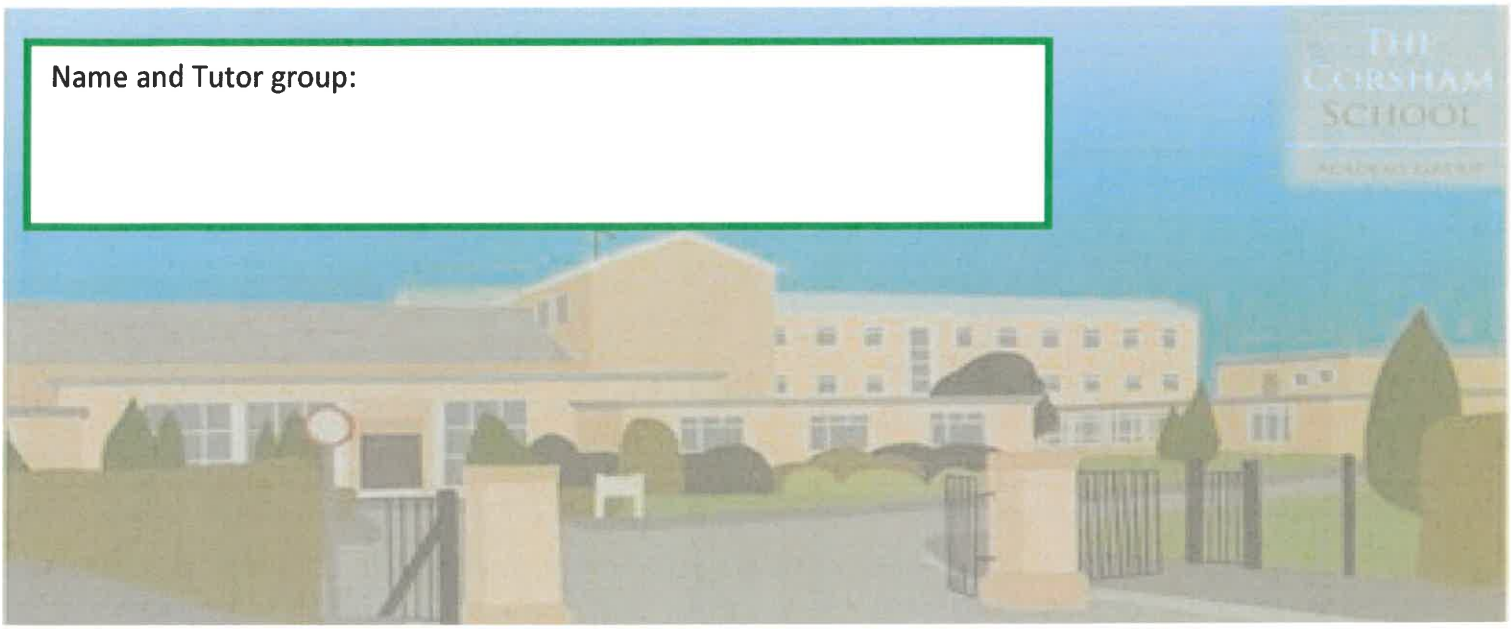
Name and Tutor group:



# Year 8 Knowledge Organiser

# Term 3

## Contents



**CORSHAM CHARACTER**

**INTELLECTUAL VALUES**

The pursuit of truth, knowledge and understanding.

Be reflective. Be curious. Be open-minded. Be creative.

**PERFORMANCE VALUES**

Maximum effort, maximum focus.

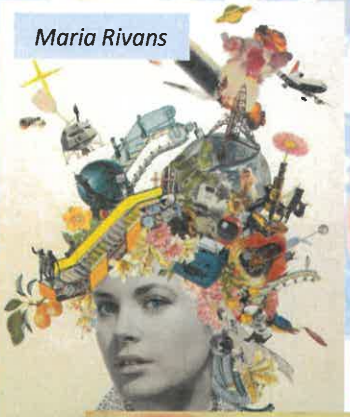
Be resilient. Always Persevere. Contribute to Teamwork. Be ambitious.

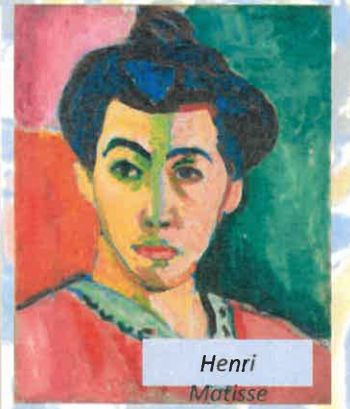
**DREAM BELIEVE ACHIEVE**

# Knowledge Organiser – Year 8 Art
# EXPRESSIVE PORTRAITS

EXAMPLES OF KEY ARTISTS WORK:


Loui Jouver


Maria Rivans


Henri Matisse


Wassily Kandinsky

## YOU WILL LEARN:

Skills to produce a mixed media collage of a self-portrait. You will look at artist's such as Loui Jouver, Maria Rivans, Henri Matisse. You will learn about different colour combinations and the relationships of colour.
You will create your own self-portrait inspired by different expressive artists.

## Why am I learning this?

The foundation skills in this project will enable you to tackle the varied concepts, artists, techniques and processes throughout Year 8.
You will build on your knowledge and skills with each project as they increase in difficulty, enabling you to express yourself in a confident way.

## CONTEXTUAL KNOWLEDGE:

Fauvism

Maria Rivans

**Fauvism** is the name applied to the work produced by a group of artists (which included Henri Matisse and André Derain) from around 1905 to 1910, which is characterised by strong colours and fierce brushwork.

**Maria Rivans** is known for her scrapbook-style collage aesthetic. A mash-up of Surrealism meets Pop-Art, Rivans' work re-appropriates vintage ephemera, transporting the viewer into fantastical imagined worlds.

## Homework Tasks:
### Tick when complete ✓

1. Fauvism research page.
2. Collect collage papers / materials
3. Maria Rivans research page.
4. Kandinsky artwork.
5. Portrait Drawing

HOW WELL AM I DOING?

| Year 8 Progress – Expressive Portraits– Term 3&4 | | |
|---|---|---|
| Name: | | |
| TARGETS: Not Yet Met, Met, Exceeded (NYM/M/E) | | Please mark with NYM / M / E in this column |
| TASK ONE: Fauvist Self Portrait | Fauvist oil pastel copy – You have copied a Fauvist painting using the correct colours and have drawn the image accurately. | |
| | Fauvist self-portrait – You have accurately drawn a self-portrait, using correct proportions. | |
| | Fauvist self-portrait – You have used fauvist colours on your portrait and applied them neatly, showing shadow, textures and highlights | |
| TASK TWO: Maria Rivans Collage | You have created an expressive self-portrait in the style of Maria Rivans showing layers of imagery and shapes | |
| | You have cut out accurately your collage imagery and explored a variety of different shapes and sizes. | |
| | You have combined some of your own drawings into your collage | |
| TASK THREE: Expressive self-portrait | You have been inspired by Kandinsky to create a unique background for your expressive portrait. | |
| | You have drawn a tonal self-portrait accurately with highlights and shadowing | |
| | You have combined different media and materials to create an expressive self-portrait collage that reflects your personality | |
| | End of project Overall Target: | |
| Teacher Comments: | | |

## Keywords

| | |
|---|---|
| Collage | Collage describes both the technique in which pieces of paper, photographs, fabric and other materials are arranged and stuck down onto a supporting surface. |
| Fauvism | Modern artists whose works emphasized painterly qualities and strong colour |
| Self-Portrait | Self-portrait refers to a painting that depicts the artist that produced it. |
| Expressive | A style of art in which the creator is trying to depict their subject matter in terms of emotions, rather than making it entirely realistic |

**Information about Fauvism**
Fauvism: The Wild Beasts of Art

COMPUTING @ CORSHAM

# Year 8 Python Knowledge Organiser

## 1: Key Words

**Algorithm:** A set of instructions or code used to solve a problem.

**Syntax:** The rules of the programming language that need to be followed in order for it to work.

**Variables:** Data that is stored in memory that is likely to change.

**Program:** Code compiled together to perform a specific function.

## 4: Data Types

**String:** A Variable data type that can store a combination of letters, characters and numbers.

**Integer:** A Variable data type that can store whole numbers.

**Float:** A Variable data type that can store decimal numbers.

**Boolean:** A Variable data type that stores either TRUE or FALSE.

## 7: Iteration

**Iteration** is used to repeat a set of instructions or commands in a program. It saves having to write them all out over and over again.

There are two loops in Python programming:
**While** - Checks if a condition is true and while it is true will keep repeating it.

**For** - Runs for a specific amount of times and stops when it reaches the desired number.

Examples:

```
while answer != "London":
    answer = input("What is the capital of London?");
```

Or

```
for i in range(5):
    movie = input("What is one of your top 5 favourite movies?")
```

## 2: Printing

To **print** out a statement or a **variable** we use the code below:

**Printing a new message:**

```
print("Hello World");
```

**Printing the value of a variable:**

```
print(x);
```

**Printing a message with variables included:**

```
print("Hello",name,"your are",age,"years old today");
```

**KS3 Computer Science** LINK

## 8: Inputs

To allow your Python program to get information from the user you will need to use the **input** command. Make sure you use the correct command for what you are asking for.

**String inputs (such as a name):**

```
input("Enter your name");
```

**Integer inputs (for whole number responses):**

```
int(input("What is your age?"));
```

**Float inputs (for decimal number responses):**

```
float(input("What is your shoe size?"));
```

## 3: Variables

**Variables** are simply a place on the computer's memory that is given a name in order for it to remember it.

In Python you create a variable by writing the name of the variable followed by an =.

Examples:

```
name = "Spongebob";
age = 14;
```

## 6: Selection

**Selection** is used to allow the program to make a choice and take a different path.

The keywords used in Python are:

**if** - checks if the **condition** is true, if so the program runs the indented code below it.

**elif** - if the first if fails then this elif condition is checked, there can be multiple of these.

**else** - if all if and elif statements are not true the the code indented below else will run.

Example:

```
colour - input("Enter your favourite colour");
if colour == "Red":
    print("Reminds me of tomatoes");
elif colour == "Blue":
    print("Reminds me of the sea!");
else:
    print("If it ain't Red or Blue then I ain't interested");
```

## BLOCKING

Planning your positioning and movement around the stage, including entrances and exits.

# Year 8 TEECHERS Term 3
# Scripted work

## SET DESIGN

Deciding on the different elements that will be used to create a visual interpretation of the environment/setting of the scene.

## PERFORMANCE SKILLS


**Vocals - Pitch:** How high or low your voice is.

**Vocals - Pace:** The speed that you speak at.

**Vocals - Emphasis:** 'Highlighting' a specific word or phrase, by changing at least one aspect of your vocals.

**Vocals - Power:** The amount of tension in your voice. This is not the same as volume - you can have large vocal power at a low volume.


**Spatial Awareness:** The ability to see yourself, (in relation to other actors/set), in the stage space to create a specific effect.

*'Teechers' is a play written by John Godber in 1985. It is a play within a play in which three students perform for their teachers.*
*The three actors multirole throughout the performance providing an account of their time in secondary school.*

*Key Characters:*
*Lilian Hobson "Hobby" –fed up with her friends.*
*Gail Saunders – The flirty one*
*Ian Salt "Salty" – The fired soul, doesn't know what he'll do with his life after leaving school.*
*Mr Nixon – the drama teacher*
*Mrs. Hudson – the headmistress, renamed Mrs. Parry for the play, loud and large with a terrible dress sense.*
*Bobby Moxon – (Oggy Moxon) Bully of the school who scares teachers and students alike.*
*Ms. Whitham – Hopeless English teacher, eager to leave*
*Mr. Basford – The deputy head and maths teacher. Hates children, typically nasty.*
*Miss Jackie Prime – The sports teacher, young and bouncy.*
*Doug – The caretaker. Grouchy and assertive.*
*Mr. Dean – A teacher who thinks that all of the kids love him.*

## DRAMA TERMS

**Script:** The entire play written down. Scripts include all the dialogue that the characters speak, stage directions and a brief overview of the setting.

**Proxemics:** The use of space/distance to communicate relationship.

**Given Circumstances:** Everything that the script tells you. The 'world' of the play - the things that make the play that play and not a different play.

- **Environmental** - Geographic location (inc. climate), date, year, season, time of day. Also includes the economic environment: the character's relationship to wealth or poverty, and the class of the character in relationship to the society in which they live.

- **Previous Action** - Any action mentioned in the play's dialogue that reveals any incident or action that took place before the current action of the play/scene began. Often called, 'exposition'.

- **Polar Opposition/Attitude** - Beliefs held by a character that are in direct opposition to the world in which the character lives. This opposition creates conflict. Conflict creates dramatic action.

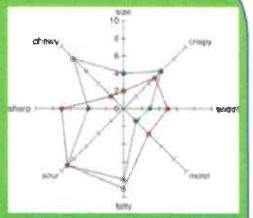
## DIG DEEPER QUESTIONS

How could you use vocal skills to communicate subtle changes to a character's emotions?
How might environmental given circumstances influence a set designer?
How might you as an actor use given circumstances to craft your character?
What do you think is the most important part of the 'page to stage' process?
Why is blocking an important part of the 'page to stage' process?
Why are proxemics so important when creating meaning?
How can eye contact change the meaning of a line of dialogue?
What makes a successful, scripted performance?

# Year 8 Food Knowledge Organiser.

## Sensory Analysis

Using technical descriptive words to evaluate food products. Using our senses - taste, texture, aroma and appearance. We often record this information onto a star (sensory) profile.



**Discrimination testing** These are used to detect differences between two or more products.

**Hedonic testing**

These are used to see how much we like the products

## Healthy eating

| | |
|---|---|
| **What happens if we eat too much fat:**<br>• Weight gain, Obesity<br>• Heart disease<br>• Type 2 diabetes | **What happens if we eat too much sugar:**<br>• Tooth decay<br>• Weight gain – obesity |
| **What happens if we eat too much salt:**<br>• Raised blood pressure<br>• Increased risk oh heart disease and stroke | **What happens if we don't eat enough fibre:**<br>• Helps digestion and prevents constipation<br>• lower risk of heart disease, stroke, Type 2 diabetes and bowel cancer |

## Washing Up Routine

RINSE

STACK

WASH

DRAIN

DRY

## Food provenance

Food that is grown, food that is caught, food that is reared.


