<br>**je travaillerai plus sérieusement au collège** (I will work harder at school)<br>**je ne ferai pas mes devoirs à la dernière minute** (I will not do my homework at the last minute) |

## 8. What was your life like when you were younger? Red Amber Green

| **Ta vie était comment, quand tu étais plus jeune ?** (What was your life like, when you were younger?) | | | |
|---|---|---|---|
| **Quand j'étais plus jeune,** (When I was younger,)<br><br>**Quand j'étais petit,** (When I was little,) | **j'habitais** (I used to live) | **dans la banlieue** (in the suburbs) | **dans une grande ville** (in a big city) |
| | **j'étais** (I used to be) | **membre d'un gang** (a member of a gang) | **victime de harcèlement au collège** (a victim of bullying at school) |
| | **j'avais** (I used to have) | **beaucoup de problèmes** (lots of problems) | |

## 9. What is the imperfect tense? Red Amber Green

The Imperfect tense is a past tense that is used for two main reasons:

1. To **describe** things in the past → **There were** lots of people in the restaurant.
2. To talk about things that **regularly happened** in the past → When I was little, **I used to play** everyday.

## 10. How do I form the simple future tense? Red Amber Green

To form the simple future tense in French, you will need to follow the following steps:

1. Find the infinitive of your verb
2. Decide who is doing the action
3. Add the ending that matches the person to your infinitive

**e.g. I will play = Je + jouer + ai = je jouerai**

| | |
|---|---|
| **Je** | **ai** |
| **Tu** | **as** |
| **Il / elle / on** | **a** |
| **Nous** | **ons** |
| **Vous** | **ez** |
| **Ils / elles** | **ont** |

**11. What are the key verbs in the simple future tense?** Red Amber Green

| French | English | French | English |
|---|---|---|---|
| **J'acheterai** | I will buy | **Je jouerai** | I will play |
| **J'aiderai** | I will help | **Je passerai** | I will spend |
| **J'aurai** | I will have | **Je penserai** | I will think |
| **J'écouterai** | I will listen | **Je serai** | I will be |
| **Je ferai** | I will do | **Je travaillerai** | I will work |
| **J'irai** | I will go | **Je mangerai** | I will eat |

**12. What is an intensifier?** Red Amber Green

**Definition: An intensifier is used before an adjective to add detail.**

Key intensifiers: très (very), vraiment (really), assez (quite), un peu (a little), trop (too)

**HOME LEARNING TASKS**

| Task Description | Done? |
|---|---|
| Can you write a short paragraph talking about your diet? | |
| Can you write a short paragraph to talk about how you feel? | |
| Can you write a write short sentences saying what is wrong with you? | |
| Can you ask questions to a doctor? | |
| Can you write a paragraph about what you will do in the future to improve your life? | |
| Can you use the sentence builders above to write sentences answering the questions? Can you improve these by adding conjunctions and intensifiers? | |
| Practise the vocabulary in your knowledge organiser by using the look, cover, write, check method. | |
| Go to www.sentencebuilders.com and practise this terms vocabulary. | |

# Sport Science // Year 9 & 10 // Terms 1-6

Cambridge National Level 1 / 2 Sport Science
R181: Applying the principles of training: fitness and how it affects skill performance

**Prior Learning Links**

- Knowledge of basic components of fitness from Core PE.
- Some knowledge of basic fitness tests such as MSFT.
- Completed unit of work on "Fitness" in Years 7&8 in Core PE.

**Future Learning Links**

- Some links to questions in exam paper for R180.
- BTEC Level 3 Unit 2 – Fitness Training and Programming.

## KEY VOCABULARY

### KEY WORDS & TERMINOLOGY

**Topic Area 1**: Components of fitness applied in sport

**Key Terms**:

- ✓ **Strength** – the extent to which a muscle or muscle group can exert force to overcome a resistance, e.g in weightlifting
- ✓ **Power** – exerting muscular force (strength) with speed, e.g. 100m sprint
- ✓ **Agility** – the ability to change direction at speed while remaining in control of movement, e.g. sidestepping an opponent
- ✓ **Balance** – the ability to maintain the centre of mass over the base of support, e.g. standing on one leg
- ✓ **Flexibility** – the range of movement around a joint, e.g. performing the splits
- ✓ **Muscular endurance** – the ability of the muscles to repeatedly contract without fatiguing/tiring
- ✓ **Cardiovascular endurance** – the ability of the heart and lungs to meet the oxygen demands of the muscle over a prolonged period of time
- ✓ **Speed** – how fast an athlete covers a premeditated distance
- ✓ **Fatigue** – extreme tiredness from mental or physical exertion
- ✓ **Stamina** – the term used to describe the body's ability to sustain physical activity for a long time
- ✓ **Coordination** – the ability to use two or more body parts at the same time with efficiency
- ✓ **Reaction time** – how long it takes to respond to a stimulus
- ✓ **Pressurised drill** – an activity within a training session which has an added element of competition such as being timed or up against an opponent

