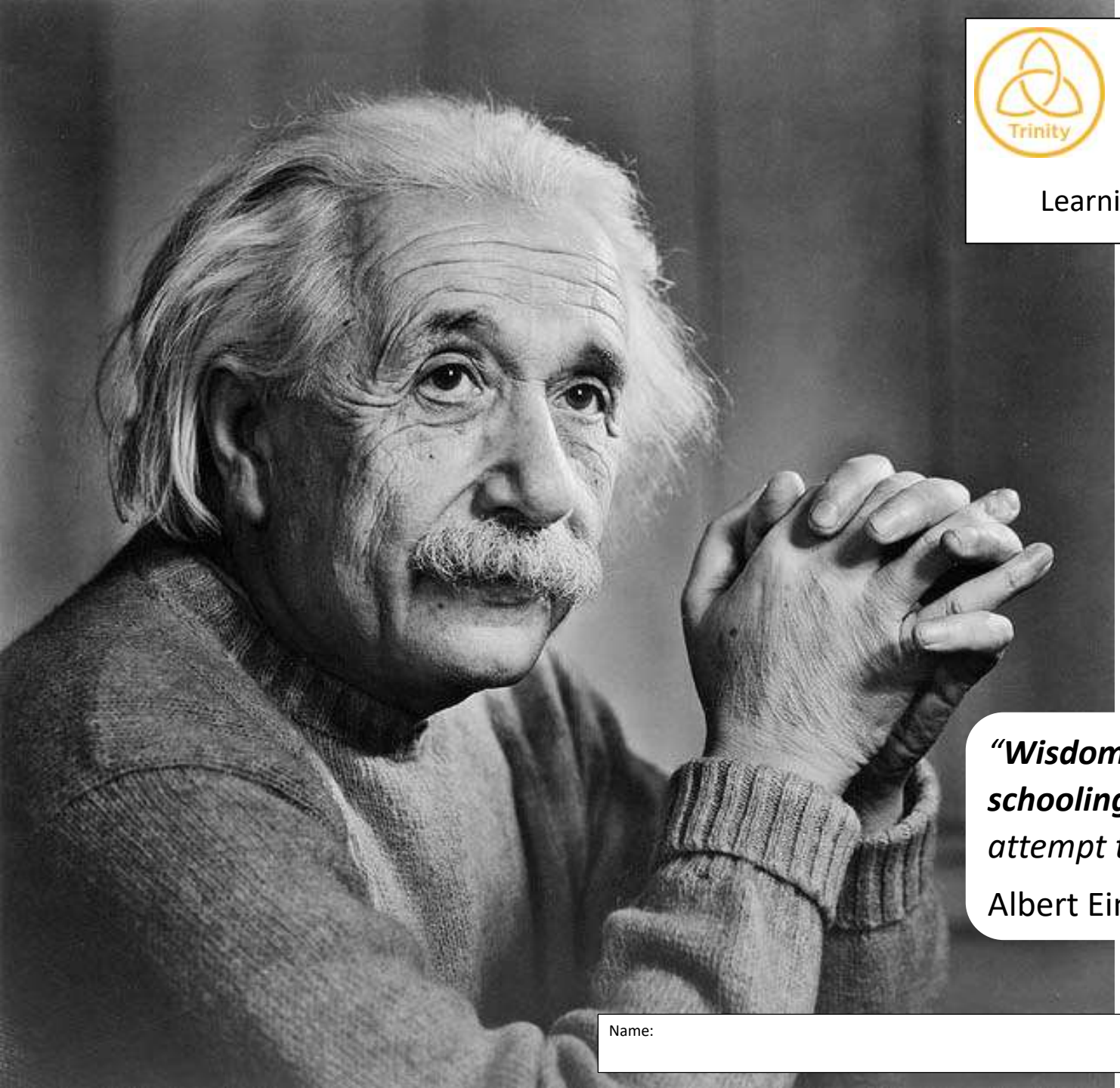


YEAR 10

KNOWLEDGE ORGANISER

Trinity 1

Learning - Loving - Living

*"**Wisdom is not a product of schooling** but of the lifelong attempt to acquire it.."*

Albert Einstein

Name:

Family Group:

How to use my Knowledge Organiser

The timetable shows the **subjects** you should be studying and the days that you should be studying them. You should **complete your work your exercise book**.

Each evening you should draw a straight line (using a ruler), under the previous day's work, and write the date, clearly at the top. You need to **bring your KO and exercise book with you to school EVERYDAY**.

The **KO** work that you have completed for the week will be checked in Family Group time **EVERY** Friday. If homework is not of an appropriate standard or amount will result in an after school detention. Knowledge tests will also be used frequently in lessons.

Subject Homework

Students will also be **given** additional subject homework to be completed throughout the week and/or can use FREE online revision tools such as www.senecalearning.com

It is also recommended that students regularly **READ** a variety of fiction and non fiction books that they choose for pleasure. This extra reading will help to develop and broaden their general knowledge.

In **ENGLISH** all students will be expected to complete 1-2 reading assignments each week by accessing www.CommonLit.org . Each assignment will take 20-30 minutes and students will be required to answer multiple choice questions to check their understanding of what they have read. Each class has a code based on the set they are in:

English Set	Class Code for Commonlit
10.3	4YQ9QL
10.2	64ZVZV
10.1	LYQJQV
10.GR	5RKQK5

In **MATHS** students are expected to watch short explanation videos and complete activities on the online platform of https://mathswatch.co.uk. Students can log in using the details and password they use to log in to the school computers.

Homework Timetable

You should spend *at least* **1 hour** per night on homework = 3 subjects x 20 mins per subject

Year 10	Subject 1	Subject 2	Subject 3
Monday	Maths	Option A	Option C
Tuesday	English	Option B	Option C
Wednesday	Maths	Religious Education	English
Thursday	English	Science	Option A
Friday	Maths	MFL	Option B

Retrieval activity ideas

Knowledge organisers are for **learning and mastering** the knowledge in each subject. There are many different ways you can do this, however some **PROVEN** methods to try in your work book are:

4 Methods of Retrieval Practice

@ImpactWales

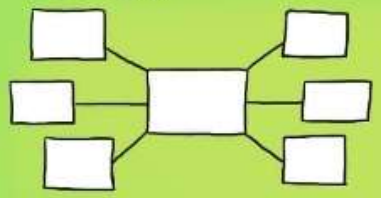
Before you start put away all your books & classroom materials.

Retrieval Practice Examples

- Exit Tickets
- Starter quizzes
- Multiple choice quizzes
- Short answer tests
- Free write
- Think, pair, share
- Ranking & sorting
- Challenge grids

BRAIN DUMP

Write, draw a picture, create a mind-map on everything you know about a topic.



Give yourself a time limit, say 3 minutes, then have a look at your books & add a few things you forgot.

QUIZZING

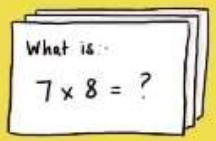
Create practice questions on a topic. Swap your questions with a partner & answer.

Question - What is a metaphor?

- ☐ A comparison using 'like, as, than'.
- ☐ A comparison where one thing is another.
- ☐ A comparison with a human attribute.

FLASHCARDS

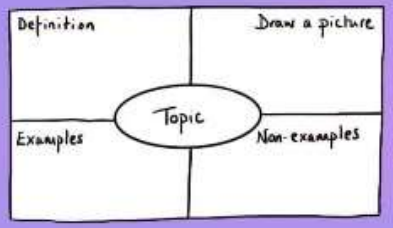
Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



You need to repeat the Q & A process for flashcards you fail on more frequently & less frequently for those you answer correctly

KNOWLEDGE ORGANISERS

Complete a knowledge organiser template for key information about a topic.

