BENTON PARK

CREATING A CLIMATE FOR GREAT LEARNING, SUCCESS AND OPPORTUNITY

Name: _____

Home Learning Number: _____

Benton Park School
Year 10 Knowledge Organiser
Semester 2
2023-2024
Maths/English/Science

Our Vision and Values

Creating a climate for great learning, success and opportunity








Endeavour Resilience Inspiration Collaboration Compassion

All Benton Park students follow three simple expectations:

- Work hard
- Be kind and respectful
- Follow staff instructions first time

To drive students' success, we actively encourage all learners to adopt the Benton Park Values

Student Support Sheet

Organisation and Planning Sheets

Use the organisation and planning sheets to record your home learning each day.

It is your responsibility to solve any issues you may have with your home learning before the due date.

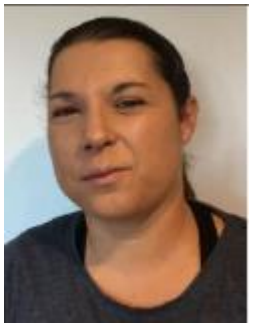
Always have your learning number and full name on your work.

Year 7 Homework Timetable

Day	Homework Due
Monday	English
Tuesday	Humanities
Wednesday	Science
Thursday	Languages
Friday	Maths (Sparx)

Where can I go if I need to do my work or get help?

My Key Stage Leader: Miss Dobby



My Year Leader: Miss Downing

Any of my Subject teachers or Subject Directors or Leaders

In the Library you can:

- Access books and resources
- Use the internet to complete any online home learning
- See staff who can give you any advice and guidance you may need
- Study independently in a quiet place

Emails and Passwords

School Email: _____

Password: _____

Other Usernames and Passwords:

Who else can I get support from?

Year Leaders

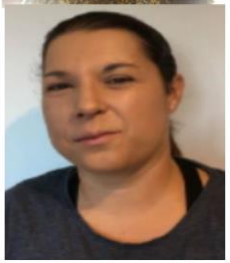
Mrs O'Donoghue
Year 7

Miss Ratcliffe
Year 8

Mr Nicholls
Year 9

Key Stage Leaders

Mrs Collins
Key Stage 3



Miss Dobby
Key Stage 4

Safeguarding

Mrs Howard
Designated Safeguarding Lead (DSL)

Mrs Bentley
Deputy Designated Safeguarding Lead (DDSL)

Other support

Miss Tizard
SENDCo

SLT Links

Year 7 – Mr Coltman
Year 8 – Miss Tyldsley
Year 9 – Miss Smith
Year 10 – Mr Bownass
Year 11 – Mr Marsh
KS3 – Miss Taylor
KS4 – Mr Hackshaw

You can also speak to all of your subject teachers, your PD teacher and all of your pastoral staff:
Miss Howe, Miss Leonard, Miss Downing, Mrs Owen, Miss Moss, Miss Webster, Miss Charlton

Creating a climate for great learning, success and opportunity

Creating a climate for great learning, success and opportunity

Sparx Log In

Home-School Communication Log

Date	Note

Home-School Communication Log

Date	Note

Creating a climate for great learning, success and opportunity

Organisation and Planning Sheet

Date set	Task	Date due	Tick when complete

Date set	Task	Date due	Tick when complete

Creating a climate for great learning, success and opportunity

Organisation and Planning Sheet

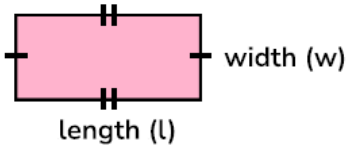
Date set	Task	Date due	Tick when complete

Date set	Task	Date due	Tick when complete

Area

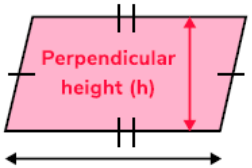
Rectangle

Area = length x width

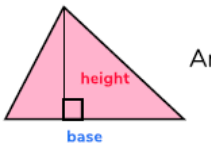


Parallelogram

Area = base x perpendicular height

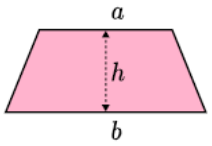


Triangle



Area = $\frac{1}{2}$ x base x height

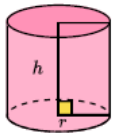
Trapezium



Area = $\frac{1}{2}(a+b)h$

Surface Area

Cylinder



r = radius, h = height

Surface area = $2\pi rh + 2\pi r^2$

Pie Charts

The angle to draw for each sector is

$$\text{Angle} = \frac{\text{Frequency}}{\text{Total}} \times 360°$$

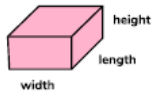
Probability

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Volume

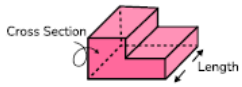
Cuboid

Volume = length x width x height

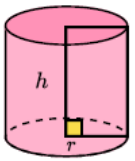


Prism

Volume = area of cross section x length



Cylinder



r = radius, h = height

Volume = $\pi r^2 h$

Direct and Inverse Proportion

If x is directly proportional to y^n then

$x \propto y^n$ so $x = ky^n$

If x is inversely proportional to y^n then

$x \propto \frac{1}{y^n}$ so $x = \frac{k}{y^n}$

Straight Lines

Gradient

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

Equation of a Line

$$y = mx + c$$

m = Gradient, c = y intercept

Midpoint 2 points (x_1, y_1) and (x_2, y_2)

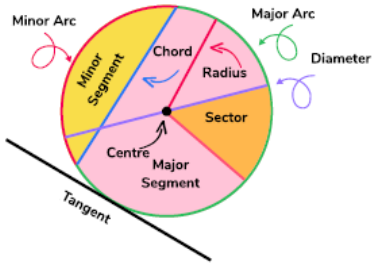
$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Circles

r = radius, d = diameter

Area = πr^2

Circumference = πd or $2\pi r$



Percentage Change

$$\text{Percentage change} = \left(\frac{\text{Difference}}{\text{Original}}\right) \times 100$$

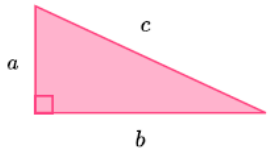
Pythagoras

Note: Right angled triangles only

$a^2 + b^2 = c^2$

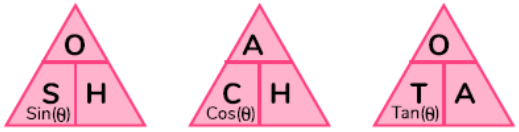
c is the **hypotenuse**
(The longest side)

a and b are the shorter sides.