## EatWell Guide

The eatwell guide shows us how much of what we eat should come from each food group. What other information can you see that will help us make healthy choices?


### Health and Safety Rules in our Kitchen

- Wash hands thoroughly with soap and hot water
- Tie hair back
- Put on a clean apron
- Blazer and jumper off and roll up sleeves
- Bags under the table and chairs pushed under
- Sensible behaviour
- Listen to instructions
- No running in the kitchen
- Do not cough or sneeze onto food
- Use the correct colour chopping board
- Clear up spills immediately
- Do not mix raw and cooked food on the same board
- Follow the washing up routine

### Food Hygiene

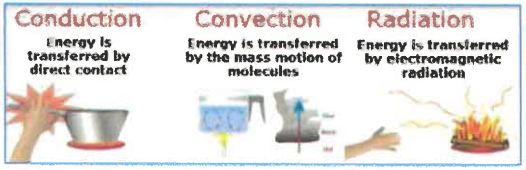
- **Food Poisoning:** Illness caused from eating contaminated food.
- **Bacteria:** Microscopic living organisms – some are good and some are bad!
- **High risk foods:** Foods that are high in protein and high in moisture. These foods need to be cooked and stored correctly to avoid harm

## Keywords

- Raising agent
- Obesity
- Type 2 diabetes
- Nutrients
- Balanced diet
- Provenance
- Coronary heart disease
- Conduction
- convection
- Hedonic testing

## Practical

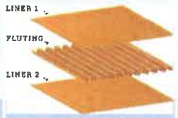
- Pasta bake
- Turkey burgers
- Chocolate brownies
- Pasta/rice salad
- Pineapple upside down cake
- Pizza
- croissants




# Year 8 Graphics

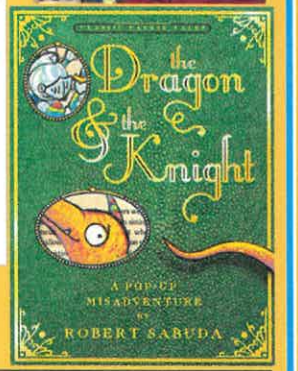
DESIGN AND TECHNOLOGY

## Tools, Techniques, Materials and Equipment

| | | |
|---|---|---|
| Paper |  | A compliant material made from wood pulp. |
| Board |   | Used for packaging, model making, photography and greeting cards. |
| Colour Rendering |  | A colour technique used for professional finish in DT. |
| Scoring |  | A method to create accurate folds. |
| Craft knife |  | To accurately cut paper. |

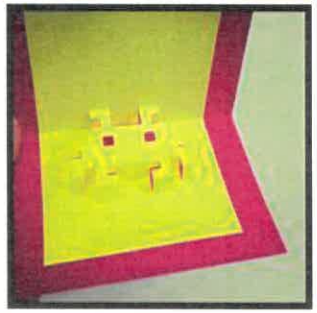
**Robert Sabuda**

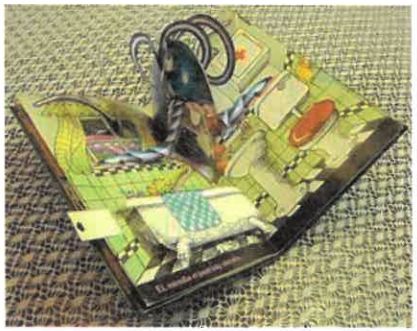
The American illustrator who creates pop-up books.

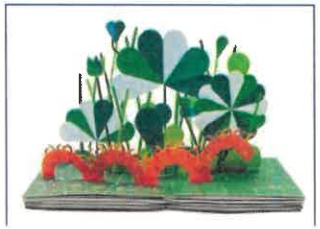




**Keywords**

- Robert Sabuda
- Product
- Image
- Analyse
- Paper Sizes
- Typography
- Fonts
- Printing
- Processes
- Story Board
- Card
- Mechanisms
- Card Modelling
- Shading
- Rendering
- Rotary
- V-fold
- Internal
- Stand
- Mouth and Slide





**Maths in DT:**

- Multiplication
- Divide
- Add / Subtract
- Measurement conversion
- Ratios
- Percentages
- Surface area

**What is good design?**

- Clear ideas
- Annotations
- Measurements
- Content
- Presentation
- Balance

**Health and Safety in DT:**


- Listen to your teacher's instructions
- Always wear an apron
- Long hair should be tied back
- Don't use equipment you are not trained on
- Always stand up during practical lessons
- When using machines, always wear safety glasses
- Only use the stop button in an emergency
- Work quietly and be sensible and careful at all times

# KS3 YEAR 8 D&T RESISTANT MATERIALS

## Tools and Equipment

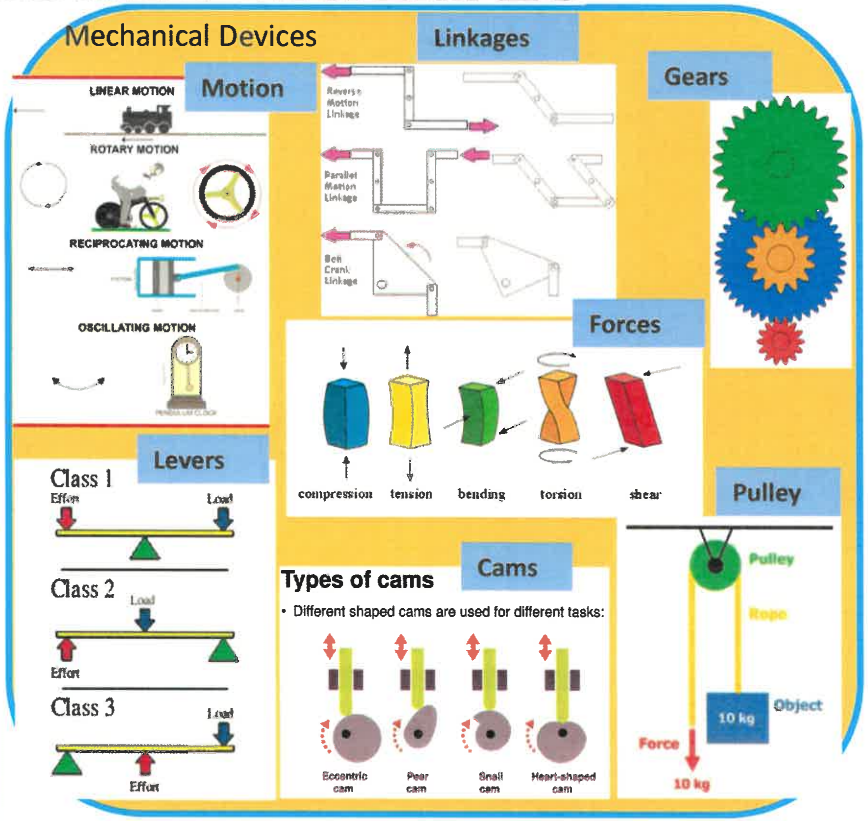
### Measuring and marking

| | | |
|---|---|---|
| Steel rule |  | An accurate tool for measuring and marking out |
| Try square |  | A tool used to check right angles on wood or plastic |
| Template |  | A template is a tool used to mark out shapes repeatedly |
| Jig |  | A tool used to control the location and/or motion of another tool |

### Shaping and finishing

| | | |
|---|---|---|
| Metal file |  | Used to shape or smooth wood, metal or plastic |
| Glass paper |  | An abrasive paper used to smooth the surface or edges of wood |
| Disc sander |  | A machine used to smooth the edges of materials |

## Mechanical Devices




## 2 point perspective

## Cutting

| | | |
|---|---|---|
| Tenon saw |  | A hand saw with a stiff back used to cut straight lines in wood – back saw action |
| Coping saw |  | A hand saw used to cut complex shapes in wood and plastic |
| Scroll saw |  | A machine saw used to cut complex shapes in wood and plastic |
| Bench hook |  | Held against the front edge of a bench or table to support work |
| Pillar drill |  | A machine used to make holes in materials |
| Chisel |  | Used for carving or cutting a hard material such as wood, stone, or metal by hand |
| Laser cutter |  | CAM: Laser cutting is the use of a high-powered laser to cut, etch and engrave your material |

**Traditional wood joints:**
- Butt Joint
- Lap / Rebate Joint
- Finger Joint
- Dovetail Joint
- Mitre Joint

**Maths in DT:**
- Multiplication
- Divide
- Add / Subtract
- Measurement conversion
- Ratios
- Percentages
- Surface area

**What is good design?**
- Clear ideas
- Annotations
- Measurements
- Content
- Presentation
- Balance

**Keywords**

| | |
|---|---|
| Research | Pulley |
| Design | Linkage |
| Evaluation | Lever |
| Wood joint | Motion |
| Mechanical | Force |

**Health and Safety in DT:**


- Listen to your teacher's instructions
- Always wear an apron
- Long hair should be tied back
- Don't use equipment you are not trained on
- Always stand up during practical lessons
- When using machines, always wear safety glasses
- Only use the stop button in an emergency
- Work quietly and be sensible and careful at all times

# KS3 YEAR 8

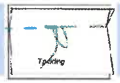
# DT TEXTILES

## Tools and Equipment

### Measuring and marking

| | | |
|---|---|---|
| Measuring Tape |  | Fabric tape measure used to measure |
| Tailor's chalk |  | A temporary mark on fabric |
| Template / Pattern |  | A template / pattern is a tool used to mark out shapes repeatedly |

### Constructing

| | | |
|---|---|---|
| Sewing needle |  | Helps to sew fabric together |
| Embroidery needle |  | A needle with a larger eye to accommodate embroidery thread |
| Sewing machine |  | Machine sews fabric together |
| Pins |  | A temporary method to hold fabric in place |
| Tacking stitch |  | A temporary stitch to hold fabric together |

## Textiles Dyes:

**Natural Dyes**

- Plants
- Food / spices
- Grass / tree bark / leaves
- Onions / beetroot
- Cochineal

**Chemical Dyes**

Dyes which are man-made using chemicals: consistent and vibrant.

## Fibre Categories:

**Natural Fibres**

Plant based natural fibres:

- Cotton
- Linen
- Flax
- Coir (coconut)

Animal based natural fibres:

- Wool
- Angora
- Silk

**Man-made Fibres**

- Polyester
- Acrylic
- Nylon

## Fabric Construction:

Woven
Knitted
Bonded

## Keywords

Islamic
Religion
Design
Product analysis
Research
Evaluation
Stitch
Scissors
Sewing machine
Customer
Environment
Function
Material
Seam allowance
Hem
Tie-Dye
Printing
Tesselate
UCD
Mordant

## Cutting

| | | |
|---|---|---|
| Fabric shears |  | Scissors used for cutting fabric |
| Thread scissors |  | Scissors used for cutting thread |
| Stitch ripper |  | Used for removing sewn stitches from fabric |
| Pinking shears |  | Creates a zig zag cut edge for decoration to prevent fraying |

## Adding Colour

| | | |
|---|---|---|
| Tie-dye |  | A type of resist dye |
| Batik |  | A type of resist dye which uses wax |
| Block Printing |  | Engraved wooden blocks to produce repeat patters |
| Fabric paint / pens |  | Paint / pens which can be applied to fabrics |

## Types of Seams:

Plain
French
Flat felled
Bound
Lapped

## Maths in DT:

Multiplication
Divide
Add / Subtract
Measurement conversion
Ratios
Percentages
Surface area

## What is good design?

Clear ideas
Annotations
Measurements
Content
Presentation
Balance

## Health and Safety in DT:

- Listen to your teacher's instructions
- Always wear an apron
- Long hair should be tied back
- Don't use equipment you are not trained on
- Work quietly and be sensible and careful at all times

**A** is for **Aesthetics**
**C** is for **Cost**
**C** is for **Customer**
**E** is for **Environment**
**S** is for **Size**
**S** is for **Safety**
**F** is for **Function**
**M** is for **Material**

| PLOT | |
|---|---|
| Act 1 | Don Pedro, returns triumphant from battle and seeks refuge in Messina. Leonato, welcomes Pedro and his soldiers with open arms, and the sudden influx of men into the town soon stirs up some romance. Claudio instantly falls in love with Hero, and Beatrice is reunited with her old flame, Benedick – the man she loves to hate. |
| Act 2 | Leonato gives permission for his daughter to marry Claudio in seven days time. Hearing that they only have one week to ruin the wedding, Don John and his henchmen soon devise a plan – they intend to trick Claudio with false evidence into thinking that Hero has been unfaithful to him the night before their wedding. Meanwhile, Don Pedro tricks Benedick into thinking that Beatrice is head-over-heals in love with him. |
| Act 3 | Don John prepares to execute his plan. He finds Claudio and tells him of Hero's impurity. At first disbelieving, Claudio eventually agrees to go with Don John and see for himself. Dogberry, a bumbling constable, instructs his watchmen to be extra vigilant because of the important wedding in the morning. The watchmen later overhear Don John's henchmen drunkenly bragging about how they successfully tricked Claudio – they are promptly arrested. |
| Act 4 | Claudio publicly reveals Hero's infidelity halfway through the marriage ceremony. Hero is stunned by the accusation and soon faints in the chaos that follows. Once the wedding party disbands, the Friar becomes suspicious and convinces Leonato, Beatrice and Benedick to pretend that Hero died from shock until they discover who has slandered her – Benedick immediately suspects Don John. Left alone, Beatrice and Benedick finally declare their love for each other. |
| Act 5 | People turn against Claudio; both Leonato and Benedick accuse him of wronging Hero, and then Dogberry reveals Don John's henchmen. Claudio realizes that he was tricked by Don John and tries to apologize to Leonato. Leonato is surprisingly forgiving (because he knows that his daughter didn't actually die). He says that he will forgive Claudio if he marries his cousin the following day. At the wedding, Claudio is amazed when Hero is revealed to be alive and as virtuous as ever. Benedick and Beatrice finally admit their love for each other in public. |

## THEMES AND CONTEXT

**Love and Masquerade-** Every step in romance takes place by way of masquerade. Hero is won for Claudio by Don Pedro in disguise. Benedick and Beatrice are brought together through an elaborate prank. Claudio can be reconciled with Hero only after her faked death.