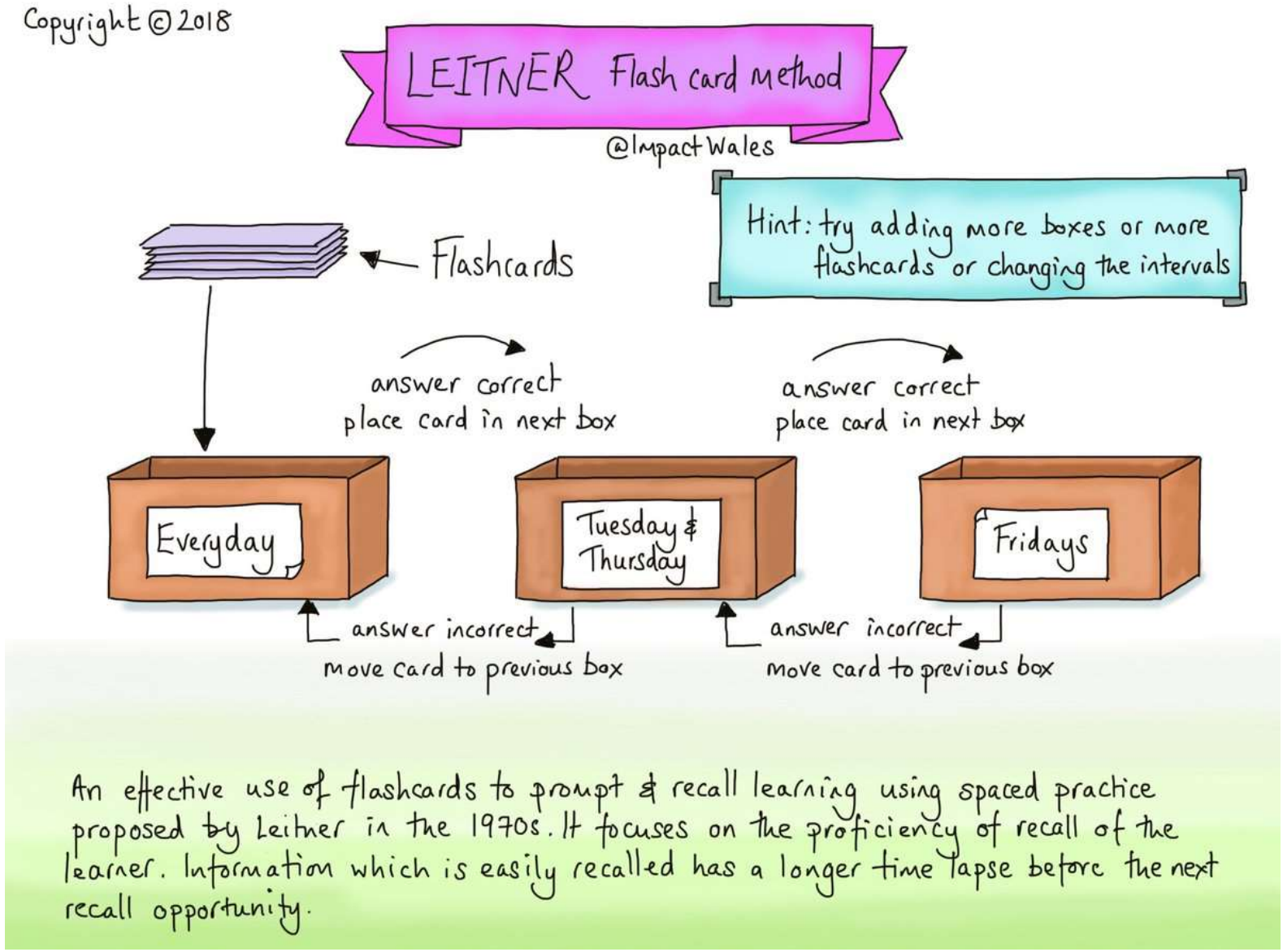


You can use knowledge organisers to learn new vocab & make links in between subjects or ideas.

After you have retrieved as much as you can go back to your books & check what you've missed. Next time focus on that missing information

Using flash cards successfully

Once flash cards are created, you will need to use them correctly to have an impact. Follow the method below for the best knowledge retention

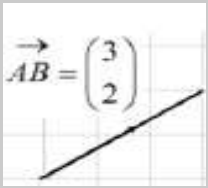


Year 10- MATHS- T1 FOUNDATION – Transformations

Important Ideas

A **vector** is a quantity represented by an arrow with both **direction** and **magnitude**.

$\overrightarrow{AB} = -\overrightarrow{BA}$



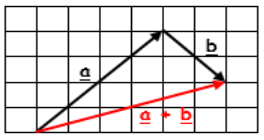
If two vectors have the **same magnitude and direction**, they are **equal**.

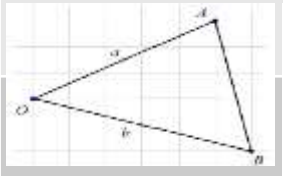
The **resultant** vector is the vector that results from **adding** two or more vectors together.

The **resultant** vector is the vector that results from **adding** two or more vectors together.

if $\underline{a} = \begin{pmatrix} 4 \\ 4 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$

then $\underline{a} + \underline{b} = \begin{pmatrix} 4 \\ 4 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$





$\overrightarrow{OA} = a \quad \overrightarrow{AO} = -a$

$\overrightarrow{OB} = b \quad \overrightarrow{BO} = -b$

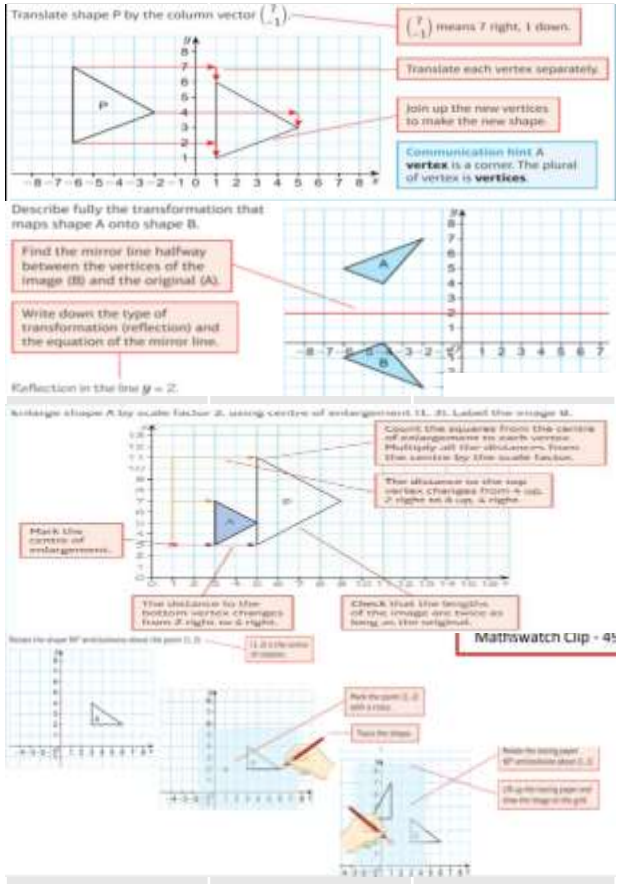
$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = -a + b = b - a$

$\overrightarrow{BA} = \overrightarrow{BO} + \overrightarrow{OA} = -b + a = a - b$

Vocabulary

Object	Starting shape
Image	Created by a transformation
Congruent	2 shapes are exactly the same
Similar	2 shapes with the same angles but different length sides

Q& A



MathsWatch References

48	Reflections
49	Rotations
50	Translations
148	Enlargements
174	Introductions to Vectors
219	Vectors

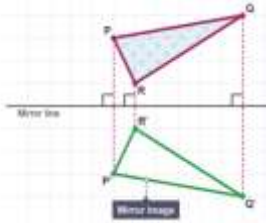
Key Facts & Formula

Reflection

Every point in the image is the same distance from the mirror line as the original shape.