Trigonometry

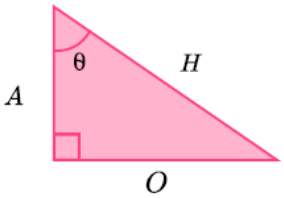
Note: Right angled triangles only



$\text{Sin}\,\theta = \frac{\text{Opposite}}{\text{Hypotenuse}}$

$\text{Cos}\,\theta = \frac{\text{Adjacent}}{\text{Hypotenuse}}$

$\text{Tan}\,\theta = \frac{\text{Opposite}}{\text{Adjacent}}$



Compound Growth & Decay

The amount after n years (or days, etc), where percentage rate of change is r is

$$\text{Starting Amount} \times (1 \pm \frac{r}{100})^n$$

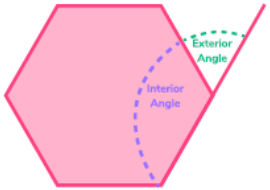
Angles in a Polygon

$\text{Exterior angle} = \frac{360}{n}$

n = number of sides

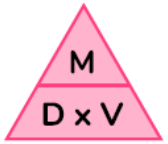
Interior angle + Exterior angle = 180°

Sum of interior angles = $(n-2) \times 180$

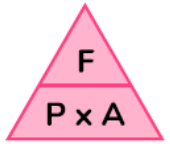


Compound Measures

Distance = Speed x Time
Speed = Distance ÷ Time
Time = Distance ÷ Speed



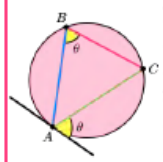
Mass = Density x Volume
Density = Mass ÷ Volume
Volume = Mass ÷ Density



Force = Pressure x Area
Pressure = Force ÷ Area
Area = Force ÷ Area

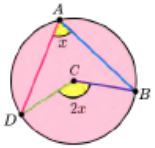
Circle Theorems

Alternate segment theorem



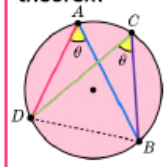
The angle that lies between a tangent and a chord is equal to the angle subtended by the same chord in the alternate segment.

Angle at the centre theorem



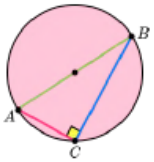
The angle at the centre is twice the angle at the circumference.

Angles in the same segment theorem



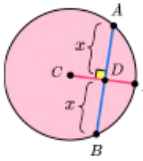
Angles in the same segment are equal.

Angles in a semicircle



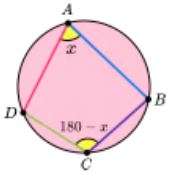
The angle in a semicircle is 90 degrees.

Chord of a circle



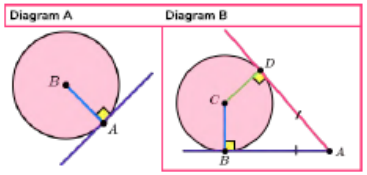
The perpendicular from the centre of a circle to a chord bisects the chord (splits the chord into two equal parts).

Cyclic quadrilateral



The opposite angles in a cyclic quadrilateral total 180 .

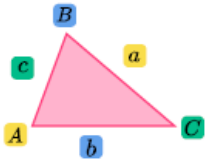
Angle at the centre theorem



A. The angle between a tangent and radius is 90 degrees.

B. Tangents which meet at the same point are equal in length.

Further Trigonometry



Area of a triangle

$$\text{Area} = \frac{1}{2}abSin(C)$$

Sine Rule

To find a side:

$$\frac{a}{Sin\,A} = \frac{b}{Sin\,B} = \frac{c}{Sin\,C}$$

To find an angle:

$$\frac{Sin\,A}{a} = \frac{Sin\,B}{b} = \frac{Sin\,C}{c}$$

Cosine Rule

To find a side:

$$a^2 = b^2 + c^2 - 2bcCos(A)$$

To find an angle:

$$CosA = \frac{b^2 + c^2 - a^2}{2bc}$$

Straight Lines

Gradient

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

Equation of a line

$$y = mx + c$$

m = Gradient, c = y intercept

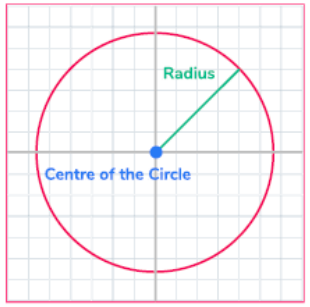
Midpoint of 2 points (x_1, y_1) and (x_2, y_2)

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Gradient of perpendicular to line $y = mx + c$

$$-\frac{1}{m}$$

Equation of a Circle



$$x^2 + y^2 = r^2$$

r = radius

Centre = (0,0)

Percentage Change

$$\text{Percentage change} = \left(\frac{\text{Difference}}{\text{Original}}\right) \times 100$$

Compound Growth & Decay

The amount after n years (or days, etc), where percentage rate of change is r is

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

Quadratics

Quadratic equation

$$ax^2 + bx + c$$

Quadratic Formula

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

Completing the square

$$(x + p)^2 + q$$

$$x^2 \pm bx \pm c = (x \pm \frac{b}{2})^2 - (\frac{b}{2})^2 \pm c$$

Direct and Inverse Proportion

If x is directly proportional to y^n then

$$x \propto y^n \quad \text{so} \quad x = ky^n$$

If x is inversely proportional to y^n then

$$x \propto \frac{1}{y^n} \quad \text{so} \quad x = \frac{k}{y^n}$$

Probability

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A \text{ given } B)P(B)$$

Pie Charts

The angle to draw for each sector is

$$\text{Angle} = \frac{\text{Frequency}}{\text{Total}} \times 360°$$

Histogram

$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Class width}}$$

Stratified Sample

$$\text{Account in sample} = \frac{\text{Group number}}{\text{Total}} \times \text{Sample size}$$

Kinematics

s = displacement
u = initial velocity
v = final velocity
a = acceleration
t = time

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$s = \frac{1}{2}(u + v)t$$

$$v^2 = u^2 + 2as$$

$$s = vt - \frac{1}{2}at^2$$

Subject: English Topic: Power and Conflict Poetry

Semester 2 W1

Word Revolution		
	Ostracised	**shut out, disliked, rejected, shunned, ignored, subbed**
	Patriotic	**Having or expression devotion and support for your country**

1: Context
Kamikaze was written by Beatrice Garland.
It explores the pressures placed on kamikaze pilots during WW2.
Kamikaze missions were suicide missions used by the Japanese military during WW2.
Beatrice Garland has said: "I spend a lot of the day listening to other people's worlds“. She did not personally experience WW2 and has no link to Japan.