**Courtship, wit and warfare-** The social world—masquerade balls, witty banter, romance and courtship—with the military world. War of wit and love are compared to real wars in a metaphor that extends through every part of the play.

**Language, perception and reality-** Tricks of language alone repeatedly change the entire situation of the play. Overheard conversations cause Benedick and Beatrice to fall in love, and the sonnets they have written one another stop them from separating once the prank behind their romance has been revealed.

**Marriage, shame and freedom-** For the characters of *Much Ado About Nothing*, romantic experiences are always connected to issues of freedom and shame. If dignity comes from having a strong and free will, then love, desire and marriage are a threat to it.

**Masculinity -** Beards are a complicated symbol of masculinity (Benedick's beard symbolizes his rugged bachelorhood, while Claudio's clean-shaven face indicates his "softness," and vulnerability).

## CHARACTERS

| | |
|---|---|
| **Don Pedro** | The Prince of Aragon. He is always involved in the affairs of the other characters. Don Pedro woos Hero for Claudio. |
| **Leonato** | Governor of Messina and father to Hero. |
| **Claudio** | A young Florentine soldier who fights for Don Pedro, and a friend of Benedick. |
| **Hero** | Leonato's daughter, Beatrice's cousin, and the beloved of Claudio. |
| **Beatrice** | Leonato's niece, an extremely witty and strong-willed young woman. Beatrice has a "merry war," of wits and insults with Benedick, whom she hates. |
| **Benedick** | A witty young Lord of Padua and a soldier. He is extraordinarily successful with women, but is fanatically committed to a bachelor's life. |
| **Antonio** | Leonato's brother. |
| **Don John** | When the play begins, Don John has just been defeated by his brother in battle. Out of desire for revenge and a general bad attitude, Don John schemes to destroy the marriage of Hero and Claudio. |

| KEY QUOTES | |
|---|---|
| Leonato | A1:S1 - "There is a kind of merry war betwixt Signior Benedick and her; they never meet but there's a skirmish of wit between them." |
| Beatrice | A1:S1 - "I had rather hear my dog bark at a crow, than a man swear he loves me. |
| Don John | A1:S2 - "I cannot be said to be a flattering honest man, it must not be denied but I am a plain-dealing villain." |
| Claudio | A2: S1 - "Friendship is constant in all other things<br>Save in the office and affairs of love" |
| Benedick | A2: S3 - "Happy are they that hear their detractions, and can put them to mending." |
| Dogberry | A4: S2 "O that he were here to write me down an ass! but, masters, remember that I am an ass; though it be not written down, yet forget not that I am an ass." |

# Yr8 Geog: Can we provide resources for 9 billion people?

## What is a natural resource?

Something that occurs naturally (without any human help) which we can make use of. These include soil, water, crops, sunlight.

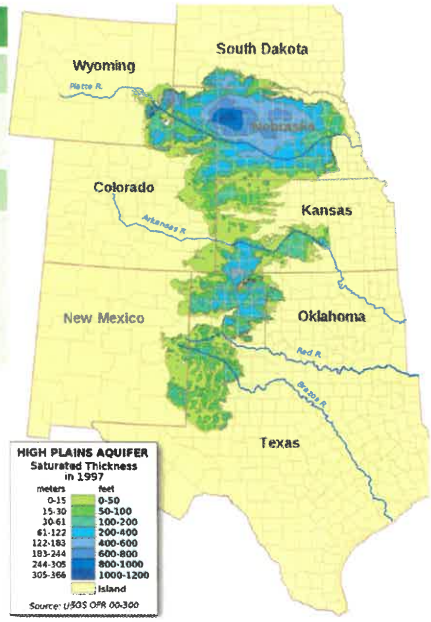
| Renewable resources | Non renewable resources |
|---|---|
| A resource that we can keep using and it will not run out.<br>e.g. wind, sunlight | If we continue to use the resource it will run out. This is also called a finite resource.<br>e.g. copper, oil, gas |

## The Ogallala

**The Ogallala is an aquifer in the USA..**

**An aquifer is an underground rock that stores water This can happen if the rock is permeable.**

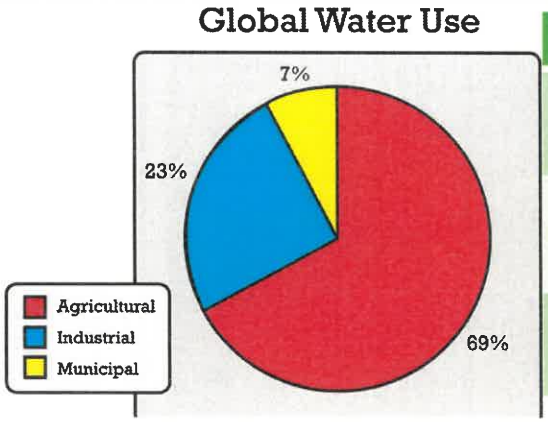
| What an aquifer can do | What is the problem |
|---|---|
| The Ogallala provides enough water to grow the crops needed to feed America. It is huge and covers 8 US states. | The USA has been using the aquifer for a century as a result the water levels in the aquifer are dangerously low. When this water runs out USA will not be able to grow all the crops it grows today. |




## Tackling water stress

| | |
|---|---|
| Stop wasting it | In 2020 in the UK, 3 billion litres of water was wasted. Fixing leaks can reduce this. Farming wastes a lot of water but by using "drip irrigation", farmers can be efficient with the water they use. |
| Recycle it | In the UK, the waste water is cleaned then returned to rivers. In some countries the waste water is cleaned then used for crops. In some cities the waste water is super cleaned and used for drinking. 90% of water in Israel is recycled. |
| Move it | We can transfer water from areas that have a lot to areas that don't. In China they have built canals that move water from the wet south to the dry north. This reduces water insecurity. |
| Take it from the sea | Desalination is the process of turning salt water into drinking water. This in theory is great as there is an infinite supply of water however this is very expensive and uses a lot of electricity. |

## Distribution of Water on Earth

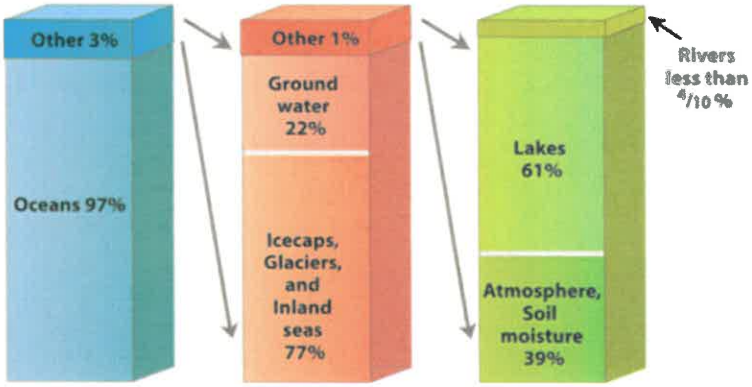



## Global water use

Globally we use most of our water for farming. However, the more developed we are the more water we will use at home. This is because we need more water for appliances such as washing machines

The Earth has a vast amount of water but 97% of it is unusable as it is in the sea. OF the 3% of fresh water 70% is locked away in glaciers and ice caps so we can't access it.

Water stress is where a country doesn't have enough water to meet its needs. This can happen to either a lack of fresh water or too many people in the country.

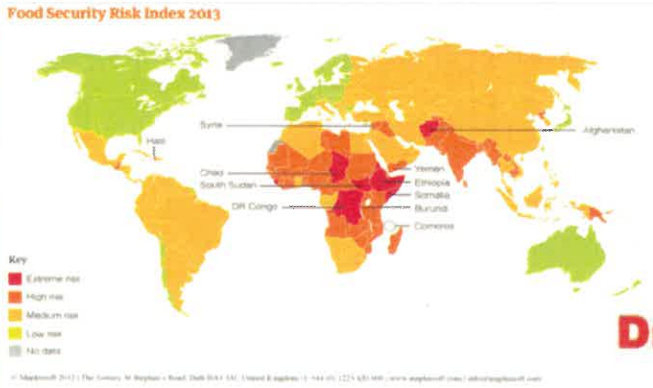


# Yr8 Geog: Can we provide resources for 9 billion people?

## What is food insecurity?

Food security is where a country provides enough food to healthily feed their entire population. Currently 2 billion people are not food secure, these countries are mostly found in Africa.

| Physical causes of food insecurity | Human causes of food insecurity |
|---|---|
| • Pests and disease destroys crops<br>• Not enough rainfall to grow crops<br>• Climate change reduces rainfall | • Conflict in the country means food can't be transported.<br>• Poverty means food can't be transported.<br>• Poverty means they can't buy enough food. |




## IS the UK food secure?

**The UK has a high level of food security**. However, many families struggle with food insecurity.

**Reasons why the UK does not have full food security**

| | |
|---|---|
| **Population growth** | Our population is growing and we are becoming more developed so we want a wider range of food. Plus we create a lot of food waste. |
| **Politics** | Government make trade deals for trading food..A lot of trade is taxed (tariffs)<br>If countries increase their tariffs, food becomes more expensive and so families may not be able to afford the food they want.<br>Currently we import 30% of our food from the EU |
| **Climate change** | Other countries are going to have less food to sell us.<br>British farmers will struggle with heatwaves and floods. |

## Reducing food waste

**Food miles explain how far food has travelled to get to your plate. The more developed a country is the greater the food miles and the more impact on the planet. More food miles means that you carbon footprint has been increased.**

| | |
|---|---|
| **Eating produce in season** | IF we can eat produce that is grown locally in season it will reduce the amount of food miles. This will reduce your own carbon footprint. |
| **Eating up left oever.** | Eating left overs means that less food gets sent to landfill sites will in turn reduce the amount of methane being |

## Drought Resistant Crops


## Tackling food insecurity

| | |
|---|---|
| **Aid and charity work** | By providing help to local farmers in LIDCs, (seeds and fertiliser). More crops can be grown and local families can become food secure. |
| **Technology** | Mobile phones are now all over the world. Local people in LIDCs can apply for food vouchers on their mobile phones. |
| **Drought resistant crops** | Technology has meant that we can now develop crops which can be grown with minimal water – perfect for countries that get a lot of drought. |

## Hallo! • Meeting and greeting

| | |
|---|---|
| Wie heißt du? | *What's your name?* |
| Ich heiße ... | *My name is ...* |
| Hallo! | *Hello! / Hi!* |
| Guten Tag! | *Hello!* |
| Wie geht's? | *How are you?* |
| Gut, danke. Und dir? | *Fine, thanks. And you?* |
| Nicht schlecht. | *Not bad.* |
| Tschüs! | *Bye!* |
| Auf Wiedersehen! | *Goodbye!* |

## Wie bist du? • What are you like?

| | |
|---|---|
| Ich bin ... | *I am ...* |
| Er/Sie ist ... | *He/She is ...* |
| faul | *lazy* |
| freundlich | *friendly* |
| intelligent | *intelligent* |
| kreativ | *creative* |
| launisch | *moody* |
| laut | *loud* |
| lustig | *funny* |
| musikalisch | *musical* |
| sportlich | *sporty* |

## Die Zahlen 1–19 • Numbers 1–19

| | |
|---|---|
| eins | *1* |
| zwei | *2* |
| drei | *3* |
| vier | *4* |
| fünf | *5* |
| sechs | *6* |
| sieben | *7* |
| acht | *8* |
| neun | *9* |
| zehn | *10* |
| elf | *11* |
| zwölf | *12* |
| dreizehn | *13* |
| vierzehn | *14* |
| fünfzehn | *15* |
| sechzehn | *16* |
| siebzehn | *17* |
| achtzehn | *18* |
| neunzehn | *19* |
| Wie alt bist du? | *How old are you?* |
| Ich bin ... Jahre alt. | *I am ... years old.* |
| Wie alt ist (Julia)? | *How old is (Julia)?* |
| (Julia) ist ... Jahre alt. | *(Julia) is ... years old.* |

# Year 8 German

## Wo wohnst du? • Where do you live?

| | |
|---|---|
| Ich wohne in ... | *I live in ...* |
| Er/Sie/Es wohnt in ... | *He/She/It lives in ...* |
| ... England | *England* |
| ... Irland | *Ireland* |
| ... Nordirland | *Northern Ireland* |
| ... Schottland | *Scotland* |
| ... Wales | *Wales* |
| ... Deutschland | *Germany* |
| ... Österreich | *Austria* |
| ... der Schweiz | *Switzerland* |

## Oft benutzte Wörter • High-frequency words

| | |
|---|---|
| und | *and* |
| (und) auch | *(and) also* |
| aber | *but* |
| sehr | *very* |
| ziemlich | *quite* |
| nicht | *not* |
| Was denkst du? | *What do you think?* |
| Ich denke, ... | *I think ...* |
| Ich auch! | *Me too!* |
| Ich nicht! | *Not me!/That's not what I think!* |
| Was? Du spinnst! | *What? You're joking!* |

## Lieblingssachen • Favourite things

| | |
|---|---|
| Mein Lieblingssport ist ... | *My favourite sport is ...* |
| Mein Lieblingsmonat ist ... | *My favourite month is ...* |
| Meine Lieblingsmusik ist ... | *My favourite music is ...* |
| Meine Lieblingszahl ist ... | *My favourite number is ...* |
| Meine Lieblingssendung ist ... | *My favourite programme is ...* |
| Meine Lieblingsfußballmannschaft ist ... | *My favourite football team is ...* |
| Mein Lieblingsspiel ist ... | *My favourite game is ...* |
| Mein Lieblingsland ist ... | *My favourite country is ...* |
| Mein Lieblingsauto ist ... | *My favourite car is ...* |
| Was ist dein Lieblingssport? | *What's your favourite sport?* |
| Was ist deine Lieblingszahl? | *What's your favourite number?* |
| Was ist dein Lieblingsland? | *What's your favourite country?* |