**Topic Area 2:** Principles of training in sport

**Key Terms:**

- ✓ **Progression** – gradual increases or movements towards a goal
- ✓ **Overload** – doing more than what was done in a previous session to ensure continued results
- ✓ **Frequency** – how regularly an individual trains, i.e. times a person trains per day, week or month
- ✓ **Intensity** – how hard an individual works during a session
- ✓ **Time** – how long an individual exercises for
- ✓ **Type** – the method of training adopted by the participant, e.g. circuit training
- ✓ **Specificity** – training which improves a component of physical or skill-related fitness related to an individual's goal, sport or activity of choice
- ✓ **Reversibility** – the regression in physical fitness or ability after a prolonged period of inactivity
- ✓ **Specific** – how relevant goal is to the performer or their role in that sport
- ✓ **Measurable** – a goal in which can be in some way quantified and monitored to assess
- ✓ **Achievable** – a goal which is not impossible to meet
- ✓ **Realistic** – a goal which is within the capabilities of the performer
- ✓ **Time-bound** – a goal which is set a duration in which it is to be achieved

**Topic Area 3**: Organising and planning a fitness training programme

**Key Terms**:

- ✓ **Injury history** – whether an individual has had any physical niggles in the past which may affect the planning of a training programme.
- ✓ **Aims** – the ultimate goals that the training programme hopes to achieve
- ✓ **Objectives** – the measurable, intermediate steps that help and athlete check progress leading to the ultimate goal
- ✓ **Suitability** – whether or not a training programme is appropriate enough for an individual's needs
- ✓ **Adaptability** – the extent to which a programme can be manipulated in response to an unforeseen event or new demands
- ✓ **FITT** – an acronym for the principles of progressive overload which should be incorporated into any successful training programme (Frequency, Intensity, Time, Type)
- ✓ **Reflection** – coaches and athletes taking time out to check on strengths, weaknesses and progress – to help formulate future plans
- ✓ **Facilities** – the location or amenities needed to take part in sport or physical activity
- ✓ **Equipment** – the items or resources which are needed to perform a certain sport or physical activity
- ✓ **Risk assessment** – a pre-exercise safety measure carried out to identify hazards and arrange appropriate controls
- ✓ **Testing** – a way of evaluating a training programme by comparing a fitness component before and after the training block.
- ✓ **SMART goals** – the targets that an individual sets themselves for a fitness training programme which applies different principles ensuring its effectiveness

**Topic Area 4**: Evaluate own performance in planning and delivery of a fitness training programme

**Key Terms**:

- ✓ **Protocol** – the set of instructions involved in carrying out a fitness test
- ✓ **Sequence** – the order in which a series of tests are carried out
- ✓ **Validity** – whether a test actually measures the component of fitness that it intends to
- ✓ **Reliability** – the ability of a test to produce the same outcome if performed exactly the same
- ✓ **Practicality** – the feasibility of a test protocol or its ease of implementation with respect to time, equipment, space and individuals
- ✓ **Normative data** – the typical age and gender matched fitness test results of a larger population, used for comparative purposes
- ✓ **Average** – the mean value of a set of fitness results
- ✓ **Rating** – the descriptor given to a test result that helps categorise or group together sets of results
- ✓ **Gender** – whether an individual considers themselves as male, female or another identity will affect how they are scored in a fitness test
- ✓ **Age** – how old or young an individual is, which impacts their expected fitness test result
- ✓ **Standardisation** – an established set of procedures which are reproduced every time to ensure consistency in both inter and intra individual testing
- ✓ **Comparison** – analysing the results from two different individuals or groups and measuring them against each other
- ✓ **Accuracy** – the extent to which a test result is recorded with precision
- ✓ **Procedure** – the sequence of steps for carrying out a task
- ✓ **Units** – the quantity given for a particular measurement

| | | | |
|---|---|---|---|
| 1. How are components of fitness relevant to different sports?<br>2. Can you justify why different components of fitness are relevant for different sports? | Red<br>Red | Amber<br>Amber | Green<br>Green |