2: The Poem
The poem is told from the perspective of a daughter whose father has embarked on a kamikaze mission but brought shame on the family by returning home.
Quotation: ‘And though he came back my mother never spoke again in his presence, nor did she meet his eyes’
As he flies on his mission the beauty of the “green-blue translucent” water and the “silver” shoals of fish trigger the pilot’s memories of his childhood.

3:Themes
The poem explores the conflict between personal and national duty, looking at the divide between individual desire and extreme patriotism.
Japanese kamikaze pilots during World War II were typically young men who hoped to bring honour to their families by sacrificing themselves on their country's behalf.
The pilot's head is described as "full of powerful incantations." Incantations are like spells or affirmations, the kind of thoughts that the pilot has to keep telling himself to help him actually go through with the kamikaze mission, which goes against his natural survival instinct

Questions
1. What does the word kamikaze mean?
2. How do we know the soldier's family feel ashamed?
3. How did the mother respond to the father’s return?
4. In what ways is the solder ostracised?
5. How is the sea described? Why is it important?

Subject: English Topic: Power and Conflict Poetry

Semester 2 W2

Word Revolution	
Contemporary	**Modern, happening in the present**
Perspective	**An attitude or viewpoint**

1: Context
Poppies was written by Jane Weir.
Poppies grew in battlefields and became a symbol of remembrance
She calls 'Poppies' a contemporary war poem about war and its influence on various people.
Poppies was written to portray a mother's perspective on conflict.

2: The Poem
'Poppies' begins "three days before Armistice Sunday," which comes every November 11th and is a day to remember those who died in war.
The mother struggles to let her child go to this dangerous environment, while the boy is 'intoxicated' by the future.
This use of sewing metaphors is repeated with her words 'turning into felt'.
She wishes he was a child she could keep safe as she reminisces about touching noses like 'Eskimos' and his 'playground voice'.

3:Themes
"Poppies" addresses the anxieties and grief that parents face as they send their children to fight in war.
Poppies is set in the modern day, but it makes references to conflicts as far back as World War One and reflects on how mothers, sisters, wives and girlfriends coped with losing their loved ones.
The main themes running throughout the poem are grief, war, loss, memory, childhood, innocence and adulthood.
The mother is anxious, and already preparing herself for grief by going to visit the war memorial to see the names of the boys who never came home, and whose families grieved before her.

Questions
1. What does the poppy symbolise?
2. What time of year is the poem set in and why is this relevant?
3. What perspective does Jane Weir explore?
4. Why does the character wish her son was still a child?
5. What does the character feel anxious about?

Subject: English Topic: Power and Conflict Poetry

Semester 2 W3

Word Revolution		
	Corruption	**Dishonest behaviour by those in power**
	Oppressive	**Cruel or unfair behaviour by those in power**

1: Context
William Blake wrote London in the 1700s.
Romantic poets explored the relationship between nature, humanity, and emotion.
He is writing just after the French Revolution when ordinary people rose up against an oppressive state.
The poem is written to reflect a “tour” of the city as Blake saw it.

2: The Poem
Blake’s language throughout London is bleak and negative, reflecting his attitude to the city.
The poem is attacking the nation’s capital and exposing its corruption and poverty.
The repetition of ‘charter’d’ shows how he feels about the laws which have been imposed on London (to give something a charter is to impose legal restrictions and ownership upon it).
The repetition of ‘every’ in the second and third stanza shows how widespread the city’s corruption has become.

3:Themes
He is considering the lives of ordinary people in London ‘mind-forg’d manacles’ is a vivid metaphor for hopelessness.
It explores the theme of power and criticises the Royal Family, the Government and the Church.
It explores the theme of identity and what it was like to live in London in the 1700s.
It's clear from the first lines of the poem that Blake has a widely negative view of what it's like to live and work in London.

Questions
1. How does Blake describe the city of London?
2. Why does he refer to the river as ‘charter’d’?
3. What does ‘mind-forg’d manacles’ mean?
4. Who does he criticise in the poem and why?
5. Why does he repeat the word ‘every’?

Subject: English Topic: English Language Reading skills

Semester 2 W4

Word Revolution		
	demented	**Behaving wildly or irrationally**
	patrolled	**To keep watch over an area by walking up and down**

1. Extract

The below extract comes from the middle of the novel About a Boy. It is 12 year old Marcus' second day at a new school.

There were a couple of girls in the room, but they ignored him, unless the snort of laughter he heard while he was getting his reading book out had anything to do with him. What was there to laugh at? Not much, really, unless you were the kind of person who was on permanent lookout for something to laugh at. Unfortunately, that was exactly the kind of person most kids were, in his experience. They patrolled up and down school corridors like sharks, except that what they were on the lookout for wasn't flesh but the wrong trousers, or the wrong haircut, or the wrong shoes, any or all of which sent them wild with excitement. As he was usually wearing the wrong shoes or the wrong trousers, and his haircut was wrong all the time, every day of the week, he didn't have to do very much to send them all demented.

2: Techniques

Simile: comparing something to something else using like or as (he ran like a tiger).

Adjectives: describing words (cold, beautiful, green)

Verbs: doing words (walked, brushed, jumped)

Questions

1. **What simile does the writer use to describe the students on the corridor?**
2. **What does Marcus feel students are on the lookout for?**
3. **Why does Marcus feel he stands out?**
4. **What adjective does he use to describe their behaviour?**
5. **What verb does he use for how they move up and down the corridor?**

Subject: English Topic: English Language Reading skills

Semester 2 W5

Word Revolution		
	ominous	**the impression that something bad is going to happen**
	intermittent	**happening at regular intervals**

1. Extract

The below extract comes from the middle of the novel A Woman in Black. In the extract our character is staying in a supposedly empty house with his dog, Spider.

At first, all seemed very quiet, very still, and I wondered why I had awoken. Then, with a missed heart-beat, I realized that Spider was up and standing at the door. Every hair of her body was on end, her ears were pricked, her tail erect, the whole of her tense, as if ready to spring. And she was emitting a soft, low growl from deep in her throat. I sat up paralysed, frozen, in the bed, conscious only of the dog and of the prickling of my own skin and of what suddenly seemed a different kind of silence, ominous and dreadful. And then, from somewhere within the depths of the house—but somewhere not very far from the room in which I was—I heard a noise. It was a faint noise, and, strain my ears as I might, I could not make out exactly what it was. It was a sound like a regular yet intermittent bump or rumble. Nothing else happened. There were no footsteps, no creaking floorboards, the air was absolutely still, the wind did not moan through the casement. Only the muffled noise went on and the dog continued to stand, bristling at the door, now putting her nose to the gap at the bottom and snuffling along, now taking a pace backwards, head cocked and, like me, listening, listening. And, every so often, she growled again.