## Hast du einen Computer? • Have you got a computer?

| | |
|---|---|
| Ich habe ... | *I have ...* |
| einen Computer | *a computer* |
| einen iPod | *an iPod* |
| einen Fußball | *a football* |
| eine Gitarre | *a guitar* |
| eine Wii | *a Wii* |
| eine Schlange | *a snake* |
| ein Handy | *a mobile phone* |
| ein Keyboard | *a keyboard* |
| ein Skateboard | *a skateboard* |

Year 8 German

## Bist du sportlich? • Are you sporty?

| | |
|---|---|
| Ich bin (sehr/ziemlich/ nicht sehr) sportlich. | *I am (very/quite/not very) sporty.* |
| Was spielst du? | *What do you play?* |
| Ich spiele ... | *I play ...* |
| Ich spiele gern ... | *I like playing ...* |
| Ich spiele ziemlich gern ... | *I quite like playing ...* |
| Ich spiele nicht gern ... | *I don't like playing ...* |
| Badminton | *badminton* |
| Basketball | *basketball* |
| Eishockey | *ice hockey* |
| Fußball | *football* |
| Handball | *handball* |
| Tennis | *tennis* |
| Tischtennis | *table tennis* |
| Volleyball | *volleyball* |
| Wasserball | *water polo* |

## Was machst du gern? • What do you like doing?

| | |
|---|---|
| Was machst du gern? | *What do you like doing?* |
| Ich fahre Rad. | *I ride my bike.* |
| Ich fahre Skateboard. | *I go skateboarding.* |
| Ich fahre Ski. | *I ski.* |
| Ich fahre Snowboard. | *I snowboard.* |
| Ich lese. | *I read.* |
| Ich mache Judo. | *I do judo.* |
| Ich mache Karate. | *I do karate.* |
| Ich reite. | *I go horse riding.* |
| Ich schwimme. | *I swim.* |
| Ich sehe fern. | *I watch TV.* |
| Ich spiele Gitarre. | *I play the guitar.* |
| Ich tanze. | *I dance.* |

## Wie findest du das? • What do you think of it?

| | |
|---|---|
| Ich finde es ... | *I think it's ...* |
| Es ist ... | *It's ...* |
| irre | *amazing* |
| super | *super* |
| toll | *great* |
| cool | *cool* |
| gut | *good* |
| nicht schlecht | *not bad* |
| okay | *okay* |
| langweilig | *boring* |
| nervig | *annoying* |
| stinklangweilig | *deadly boring* |
| furchtbar | *awful* |

## Was machst du in deiner Freizeit?
## • What do you do in your free time?

| | |
|---|---|
| Ich chille. | *I chill out.* |
| Ich esse Pizza oder Hamburger. | *I eat pizza or hamburgers.* |
| Ich gehe einkaufen. | *I go shopping.* |
| Ich gehe ins Kino. | *I go to the cinema.* |
| Ich gehe in den Park. | *I go to the park.* |
| Ich gehe in die Stadt. | *I go into town.* |
| Ich höre Musik. | *I listen to music.* |
| Ich mache Sport. | *I do sport.* |
| Ich spiele Xbox oder Wii. | *I play Xbox or on the Wii.* |

# Year 8 German

## Fragewörter • Question words

| | |
|---|---|
| Wie? | *How?* |
| Was? | *What?* |
| Wo? | *Where?* |
| Woher? | *Where ... from?* |
| Wer? | *Who?* |

## Ich bin online • I'm online

| | |
|---|---|
| Was machst du am Computer? | *What do you do on the computer?* |
| Was machst du auf deinem Handy? | *What do you do on your mobile?* |
| Ich chatte mit Freunden auf Facebook. | *I chat with friends on Facebook.* |
| Ich lade Musik herunter. | *I download music.* |
| Ich mache Fotos oder Filme. | *I take photos or make films.* |
| Ich sehe Videos. | *I watch videos.* |
| Ich simse. | *I text.* |
| Ich spiele Computerspiele. | *I play computer games.* |
| Ich suche und lese Infos für die Hausaufgaben. | *I look for and read information for my homework.* |
| Ich surfe im Internet. | *I surf the internet.* |
| Ich telefoniere mit Freunden. | *I call my friends.* |
| Ich mache ziemlich viel auf meinem Handy. | *I do quite a lot of things on my mobile.* |

## Oft benutzte Wörter
## • High-frequency words

| | |
|---|---|
| Wie oft? | *How often?* |
| (sehr/ziemlich/nicht so) oft | *(very/quite/not so) often* |
| einmal/zweimal/dreimal pro Woche/pro Monat | *once/twice/three times a week/a month* |
| jeden Tag | *every day* |
| jeden Morgen | *every morning* |
| manchmal | *sometimes* |
| immer | *always* |
| nie | *never* |
| Wann? | *When?* |
| am Wochenende | *at the weekend* |
| am Abend | *in the evening* |
| heute | *today* |
| morgen | *tomorrow* |
| am Montag | *on Monday* |
| nächste Woche | *next week* |
| in zwei Wochen | *in two weeks* |



## The present tense – regular verbs

The verb ***wohnen*** (to live) is a regular verb. Take ***-en*** off the infinitive to form the stem, then add these endings. (These are the same for nearly every verb in German.)

| | | | |
|---|---|---|---|
| *ich wohne* | I live / am living | *wir wohnen* | we live / are living |
| *du wohnst* | you live / are living (familiar singular) | *ihr wohnt* | you live / are living (familiar plural) |
| *er/sie/es wohnt* | he/she/it lives / is living | *Sie wohnen* | you live / are living (polite singular or plural) |
| | | *sie wohnen* | they live / are living |

Year 8
German

## The present tense – *haben*

The verb ***haben*** (to have) is slightly irregular. the *du* and *er/sie/es* forms – the 'b' is left out.

| | |
|---|---|
| *ich habe* | *wir haben* |
| *du hast* | *ihr habt* |
| *er/sie/es hat* | *Sie haben* |
| | *sie haben* |

## sein (to be)

The verb ***sein*** (to be) is very common,

| | |
|---|---|
| ich bin | wir sind |
| du bist | ihr seid |
| er/sie/es ist | Sie sind |
| | sie sind |

| | **a → ä** | **e → ie** |
|---|---|---|
| | ***fahren*** | ***sehen*** |
| ich | fahre | sehe |
| du | fährst | siehst |
| er/sie/es | fährt | sieht |
| wir | fahren | sehen |
| ihr | fahrt | seht |
| Sie | fahren | sehen |
| sie | fahren | sehen |

| | *the* | *a* | *my* | *your* |
|---|---|---|---|---|
| ***masculine*** | *der* | *ein* | *mein* | *dein* |
| ***feminine*** | *die* | *eine* | *meine* | *deine* |
| ***neuter*** | *das* | *ein* | *mein* | *dein* |

## Word order

In German, sentences often start with the subject but can also start with a different piece of information, such as a time phrase. The verb in German is **always** the second idea. Look at how this changes the word order; when you start with a time phrase the verb and subject swap around so that the verb remains in second place.

**Ich** spiele Gitarre. ➜ Am Abend spiele **ich** Gitarre.

**Ich** fahre Skateboard. ➜ Einmal pro Woche fahre **ich** Skateboard.

# Enquiry: Was Victorian justice different to justice today?

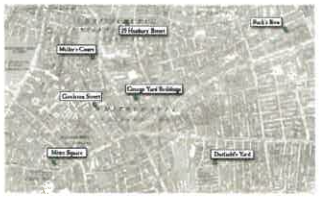
THE LANDING of the CONVICTS at BOTANY BAY

History – Year 8
Knowledge Organiser
Topic 3

**Outline:** During the 19th and 20th centuries, what it meant to be a criminal and how you were punished changed enormously. Though punishments could still be cruel, there were some important changes that were making life fairer. However, who you were still often affected how a crime was investigated and whether you received a fair trial.

| Date | Event | Description |
|---|---|---|
| 1717 | Transportation began | Prisoners were sent to Australia to serve out their time instead of facing the death penalty. |
| 1823 | Prison reforms | Prisons were made safer and fairer for the prisoners with more focus on rehabilitation. |
| 1829 | Metropolitan Police set up | First British police force which was in London and nicknamed "peelers" or "bobbies" after their founder Robert Peel. |
| 1888 | Whitechapel murders | The police failed to catch a serial killer in London, partially due to negative attitudes about the victims. |
| 1969 | Abolition of the death penalty | Though the last execution was in 1965, the death penalty was abolished 4 years later due to several miscarriages of justice. |

**Furthering learning**
Want to find out more about Victorian crime And punishment?



## Key individuals

**Elizabeth Fry.** She campaigned for reform of prisons to make them safer and also have the aim of rehabilitation instead of punishing a prisoner.

**Derek Bentley.** One of the last People in the UK to be executed for a crime. His case increased pressure on the government to end the death penalty as his conviction was seen as unfair in 1953.

**Robert Peel.** Set up the first Police force – the Metropolitan police in London to have a professionally trained force.

**Josephine Butler.** Social reformer in London in the 19th century who helped those in poverty and fought to improve the rights of women and children in poverty.

## Key vocabulary:

**Bloody code:** when the death penalty was used for more crimes.
**Convict:** someone who has been found guilty of a crime.
**Death penalty:** execution of a prisoner as punishment for a crime. It was intended to deter people from breaking the law.
**Martyr:** someone who dies for their beliefs.
**Misogyny:** a hatred of women.
**Pacifist:** someone who doesn't believe that wars should be fought.
**Penal colony:** where prisoners were transported away from Britain to serve their sentence. Australia was the main location.
**Prison:** a place where people are sent to wait for their trial or as a punishment.
**Prison hulk:** a ship anchored off the coast for prisoners to live and work on.
**Rehabilitation:** preparing a prisoner to re-join society so they can avoid breaking the law again.
**Slum:** an area in a city where the houses are poorly built and it is overcrowded. People in poverty live there.
**Social reformer:** someone who campaigns to improve the lives of people, especially those in poverty.
**Transportation:** a punishment to avoid the death penalty where convicts were sent by boat to Australia to work.
**Whitechapel:** an area in the East End of London where most people lived in dire poverty.
**Workhouse:** where people in poverty are sent to live if they cannot support themselves. They have to work there too.

**Prior learning?**
Justice
Patriarchy
Misogyny

**Enquiry:** Was Victorian justice different to justice today?

History – Year 8
Knowledge Organiser
Topic 3

## Historical skill focus: similarity & difference

- How is the past similar to life now?
- How does the past differ to life now?

| Remember to mention: | Areas you could mention include: | Starting sentences... |
|---|---|---|
| **Similarities AND differences** | Types of crime<br>Reasons to commit crimes<br>Types of punishment<br>Problems caused by crime<br>Who investigates crimes? | Crime and punishment was similar to now because...<br>Crime and punishment was very different between the 19th century and now because: |

**Section B:** Write at least two paragraphs to answer this question:

**How similar was crime and punishment in the 19th century to crime and punishment now?**

| Developing | Secure | Exceeding |
|---|---|---|
| I can describe key similarities and key differences between people's lives during two periods of time | I can explain key similarities and key differences between people's lives during two periods of time using PEE paragraphs. | I can explain key similarities and key differences between people's lives during two periods of time using PEEL paragraphs<br>I can begin to judge the extent of the similarity or difference |

Point = A key difference was...
Evidence = This is shown by the types of crime which were...
Explain = This is different because...

# YEAR 8 - ALGEBRAIC TECHNIQUES...

@whisto_maths

# Brackets, Equations & Inequalities

## What do I need to be able to do?

**By the end of this unit you should be able to:**

- Form Expressions
- Expand and factorise single brackets
- Form and solve equations
- Solve equations with brackets
- Represent inequalities
- Form and solve inequalities

## Keywords

**Simplify**: grouping and combining similar terms
**Substitute**: replace a variable with a numerical value
**Equivalent**: something of equal value
**Coefficient**: a number used to multiply a variable
**Product**: multiply terms
**Highest Common Factor (HCF)**: the biggest factor (or number that multiplies to give a term)
**Inequality**: an inequality compares who values showing if one is greater than, less than or equal to another

## Form expressions

For unknown variables, a letter is normally used in its place

More than – ADD
Less than/ difference – SUBTRACT

e.g 4 more than t → t + 4
8 less than k → k - 8

Only similar terms can be grouped together

e.g Find the perimeter of this shape
(Perimeter = length around outside of shape)

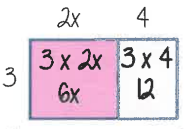

t + 2t + 1 + t + 2t + 1 → 6t + 2

## Directed numbers

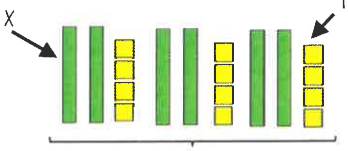
+ + → +
- - → +
+ - → -
- + → -

e.g a = -5 and b = 2
$a^2$ = a x a = -5 x – 5 = 25
b + a = 2 + - 5 = -3

## Multiply single brackets 3 (2x + 4)



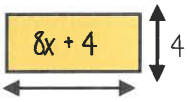

6x + 12




6x + 12


Different representations of 3(2x+4) = 6x + 12

## Factorise into a single bracket 8x + 4



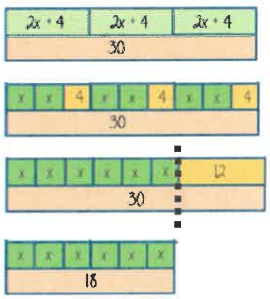

Try and make this the **highest common factor**

The two values **multiply** together (also the area) of the rectangle

8x + 4 ≡ 4 (2x + 1)

Note:
8x + 4 ≡ 2(4x + 2)
This is factorised but the HCF has not been used

## Solve equations with brackets 3 (2x + 4) = 30




3 (2x + 4) = 30 — Expand the brackets

6x + 12 = 30
- 12 - 12

6x = 18
÷ 6 ÷ 6

x = 3

Substitute to check your answer. This could be negative or a fraction or decimal

## Simple Inequalities

< less than
≤ Less than or equal to
> More than
≥ More than or equal to

x < 10
Say this out loud
"x is a value less than 10"