**Components of Fitness**

Think about which components of fitness are needed to complete the challenges set for the sports stars below

**Owen Farrell** (rugby union)

**Challenge:** To steal the ball and sidestep an opponent to score a try.

| Component of fitness | Definition |
|---|---|
| | |
| | |

**Simone Biles** (gymnastics)

**Challenge:** To execute the double layout floor exercise to a high standard.

| Components of fitness | Definition |
|---|---|
| | |
| | |

| | | | |
|---|---|---|---|
| 3. What fitness tests are used for each component of fitness?<br>4. Can you apply the components of fitness to a skilled performance? | Red<br>Red | Amber<br>Amber | Green<br>Green |

**Fitness Tests**

Fill in the missing appropriate fitness tests:

| Component of Fitness | Appropriate fitness test |
|---|---|
| Agility | |
| Cardiovascular endurance | Multistage fitness test |
| Muscular endurance | Press up test |
| Speed | 30m speed test |
| Strength | |
| Power | Standing long jump |
| Flexibility | |
| Balance | Stork stand test |
| Coordination | |

## 5. What are the principles of training? Red Amber Green

**Principles of Training**

Fill in the blanks for the following definitions of the FITT principles:

- Fr_qu_e_cy – the number of times you train per week (how often)
- In_e_s_ty – how hard you train during each training session (how hard)
- _im_ – the length of each training session (how long)
- T_p_ – the method of training used during each training session (which training method)

## 6. What are SMART goals? Red Amber Green

**SMART Goals**

Match up the SMART principles below with their definitions

| | |
|---|---|
| **Specific** | It should be possible to reach your goal. |
| **Measurable** | Goals should not be vague but should describe what you want to achieve in detail. |
| **Achievable** | Goals should be tracked in order to see your progress as you complete them. |
| **Realistic** | It should be clear when your goals should be achieved by. |
| **Time-bound** | A goal should be something that is possible given your individual circumstances, e.g. the amount of time you can dedicate to training, or the facilities and equipment available to you. |

## 7. What are methods of training and their advantages/disadvantages? Red Amber Green

**Methods of Training**

Complete the table below to describe the characteristics of the exercises/training methods and the advantages and disadvantages of each.

| Exercise/ training method | Aerobic, Anaerobic or both? | Advantages | Disadvantages |
|---|---|---|---|
| Walking around the room/hall/track for 1 minute | | | |
| jogging on the spot for 30 seconds | | | |
| Sprinting on the spot for 10 seconds | | | |
| Weaving in and out of 10ms of cones | | | |
| Sprinting to a cone 10m away and walking back | | | |
| Sprinting to a cone 10m and sprinting back | | | |
| Enacting a first and second tennis serve | | | |
| Performing four different static stretches for 10-12 seconds each | | | |

**8. What factors should you consider when designing a fitness training programme?** | **Red** | **Amber** | **Green**

**Designing a Fitness Programme**

Circle the 5 most important factors to consider when designing a fitness training programme:

| | | |
|---|---|---|
| Method used | Current fitness levels | Safety/risk assessments |
| Duration | Previous injuries | Suitable activities |
| Name | Session aims | Application of SPOR |
| Age | Athlete goals | Progression |
| Aims | Equipment/ facilities needed | Objectives |

**9. How do you apply the principles of training to a fitness programme?** | **Red** | **Amber** | **Green**

**Principles of Training**

Read what each athlete says below about their training and give them advice on how they could apply the most relevant principle of training to their situation

I have managed to stay fit and active over the years and continue to run recreationally, but I am frustrated by the fact that I can no longer run at the same pace I did when I was racing.

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I always lift the same weights at the gym as I'm comfortable with this but I don't seem to feel any fitter or stronger.

.....

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.....

| 10. How do you plan a fitness programme?<br>11. How do you record your results from a fitness training programme? | Red | Amber | Green |
|---|---|---|---|

**Planning a Fitness Programme**

Think about the information that goes into a training programme. Fill out the worksheet below to begin the planning process.

**Suitable warm-up and cool-down**
(Think about the different components of warm-ups and cool-downs and how exercises may vary for different activities.)

**Suitable main activities**
(Can you think of different activity examples suitable to a range of different subjects?)

**Coaching points** (What instructions might coaches provide to improve the performance of different skills and techniques?)