The line joining a point on the original shape to the same point on the image is perpendicular to the mirror line.

A reflection creates a congruent image



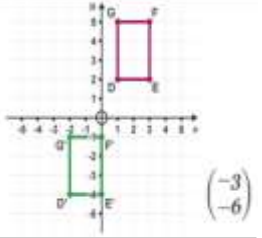
Translation

A **translation** moves a shape up, down or from side to side and creates a congruent image.

Column vectors are used to describe translations

$\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ means translate the shape 4 squares to the right and 3 squares down

$\begin{pmatrix} -2 \\ 1 \end{pmatrix}$ means translate the shape 2 squares to the left and 1 square up

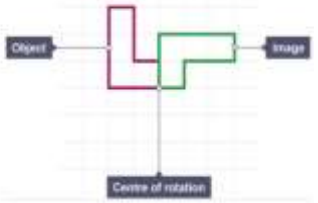


Rotation

Rotation turns a shape around a fixed point called the **centre of rotation**.

3 parts of a rotation
- the centre of rotation
- the angle of rotation
- the direction of rotation

A Rotation creates a congruent image



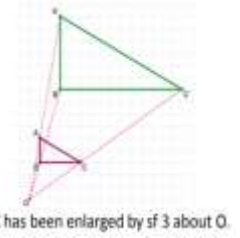
Enlargement

Enlarging a shape changes its size

2 parts of an enlargement
- the scale factor
- the centre of enlargement

Fractional SF reduces the shape
Negative SF inverts the shape

An enlargement creates a similar shape



Year 10- Higher - Transformations, shapes and graphs

Important Ideas

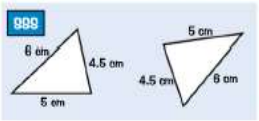
Congruent Shapes

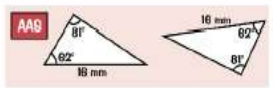
Proving Triangles are Congruent

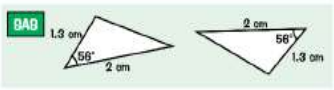
CONGRUENT — same size, same shape

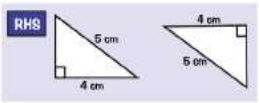
To prove that two triangles are congruent, you have to show that one of the conditions below hold

1) SSS three sides are the same
2) AAS two angles and a corresponding side match up
3) SAS two sides and the angle between them match up
4) RHS a right angle, the hypotenuse and one other side all match up









Similar Shapes

Similar Shapes Have the Same Angles

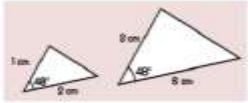
Generally, for two shapes to be similar, all the angles must match and the sides must be proportional. But for triangles, there are three special conditions — if any one of these is true, you know they're similar.

Two triangles are similar if:

1) All the angles match up i.e. the angles in one triangle are the same as the other.

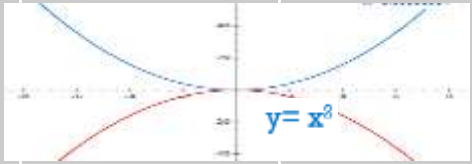
2) All three sides are proportional i.e. if one side is twice as long as the corresponding side in the other triangle, all the sides are twice as long as the corresponding sides.

3) Any two sides are proportional and the angle between them is the same.

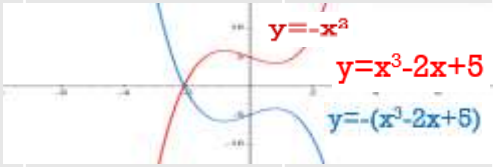


Q&A

Sketch the graphs of $y= x^2$ and $y= -x^2$



Sketch the graph of $y= x^3-2x+5$ and $y=-(x^3-2x+5)$



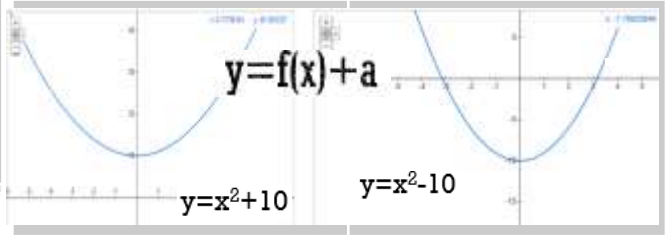
Area scale factor for similar shapes

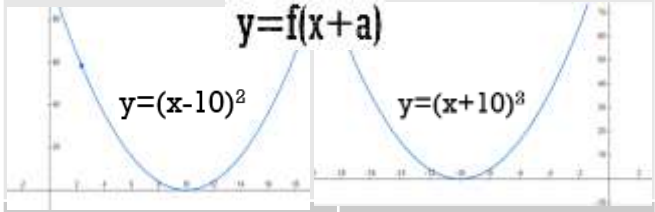
when lengths are multiplied by k, area is multiplied by k^2, volume by k^3

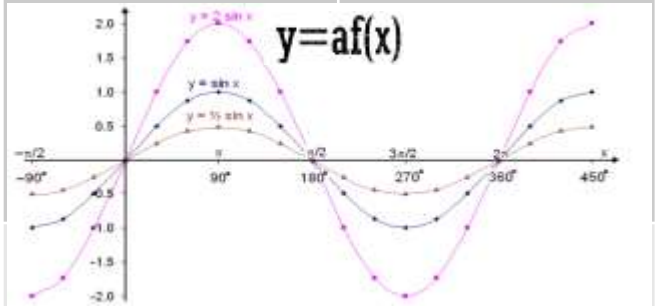
MathsWatch clip References

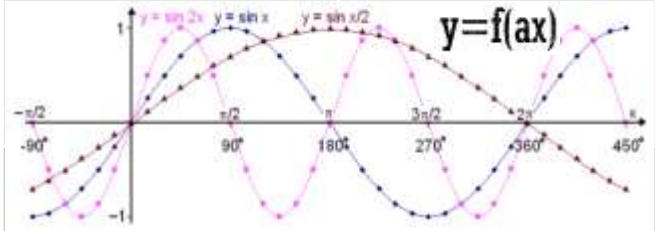
144	Similar Shapes
200	Similarity - Area and Volume
12b	Congruent Shapes
166	Congruent triangles
98	Drawing Quadratic Graphs
161	Cubic and Reciprocal Graphs
196a 196b	Transformation of Polynomial Functions Transformation of trigonometric Functions

Four main types of graph transformation









Science- Energy changes- Year 10- Part 1

Reaction profiles	*Show the overall energy change of a reaction*

Breaking bonds in reactants	*Endothermic process*
Making bonds in products	*Exothermic process*

5.4 The energy change of reactions (HT only)

Overall energy change of a reaction	*Exothermic*	Energy released making new bonds is greater than the energy taken in breaking existing bonds.
	Endothermic	Energy needed to break existing bonds is greater than the energy released making new bonds.

Bond energy calculation

Calculate the overall energy change for the forward reaction

$N_2 + 3H_2 \rightleftharpoons 2NH_3$

Bond energies (in kJ/mol): H-H 436, H-N 391, N≡N 945

Bond breaking: 945 + (3 x 436) = 945 + 1308 = 2253 kJ/mol

Bond making: 6 x 391 = 2346 kJ/mol

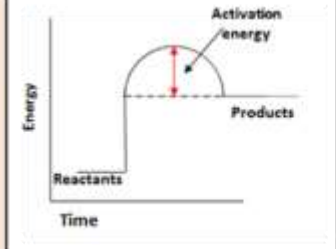
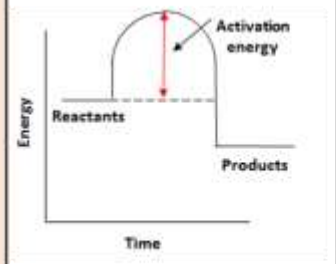
Overall energy change = 2253 - 2346 = -93kJ/mol

Therefore reaction is exothermic overall.