10 > x
Say this out loud
"10 is more than the value"

Note:
x< 10 and 10>x represent the same values

x + 2 ≤ 20
"my value + 2 is less than or equal to 20"
x ≤ 18
The biggest the value can be is 18

## Form and solve inequalities

Two more than treble my number is greater than 11

Find the possible range of values

**Form**

x → x3 → +2 → 11

3x + 2 > 11

**Solve**

x ← -3 ← -2 ← 11

x > 3

**Check**

This would suggest any value bigger than 3 satisfies the statement
3 x 3 + 2 = 11 ✓ 10 x 3 + 2 = 32 ✓

## Algebraic constructs

**Expression**
A sentence with a minimum of two numbers and one maths operation

**Equation**
A statement that two things are equal

**Term**
A single number or variable

**Identity**
An equation where both sides have variables that cause the same answer includes ≡

**Formula**
A rule written with all mathematical symbols
e.g. area of a rectangle A = b x h

# YEAR 8 - ALGEBRAIC TECHNIQUES...

# Sequences

@whisto_maths

## What do I need to be able to do?

**By the end of this unit you should be able to:**

- Generate a sequence from term to term or position to term rules
- Recognise arithmetic sequences and find the nth term
- Recognise geometric sequences and other sequences that arise

## Keywords

**Sequence:** items or numbers put in a pre-decided order
**Term:** a single number or variable
**Position:** the place something is located
**Linear:** the difference between terms increases or decreases (+ or -) by a constant value each time
**Non-linear:** the difference between terms increases or decreases in different amounts, or by x or ÷
**Difference:** the gap between two terms
**Arithmetic:** a sequence where the difference between the terms is constant
**Geometric:** a sequence where each term is found by multiplying the previous one by a fixed non zero number

## Linear and Non Linear Sequences

**Linear Sequences** – increase by addition or subtraction and the same amount each time
**Non-linear Sequences** – do not increase by a constant amount – quadratic, geometric and Fibonacci

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

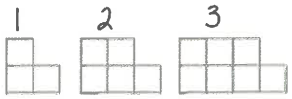
**Fibonacci Sequence – look out for this type of sequence**

0 1 1 2 3 5 8 ...

Each term is the sum of the previous two terms

## Sequence in a table and graphically

**Position:** the place in the sequence




"The **term** in **position** 3 has 7 squares"

3 5 7

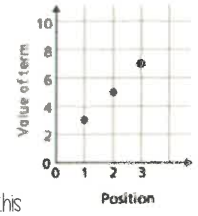
**Term:** the number or variable
**(the number of squares in each image)**

**In a table**

| Position | 1 | 2 | 3 |
|---|---|---|---|
| Term | 3 | 5 | 7 |

+2 +2

**Graphically**




Because the terms increase by the same addition each time this is **linear** – as seen in the graph

## Sequences from algebraic rules

This is substitution!

$3n + 7$

This will be linear - note the single power of n. The values increase at a constant rate

$3n^2 + 7$

This is not linear as there is a power for n

$2n - 5$ → Substitute the number of the term you are looking for in place of 'n'

eg
1st term = 2 (1) – 5 = -3
2nd term = 2 (2) – 5 = -1
100th term = 2 (100) – 5 = 195

## Checking for a term in a sequence

Form an equation

Is 201 in the sequence 3n – 4?

$3n - 4 = 201$ ← Term to check

Algebraic rule

Solving this will find the position of the term in the sequence
ONLY an integer solution can be in the sequence

## Complex algebraic rules

Misconceptions and comparisons

$2n^2$

2 times whatever n squared is

eg
1st term = 2 x $1^2$ = 2
2nd term = 2 x $2^2$ = 8
100th term = 2 x $100^2$ = 20000

$(2n)^2$

2 times n then square the answer

eg
1st term = $(2 \times 1)^2$ = 4
2nd term = $(2 \times 2)^2$ = 16
100th term = $(2 \times 100)^2$ = 40000

$n(n + 5)$ ←

eg
1st term = 1 (1 + 5) = 6
2nd term = 2 (2 + 5) = 14
100th term = 100 (100 + 5) = 10500

You don't need to expand the expression

## H Finding the algebraic rule

This is the 4 times table → 4, 8, 12, 16, 20....

$4n$

7, 11, 15, 19, 22 ← This has the same constant difference – but is 3 more than the original sequence

$4n + 3$

This is the constant difference between the terms in the sequence

$4n + 3$

This is the comparison (difference) between the original and new sequence

# YEAR 8 - ALGEBRAIC TECHNIQUES...

# Indices

@whisto_maths

## What do I need to be able to do?

**By the end of this unit you should be able to:**

- Add/ Subtract expressions with indices
- Multiply expressions with indices
- Divide expressions with indices
- Know the addition law for indices
- Know the subtraction law for indices

## Keywords

**Base:** The number that gets multiplied by a power
**Power:** The exponent – or the number that tells you how many times to use the number in multiplication
**Exponent:** The power – or the number that tells you how many times to use the number in multiplication
**Indices:** The power or the exponent.
**Coefficient:** The number used to multiply a variable
**Simplify:** To reduce a power to its lowest term
**Product:** Multiply

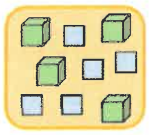
## Addition/ Subtraction with indices

Coefficient, Power

$5x^2 + 4x^4$

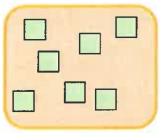
Term, Term

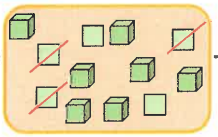
Expression



Each square represents $x^2$ and each cube represents $x^4$

Only similar terms can be simplified
If they have different powers, they are unlike terms

$5x^2 + 2x^2$ →  → $7x^2$

$5x^2 + 6x^4 - 3x^2 + x^4$ →  → $2x^2 + 7x^4$

## Multiply expressions with indices

$4b \times 3a$
$\equiv 4 \times b \times 3 \times a$
$\equiv 4 \times 3 \times b \times a$
$\equiv 12ab$

$5t \times 9t$
$\equiv 5 \times t \times 9 \times t$
$\equiv 5 \times 9 \times t \times t$
$\equiv 45t^2$

$2b^4 \times 3b^2$
$\equiv 2 \times b \times b \times b \times b \times 3 \times b \times b$
$\equiv 2 \times 3 \times b \times b \times b \times b \times b \times b$
$\equiv 6b^6$

There are often misconceptions with this calculation but break down the powers

## Addition/ Subtraction laws for indices

$3^5 \times 3^2$
$= (3 \times 3 \times 3 \times 3 \times 3) \times (3 \times 3)$ → $3^7$

The base number is all the same so the terms can be simplified

**Addition law for indices**

$$a^m \times a^n = a^{m+n}$$

$3^5 \div 3^2$ → $3^3$

$\frac{3 \times 3 \times 3 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}}$ → $\frac{3^3}{3^0}$ → $\frac{3^3}{1}$

**Subtraction law for indices**

$$a^m \div a^n = a^{m-n}$$

## Divide expressions with indices

$\frac{24}{36}$ → $\frac{\cancel{2} \times \cancel{2} \times 2 \times \cancel{3}}{\cancel{2} \times \cancel{3} \times 2 \times \cancel{3}}$ → $\frac{2}{3}$

$\frac{5a^3b^2}{15ab^6}$ → $\frac{\cancel{5} \times \cancel{a} \times a \times a \times \cancel{b} \times \cancel{b}}{3 \times \cancel{5} \times \cancel{a} \times \cancel{b} \times \cancel{b} \times b \times b \times b \times b}$ → $\frac{a^2}{3b^4}$

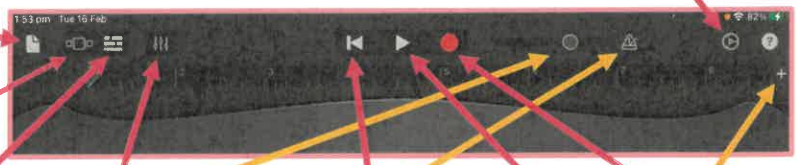
Cross cancelling factors shows cancels the expression

$\frac{23a^7y^2}{5db^6}$ This expression cannot be divided (cancelled down) because there are no common factors or similar terms

# Sanquay Music Education —Garage Band—Knowledge Organiser

PAGE 1

## A) Control Features.



1) Save your song & create a new song.

2) Select a new instrument from the sound palette.

3) Go to track or instrument view.

4) Edit sound.

5) Back to beginning.

6) Play.

7) Record.

8) Volume control.

9) Metronome to keep in time.

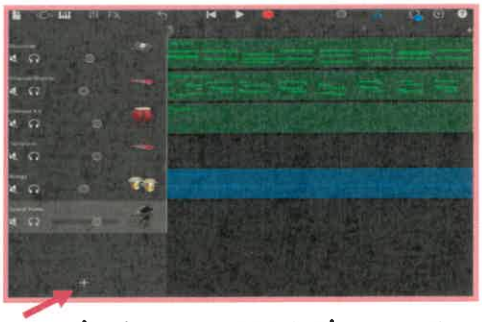
10) Edit, copy or add sections.

11) Settings

## B) Sound Palette.


**This is where you select your instrument.**

## C) Track View.



**In track view you can make new tracks.**

## D) Smart Instruments—Keyboard.

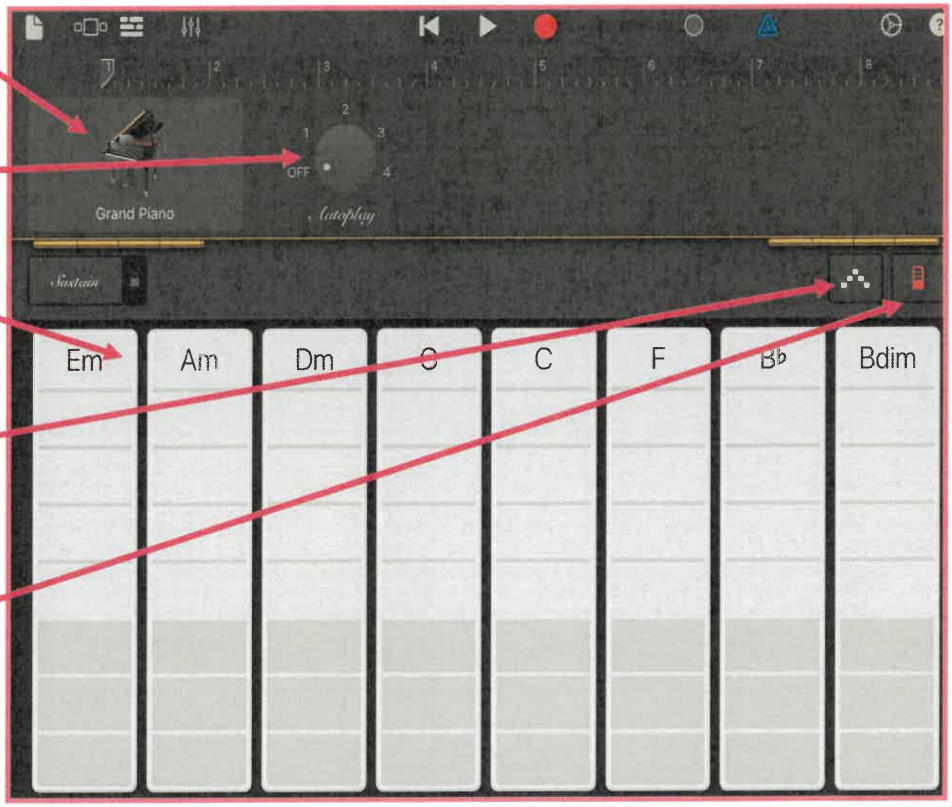
12) Change instrument

13) Select auto play.

14) Play chords.

15) Use the arpeggiator to make broken chords.

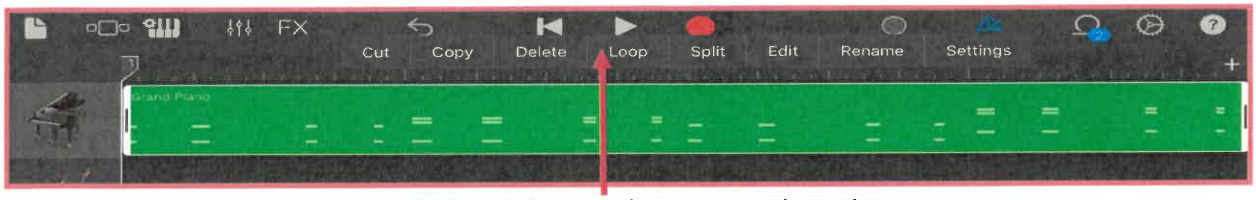
16) Click to play notes on the instrument.




**To record a chord progression just click on the red circle to get your four beat count in. Touching over the chord name will play the full chord.**

Once you have recorded your music, click on track view (3).