**Duration of plan** (What factors would influence the optimum duration of the programme?)

**Duration of sessions** (What factors might influence the duration of a training session?)

**Monitoring progression and adaptability**
(How is progress monitored and how might a training session or mid-term testing result in adaptation of the programme?)

**Equipment and facilities**
(What different equipment and facilities are needed for different sports and activities?)

| 12. What are the strengths and areas for improvement for your fitness training programme? | Red | Amber | Green |
|---|---|---|---|

**Strengths and Areas for Improvement**

It is important to evaluate the effectiveness of a fitness programme. Think about the strengths and weaknesses of your fitness programme. Things to consider are:

- ✓ The level of success based on whether or not the goals were met
- ✓ Whether the training methods were appropriate for the participant
- ✓ If the programme was tailored to the individual needs of the subject
- ✓ Whether the programme was fully adhered to (if not, why not?)

| Strengths | Areas for improvement |
|---|---|
| | |
| | |

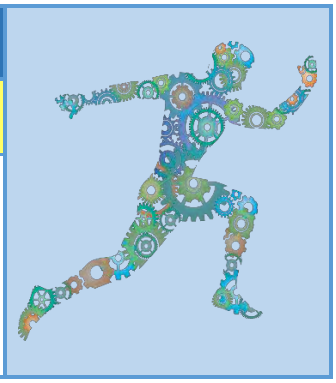
**HOME LEARNING TASKS**

| Task Description | | Done? |
|---|---|---|
| **1) Complete Checkpoint 1 & 2 on the EverLearner at a minimum grade of 70%**<br>*"Components of fitness applied to sport"* |  | |
| **2) Complete Checkpoint 3 & 4 on the EverLearner at a minimum grade of 70%**<br>*"Applying the principles of training: fitness and how it affects skill performance"* |  | |
| **3) Complete Checkpoint 5 on the EverLearner at a minimum grade of 70%**<br>*"Organising and planning a fitness training programme"* |  | |
| **4) Complete Checkpoint 6 on the EverLearner at a minimum grade of 70%**<br>*"Evaluate own performance in planning and delivery of a fitness training programme"* |  | |

# Sport Science // Year 9 & 10 // Terms 1-6

Cambridge National Level 1 / 2 Sport Science

**Unit R182: The body's response to physical activity and how technology informs this.**



**Prior Learning Links**

- Knowledge of basic anatomy and physiology from Core PE.
- Knowledge of sporting examples R181 and Core PE.

**Future Learning Links**

- Some links to questions in exam paper for R180.
- BTEC Level 3 Unit 1 – Anatomy and Physiology

## KEY VOCABULARY

### KEY WORDS & TERMINOLOGY

**Topic Area 1**: The cardio-respiratory system and how the use of technology supports different types of sports and their intensities

**Key Terms**:

- ✓ **Atria** - upper chambers of the heart that collect blood from veins.
- ✓ **Ventricles** – lower chambers of the heart that pump blood out through arteries.
- ✓ **Valves** - prevent the backflow of blood.
- ✓ **Deoxygenated** – venous blood (in veins) that does not carry oxygen.
- ✓ **Oxygenated** - arterial blood (in arteries) that carries oxygen.
- ✓ **Arteries** - blood vessels that mainly carry oxygenated blood away from the heart.
- ✓ **Capillaries** - tiny, thin walled blood vessels that join arteries (which carry blood away from the heart) and veins (which carry blood back to the heart).
- ✓ **Alveoli** - tiny air sacs in the lungs.
- ✓ **Veins** - blood vessels that mainly carry deoxygenated blood back to the heart.
- ✓ **Trachea** - tube connecting the mouth and nose to the lungs.
- ✓ **Lungs** - large spongy organs in chest; used for gas exchange.
- ✓ **Bronchi** - airways that lead from the trachea into the lungs.
- ✓ **Bronchioles** - air passages inside the lungs that connect the bronchi to the alveoli.
- ✓ **Diaphragm** - dome-shaped muscle causing inhalation and exhalation.
- ✓ **Radial pulse** - heart rate that can be felt at the wrist.
- ✓ **Carotid pulse** - heart rate that can be felt at the neck.
- ✓ **Vasoconstriction** – reduction in the diameter of a blood vessel to reduce blood flow through that vessel.