2: Techniques

Personification: giving human qualities to objects (the chair groaned)
Adjectives: describing words (cold, beautiful, green)
Verbs: doing words (walked, brushed, jumped)

Questions

1. **Write down 3 things we learn about Spider the dog.**
2. **Which adjectives are used to describe the silence?**
3. **What sound can the character hear?**
4. **Find a verb used to describe the dog's actions.**
5. **Find a quotation that tells us the character is scared.**

Subject: English Topic: Macbeth

Year Semester 2 W6

Word Revolution	
supernatural	Something beyond the laws of nature
prophecy	A prediction of future events
regicide	Murdering a king or queen.

1: Plot

Act 1 Scenes 1-3

The play opens with three witches chanting on a bleak moorland. In the next scene we hear a battle report in which a soldier Macbeth bravely fought in a battle to defend Scotland. On a bleak Scottish moorland, Macbeth and Banquo, two of King Duncan's generals, discover three strange women (witches). The witches prophesy that Macbeth will be promoted twice: to Thane of Cawdor and King of Scotland. Banquo's descendants will be kings, but Banquo isn't promised any kingdom himself. Macbeth and Banquo want to know more, but the "weird sisters" disappear.

3: Context

Divine Right of Kings

The belief that the King was chosen by God. Thus, to commit regicide meant disobeying the will of God. A Jacobean audience believed people who committed regicide would be punished by God. The mental decline of both Macbeth and Lady Macbeth, having been plagued with guilt, is Shakespeare's way of showing that regicide does not go without punishment.

2: Characters

Macbeth

A captain in Duncan's army, later the Thane (Lord) of Glamis and Cawdor. When Three Witches predict that he will one day be king of Scotland, he takes his fate into his own hands, allowing his ambition and that of his wife's to overcome his better judgement. His bloody reign culminates in a battle against Malcolm and the English forces.

Macbeth is the epitome of a tragic hero. He represents the dangers of overstepping your position in life.

Questions

1. **Which supernatural characters open the play?**
2. **What do the witches prophesy about Macbeth?**
3. **What do the witches prophesy about Banquo?**
4. **What is the Divine Right of Kings?**
5. **What is regicide?**
6. **What did the Jacobeans believe would happen to someone who committed regicide?**

Subject: English Topic: Macbeth

Year Semester 2 W7

Word Revolution	
patriarchy	A system of society in which men hold the power.
ambition	A strong desire to achieve something, particularly to gain status.
tragic hero	The main character in a tragedy who suffers a reversal of fortune

1: Plot

Act 1 Scene 4-7

Soon after the witches' prophecies, King Duncan names Macbeth Thane of Cawdor as a reward for his success in the recent battles. The promotion seems to support the prophecy. The King then proposes to make a brief visit that night to Macbeth's castle. Lady Macbeth receives news from her husband about the prophecy and his new title. She vows to help him become king by whatever means are necessary…

2: Characters

Lady Macbeth

Macbeth's wife whose ambition helps to drive her husband toward the desperate act of regicide. Subsequently, her husband's tyranny and her own guilt recoil upon her, sending her into a madness from which she never recovers and leads to her suicide. Shakespeare demonstrates how a powerful, ambitious and ruthless character cannot escape the consequences of their own actions. Lady Macbeth defies gender expectations of women at the time. Linked with the witches.

3: Context

Patriarchal Society / Gender Identity—The play is set in a Patriarchal society; a society where women were expected to be subservient to men. A woman was expected to obey her father / husband and was presumed to be physically and mentally weaker than a man. However, Shakespeare subverts these traditional gender roles in the relationship between Macbeth and Lady Macbeth; a relationship where we observe a strong female character command, instruct and manipulate her husband. Many women who subverted expected gender roles or conventions at the time were accused of being witches.

Questions

1. **How does King Duncan reward Macbeth for his success in battle?**
2. **What does Lady Macbeth do when she hears about the prophecy?**
3. **What is a patriarchal society?**
4. **Why is the Macbeths' relationship unusual for the time the play was written?**
5. **What sometimes happened to women who behaved in an unusual way?**
6. **What is ambition?**

Subject: English Topic: Macbeth

Year Semester 2 W8

Word Revolution		
	soliloquy	A speech made by a character on their own, which reveals their thoughts and feelings.
	Jacobean	Belonging to the time when James I was king.
	rational	According to reason or logic.

1: Plot

Act 2

Macbeth returns to his castle, followed almost immediately by King Duncan. The Macbeths plot together to kill Duncan and wait until everyone is asleep. At the agreed time, Lady Macbeth gives the guards drugged wine so Macbeth can enter and kill the King. He regrets this almost immediately, but his wife reassures him. She leaves the bloody daggers by the dead king just before Macduff arrives. When Macduff discovers the murder, Macbeth kills the drunken guards in a show of rage and retribution. Duncan's sons, Malcolm and Donalbain, flee, fearing for their own lives; but they are, nevertheless, blamed for the murder.

2: Characters

Banquo

Macbeth's close friend and ally who also receives predictions from the witches. His response, however, is more cautious than Macbeth's. The prediction, that Banquo's child will become king, is sufficient to spell Banquo's death, ordered by an increasingly resentful and paranoid Macbeth. The vision of Banquo's ghost later haunts Macbeth. He represents rationality and reason in contrast to Macbeth.

3: Context

Natural Order / The Great Chain of Being — A religious hierarchy where everything on earth was awarded a 'rank' / status. God was at the top, followed by angels, humans, animals and plants etc A Jacobean audience believed that if this hierarchy was interfered with (i.e. a human tried to 'jump up' the ranks to the status of angels or God) then the natural order would be thrown into chaos. Shakespeare shows this on the night of the regicide when there is a violent storm. Macbeth's attempt to climb the 'Chain of Being' disturbs the natural world.

Questions

1. **How does Macbeth feel after he has killed Duncan?**
2. **Who is blamed for Duncan's murder?**
3. **How is Banquo's response to the witches different to Macbeth's?**
4. **Who was at the top of 'The Great Chain of Being'?**
5. **What did the Jacobeans think would happen if the Great Chain of Being was interfered with?**
6. **What is a soliloquy?**

Subject: English Topic: Macbeth

Year 10 Semester 2 W9

Word Revolution	
deception	Making someone think something that isn't true.
paranoia	Suspicion and mistrust of other people, without good reason.
treason	The crime of betraying one's country, especially by attempting to kill or overthrow the monarch.