## E) Editing the track you have recorded.

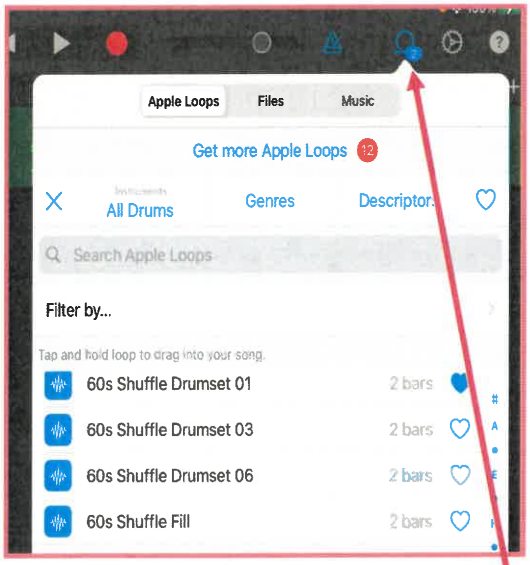



**Double click on the track to open the edit menu.**

## F) Deleting whole tracks.


**Click over the instrument in the left hand side of the track view to enable deletion.**

## G) Adding Loops.

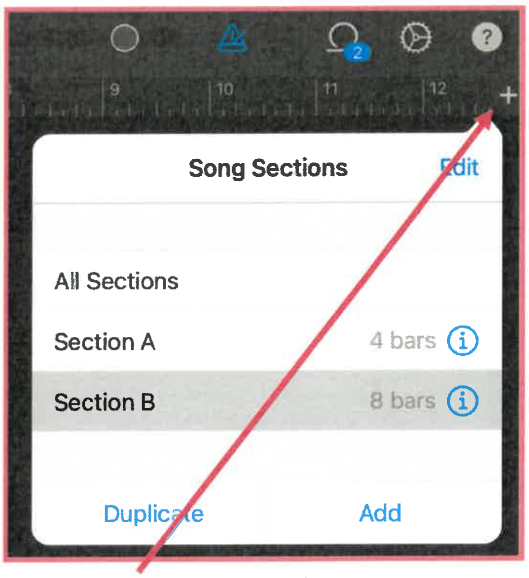



**When you have recorded music the loop icon appears in track view.**

**Make sure the Apple Loops tab is selected.**

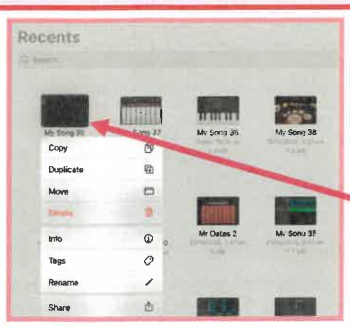
**Click on the instruments tab to access the full range of loops.**

## H) Making new sections.




**Click on the + icon to add new sections, copy existing sections or see all sections in the track view.**

**Click Edit to delete sections. Click the circled I to change the length of the sections.**




## I) Naming & Saving your work.

**Click on icon number 1 and your work will automatically save but it will be given a song number. (See Page 1)**

**To rename your song for future editing:**

**Click and hold your finger over the thumbnail of your song.**

**Rename your song.**

**RS Dept. Knowledge Organiser: Suffering** **Name:** _____

## 1. Suffering and Evil

Evil is a cause of human suffering. There are two types of evil:

- **moral evil** - the acts of humans which are considered to be morally wrong
- **natural evil** - natural disasters, such as earthquakes or tsunamis

These two types of evil can work together, e.g. human evil can make natural evil worse. If natural evil, e.g. a drought brought on by lack of rainfall, causes crops to fail, the policies of a government can make the food shortages for the poorest people worse (moral evil).

## 2. Problem of Evil and Suffering.

For theists, the existence of evil and suffering creates a problem for God. As they believe that God is all-powerful and all-loving, God has the capability to stop all suffering, but either God can't or chooses not to. This is called the Inconsistent Triad.

- God has given people **free will** – the ability to choose between right and wrong for themselves. God has shown people how they should live (e.g. the Ten Commandments; Jesus' life and teaching), but it is up to them to decide whether or not to follow God's instructions.
- The story of humanity's battle with good and evil is told in the story of Adam and Eve in the Garden of Eden. Adam and Eve chose to disobey God by eating the fruit of the tree of knowledge of good and evil. This is called **the Fall**. Some people believe that as a result of Adam and Eve's first sins, each human is born with a tendency towards evil. This is called **Original Sin**.
- The belief in **karma** causes some people to believe that suffering is the consequence of our actions, either in this life, or the previous one. People who believe this believe that we are responsible for our actions and will be rewarded or punished, depending on how good or bad our actions are.
- For atheists, there is no problem of evil and suffering as they do not believe in an all-powerful being who could potentially intervene to stop all the evil and suffering on the earth.

## 3. Suffering of Jesus

The death of Jesus had a purpose and many Christians feel hope when they reflect on the suffering of Christ. It reminds them that Jesus can understand physical and mental suffering that all humans go through. It also shows that there can be a purpose to suffering. The death of Jesus on the cross wasn't the end of the story, as. Christians believe he rose again three days later. The Resurrection shows that God can triumph over evil. This helps give Christians hope, as they might think God has a plan, even if they don't know what it is. It can also give Christians hope that the suffering won't go on forever and good things will come to those who have faith in God.

## Key Terms 1:

**Agnostic**: someone who believes it is impossible to prove or disprove the existence of God

**Atheist**: someone who does not believe in God

**Crucifixion**: the killing of Jesus on the cross, an ancient form of execution

**Dukkha**: The Buddhist concept of suffering, unsatisfactoriness

**Evil**: Something that is morally wrong or unjust, doing the wrong thing

**Free will**: The ability to act based on your own decisions

**Karma**: the sum of a person's actions, influencing the life you go into after death

**Omnibenevolent**: All loving

**Omnipotent**: All powerful

**Omnipresent**: Always present, present everywhere

**Omniscient**: All knowing

**Original Sin**: a consequence of the actions of Adam and Eve in the Garden of Eden as a result of their disobedience

**Parable**: a simple story that contains a moral or meaning, used by Jesus to teach

4. Suffering of Job. This story tells of a man, Job, who has his faith tested. Satan claims that Job only believes in God because he is successful and doesn't suffer. God gives Satan permission to test Job's faith by making him suffer. Satan does this by:

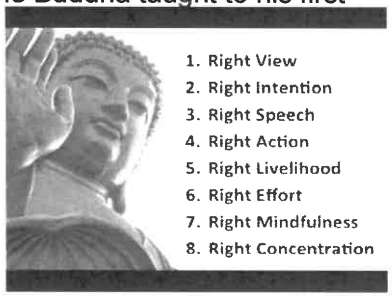
- Attacking his servants
- Stealing his animals
- Killing all his children
- Making Job sick

Despite all the different ways that Satan causes Job to suffer, Job's faith in God never waivers, despite never knowing why he went through the suffering. "I was born with nothing, and I will die with nothing. The Lord gave and now He has taken away. May his name be praised!" As a result of his continued faith, everything Job had lost is restored.

Some Christians believe suffering is a test of faith and won't expect to know why they have been caused to suffer.

5. Responding to Suffering - Parable of the Sheep and Goats. Jesus taught his followers to *'love your neighbour as yourself'* and this teaching is contained in the Parable of the Sheep and Goats. In the parable, Jesus explains that the righteous people (sheep) who helped those in need will be rewarded with spending eternity in heaven. Those who have ignored people in need will spend eternity in hell as a punishment. Jesus says that helping people in need is the same as helping Jesus himself. Ignoring people who are going through suffering is not an option. This is why many Christians support charities such as Christian Aid and aim to reduce the suffering of others as much as possible.

6. Suffering in Buddhism. Suffering is a natural part of life. When Siddhartha left the palace in which he lived, the three people he saw were an old man, an ill man and a dead person. This taught him that people suffer in life. The Four Noble Truths are a summary of the Buddha's teachings. It is these truths that the Buddha taught to his first disciples after he was enlightened.




1. All existence is dukkha (suffering)
2. The cause of dukkha is craving.
3. Stopping suffering comes with the stopping craving
4. Following the Eightfold Path can bring an end to suffering

The Buddha taught that craving is ultimately caused by greed, ignorance & hatred. The Buddha taught that the way to get rid of the desire that causes suffering is to free yourself from being attached to it. Buddhists believe that following the Eightfold Path will help them to reach enlightenment. This will end the cycle of suffering. Buddhists also believe in karma or 'intentional action'.

Buddhists try to perform good actions, e.g. based in generosity and compassion. They avoid performing bad actions, e.g. based on greed and hatred. Actions also determine where they will be reborn in the next life. Good actions with good intentions can mean being born as a human. Bad actions with bad intentions can mean rebirth as an animal, or into a hell realm. Buddhists believe that they should help those who are suffering and may work with charities to help bring an end to those going through suffering.

Key Terms 2:

**Resurrection**: Rising from the dead, being restored to life

**Righteous**: morally right or justifiable, doing the right thing

**Sin**: An immoral act, going against God's law

**Suffering**: Undergoing pain or distress

**The Fall:** The disobedience of Adam and Eve, which resulted in sin being in the world

**Theist**: Someone who believes in God

Key Quotes:

"The righteous person may have many troubles, but the LORD delivers him from them all."
*Psalm 34:19*

"Not only so, but we also glory in our sufferings, because we know that suffering produces perseverance."
*Romans 5:3*

"The root of suffering is attachment."
*The Buddha*

"All conditioned things are impermanent' — when one sees this with wisdom, one turns away from suffering." *The Buddha*

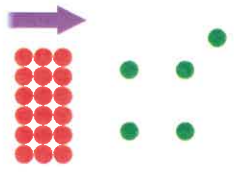
# P2 Chapter 1: Forces
## Knowledge organiser

Activate
Question • Progress • Succeed

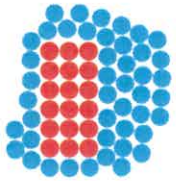
## Friction and drag

- **Friction** is a force which will slow down a moving object due to two surfaces rubbing on one another
- The greater the friction, the faster an object will slow down, or the greater the force it will need to overcome the force of friction. For example, it is easier to push a block on ice than on concrete, as the ice is smoother and causes less friction

- When an object is moving through a fluid, either liquid or gas, the force which slows it down is known as **drag**
- The fluid particles will collide with the moving object and slow it down, meaning that more force is needed to overcome this
- Both drag and friction are **contact forces** as the two surfaces in friction, and the object and fluid particles in drag, come into contact with one another
- Both drag and friction are forces so they are measured in **Newtons** (N)



A solid moves through a gas.



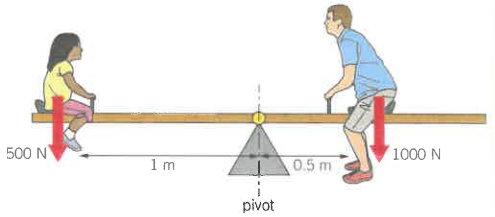
A solid moves through a liquid.

## Turning forces

- A **moment** is the turning effect of a force, it is measured in Newton meters
- We can calculate a moment with the equation:

moment (Nm) = force (N) × distance from the pivot (m)

- The size of the moment will increase as the distance from the **pivot** or the size of the force increases
- When an object, such as a seesaw, is balanced, the clockwise and the anticlockwise moments will be equal and opposite, which is known as **equilibrium**
- When forces are equal and opposite to each other, there is no **resultant force**

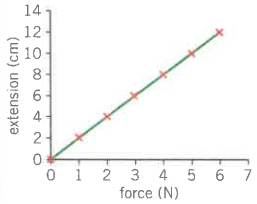



*clockwise moment = force × distance on the right*
*= 1000 N × 0.5 m*
*= 500 Nm*

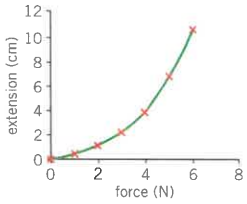
*anticlockwise moment = force × distance on the left*
*= 500 N × 1 m*
*= 500 Nm*

## Hooke's law

- Some objects, like springs, can be stretched, the amount that they stretch is known as their **extension**
- A force needs to be applied to the spring for it to be stretched, we can achieve this by adding masses which exert the force weight
- A spring will continue to stretch until it passes it's **elastic limit**
- If an object obeys **Hooke's law** it will have a **linear relationship**: if the force applied to the spring is doubled, the extension will double too
- If an object does not obey Hooke's law, it will not have a linear relationship




This graph shows how the extension of a spring changes as you pull it




This graph shows the relationship between force and extension

## Gas pressure

- **Gas pressure** is caused by the particles of a gas colliding with the wall of the container which they are in
- The more often that the particles collide with the wall of the container, the higher the pressure of the gas will be
- Gas pressure can be increased by:
  - Heating the gas so the particles move more quickly and collide with the container with a higher energy
  - Compressing the gas so there are the same amount of particles within a smaller volume meaning that there are more collisions
  - Increasing the amount of particles within the same volume so there are more collisions

- **Atmospheric pressure** is the pressure which the air exerts on you all of the time, nearer the ground there are more particles weighing down on you so the pressure is greater
- The higher you go, the smaller the atmospheric pressure, this is because there will be less particles weighing down on you

## Pressure in solids

- The pressure which is exerted on a solid is known as **stress**
- The greater the area over which the force is exerted over, the lower the pressure, this is why snowshoes have a large area to prevent you sinking into the snow
- **Pressure** can be calculated using the following equation:

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

## Pressure in liquids

- Liquids are **incompressible**
- The particles in a liquid are already touching, meaning that there is little space between them to compress
- Liquids will transfer the pressure applied to them, this is seen in hydraulic machines
- As the ocean gets deeper, the pressure will increase, this is because the pressure depends on the weight of the water above
- The greater the number of water molecules above, the higher the pressure will be

**Key terms** Make sure you can write definitions for these key terms.

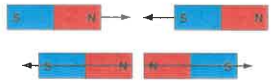
air resistance · atmospheric pressure · contact force · drag · elastic limit · equilibrium · extension · friction · gas pressure · Hooke's law · incompressible · linear relationship · moment · newton · pivot · pressure · resultant force · stress

# P2 Chapter 2: Electromagnets
## Knowledge organiser

Activate
Question • Progress • Succeed

## Magnets

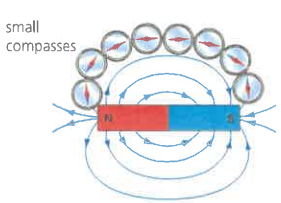
- A **magnet** has two poles, a north and a south pole
  - North poles **attract** south poles
  - South poles **attract** north poles
  - South poles **repel** south poles
  - North poles **repel** north poles



- **Magnetic materials** will experience a magnetic force when placed near a magnet, this is a type of non-contact force as the materials do not have to touch for the force to be apparent
- The three magnetic metals are iron, nickel and cobalt