Activation energy	*Chemical reactions only happen when particles collide with sufficient energy*	The minimum amount of energy that colliding particles must have in order to react is called the activation energy.

Types of reaction			
5.1 Endothermic	*Energy is taken in from the surroundings so the temperature of the surroundings decreases*	• Thermal decomposition • Sports injury packs	
Exothermic	*Energy is transferred to the surroundings so the temperature of the surroundings increases*	• Combustion • Hand warmers • Neutralisation	

5.3 Reaction profiles

Endothermic		Products are at a higher energy level than the reactants. As the reactants form products, energy is transferred from the surroundings to the reaction mixture. The temperature of the surroundings decreases because energy is taken in during the reaction.
Exothermic		Products are at a lower energy level than the reactants. When the reactants form products, energy is transferred to the surroundings. The temperature of the surroundings increases because energy is released during the reaction.

5.6 Fuel cells (Chemistry only)

Ionic half equations	Negative electrode: $2H_2$ (g) + $4OH^-$ (aq) → $4H_2O$ (l) + $4e^-$	Positive electrode: O_2 (g) + $2H_2O$ (l) + $4e^-$ → $4OH^-$ (aq)

Hydrogen fuel cells	*Word equation:* *hydrogen + oxygen → water*	Symbol equation: $2H_2 + O_2 \rightarrow 2H_2O$
	Advantages: • No pollutants produced • Can be a range of sizes	Disadvantages: • Hydrogen is highly flammable • Hydrogen is difficult to store

5.5 Cells and batteries (Chemistry only)

Simple cell	*Make a simple cell by connecting two different metals in contact with an electrolyte*	Increase the voltage by increasing the reactivity difference between the two metals.
Batteries	*Consist of two or more cells connected together in series to provide a greater voltage.*	

Non-rechargeable cells	*Stop when one of the reactants has been used up*	Alkaline batteries
Rechargeable cells	*Can be recharged because the chemical reactions are reversed when an external electrical current is supplied*	Rechargeable batteries

Year 10- Science- Infection and response- Part 1

1. Pathogens

Pathogens are microorganisms that cause **infectious disease**

Pathogens may infect plants or animals and can be spread by **direct contact**, **water** or **air**

Viruses	Bacteria (prokaryotes)	Protists (eukaryotes)	Fungi (eukaryotes)
e.g. cold, influenza, measles, HIV, tobacco mosaic virus	*e.g. tuberculosis (TB), Salmonella, Gonorrhoea*	*e.g. dysentery, sleeping sickness, malaria*	*e.g. athlete's foot, thrush, rose black spot*
DNA or RNA surrounded by a protein coat	No membrane bound organelles (no chloroplasts, mitochondria or nucleus). Cell wall. Single celled organisms	Membrane bound organelles. Usually single celled.	Membrane bound organelles, cell wall made of chitin. Single celled or multi-cellular
Viruses live and reproduce inside cells causing damage	Bacteria may produce toxins that damage tissues and make us fell ill		

2. Communicable diseases

Disease	Pathogen	Symptoms	Method of transmission	Control of spread
Measles	Virus	Fever, red skin rash.	Droplet infection from sneezes and coughs.	Vaccination as a child.
HIV	Virus	Initially flu like systems, serious damage to immune system.	Sexual contact and exchange of body fluids.	Anti-retroviral drugs and use of condoms.
Tobacco mosaic virus	Virus	Mosaic pattern on leaves.	Enters via wounds in epidermis caused by pests.	Remove infected leaves and control pests that damage the leaves.
Salmonella	Bacteria	Fever, cramp, vomiting, diarrhoea.	Food prepared in unhygienic conditions or not cooked properly.	Improve food hygiene, wash hands, vaccinate poultry, cook food thoroughly.
Gonorrhoea	Bacteria	Green discharge from penis or vagina.	Direct sexual contact or exchange of body fluids.	Use condoms. Treatment using antibiotics.
Malaria	Protists	Recurrent fever.	By an animal vector (mosquitoes).	Prevent breeding of mosquitoes. Use of nets to prevent bites.
Rose black spot	Fungus	Purple black spots on leaves.	Spores carried via wind or water.	Remove infected leaves. Spray with fungicide.

3. Non-specific defence systems

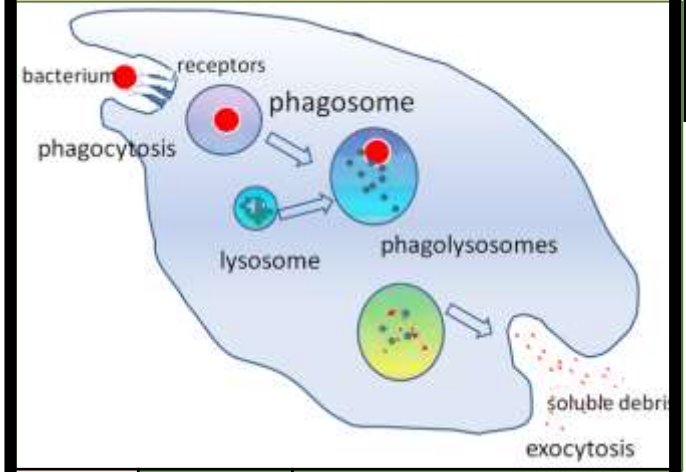
The human body has several non specific ways of defending itself from pathogens getting in

 *Nose*	Nasal hairs, sticky mucus and cilia prevent pathogens entering through the nostrils.
 *Trachea and bronchus (respiratory system)*	Lined with mucus to trap dust and pathogens. Cilia move the mucus upwards to be swallowed.
 *Stomach acid*	Stomach acid (pH1) kills most ingested pathogens.
 *Skin*	Hard to penetrate waterproof barrier. Glands secrete oil which kill microbes

Year 10- Science- Infection and response- Part 2

4. Immune system

White blood cells are part of the immune system



Phagocytes	***Phagocytosis***	Phagocytes engulf the pathogens and digest them.
Lymphocytes	***Antibody production***	Specific antibodies destroy the pathogen. This takes time so an infection can occur. If a person is infected again by the same pathogen, the lymphocytes make antibodies much faster.
	Antitoxin production	Antitoxin is a type of antibody produced to counteract the toxins produced by bacteria.

Pathogens are identified by white blood cells by the different proteins on their surfaces **ANTIGENS.**

5. Antibiotics painkillers

antibiotics	***e.g. penicillin***	Kill infective **bacteria only** inside the body. Specific bacterial infections require specific antibiotics.

Bacteria can mutate
Sometimes this makes them resistant to antibiotic drugs.

Painkillers and other medicines	***e.g. aspirin, paracetamol, ibuprofen***	Drugs that are used to treat the symptoms of a disease. They do not kill pathogens

6. Vaccinations

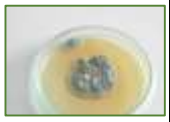
Vaccination	***Small amount of dead or inactive form of the pathogen***	***1st infection by pathogen***	White blood cells detect pathogens in the vaccine. Antibodies are released into the blood.
		Re-infection by the same pathoge	White blood cells detect pathogens. Antibodies are made much faster and in larger amounts.

Used to immunise a large proportion of the population to prevent the spread of a pathogen

7. Drug development

Most new drugs are synthesised by chemists in the pharmaceutical industry.

Traditionally drugs were extracted from plants and microorganisms

Digitalis	***Aspirin***	***Penicillin***
Extracted from foxglove plants and used as a heart drug	A painkiller and anti-inflammatory that was first found in willow bark	Discovered by Alexander Fleming from the *Penicillium* mould and used as an antibiotic
		

Drugs have to be tested and trialled before to check they are safe and effective

New drugs are extensively tested for:	***Efficacy***	Make sure the drug works
	Toxicity	Check that the drug is not poisonous
	Dose	The most suitable amount to take

8. Drug trials

Preclinical trials - using cells, tissues and live animals - must be carried out before the drug can be tested on humans.