**Topic Area 1 (Continued…):**

- ✓ **Vasodilation** - widening in the diameter of a blood vessel to increase blood flow through that vessel.
- ✓ **Cardiac output** – the volume of blood that the heart is able to pump out in one minute.
- ✓ **Stroke volume** – the volume of blood that leaves the heart during each contraction.
- ✓ **Systolic blood pressure** - blood pressure when the heart is contracting.
- ✓ **Diastolic blood pressure** - blood pressure when the heart is relaxed.
- ✓ **Inhalation** - breathing in.
- ✓ **Exhalation** - breathing out.
- ✓ **Intercostal muscles** - muscles located between the ribs.
- ✓ **Diffusion** - the movement of a gas from an area of high concentration to an area of low concentration.
- ✓ **Wearable technology** - technology worn on the body during exercise to provide data.
- ✓ **Laboratory-based technology** - the use of technology inside a laboratory to provide data.
- ✓ **Field-based technology** - technology that can be used to provide data outside of a laboratory in the setting where sports take place, for example a football pitch.
- ✓ **Spirometer** - machine that produces a spirometry trace of breathing volumes.
- ✓ **Vital capacity** – amount of air expelled from your lungs when you take a deep breath and then exhale fully.
- ✓ **Pulse oximeter** – device used to measure how efficiently oxygen is being carried to the extremities by the heart (blood oxygen level).

**Topic Area 2:** The musculo-skeletal system and how the use of technology supports different types of sports and their movements

**Key Terms:**

- ✓ **Clavicle** - the collarbone.
- ✓ **Scapula** - the shoulder blade.
- ✓ **Humerus** - bone in the upper arm.
- ✓ **Radius** - bone of the forearm; attaches to the thumb side of the wrist.
- ✓ **Ulna** - bone of the forearm; forms the point of the elbow.
- ✓ **Cranium** - skull bone, which surrounds the brain.
- ✓ **Ribs** - bones surrounding the heart and lungs, forming the chest cavity.
- ✓ **Sternum** - flat bone at the front of the chest, sometimes called the breastbone.
- ✓ **Vertebrae** - many single bones joined together to form the backbone.
- ✓ **Femur** - long bone of the thigh or upper leg, which extends from the hip to the knee.
- ✓ **Tibia** - the shin bone; forms knee joint with the femur.
- ✓ **Fibula** - bone in the lower leg that forms the ankle.
- ✓ **Patella** - the kneecap; covers the knee joint.
- ✓ **Deltoids** - muscles on shoulder joint that move the upper arm.
- ✓ **Trapezius** - muscle at the top of the back that moves the scapula and head.
- ✓ **Latissimus dorsi** – muscle at the side of back that moves the upper arm.

**Topic Area 2 (Continued…):**

- ✓ **Pectorals** - muscles in the chest that move the upper arm.
- ✓ **Biceps** - muscles at the front of the upper arm.
- ✓ **Triceps** - muscles at the back of the upper arm.
- ✓ **Abdominals** – stomach muscles that protect internal organs.
- ✓ **Gluteals** - buttock muscles, which are used when running.
- ✓ **Hamstrings** - muscles at the back of the upper leg.
- ✓ **Quadriceps** - muscles at the front of the upper leg.
- ✓ **Gastrocnemius** - one of the calf muscles; used in walking.
- ✓ **Soleus** - one of the calf muscles; used in walking.

- ✓ **Synovial joint** - a freely moveable joint.
- ✓ **Ball and socket joint** - ball shaped end of bone fits into the socket of another, for example the hip.
- ✓ **Hinge joint** - end of bone fits against another bone allowing movement in only one direction, for example the knee.
- ✓ **Gliding joint** - one bone can slide over another, for example the carpals in the wrist.
- ✓ **Pivot joint** - rounded end of one bone fits into a ring formed by the other bone, for example the vertebrae of the neck, which allow head rotation.

**Topic Area 3**: Short-term effects of exercise on the cardio-respiratory and musculo-skeletal systems

**Key Terms**:

- ✓ **Anticipatory rise** – slight increase in heart rate before exercise.
- ✓ **Heart rate –** Number of times the Heart beats per minute
- ✓ **Stroke volume –** Volume of blood that leaves the Heart during each contraction
- ✓ **Cardiac output –** Volume of blood that the Heart pumps out in one minute
- ✓ **Breathing rate –** Number of breaths taken per minute
- ✓ **Gaseous exchange –** The exchange of gases in the lungs (Oxygen in – Carbon dioxide out)
- ✓ **ROM –** Range of movement at joints