1: Plot

Act 3

Macbeth becomes King of Scotland but is plagued by feelings of insecurity. He remembers the prophecy that Banquo's descendants will inherit the throne and arranges for Banquo and his son Fleance to be killed. In the darkness, Banquo is murdered, but his son escapes the assassins. At his state banquet that night, Macbeth sees the ghost of Banquo and worries the courtiers with his mad response. Lady Macbeth dismisses the court and unsuccessfully tries to calm her husband.

3: Context

Witchcraft—King James I was obsessed with magic and witchcraft and ordered several witch-hunts during his reign as King, even producing a short book on witchcraft called Daemonologie ('the Science of Demons'). In 1542, fifty years before Shakespeare wrote Macbeth, King Henry VIII passed the first English Witchcraft Act, which officially made the practice of witchcraft punishable by death. The inclusion of the three Witches in Shakespeare's 'Macbeth' would have greatly interested King James. Shakespeare's portrayal of the Witches shows them to cast spells and use familiars.

2: Characters

Duncan

King of Scotland. His victories against rebellious subjects and the Norwegians have made him a popular king. When Macbeth initially decides not to kill the king, he gives Duncan's many qualities as his reasons. He names his eldest son—Malcolm—as his heir. He dies at the hands of Macbeth and therefore the Chain of Being or Natural Order is disrupted. Too trusting—his trust in the original Thane of Cawdor was betrayed—as was his trust in Macbeth.

Questions

1. **What is Banquo's son called?**
2. **What does Macbeth see at the banquet?**
3. **Who does Duncan name as heir to the throne?**
4. **What mistake does Duncan make?**
5. **What was King James' book 'Daemonology' about?**
6. **What is treason?**

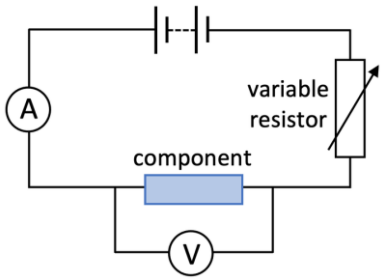
Subject: Science (P) Topic: I-V Curves

Year 10 Semester 2 W1

Word Revolution	
Fixed resistor	A resistor limits the passage of electrical current. A fixed resistor has a resistance that does not change.
Diode	A diode is a device that allows current to flow in one direction but not in the reverse direction.
IV Graph	A graph that shows how the current flowing through a component changes as the potential difference across it varies.

1: The practical

Circuit diagram:

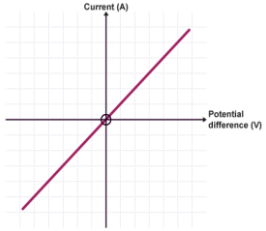


Methodology:

1) Connect a resistor into the circuit.
2) Vary the potential difference from -6 to +6 V in 1V intervals.
3) Measure the current for each potential difference.
4) Repeat for a filament bulb and diode.

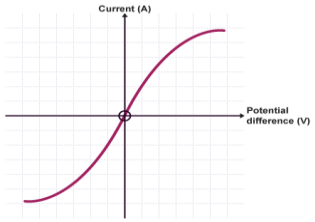
2: Resistor and filament bulb

Resistor:



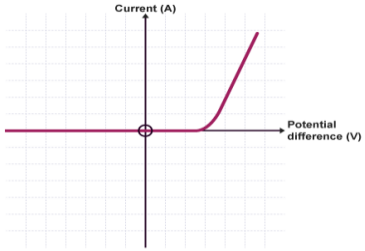
This is a directly proportional trend because fixed resistors are ohmic conductors when kept at a constant temperature. An ohmic conductor follows Ohm's Law (V = I x R).

Filament bulb:



As potential difference increases so does temperature of the filament. As the temperature increases so does the vibration of metal ions in the filament. It is harder for electrons to flow and resistance increases. This creates a shallower gradient.

3: Diode



Diodes are electronic components that can be used to regulate the voltage in circuits and to make logic gates. Light-emitting diodes (LEDs) give off light and are often used for indicator lights in electrical equipment such as computers and television sets.
The diode has a very high resistance in one direction. This means that current can only flow in the other direction. Normally a diode will not conduct until a particular potential difference is reached.

Questions

1. **Which component is an ohmic conductor.**
2. **What does an I-V graph show?**
3. **What does a steeper gradient line mean on an I-V graph?**
4. **Explain the shape of the I-V graph for a fixed resistor.**
5. **Explain the shape of the I-V graph for a filament bulb.**
6. **Describe the method you would follow to obtain data to plot a I-V graph.**

Subject: Science (B) Topic: Meiosis and Inheritance

Year 10 Semester 2 W2

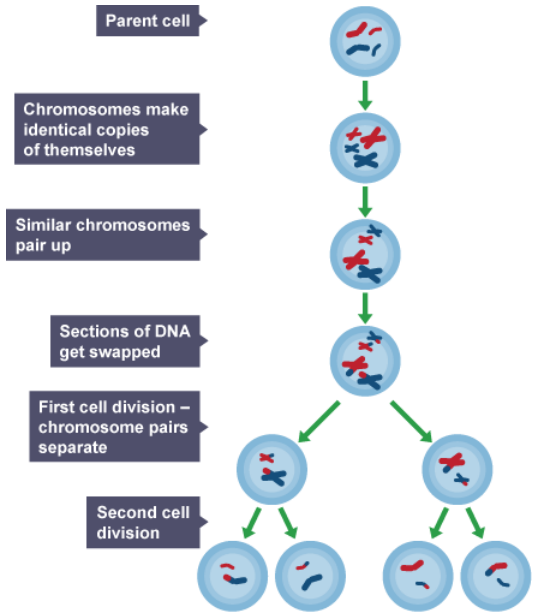
Word Revolution

Meiosis	A type of cell division that produces 4 daughter cells with half the number of chromosomes
Gamete	A sex cell. Example: sperm, cell, pollen
Allele	An alternative form of a gene

1. Types of reproduction

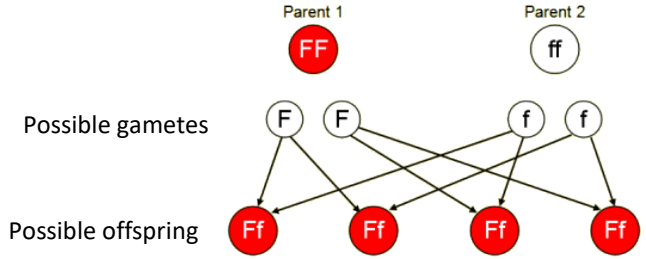
	Asexual	Sexual
Parents	One parent	Two parents
Cell division	Mitosis only	Meiosis to produce gametes and mitosis after fertilisation
Produces	Genetically identical offspring (clones)	Genetically different offspring

2: Meiosis



Gametes are created through the process of meiosis. The cell divides twice to form four gametes with a single set of chromosomes. All of the gametes are genetically different from each other.