## Magnetic fields

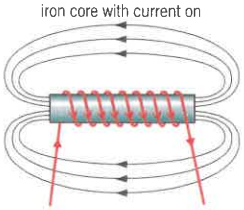
- A **magnetic field** is an area where a magnetic material will experience a force
- A **permanent magnet** will have it's own magnetic field
- **Magnetic field lines** represent the field, these always travel out of the north pole of the magnet, and into the south pole
- The closer together the magnetic field lines are, the stronger the magnetic field will be
- We can find out the shape of a magnetic field in two ways:
  - Using plotting compasses
  - Using iron filings




- The Earth has its own magnetic field, which acts like a giant bar magnet inside the centre of the Earth
- This magnetic field allows compasses to work when navigating around the Earth

## Electromagnets

- **Electromagnets** are made by wrapping a coil of wire around a magnetic **core**
- Electromagnets only work when electricity is flowing through the coil, which means that they can be turned on and off
- Electromagnets are also stronger than **permanent** magnets
- The electromagnet will produce the same magnetic field shape as a bar magnet




- You can increase the strength of an electromagnet by:
  - Increasing the number of turns on the coil around the core of the electromagnet
  - Increasing the current which is flowing through the coil of wire
  - Using a more magnetic material for the core, e.g. iron rather than aluminium

## Using electromagnets

### Electric Bells

The electromagnet attracts the iron armature

↓

When it moves, it breaks the circuit, no longer allowing current to flow

↓

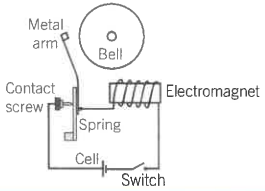
The coil and core are no longer magnetic meaning the spring is no longer attracted and returns to its original position

↓

The bell is rung once

↓

The circuit is complete again, restarting the process

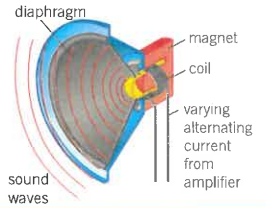



### Circuit breakers

- Circuit breakers detect large changes in current in a house, and will break a circuit
- When a large current flows, the electromagnet becomes strong enough to attract an iron catch which will break a circuit
- They can then be reset and used again
- This makes them suitable as an electrical safety device in a home

### Loudspeakers

- Loudspeakers use an electromagnet in order to generate sound
- A current passes through the coil and creates an electromagnet, this repels another permanent magnet which moves the cone in and out creating sound




**Key terms** Make sure you can write definitions for these key terms.

attract | core | circuit breaker | electromagnet | electric bell | loudspeaker | magnet | magnetic pole | magnetic field lines | magnetic material | permanent magnet | repel

# P2 Chapter 3: Energy
## Knowledge organiser

Activate
Question • Progress • Succeed

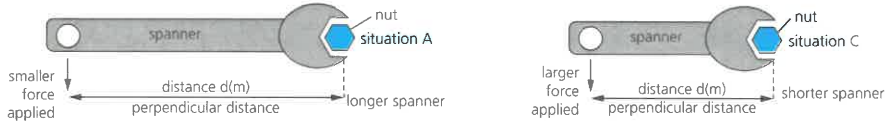
## Work

- In physics, **work done** is the energy transferred when a force is used to move an object a certain distance
- Like energy, work is measured in **Joules** (J)
- Work can be done in a a range of situations e.g. lifting a book work is done against gravity, when you slide a book along a table work is done against friction
- We calculate work with the equation:

work done (J) = force (N) × distance moved (m)

- A **simple machine** makes it easier to lift things, they reduce the force needed
- A **force multiplier** uses a smaller **input force** (what you apply) to to generate a larger **output force** (what is created)
- If you increase the distance from the pivot, less input force is needed to be used for the same output force as before
- A **lever** is an example of a force multiplier, a longer lever will require a less input force than a shorter lever to produce the same output force

**The physics of unscrewing a tight nut with a spanner**




## Radiation

- **Radiation** is a method of transferring energy without the need for particles
- An example of radiation is thermal energy being transferred from the Sun to us through space (where there are no particles)
- This type of radiation is known as **infrared radiation**, it is a type of wave just like light
- The hotter an object is the more infrared radiation it will emit (give out)
- The amount of radiation emitted and absorbed depends on the surface of the object:
  - Darker matte surfaces absorb and emit more infrared radiation
  - Shiny and smooth surfaces absorb and emit less infrared radiation, instead reflecting this
  - The amount of infrared radiation being emitted can be viewed on a **thermal imaging camera**

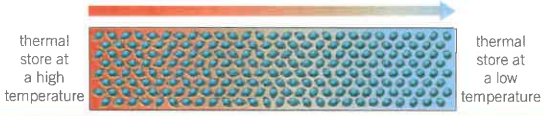
## Energy and temperature

- The **temperature** of a substance is a measure of how hot or cold it is
- Temperature is measured with a **thermometer**, it has the units of degrees Celsius (°C)

- The **thermal energy** of a substance depends on the individual energy of all of the particles, it is measures in Joules (J)
- As all particles are taken into account, a bath of water at 30 °C would have more thermal energy than a cup of tea at 90 °C as there are many more particles
- The faster the particles are moving, the more thermal energy they will have
- When particles are heated they begin to move more quickly
- The energy needed to increase the temperature of a substance depends on:
  - the mass of the substance
  - what the substance is made of
  - how much you want to increase the temperature by

## Conduction

- **Conduction** is the transfer of thermal energy by the vibration of particles, it cannot happen without particles
- This means that every time particles collide they transfer thermal energy
- Conduction happens effectively in solids as their particles are close together and can collide often as they vibrate around a fixed point
- Metals are also good **thermal conductors** as they contain electrons which are free to move
- In conduction the thermal energy will be transferred from an area which has a high **thermal energy store** (high temperature) to an area where there is a low thermal energy store (low temperature)
- Gases and liquids are poor conductors as their particles are spread out and so do not collide often, we call these **insulators**




## Convection

- **Convection** is the transfer of thermal energy in a liquid or a gas, it cannot happen without particles
- As the particles near the heat source are heated they spread out and become less dense, this means that they will rise
- More dense particles will take their place at the bottom nearest the heat source creating a constant flow of particles
- This is known as a **convection current**
- Convection cannot happen in a solid as the particles cannot flow, they can only move around a fixed point

**Key terms** Make sure you can write definitions for these key terms.

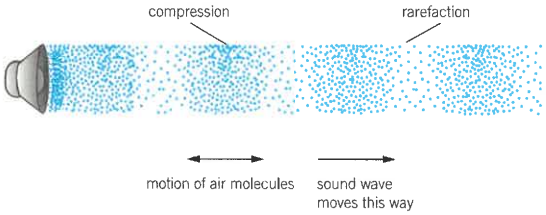
conduction convection convection current force multiplier input force insulator infrared radiation lever output force simple machine temperature thermometer thermal conductor thermal energy store thermal imaging camera work done

# P2 Chapter 4: Waves
## Knowledge organiser

Activate
Question • Progress • Succeed

## Sound waves

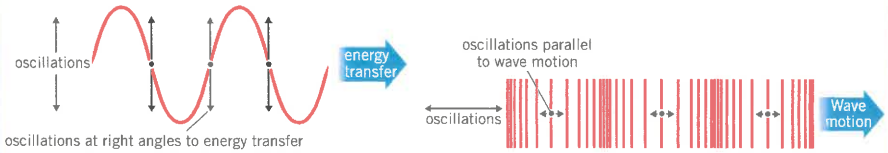
- Any **wave** transfers energy from one place to another
- Sound waves cause particles to vibrate backwards and forwards in the direction of the wave, this produces areas of high pressure (**compression**) and low pressure (**rarefaction**)
- As there are areas where the air pressure is different in a sound wave, we can call sound waves a type of **pressure wave**



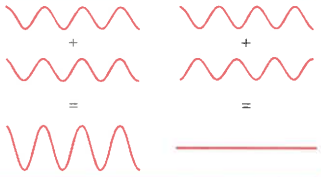

- Sound can be detected with a **microphone**, the microphone will change air pressure into a changing potential difference
- Sound can be produced with a **loudspeaker**, the changing potential difference causes changes in air pressure
- Changes in air pressure will be caused by the diaphragm of the loudspeaker vibrating and causing the movement of the air particles

## Types of waves

- **Transverse waves** vibrate at 90° to the direction at which they are travelling, they move up and down as well as forward
- **Longitudinal waves** vibrate in the direction in which they are travelling



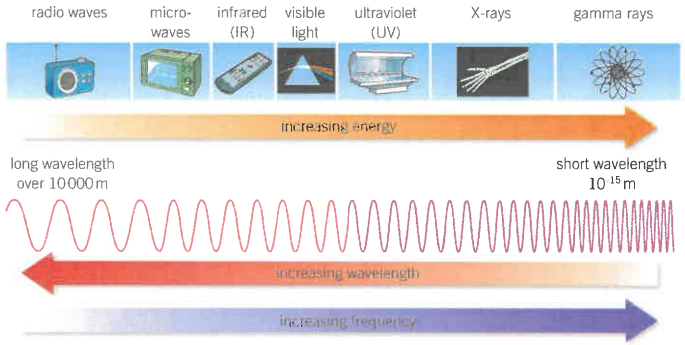

- When waves are put together they **superpose**, this means they will either add together or cancel each other out
- When the waves are in line with one another they add together, increasing the amplitude of the wave
- When the waves are not in line, they will cancel each other out, decreasing the amplitude of the wave



## Ultrasound

- Humans can hear sounds with a frequency between 20–20000Hz.
- **ultrasound** is any sound with a frequency of higher than 20000Hz
- As ultrasound has a high frequency it causes the particles it interacts with to vibrate more quickly, this means that it can be used in:
  - Ultrasonic cleaning – dirt particles are 'shaken' off of objects
  - Physiotherapy – the ultrasound waves causes liquid particles in the body to move more quickly and hence get warmer

## Electromagnetic spectrum

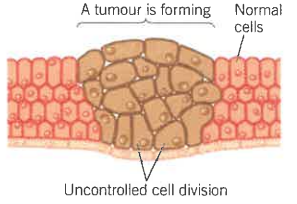



## Uses of the electromagnetic spectrum

| | |
|---|---|
| **Radio waves** | TV signals |
| **Microwaves** | Mobile phones |
| **Infrared** | Heating and cooking |
| **Visible light** | Photography |
| **Ultraviolet waves** | Detecting forgeries,sunbeds |
| **X-rays** | Imaging broken bones |
| **Gamma rays** | Killing cancer cells |

## Ionisation

- The higher the frequency of the wave, the higher the energy
- High energy waves can lead to **ionisation**, where electrons are knocked off of atoms in cells
- This can cause mutations in cells if the DNA is affected and this can lead to cancerous tumours forming
- The ionising waves in the electromagnetic spectrum are gamma, X-rays and ultraviolet rays




**Key terms** Make sure you can write definitions for these key terms.

compression electromagnetic spectrum gamma rays infrared ionisation longitudinal wave loudspeaker microphone microwaves pressure wave radio waves rarefaction superpose transverse wave ultrasound ultraviolet visible light wave X-rays

# C2 Chapter 5: Matter
## Knowledge organiser

Activate
Question • Progress • Succeed

### Elements and atoms

- An **element** is a substance that only contains one type of atom, it is found on the **Periodic Table**
- Each element has it's own unique chemical symbol which is the same in every language, these are also found on the Periodic Table
- An **atom** is the smallest part of which an element can be broken down into
- As there are around 100 types of elements that can occur naturally, there are around 100 different atoms

### Compounds

- **Compounds** are formed when two or more different elements chemically bond together
- The compound will have different **physical properties** to the elements which make up the compound, for example water is a liquid, but it made from oxygen and hydrogen which are both gases
- Compounds are hard to separate and need a chemical reaction to do this

---

- When naming a compound, we always mention the metal first and the non metal second
- The name of the metal will not change but the name of the non metal will, for example oxygen can change to oxide
- Chemical formulae tells us how many atoms of each element are in the compound in relation to each other

$CH_4$ → 1 carbon, 4 hydrogens

$CO_2$ → 1 carbon, 2 oxygens

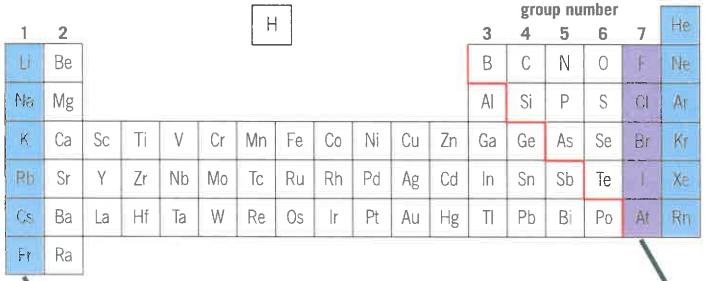
- The small number tells us the number of each element which is in front of the number

### Polymers

- **Polymers** are long chains of groups of atoms which are repeated many times
- Natural polymers are not man-made and include wool, cotton, starch and rubber
- Synthetic polymers are man-made and include polythene, polystyrene and nylon

### Groups and periods

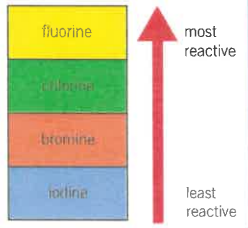
- **Groups** are the columns in the Periodic Table, they go downwards
- **Periods** are the rows in the Periodic Table, they go sideways
- Elements in the same group normally follow the same trends in properties such as melting point, boiling point and reactivity
- By placing these elements into these groups, scientists can make predictions about their properties




### Group 0

- **Group 0** elements are known as the **noble gases**
- They are all non metals with low melting and boiling points, meaning all are gases at room temperature
- The boiling point decreases going down the group
- All of the group 0 elements are unreactive
- When electricity is passed through the gas, they emit a brightly coloured light, this can be seen in neon signs

### Halogens




### Group 1

- **Group 1** elements are also known as the **alkali metals**
- They share similar properties with other metals such as:
  - Being shiny when freshly cut
  - Being good conductors of electricity and heat
- Group 1 metals are much softer than other metals and also have much lower melting and boiling points
- Group 1 elements react with water to form alkali solutions

lithium + water → lithium hydroxide + hydrogen
metal + water → metal hydroxide + hydrogen