Clinical trials use healthy volunteers and patients

Stage 1	***Stage 2***	***Stage 3***	***Stage 4***
Healthy volunteers try small dose of the drug to check it is safe record any side effects	A small number of patients try the drug at a low dose to see if it works	A larger number of patients; different doses are trialled to find the optimum dose	A **double blind** trial will occur. The patients are divided into groups. Some will be given the drug and some a **placebo**.

Double blind trial: patients and scientists do not know who receives the new drug or placebo until the end of the trial. This avoids bias.

A **placebo** can look identical to the new drug but contain no active ingredients

Year 10- Science- Monoclonal antibodies (Separate Biology only)

1. Plant defences

Plants have several ways of defending themselves from pathogens and animals

Physical	*Mechanical*
Thick waxy layers, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten

Chemical
Antibacterial and toxins made by plant

Detection and identification of plant diseases (bio only)	*Detection*	**Identification**
	Stunted growth	Reference using gardening manual or website, laboratory test for pathogens, testing kit using monoclonal antibodies.
	Spots on leaves	
	Area of decay	
	growths	
	Malformed stem/leaves	
	Discolouration	
	Presence of pests	

Nitrate ions needed for protein synthesis – lack of nitrate = stunted growth.	**Magnesium ions** needed to make chlorophyll – not enough leads to chlorosis – leaves turn yellow.

2. Monoclonal antibodies

Monoclonal antibodies

Identical copies of one types of antibody produced in laboratory	1. A mouse is injected with pathogen
	2. Lymphocytes produce antibodies
	3. Lymphocytes are removed from the mouse and fused with rapidly dividing mouse tumour cells
	4. The new cells are called **hybridomas**
	5. The hybridomas divide rapidly and release lots of antibodies which are then collected

Monoclonal antibodies can be used in a variety of ways

Diagnosis	*Detecting pathogens*	*Detecting molecules*	*Treatment*
e.g. pregnancy test – measure the level of hormones	Can detect very small quantities of chemicals in the blood	Fluorescent dye can be attached so it can be seen inside cells or tissues	Bound to radioactive substance, toxic drug or chemical Cancer cells are targeted to normal body cells are unharmed

Disadvantages: Created more side effects than expected (fatal in some cases) and are not as widely used as everybody hoped when first developed.

BOX 1: Key words.

Afterlife – Life after death; the belief that existence continues after physical death.
Euthanasia – Greek for 'a good death'. Sometimes known as 'mercy killing'. Killing or permitting the death of a seriously ill person.
Evolution – The process by which different living creatures have developed from earlier less complex forms during the history of the earth.
Abortion – When a pregnancy is ended so that it does not result in the birth of a child.
Quality of life – The extent to which life is meaningful and pleasurable.
Sanctity of life – The belief that life is precious, or sacred. For many religious believers, only human life holds this special status.
Bioethics – the process of deciding what is good and acceptable in medicine.
Situation ethics – judging the rightness or wrongness of an act on a case-by-case basis. Basing moral decision-making on the most loving thing.
Hospice – A place where those with terminal illness go to die with dignity. Palliative care – focuses on relieving pain and suffering.
Purgatory – A Catholic place of waiting to have sins forgiven before entering heaven.

BOX 2: The scientific origins of the world

Charles Darwin in the 1800s explained how living creatures have evolved through a process of gradual change over millions of years.

Natural selection was observed on the Galapagos Islands where finches (birds) had different shaped beaks on different islands to suit the environment and eat food. These characteristics happened by chance but helped them survive and pass on these traits to their offspring. **'The survival of the fittest.'** Over time, this process led to new species of animals. It is how humans evolved.

Theory of the Expanding Universe Lemaitre argues that the universe is expanding outwards and possibly into infinity. Lemaitre also argues that time and space began 15 billion years ago from a singularity which was infinitely hot and dense and expanded causing sub-atomic particles and atoms to appear. He referred to this argument as hypothesis of the 'primeval atom' or the 'cosmic Egg'. Stars and planets were formed, including Earth.

BOX 3: The sanctity of life

Most people believe to have **life is special** but religious people believe this because it is God's gift. This belief has an impact on issues of **bioethics** such as **abortion** and **euthanasia**.

Christians believe God is involved in His creation and has made everyone unique. He made humankind in His own image which means all life is sacred. Only G-d should take life away. Quakers oppose the death penalty and war. God chooses when life begins. Catholics disagree with IVF and contraception.

Humanists argue there is no soul or afterlife as this is the only life we get. Therefore life is special and its purpose is to make us and others happy.

The quality of life

Some argue this is more important than the sanctity of life. If we are free from pain and can live in freedom and dignity then we have a good quality of life. If pain outweighs pleasure, then we are have a poor quality of life. Measuring our quality of life is difficult as we all experience different tolerance to pain and pleasure. Government look at living conditions, health, education, the economy and human rights to determine the quality of life. This belief impacts medical ethics where some argue if the quality of life has deteriorated then someone should be allowed to die (**euthanasia**).

BOX 4: Abortion

Life begins at different points for people. Some argue it is at **conception** (when the sperm meets the egg). Other when the baby can be felt in the womb. Others it's when the nervous system and organs develop. At **24 weeks** the baby has viability and can survive if born. This is the **UK legal limit** for an abortion where 2 doctors must agree. For some it is at birth. **Pro-life** people believe abortion is always wrong as the foetus has a right to life. UK law however does not recognize an unborn child as a person**.** **Pro-choice** people believe a women should have a right to choose what happens to her body.

Catholics do not allow abortions due to the sanctity of life. Life begins at conception. It is murder and against the 10 Commandments.

Church of England opposes abortion for social reasons but not if the mother's life is in danger, or it affects the quality of her life (e.g rape).

Humanists look for the least amount of harm to be brought to all concerned. There is not one view, but many are liberal and pro-choice.

BOX 5: Euthanasia

The four types of euthanasia:
Voluntary (asks to die)
Active (tries to end their life)
Passive (treatment is removed)
Involuntary (forced death)
Usually the poor **quality of life** and suffer from incurable degenerative diseases is the reason someone may want to end their life. Euthanasia is **illegal in the UK** but legal in countries like Switzerland where the ***Dignitas*** clinic exists.

Christians mostly disagree stating the **sanctity of life** argument or see it as murder/ going against the 10 Commandments and also believe there is purpose in suffering. Many Christians see **Hospices** as an alternative. **Liberal Christians** might agree to life support being turned off or withholding treatment as it is the most loving thing (**situation ethics**).

Humanists support legalising **voluntary euthanasia** and not just for the terminally ill. People should be able to die with dignity and when faced with a poor **quality of life**.

BOX 7: Heaven and Hell

For **Christians**, heaven is to be in God's presence. **Evangelicals** argue it is a real place. **Liberal Christians** say heaven is symbolic. Heaven is believe to be a reminder there are consequences to actions and thoughts.

For **Christians** hell is to be in constant torment cut off from all things good and loving. **Evangelicals** argue it is a real place. **Liberal Christians** say hell is symbolic. A reminder there are consequences to actions and thoughts.

The **Roman Catholic Church** teaches that after death there is a state of **Purgatory**. This is a place where some people who have sinned are purified in a 'cleansing fire', after which they are accepted into Heaven.

Humanists say there is no heaven or hell, the dead live on through the memories of the living.

BOX 6: Life after Death

Christians believe in resurrection and everlasting life. Jesus modelled what would happen to our mortal bodies by rising from the dead. On **Judgement Day** God will decide who enters paradise and who doesn't. **Dualists** believe the body will decay upon death and the soul, which is immortal, will be reunited with God in heaven. **Evangelicals** argue we will have a bodily resurrection like Jesus. St Paul says it will be a spiritual body.