3: Inheritance



Allele: An alternative form of a gene. E.g. brown hair colour.
Genotype: the combination of alleles.
Phenotype: the characteristic caused by the genotype e.g. natural hair colour. .
Homozygous: 2 of the same alleles (FF, ff).

Heterozygous: 2 different alleles (Ff).
Dominant: An allele that is always expressed and seen in the phenotype (F).
Recessive: An allele that is only expressed if there are 2 of them (f).

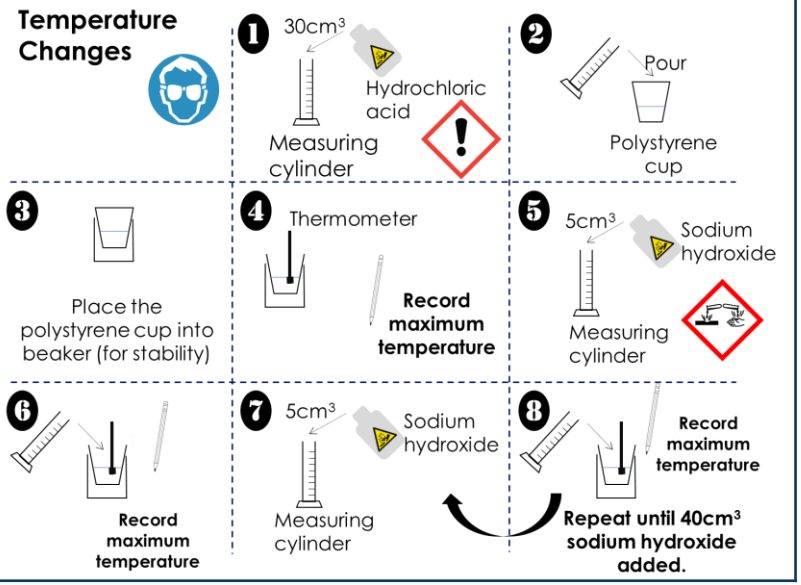
Questions

1. **What type of cell division is used to make egg cells?**
2. **How many times do cells divide in meiosis?**
3. **How many gametes are made in meiosis?**
4. **In meiosis, what is different about the gametes made compared to the cell that you started with**
5. **What is an example of a homozygous recessive genotype?**
6. **What is an example of a phenotype?**

Subject: Science(C) Topic: Exothermic reactions Year 10 Semester 2 W3

Word Revolution	
Exothermic	A chemical reaction where heat is transferred to the surroundings.
Endothermic	A chemical reaction where heat is absorbed from the surroundings.
Energy Profile	A graph to show the change in energy during a chemical reaction.

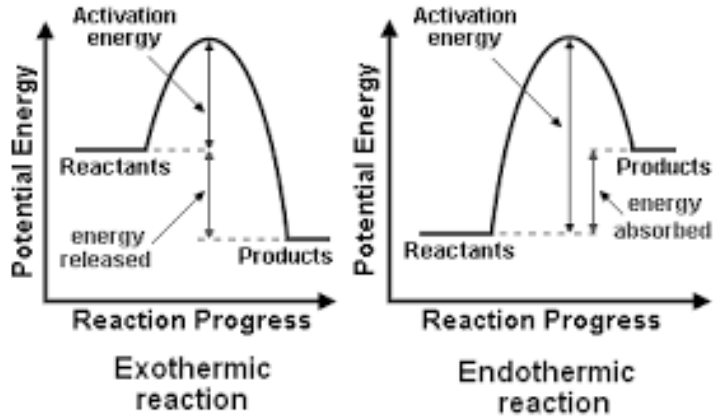
1: The required practical methodology



2: Exothermic and endothermic

	Exothermic	Endothermic
Energy	Released to surroundings	Taken in from surroundings
Temperature of surroundings	Increase	Decrease
Examples	Combustion; respiration	Photosynthesis; thermal decomposition
Uses	Self-heating cans; handwarmers	Sports injury ice packs

3: Energy profiles



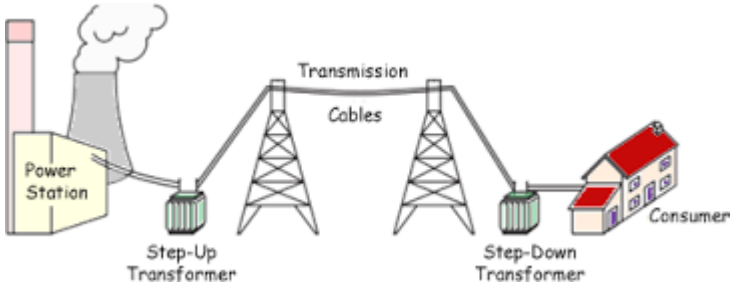
Questions

1. Define exothermic.
2. What happens to the temperature in an exothermic reaction?
3. Describe how to conduct a temperature change experiment.
4. Draw and label the energy profile for an endothermic reaction.
5. What is an example of an endothermic reaction?
6. Draw and label the energy profile for an exothermic reaction.

Subject: Science(P) Topic: Mains Electricity Year 10 Semester 2 W4

Word Revolution	
National Grid	The network of power stations, transformers and cables that makes sure that everywhere has access to electricity.
AC current / potential difference.	The direction of current / potential difference constantly changes from positive to negative. Example is mains supply.
DC current / potential difference.	The current / potential difference remains in one direction. Examples are batteries.

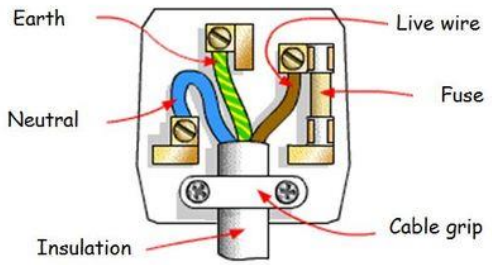
1: The national grid



Step up transformers increase potential difference which decreases current which reduces energy loses due to heating effects and resistance.