**Topic Area 4**: Long-term effects of exercise on the cardio-respiratory and musculoskeletal systems

**Key Terms**:

- ✓ **Fast twitch fibres** – muscle fibres that contract quickly and/or with high force; used during high-intensity work.
- ✓ **Slow twitch fibres** – muscle fibres that contract with a low force but do not fatigue quickly.
- ✓ **Bradycardia** – decrease in the resting heart rate because of training.
- ✓ **Goniometer** - device used to measure flexibility (range of movement at a joint).
- ✓ **Lung capacity** - the amount of air the lungs can hold.
- ✓ **Tidal volume** - the amount of air breathed in and out at rest.
- ✓ **Bone density** - the amount of bone mineral in bone tissue.
- ✓ **Capillarisation** – an increase in the number of capillaries as a result of endurance training.

| | |
|---|---|
| | ✓ **Heart disease** - when the heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries that supply the heart with blood.<br>✓ **Heart attack** – medical emergency in which the supply of blood to the heart is suddenly blocked. |

| 1: What is the function and role of the cardio-respiratory system? | Red | Amber | Green |
|---|---|---|---|

- **What is Heart Rate and how is it measured?**

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.....
.....

- **What is Stroke Volume?**

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.....

- **What is Cardiac Output?**

.....
.....

- **What is Breathing Rate and how is it measured?**

.....
.....
.....

- **What is Tidal Volume?**

.....
.....

- **What is Gaseous Exchange?**

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| 2: How is technology used to inform us about the cardio-respiratory system? | Red | Amber | Green |
|---|---|---|---|

**Key terms**

**Technology** Putting scientific knowledge into practical use to solve problems or invent useful tools.

**Wearable technology** Technology worn on the body during exercise to provide data.

**Laboratory-based technology** The use of technology inside a laboratory to provide data.

**Field-based technology** Technology that can be used to provide data outside of a laboratory in the setting where sports take place, for example a football pitch.

- **How could a coach use data from a Central Midfielder's Heat Map to assess the performance of his/her Football player?**

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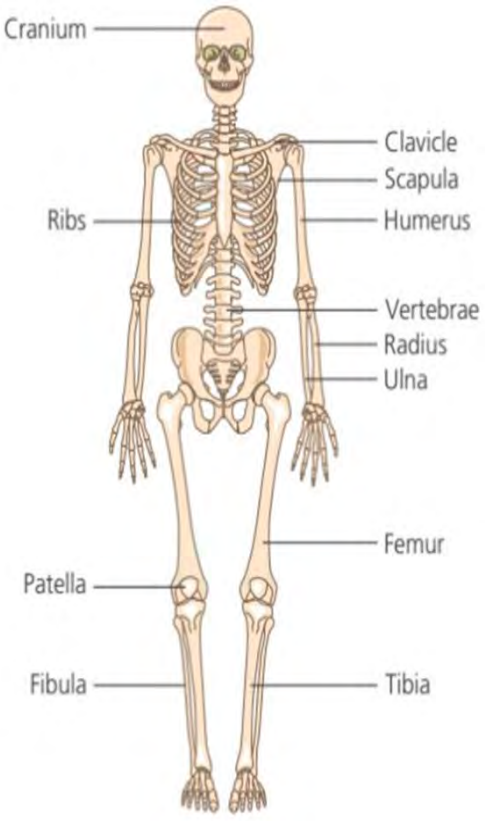
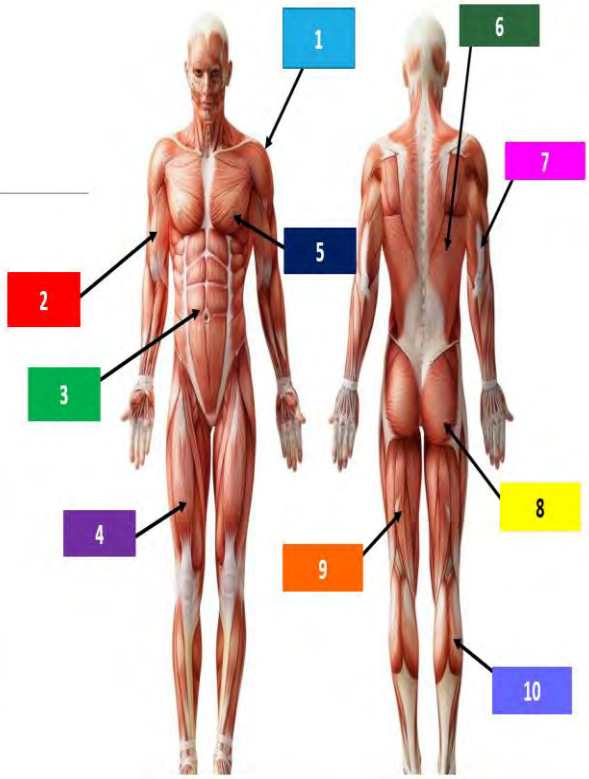
| 3: What are the components and role of the musculo-skeletal system? | Red | Amber | Green |
|---|---|---|---|