The Parable of the Sheep and Goats reveals that Jesus will separate those who followed Him (sheep) from those who rejected Him (goats).

Humanists say we can reflect on our own lives. There is nothing after death. We should live morally for ourselves and others, not God.

BOX 8: Sources of Authority

"I am the resurrection and the life; he who believes in me will live, even if he dies". -John 11:25

"I believe in the resurrection of the body and the life everlasting."
Apostles' Creed

"Before I formed you in the womb I knew you" - Jeremiah 1: 5

"Don't you know that your body is the temple of the Holy Spirit"-
1 Corinthians 6:19

"You shall not kill" 10 Commandments - Exodus 20:13

"I revere the sanctity of life – but not at any cost" - Archbishop Desmond Tutu

"Why keep anyone alive when all the dignity, beauty and meaning of life had vanished… and when we should have been punished by the state if we had kept alive an animal in similar conditions" Dr. Leslie Weatherhead
leader of the Methodist Church

" We need to provide better care for the dying rather than kill them off 'early." Methodist Conference 1974

Year 1 STATISTICS T1 – Measures of Central Tendency & Dispersion

Important Ideas
You can compare distributions by looking at measures of central tendency and dispersion.
Measures of central tendency identify the centre of a set of values – this gives us an average value that represents the data. Common measures of central tendency include the mean, median, and mode
Measures of dispersion look at the spread of data from the mean – this tells us how consistent (or otherwise) the data is.

Key Facts & Formula	
Weighted mean	$\bar{x} = \frac{\sum wx}{\sum w}$
Geometric mean	$\sqrt[n]{value_1 \times value_2 \times \ldots \times value_n}$
Standard deviation (1)	$\sqrt{\frac{1}{n}\sum (x - \bar{x})^2}$
Standard deviation (2)	$\sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$

Question	Answer
Range and IQR	
A scientist counted the number of spots on 16 leaves of a rose bush. 3 8 0 7 4 0 8 3 2 4 3 1 1 0 2 5 (a) Work out the range. (b) Work out the interquartile range. (c) Give one advantage and one disadvantage in using the range as a measure of spread.	a) 8 b) 3.75 c) Advantage is it is easy to calculate. Disadvantage is it is affected by outliers
Standard deviation	
The number of visits, x, to a dentist was recorded over 10 days. $\sum x = 200, \sum x^2 = 4800$ Work out the mean and the standard deviation.	Mean number of visits per day = 20 Standard deviation = 8.9
Mean	
1. The geometric mean of two numbers is 2.5 One number is increased by 12%, the other decreased by 15%. Calculate the new geometric mean to 3 decimal places. 2. An exam has three papers: A, B and C. Paper A is worth 60 marks, paper B is worth 60 marks and paper C is worth 80 marks. The percentage marks on the papers are equally weighted. Ahmed got 45 on Paper A, 26 on paper B and 60 on Paper C. What is his mean percentage?	1. 2.439 2. 70%

Vocabulary	
Weighted mean	The weighted mean is used to cpmpare different sets of data when one is more important than the other.
Geometric mean	The geometric mean can be used to find the mean of a set of data values that aren't immediately comparable (e.g. a set of scores out of 10 and a set of scores out of 50)
Range	The range tells us how far the data spreads. Is it the difference between the highest and lowest values.
Interquartile range (IQR)	The interquartile range is there difference between the upper quartile and the lower quartile.
Percentile	Percentiles divide the data into one hundred equal groups.
Interpercentile range	The interpercentile range is the difference between the percentiles. E.g. the 20^{th} to 80^{th} percentile range is $P_{80} - P_{20}$.
Interdecile range	The interdecile range gives the range of the middle 80% o the data.
Standard deviation	Standard deviation measures spread from the mean.
Outlier	Outliers are points that don't fit the general pattern.

OCR Sport Studies – Unit 51 – Learning Objective 4 – Governing bodies in sport.

Box 1: National Governing bodies examples -

Box 1: What national governing bodies in sport do?

Promotion, Development, Infrastructure, Policies and initiatives, funding, support.

Box 2: **Promotion**
- Promoting participation for example by equal opportunities policy,
- Increasing popularity of the sport for schemes in schools,
- Increasing exposure in the media for example press releases and public relations.

Box 2: **Development**
- Elite training and development for example national performance squads and national teams in many sports across all age groups,
- Coaching awards for example England Netball UK coaching awards from level 1 upwards.
- Training officials for example RFU young officials award.

Box 3: **Infrastructure**
- Competitions and tournaments for example England basketball organize competitions for all age groups,
- Rule making and disciplinary procedures,
- Providing a national directive and vision,
- Providing guidelines, support and infrastructure to members,
- Assist with facility development.

Box 4: **Policies and initiatives**
- Anti doping policy,
- Promoting etiquette and fair play,
- Community programs,
- Information and guidance on safeguarding.

Box 5: **Funding**
- Lobby for and receive funding,
- Distribution of funding,
- Advice for members on funding.

Box 6: **Support**
- Providing technical advice for example information about playing surfaces.
- Providing location and contact details for local clubs and how to start out in the sport.

Box 7:
- NGBs of sport have a range of different responsibilities and are involved in a whole host of different aspects of their sports.
- Each sport has a governing body organisation who will promote participation for all as well as identify and nurture young sporting talent. *i.e. The Football Association/UK Athletics/British Cycling.*
- The government recognise the importance of UK sporting success and in recent years have increased the amount of funding received to grow sports organisations and athlete excellence.
- England athletics are the National Governing Body for the Olympics and state that: ***London 2012 was the most successful games for Team GB (65) and Rio 2016 was the best away games in terms of medal count (67).***

Box 8:

England Netball is responsible for the management of the England national netball team, nicknamed The Vitality Roses. It also oversees a number of programs running from junior to development level such as *High Five Netball*, *Walking Netball* and the Roses National Academy for aspiring athletes under the age of 20. As of June 2017, England Netball has 103,335 affiliated members and more than 180,000 women and girls play the sport every week and this is growing as a result of a successful National Governing Body.

The Football Association (**FA**) is the governing body of association football in England, the Crown dependencies of Jersey, Guernsey, and the Isle of Man. Formed in 1863, it is the oldest football association in the world and is responsible for overseeing all aspects of the amateur and professional game in its territory. **The FA sanctions all competitive football matches within its remit at national level, and indirectly at local level through the County Football Associations. It runs numerous competitions, the most famous of which is the FA Cup. It is also responsible for appointing the management of the men's, women's, and youth national football teams.**

The **England national rugby union team** competes in the annual Six Nations with France, Ireland, Scotland, Italy, and Wales. They have won this championship on a total of 28 occasions (with the addition of 10 shared victories), 13 times winning the Grand Slam and 25 times winning the Triple Crown, making them the most successful outright winners in the tournament's history. They are ranked fourth in the world by the International Rugby Board as of 18 March 2019. England are to date the only team from the northern hemisphere to win the Rugby World Cup, when they won the tournament back in 2003. They were also runners-up in 1991 and 2007.

Questions:
1. From the images above state 4 National Governing Bodies for sport in the UK.
2. Describe the roles of a National Governing Body.
3. Explain how NGB's receive funds and how these are spent.
4. How might NGB's develop talented athlete in a particular sport?
5. Identify 2 sources of funding available to a national governing body to help fund new sports facilities.
6. Suggest 2 ways a NGB may promote their sport to an ethnic minority group.

Y10 GCSE PE - Respiratory system

What is spirometer trace?