2: Plugs and electric shocks.

The plug:

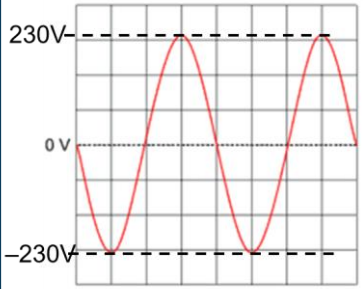


The potential difference of mains supply is 230V. The frequency of mains supply is 50Hz.

You can get electric shocks because the potential of the live wire is 230 V but the potential of you is 0 V. Therefore there is a large potential difference between the live wire and you. So, charge / current passes through your body.

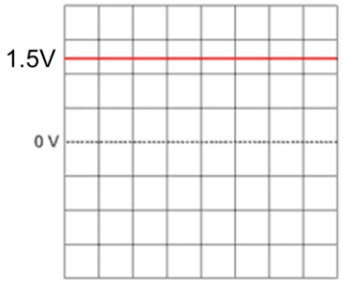
3: AC vs DC

Alternating current / Pd



The direction of current / potential difference constantly changes from positive to negative. Example is mains supply.

Direct current / Pd



The current / potential difference remains in one direction. Examples are batteries.

Questions

1. **Explain the role of a step up transformer.**
2. **Explain why you can get an electric shock.**
3. **Define alternating potential difference.**
4. **Sketch an oscilloscope (graph) image of DC current.**
5. **What colour is the earth wire in a plug?**
6. **What is the potential difference and frequency of mains electricity?**

Subject: Science(B) Topic: Gene technology Year 10 Semester 2 W5

Word Revolution	
Embryonic screening	Testing embryos for genetic disorders.
Genetic engineering	Modifying the genome of an organism by introducing a gene from another organism.
Ethics	Moral guidelines which govern good behaviour.

1: Inherited disorders and sex determination

Cystic fibrosis is caused by a **recessive allele**. If someone only has one copy of the allele then they are considered **carriers** - they are not affected by the disease but can pass the allele on to offspring. People with cystic fibrosis have lots of **sticky mucus** that can block their airways and digestion.

Polydactyl is caused by a **dominant allele**. You cannot be a carrier as if you have even one allele, you will have the disease People with polydactyly are born with **extra fingers or toes.**

Sex is determined by a pair of chromosomes, X and Y
Female=XX
Male=XY

There is a 50:50 chance of each sex at each pregnancy

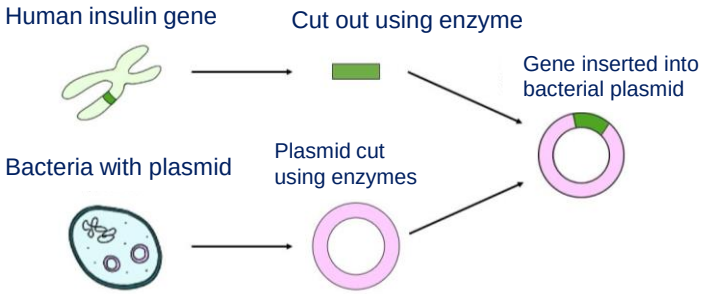
		Mother	
		X	X
Father	X	XX	XX
	Y	XY	XY

2: Embryonic screening

Advantages	Disadvantages
Can help parents prepare financially for extra care their child may need	Genetic screening is expensive
It can stop people suffering	It can cause prejudice against people with genetic diseases
Allows parents to choose whether to continue with the pregnancy	May encourage abortion

3: Genetic engineering

Genetic engineering is a process which involves modifying the genome of an organism by introducing a gene from another organism to give a desired characteristic. Plant crops have been genetically engineered to be resistant to diseases or to produce bigger better fruits. In medicine, bacterial cells have been genetically engineered to produce useful substances such as human insulin to treat diabetes.



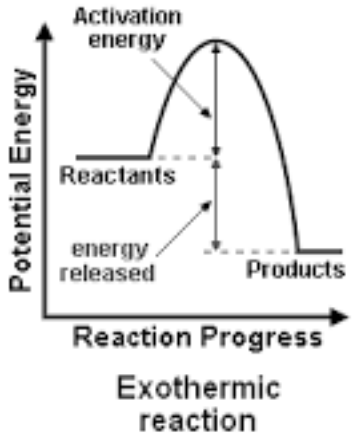
Questions

1. **What is a carrier?**
2. **What is a symptom of polydactyl and what is it caused by?**
3. **What is a symptom of cystic fibrosis and what is it caused by?**
4. **What is a disadvantage of genetic screening of embryos?**
5. **What is an example of the genetic engineering of plants?**
6. **What is an example of genetic engineering in medicine?**

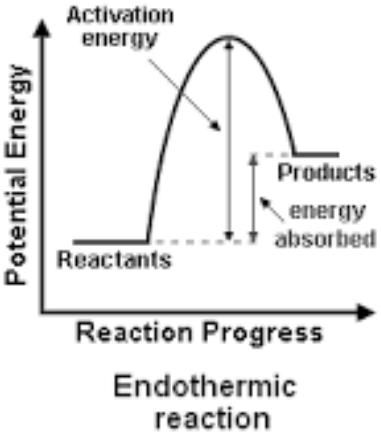
Subject: Science (C) Topic: Energy Profiles Year 10 Semester 2 W6

Word Revolution	
Exothermic	Energy given out from chemicals, causes a temperature rise in surroundings. Bond making process.
Endothermic	Energy taken in to chemicals, causes a temperature decrease in surroundings. Bond breaking process.
Activation energy	The minimum energy needed for a reaction to occur.

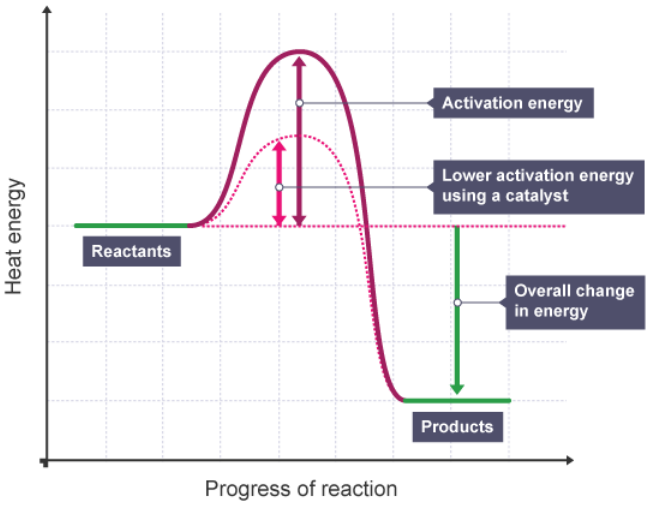
1: Exothermic



2: Endothermic



3: Effects of a catalyst



Questions

1. What is the activation energy in a reaction?
2. Draw and label the energy profile for an exothermic reaction.
3. Draw and label the energy profile for an endothermic reaction.
4. Draw and label the energy profile for a reaction that uses a catalyst.
5. In which process are bonds made?
6. Define exothermic.