1 = Deltoid
2 = Bicep
3 = Abdominals
4 = Quadriceps
5 = Pectorals
6 = Latissimus Dorsi
7 = Triceps
8 = Gluteal
9 = Hamstring
10 = Gastrocnemius



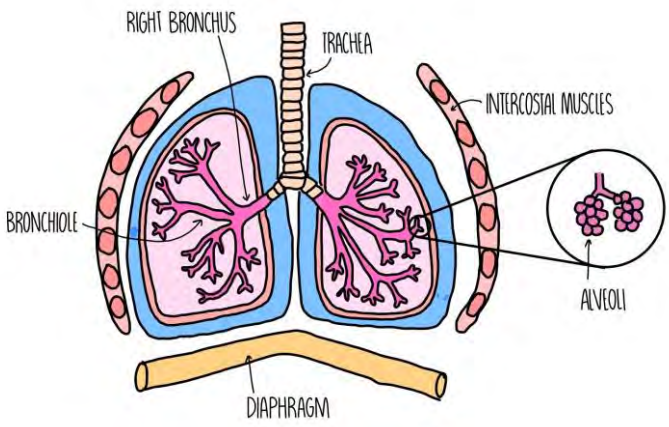
| 4: How is technology used to inform us about the musculo-skeletal system? | Red | Amber | Green |
|---|---|---|---|

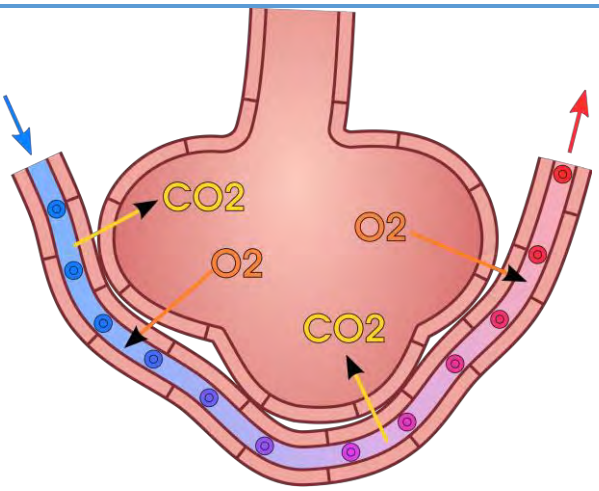
- **How could a High Jump coach use the data gathered from Slow Motion Capture to assess the performance of his/her athlete?**

| 5: What are the short-term effects of exercise on the cardio-respiratory system? | Red | Amber | Green |
|---|---|---|---|

- **What would you notice occurring to your Heart Rate and Cardiac Output during exercise?**

- **What would you notice occurring to your Breathing Rate during exercise?**




| 6: What are the short-term effects of exercise on the musculo-skeletal system? | Red | Amber | Green |
|---|---|---|---|

- **During exercise, what happens to blood flow to muscles and why does this occur?**
- **What effect would this have on muscle temperature and pliability?**