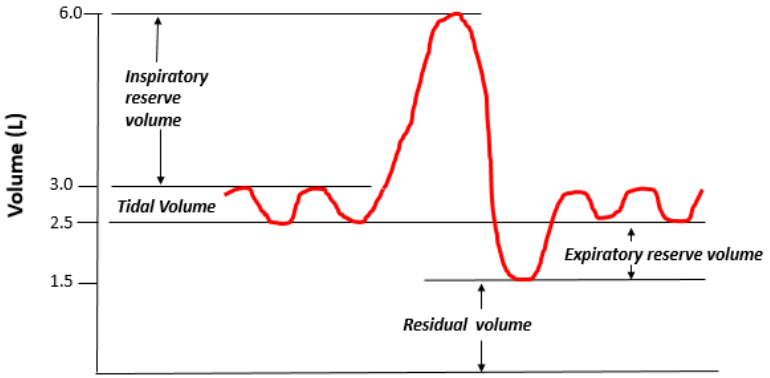
TIDAL VOLUME – The amount of air that enters the lungs during normal inspiration at rest. The average tidal volume is 500ml. The same amount leaves the lungs during expiration.

Inspiratory Reserve Volume – the amount of extra air inspired (above tidal volume) during a deep breath in. This can go as high as 3000ml.

Expiratory Reserve Volume – The amount of extra sir expired (above tidal volume) during a forceful breath out.

Residual Volume – The amount of air left in the lungs following a maximal expiration. There is always some air remaining in the lungs.

A graph to show typical spirometer trace



A Cool Down

- Should include 5-10 minutes of jogging/walking to bring down the **body's** temperature, heart rate and breathing rate and to remove waste products such as lactic acid from the working muscles.
- By bringing these things down gradually it also prevents pooling of blood which can cause dizziness.
- This should then be followed by 5-10 minutes of static stretching to relax muscles and to avoid DOMS (delayed onset of muscle soreness).

Ice Baths

- Strenuous exercise can sometimes cause tiny tears in muscle fibres. Even though they eventually grow back stronger, DOMS can kick in 24-72 hours after exercise.
- Icebaths restrict blood vessels and flush waste products out of the effected tissues and can also reduce swelling.
- Once performer is out of the ice bath, muscles start warming up, increasing blood flow (vasodilation) through to the muscles which is thought to speed up the healing process.

Diet/Rehydration

- It is important to replace the fluid lost through sweat when exercising during vigorous exercise and afterwards.
- However, it is also important to replace the lost minerals by having electrolytes afterwards (Lucozade, poweraid, rehydration sachets etc).
- Glucose is used for energy to make muscles contract and this needs to be replaced after exercise. Carbohydrates are the best source of glucose and therefore is a good idea to consume carbs after strenuous exercise.
- You can get fluids that are purposely made for post exercise drinks, flavoured milks or meal replacement protein shakes that manipulate the diet to include what body needs post strenuous exercise. Be careful that you have worked hard enough to need a meal replacement – as it is easy to store extra fat if **you have not burned the amount of energy that you are replacing with.**

Massage

- The rubbing and kneading of muscles can help reduce the pain caused by strenuous exercise.
- It can prevent or relieve from DOMS by encouraging blood flow throughout the body which prevents muscle soreness.
- It can reduce the swelling of muscles that are stiff helping them recover quicker.

GCSE History- Elizabethan England Queen, Government and Religion 1558-69

Context	
1	There was much religious change under the Tudors and Elizabeth had to find a way of dealing with these issues. Many people objected to Elizabeth's coronation in 1558 and she faced questions over her legitimacy, with many preferring Mary Queen of Scots, and whether a woman could rule effectively.

Key events	
2	**1532** Start of the English Reformation.
3	1556-58 Dutch Revolt against Spanish.
4	**1558** Elizabeth's accession.
5	**1559** Mary Queen of Scots became queen of France.
6	**1559** Treaty of Cateau-Cambresis – England had to return Calais to France.
7	**1559** Religious Settlement and visitations commenced.
8	**1556** Pope issued an instruction that English Catholics should not attend Church of England services.
9	Elizabeth helped Scotland Protestant lords defeat Mary of Guise. Treaty of Edinburgh.
10	**1562** Religious war in France.
11	**1563** Philip II banned import of English loth into Netherlands.
12	**1567** Elizabeth allows Dutch Sea Beggars to shelter in English harbours.
13	**1568** Genoese Loan
14	**1568** Mary Queen of Scots fled to Scotland and the arrives in England.
15	**1569** Revolt of the Northern Earls,

Key Concepts	
16	**Society and Government** was very structured and hierarchical. The monarch had much power.
17	**Elizabeth's accession** caused controversy as her gender, legitimacy religion were questioned.
18	**Religion – Elizabeth imposed her Religious Settlement but this upset many English and foreign Catholics and some wanted Mary Queen of Scots to replace Elizabeth.**
19	**Financial problems** – When Elizabeth took the throne the Crown was £300,000 in debt.
20	**Foreign powers** opposed to Protestantism remained an issue for Elizabeth, especially Scotland, France and Spain.

Key Words		
20	**Nobility**	Belonging to the aristocracy.
21	**Gentry**	People of a high social class.
22	**Yeomen**	Men who held a small amount of land or an estate.
23	**Tenant farmers**	Farmed rented land usually owned by yeomen or gentry.
24	**Merchants**	Traders.
25	**Professionals**	Lawyers and doctors.
26	**Craftsmen**	Skilled employees.
27	**Extraordinary taxation**	Occasional, additional taxation to pay for unexpected expenses, especially war.
28	**Militia**	A military force of ordinary people, rather than soldiers, raised in an emergency.
29	**Privy council**	Advisors to Elizabeth.
30	**Justices of the Peace**	Large landowners who kept law and order.
31	**Patronage**	To provide someone with an important job or position.
32	**Secretary of State**	Elizabeth's most important Privy Counsellor.
33	**Crown**	Refers to the monarch and their government.
34	**Divine Right**	Belief that the monarchs right to rule came from God.
35	**Royal Prerogative**	Elizabeth could insist that Parliament did not talk about certain issues.
36	**Succession**	The issue of who was going to succeed the throne after the existing monarch died.
37	**Legitimate**	Being born in wedlock when the existing king and queen were married.
38	**Customs duties**	Taxes from trade.
39	**Auld Alliance**	A Friendship between France and Scotland.
40	**Puritans**	Radical Protestants.

41	**Ecclesiastical**	An adjective used to describe things to do with the Church.
42	**Act of Supremacy**	Made Elizabeth supreme governor of the Church of England.
43	**Act of Uniformity**	Established the appearance of churches and the form of services they held.
44	**Royal Injunctions**	A set of instructions to reinforce the acts of Supremacy and Uniformity.
45	**Recusants**	Catholics who were unwilling to attend church services laid down by the Elizabethan religious settlement.
46	**Visitations**	Inspections of churches and clergy by bishops to ensure that the Act of Supremacy was being followed.
47	**Papacy**	The system of church government ruled by the Pope.
48	**Heretics**	People who refused to follow the religion of the monarch.
49	**Martyr**	Someone who dies for their religious beliefs.
50	**Counter Reformation**	The campaign against Protestantism.
51	**Philip II**	Catholic King of Spain.
52	**Trade embargo**	When governments ban trade with another country.
53	**Excommunicated**	Expulsion from the Catholic Church.
54	**Sea Beggars**	Dutch rebels who fled to the water.
55	**Genoese Loan**	When Elizabeth took gold loaned to Philip II by the bankers of Genoa.

Early Challenges	
56	**Legitimacy-** Her father Henry VIII divorced his first wife without permission of the Pope. This meant his marriage to Elizabeth's mother Anne Boleyn was invalid. This meant Elizabeth was illegitimate.
57	**Marriage-** Elizabeth was expected to marry quickly because they thought women were not strong enough to rule alone, she would need a husband to help control the nobles and she needed to produce an heir to provide stability after she died.
58	**Invasion-** Danger of invasion from powerful foreign countries… •*France*–England was already at war with Catholic France. France had close ties with Mary, Queen of Scots. •*Scotland,* •*Spain* –Wealthy & powerful, strongly Catholic.