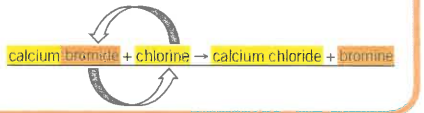
- The further down the group that the metal is, the more vigorous the reaction will be. This is called a **trend**
- Another trend seen in Group 1 is with the boiling and melting points: the further down the group, the lower the boiling and melting points are

### Group 7

- **Group 7** elements are also known as the **halogens**
- They share similar properties with other non metals such as:
  - Having low melting and boiling points
  - Not conducting electricity
  - Moving down the groups the elements have an increased melting and boiling point
- The halogens also react in a similar way to one another, for example with iron:

iron + chlorine → iron chloride
iron + bromine → iron bromide

- Halogens can undergo **displacement reactions**, this is where a more reactive halogen will take the place of a less reactive halogen
- The most reactive halogens are at the top of the group, and the least reactive halogens are at the bottom of the group
- If the most reactive halogen is on its own, it will take the place of the less reactive halogen in a compound




**Key terms** Make sure you can write definitions for these key terms.

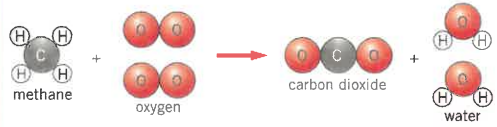
atom, alkali metals, compound, displacement reaction, element, group, Group 1, Group 7, Group 0, halogen, noble gas, period, Periodic Table, physical properties, polymer, trend

# C2 Chapter 6: Reactions
## Knowledge organiser

Activate
Question • Progress • Succeed

## Chemical reactions

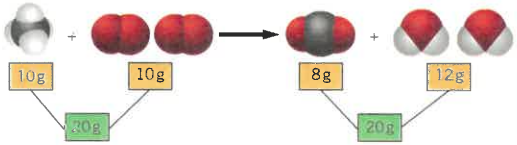
- Word equations can represent a **chemical reaction:**




- The **reactants** are on the left side of the arrow and the **products** are on the right side of the arrow
- We use an arrow instead of an equals sign as it represents that the reactants are changing into a new substance
- In a reaction, the amount of each type of atom stays the same, however they are rearranged to form a new product

## Conservation of mass

- In a reaction the mass will be **conserved**, this means that the total mass of the reactants will be equal to the total mass of the products
- If it appears that some of the mass has been lost, this means that a gas has been produced and escaped, accounting for the lost mass




**Balanced symbol equations** show the amounts of all of the individual atoms in a reaction

- The symbols used are from the Periodic Table
- They also show:
  - Formulae of reactants and products
  - How the atoms are rearranged
  - Relative amounts of reactants and products

$$2H_2 + O_2 \rightarrow 2H_2O$$

## Combustion

- **Combustion** is the burning of a **fuel** in oxygen
- A fuel is a substance which stores energy in a chemical store
- Examples of fuels include petrol, diesel, coal and hydrogen
- When a carbon based fuel undergoes combustion, it will produce water and carbon dioxide

methane + oxygen → carbon dioxide + water

- Hydrogen can also be used as a fuel, this is much better than traditional fossil fuels as it does not produce carbon dioxide:

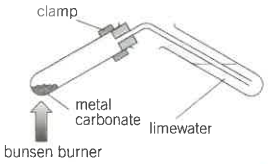
hydrogen + oxygen → water

## Thermal decomposition

- A **thermal decomposition** reaction is one where the reactants are broken down (decomposition) using heat (thermal energy)
- An example of this is with metal carbonates:

zinc carbonate → zinc oxide + carbon dioxide

- We can test for this carbon dioxide by bubbling the gas through limewater, if the limewater turns cloudy, the gas is carbon dioxide




## Exothermic and endothermic reactions

**Exothermic** reactions involve a transfer of energy from the reactants to the surroundings

- As energy is transferred to the surroundings this will show an increase in temperature
- Examples of exothermic reactions include combustion, freezing, and condensing

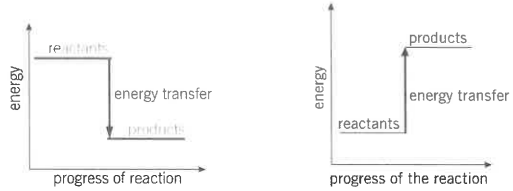

**Endothermic** reactions involve a transfer of energy from the surroundings to the reactants

- As energy is taken into the reactants a decrease in temperature will be shown
- Examples of endothermic reactions include thermal decomposition, melting, and boiling


## Energy level diagrams

**Energy level diagrams** show the values of energy between the reactants and the products in a reaction

- If the energy is greater in the reactants than the products then the reaction is exothermic as energy has been given out to the surroundings
- If the energy is lower in the reactants than the products then the reaction is endothermic as energy has been taken in from the surroundings




## Bond energies

- Energy must be used to break **chemical bonds**, meaning that this reaction is endothermic
- Energy is given out when chemical bonds are made, meaning that this reaction is exothermic
- To see if a reaction is endothermic or exothermic, you must find the difference in the energy needed to break and to make the bonds in the reaction
- If the energy needed to break the bonds is less than the energy given out when making the bonds, the reaction is exothermic
- If the energy needed to break the bonds is more than the energy released when making the bonds, the reaction is endothermic

**Key terms** Make sure you can write definitions for these key terms.

balanced symbol equation · chemical bond · chemical reaction · combustion · conserved · conservation of mass · decomposition · fuel · endothermic · energy level diagram · exothermic · products · reactants · thermal decomposition

# B2 Chapter 9: Ecosystems
## Knowledge organiser

Activate
Question • Progress • Succeed

## Respiration

- Respiration is the process in which energy is released from the molecules of food which you eat
- Respiration happens in the mitochondria of the cell
- **Aerobic respiration** involves oxygen, it is more efficient as all of the food is broken down to release energy

glucose + oxygen → carbon dioxide + water

- The glucose is transported to the cells in the blood **plasma**
- The oxygen is transported to the cells in **red blood cells**, by binding with **haemoglobin**
- Carbon dioxide is a waste product and is transported from the cells to the lungs to be exhaled

---

- **Anaerobic respiration** is a type of respiration which does not use oxygen, it is used when the body cannot supply the cells with enough oxygen for aerobic respiration
- Anaerobic respiration releases less energy than aerobic respiration

glucose → lactic acid

- The **lactic acid** produced through anaerobic respiration can cause muscle cramps
- Lactic acid will build up if there is not enough oxygen present in the blood supply to break it down. This is known as an **oxygen debt**

## Fermentation

- **Fermentation** is a type of anaerobic respiration which occurs in yeast
- Instead of producing lactic acid, yeast produces ethanol, which is a type of alcohol

glucose → ethanol + carbon dioxide

- This process can be used to form alcohol to drink or to allow bread and cakes to rise

## Plant minerals

Plants need minerals for healthy growth, if they do not have enough of these minerals this is known as a **mineral deficiency**

| Mineral | What is it used for? | What happens if there is not enough? |
|---|---|---|
| **nitrates** (contain nitrogen) | healthy growth | poor growth and older leaves yellow |
| **phosphates** (contain phosphorus) | healthy roots | poor growth, younger leaves look purple |
| **potassium** | healthy leaves and flowers | yellow leaves with deadpatches |
| **magnesium** | making chlorophyll | leaves will turn yellow |

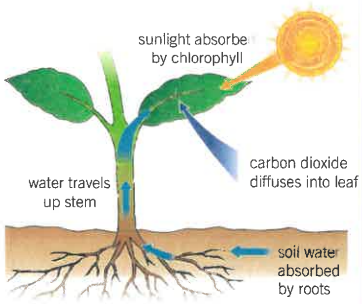
**Fertilisers** can be used to stop plants from suffering with mineral deficiencies

## Photosynthesis

- **Photosynthesis** is the process which occurs in the chloroplasts to produce glucose using sunlight

water + carbon dioxide + sunlight → glucose + oxygen

- Any organism that can use photosynthesis to produce its own food is known as a **producer**, these are not just limited to plants but can include other organisms such as **algae**

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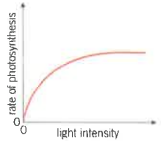
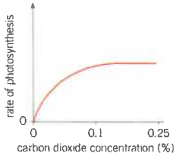
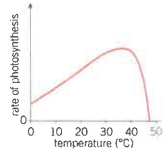
- The rate of photosynthesis can be affected by:
  - Light intensity – the higher the light intensity the higher the rate of photosynthesis up to a point
  - Carbon dioxide concentration – the higher the carbon dioxide concentration the higher the rate of photosynthesis up to a point
  - Temperature – the optimum temperature is the temperature at which photosynthesis occurs at the highest rate, before and after this the rate will be less

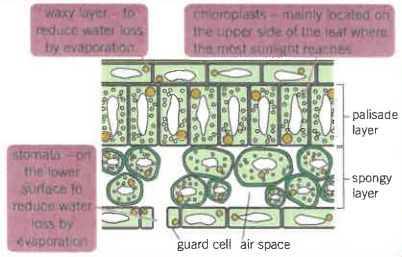



## Leaves

- To best adapt for photosynthesis leaves have a number of adaptations
- They are thin to allow the most light through
- There is a lot of **chlorophyll** to absorb light
- They have a large surface area to absorb as much light as possible




**Key terms** Make sure you can write definitions for these key terms.

aerobic respiration · algae · anaerobic respiration · chlorophyll · mineral deficiency · fermentation · fertiliser · haemoglobin · lactic acid · magnesium · nitrates · oxygen debt · phosphates · photosynthesis · plasma · potassium · producer · red blood cells

## Saludos Greetings

| | | | |
|---|---|---|---|
| ¡Hola! | Hello! | ¿Cómo te llamas? | What are you called? |
| ¿Qué tal? | How are you? | Me llamo... | I am called... |
| Bien, gracias. | Fine, thanks. | ¿Dónde vives? | Where do you live? |
| fenomenal | great | Vivo en... | I live in... |
| regular | not bad | ¡Hasta luego! | See you later! |
| fatal | awful | ¡Adiós! | Goodbye! |

## ¿Qué tipo de persona eres? What sort of person are you?

| | | | |
|---|---|---|---|
| Soy... | I am... | listo/a | clever |
| divertido/a | amusing, funny, fun | serio/a | serious |
| estupendo/a | brilliant | simpático/a | nice, kind |
| fenomenal | fantastic | sincero/a | sincere |
| generoso/a | generous | tímido/a | shy |
| genial | great | tonto/a | silly |
| guay | cool | tranquilo/a | quiet, calm |

## Mi pasión My passion

| | | | |
|---|---|---|---|
| Mi pasión es... | My passion is... | el fútbol | football |
| Mi héroe es... | My hero is... | la música | music |
| el deporte | sport | el tenis | tennis |

## ¿Tienes hermanos? Do you have any brothers or sisters?

| | | | |
|---|---|---|---|
| Tengo... | I have... | No tengo hermanos. | I don't have any brothers or sisters. |
| una hermana | a sister | | |
| un hermano | a brother | Soy hijo único/hija única. | I am an only child. (male/female) |
| una hermanastra | a half-sister/stepsister | | |
| un hermanastro | a half-brother/stepbrother | | |

## Los números 1 - 31 Numbers 1 - 31

| | | | |
|---|---|---|---|
| uno | 1 | diecisiete | 17 |
| dos | 2 | dieciocho | 18 |
| tres | 3 | diecinueve | 19 |
| cuatro | 4 | veinte | 20 |
| cinco | 5 | veintiuno | 21 |
| seis | 6 | veintidós | 22 |
| siete | 7 | veintitrés | 23 |
| ocho | 8 | veinticuatro | 24 |
| nueve | 9 | veinticinco | 25 |
| diez | 10 | veintiséis | 26 |
| once | 11 | veintisiete | 27 |
| doce | 12 | veintiocho | 28 |
| trece | 13 | veintinueve | 29 |
| catorce | 14 | treinta | 30 |
| quince | 15 | treinta y uno | 31 |
| dieciséis | 16 | | |

## ¿Cuántos años tienes? How old are you?

| | |
|---|---|
| Tengo... años. | I am... years old. |
| ¿Cuándo es tu cumpleaños? | When is your birthday? |
| Mi cumpleaños es el... de... | My birthday is the... of... |
| enero | January |
| febrero | February |
| marzo | March |
| abril | April |
| mayo | May |
| junio | June |
| julio | July |
| agosto | August |
| septiembre | September |
| octubre | October |
| noviembre | November |
| diciembre | December |

## ¿Tienes mascotas? Do you have pets?

| | |
|---|---|
| Tengo... | I have... |
| una cobaya | a guinea pig |
| un conejo | a rabbit |
| un gato | a cat |
| un perro | a dog |
| un pez | a fish |
| un ratón | a mouse |
| una serpiente | a snake |
| No tengo mascotas. | I don't have any pets. |
| ¿Cómo es? | What is it like? |
| ¿Cómo son? | What are they like? |

## Los colores Colours

| | |
|---|---|
| blanco/a | white |
| amarillo/a | yellow |
| negro/a | black |
| rojo/a | red |
| verde | green |
| gris | grey |
| marrón | brown |
| azul | blue |
| rosa | pink |
| naranja | orange |

## Palabras muy frecuentes High-frequency words

| | |
|---|---|
| bastante | quite |
| no | no/not |
| mi/mis | my |
| muy | very |
| pero | but |
| también | also, too |
| tu/tus | your |
| un poco | a bit |
| y | and |
| a la derecha | on the right |
| a la izquierda | on the left |
| en el centro | in the centre/middle |
| hay | there is/there are |
| un chico | a boy |
| una chica | a girl |
| creo que | I think that |

### Estrategia 1

**Look, say, cover, write, check**

Use the five steps below to learn how to spell any word.

1 *LOOK* Look carefully at the word for at least 10 seconds.
2 *SAY* Say the word to yourself or out loud to practise pronunciation.
3 *COVER* Cover up the word when you feel you have learned it.
4 *WRITE* Write the word from memory.
5 *CHECK* Check your word against the original. Did you get it right? If not, what did you get wrong?

Spend time learning that bit of the word. Go through the steps again until you get it right.