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**Think:**

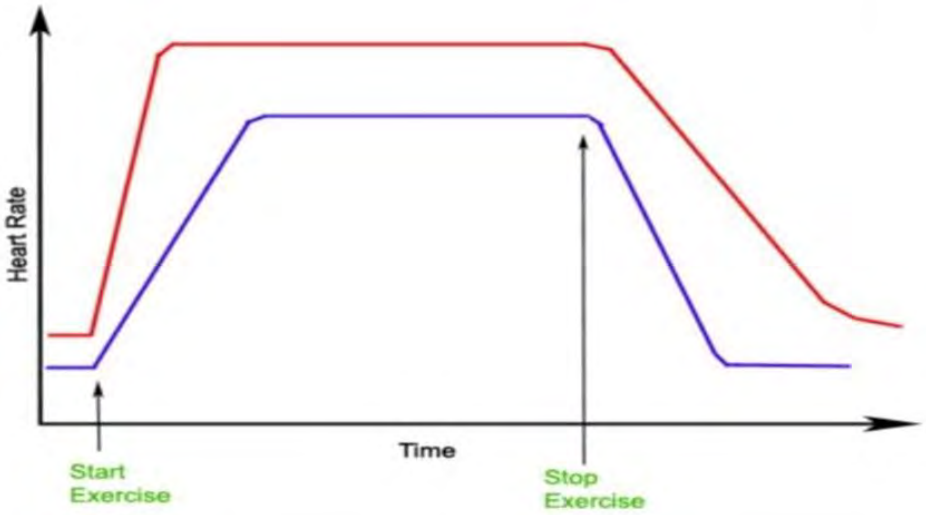
- ✓ **Heart rate** – Number of times the Heart beats per minute
- ✓ **Stroke volume** – Volume of blood that leaves the Heart during each contraction
- ✓ **Cardiac output** – Volume of blood that the Heart pumps out in one minute
- ✓ **Breathing rate** – Number of breaths taken per minute
- ✓ **Gaseous exchange** – The exchange of gases in the lungs (Oxygen in – Carbon dioxide out)

| 7: What are the long-term effects of exercise on the cardio-respiratory system? | Red | Amber | Green |
|---|---|---|---|

## Long-term effects of exercise on the cardio-respiratory system occurs to:

- **Heart Rate**
- **Stroke Volume**
- **Cardiac Output**
- **Heart Rate recovery**
- **Lung capacity**

- This graph shows the **Heart Rates** of two performers running 100m. One of them is fit, while the other is unfit. Which is which? Back up your answer with **two reasons** as to why you have come to your conclusions. **(4 marks)**

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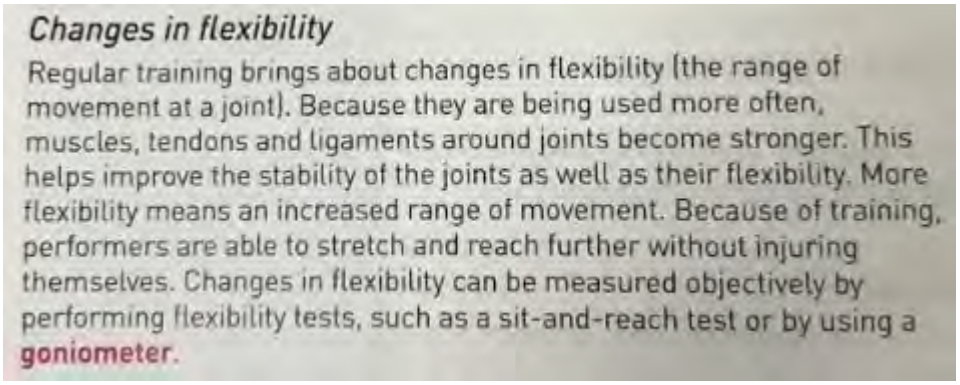
| 8: What are the long-term effects of exercise on the musculo-skeletal system? | Red | Amber | Green |
|---|---|---|---|

## Long-term effects of exercise on the musculo-skeletal system occurs to:

- Changes in muscle size
- Changes in strength
- Changes in flexibility
- Quicker muscle recovery



*Changes in flexibility*

Regular training brings about changes in flexibility (the range of movement at a joint). Because they are being used more often, muscles, tendons and ligaments around joints become stronger. This helps improve the stability of the joints as well as their flexibility. More flexibility means an increased range of movement. Because of training, performers are able to stretch and reach further without injuring themselves. Changes in flexibility can be measured objectively by performing flexibility tests, such as a sit-and-reach test or by using a **goniometer**.

- **The long-term changes to an athlete's flexibility due to training will enable them to perform at a much higher level than someone who has not been training over time. How would their performances in Badminton differ? Give two explicit examples of how flexibility benefits Badminton performance.**
  **(4 marks)**

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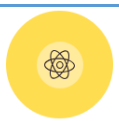
| HOME LEARNING TASKS | | |
|---|---|---|
| **Task Description** | | **Done?** |
| **1) Complete Checkpoint 1 on The EverLearner at a minimum grade of 70%:** *"The cardio-respiratory system and how the use of technology supports different types of sports and their intensities"* |   | |
| **2) Complete Checkpoint 2 on The EverLearner at a minimum grade of 70%:** *"The musculo-skeletal system and how the use of technology supports different types of sports and their movements"* |   | |
| **3) Complete Checkpoint 3 on The EverLearner at a minimum grade of 70%:** *"Effects of Exercise"* |   | |