Subject:- Geography

Challenges of a urbanising world

Year 10

No.	Key Term	Definition
1	**Urban**	Town or city
2	**Urbanisation**	The growth of towns and cities
3	**Megacity**	A city with a population of 10 million people or more.
4	**World City**	A city with global influence.
5	**Urban Primacy**	The importance and influence is bigger than the size would suggest.
6	**Formal Sector**	The government knows you are working, have contracts and pay taxes.
7	**Informal Sector**	The government doesn't know a person is working. No contracts and they pay no tax.
8	**Conurbation**	Merging of towns and cities into one large city.
9	**Net Growth**	Means the number of people left after subtracting those leaving from those arriving
10	**Deindustrialisation**	Closure of industries.
11	**Knowledge economy**	People supplying their expertise.
12	**Rural-urban migration**	People moving from the countryside to towns and cities.
13	**Regeneration**	The redeveloping of former industrial areas or housing to improve them.
14	**Brownfield sites**	Sites that are former industrial areas that have been developed before.

No.	Mumbai	
15	Slum/squatter setttlment	An illegal settlement.
16	Peninsula	Land surrounded by water on three sides.
17	Chawls	Low income multi-story buildings.
18	Site	Physical location of a place
19	Situation	The situation of a settlement is its location in relation to surrounding human and physical features

No.	Mumbai key facts	
20	Site	In Maharastra, central west India
21	Situated	Has India's biggest port – advantage is it is deep and sheltered with easy access to Africa, Middle East and Europe via the Suez canal.
22	CBD	Located on the western tip at the old harbour.
23	Population	Estimate 16 million
24	Squatter settlements	60% of population live in slums – most on the outskirts of the city.
25	Est.growth.	20 million by 2020.Largest city in the world by 2050.
26	Migration rate	1000 people a day- mostly from rural-urban migration.
27	Natural increase	1.4% a year- most migrants are in their 20s and 30s and will start families in Mumbai.
28	Dharavi	Name of large inner city squatter settlements
29	No. of people per house in Dharavi	13-17
30	People per toilet in Dharavi	625
31	Number of railways deaths	10 a day- mostly from those living next to the railway and crossing without looking.

Themes	Definition	YEAR 10 ENGLISH JEKYLL AND HYDE	Key Characters	
Gothic	1) London is opaque, funereal, tenebrous and ominous 2) London is shrouded, dark, mysterious, baleful 3) Hyde and London link to the Uncanny: frightening yet familiar 4) Fin de Siècle (end of 19th Century): the fear of change and transition 5) Gothic Stories are full of constraint, entrapment and coercion (Victorian Social Mores) 6) Gothic stories deal with doubt: religion becomes less important, an interest in the supernatural replaces this. 7) Gothic stories often take place in exotic and strange locations: Stevenson subverts this convention, making the familiar (London) unfamiliar and the known unknown. 8) Gothic stories often involve transgressors attacking vulnerable women: Stevenson subverts this convention-Hyde attacks the vulnerable as well as threatening society.		Utterson	1) The archetypal Victorian Gentleman: serious, solemn, paranoid 2) Occasionally loses inhibitions:'when the wine was to his taste, something eminently human beaconed' 3) Avoids frivolity: 'though he enjoyed the theatre, had not crossed the doors of one for twenty years' 4) Avoids frivolity: 'austere' 5) Never judges or gossips: "I incline to Cain's heresy," he used to say quaintly: "I let my brother go to the devil in his own way." 6) Paranoid: 'humbled to the dust by the many ill things he had done' 7) Paranoid: 'Brooded a while on his past' 8) Serious and solemn: 'never lighted by a smile'
Science and Enlightenment	9) Science, rationality and reason replaced tradition, magic and religion 10) from late 17th Century until early 19th century 11) Democracy, individuality and equality under the law were important ideas 12) Victorians feared science: Was it magic? Had it replaced God? 13) Darwin and Evolution: shocking idea for Victorians, removed primacy of humans and God. Hyde mirrors this fear: 'ape-like fury' and 'the animal within me' and 'troglodytic' 14) Science contained a duality: optimism and progress vs terror, lack of control and hubris		Jekyll	9) Creates Hyde as a 'a solution of the bonds of obligation' 10) Wanted to be 'like a schoolboy, strip off these lendings and spring headlong into the sea of liberty' 11) Interested in transcendental medicine 12) Takes potion to become Hyde: he loses control of this ability 13) Calls Lanyon 'hidebound'
Duality	15) Jekyll: are commingled out of good and evil 16) Jekyll: 'man is not truly one, but truly two' 17) Jekyll: 'If I am the chief of sinners, I am the chief of sufferers also' 18) Jekyll Contradicts himself: 'this extraneous evil." and 'like a thick cloak' 19) Jekyll: 'this brief condescension to evil finally destroyed the balance of my soul' 20) Multiple dualities in the novella: duty vs temptation/empiricism vs transcendental/evolution vs degradation/civilised vs atavistic (snarled aloud into a savage laugh')/affluence vs poverty (areas of London)/ individual vs society ('fronted about with an air of defiance')		Lanyon	14) Empirical, rational man of the enlightenment 15) Calls Jekyll's approach 'unscientific balderdash' and 'scientific heresies' 16) After seeing the transformation: 'The rosy man had grown pale; his flesh had fallen away; he was visibly balder and older' 17) After seeing transformation: "deep-seated terror of the mind and 'a doomed man'
Secrecy and Reputation	21) Victorian social mores were repressive and restrictive 22) Upper Class conformed to strict standards of propriety and decorum 23) Victorian Gentleman were inhibited, paranoid and secretive 24) Blackmailer's Charter, the law making homosexual acts illegal, passed in 1885 (same year as the novella was published. 25) Upper Class men lived in fear of blackmail and 'scandal'. Victorian readers may have suspected that Jekyll and Hyde were involved in an illicit homosexual relationship. 26) When Jekyll is Hyde, he commits 'secret pleasures' and is a 'secret sinner'		Enfield	18) Secretive, avoids gossip, obsessed with reputation 19) On gossip: 'The more it looks like Queer Street, the less I ask' 20) On gossip: 'you start a question, and it's like starting a stone' 21) His contrived walks with Utterson: 'looked singularly dull' BUT 'the chief jewel of every week'
Basic Plot and Chapter Summary	CH1: Intro to Utterson(U). Enfield (E) tells of Hyde (H) trampling on a child. U thinks H is blackmailing Jekyll (J) CH2: U sees J's will-J leaves all to H. U speaks to Lanyon (L). L disagrees with H about science CH3: U argues with J about J's will. J asks U to look after H if J disappears. CH4: H batters Sir Danvers Carew. U goes to H's house in Soho-rooms are ransacked CH5: J shows U a letter he says is from H. U compares handwriting: H and J's are same. CH6: L has had a terrible shock. L dies, leaving U a letter-only open it if J disappears. CH7: U passes J's house, sees J have a seizure CH8: U and J's butler find a small man who has poisoned himself (H). CH9: L letter explains he saw H transform into J CH10: J's letter explains why he made Hyde		Hyde	22) Feral, brutal, atavistic, savage, animalistic, diminutive, sadistic. 23) 'There is something wrong with his appearance; something displeasing, something downright detestable' 24) Violent Acts against the vulnerable: tramples on a child, murders Sir Danvers Carew 25) Symbolises Upper Class Victorian fears of the lower classes, poverty and criminality 26) 'he gives a strong feeling of deformity, although I couldn't specify the point." 27) 'his remarkable combination of great muscular activity and great apparent debility of constitution.' 28) 'so ugly that it brought out the sweat on me like running.' 29) 'detestable attributes' and' a fiend