Subject: Science (P) Topic: Vectors and Scalars | Year 10 Semester 2 W7

Word Revolution	
Scalar	A measurable quantity with magnitude (size) only.
Vector	A measurable quantity with both magnitude (size) and direction.
Magnitude	The size of a measurable quantity (the number).

1: Scalars

A measurable quantity with magnitude (size) only.

Examples are:
Temperature measured in ^0C
Mass measured in kg
Energy measured in J
Distance measured in m
Speed (how fast on average an object is moving) measured in m/s
Density measured in kg/m^3
Time measured in s

2: vectors

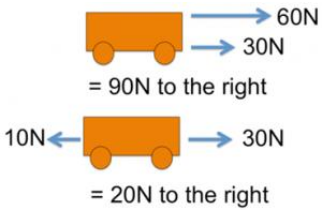
A measurable quantity with both magnitude (size) and direction.

Examples are:
Force measured in N
Displacement (the distance travelled relative to a starting point) measured in m
Velocity (the speed in a given direction) measured in m/s
Acceleration measured in m/s^2
Momentum measured in kg m/s

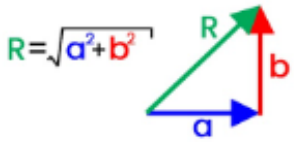
When drawn as an arrow the length of the arrow represents the magnitude of the quantity.

3: Calculating vectors

Vectors pointing in the same direction can be added together, vectors going in the opposite direction can be subtracted.



To find the resultant of two perpendicular forces you will need to use Pythagoras' theorem ($a^2 + b^2 = c^2$) to find the unknown side of the triangle.



You can also use a scale diagram to work out resultants. 1. Decide on a suitable scale. 2. Draw the horizontal and vertical vectors using a ruler and making sure they are perpendicular. 3. Draw the resultant vector by joining two vectors you have drawn. 4. Measure the length of a line correspond to resultant vector.

Questions

1. **Explain the difference between speed and velocity.**
2. **List 3 vector quantities.**
3. **List 3 scalar quantities.**
4. **Explain what is meant by 'magnitude'.**
5. **Draw the vector triangle and write the equation for Pythagoras' theorem?.**
6. **Describe how to find the resultant vector using scale drawings.**

Subject: Science (B) Topic: Nervous system Year 10 Semester 2 W8

Word Revolution

Neurone	A particular type of cell that carry information messages or signals to and from the brain and the rest of the body.
CNS	Central nervous system-made up of the brain or the spinal cord.
Homeostasis	The regulation of stable internal body conditions such as blood sugar, body temperature and water content.

1: The nervous system

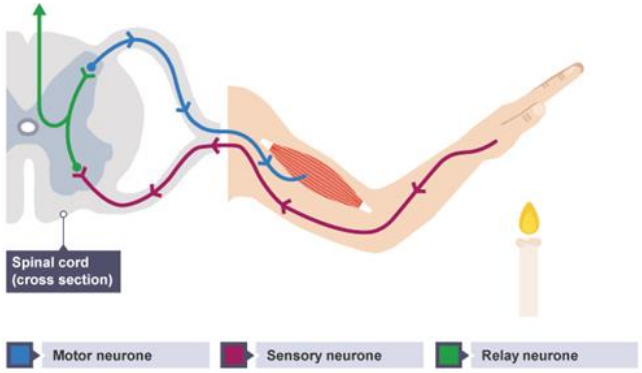
Sensory neurone

Motor neurone

Stimulus	A change in the environment
Receptor	A cell that detects a stimuli
Coordinator	Something that processes information and organises a response
Effector	Something that makes a change happen- a muscle or a gland
Response	Something changes

2: Reflex reactions

A reflex action is an automatic and rapid response by the body to a stimulus, which minimises any damage to the body from potentially harmful conditions, such as touching something hot. The conscious part of the brain is not used as a coordination centre, instead the unconscious part of the brain or the spinal cord coordinate the response.

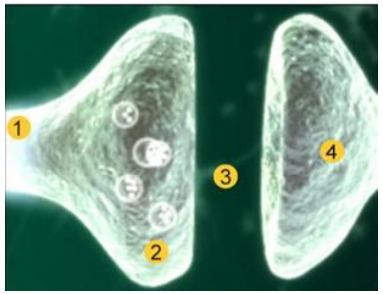


3: Synapses

Where two neurones meet there is a small gap, a synapse

1 - An electrical impulse travels along the first axon (nerve)

2 - This triggers the nerve-ending of a neurone to release chemical messengers called **neurotransmitters**.



3 - These chemicals diffuse across the synapse (the gap) and bind with receptor molecules on the membrane of the second neurone.

4 - The receptor molecules on the second neurone bind only to the specific neurotransmitters released from the first neurone. This stimulates the second neurone to transmit the electrical impulse.

Questions

1. **Which parts of the body co-ordinate the response to a stimulus?**
2. **What is the name of an environmental change that causes a reaction**
3. **What are the 2 types of effectors?**
4. **Why does the body have reflex actions?**
5. **What is a reflex reaction?**
6. **What chemicals are released into a synapse?**

Subject: Science Topic: Rates of Reaction Year 10 Semester 2 W9

Word Revolution	
Reactant	A substance that reacts with another substance to form products during a chemical reaction
Product	A substance formed in a chemical reaction
Activation Energy	The minimum amount of energy that colliding particles must have for them to react

1: Calculating rate of reaction

Rate of reaction = amount of reactant used ÷ time

Rate of reaction = amount of product made ÷ time

Rate of reaction can be analysed by plotting a graph of mass or product formed over time, taking a tangent and measuring the gradient.

The greater the gradient of the line, the faster the rate of reaction at that time. The sooner the line becomes horizontal, the quicker the reaction has finished.

2: Factors affecting rate of reaction

The greater the frequency of successful collisions of particles, the greater the rate of reaction.

Increasing the concentration of a reaction increases the rate of reaction. There are more particles present in a given volume meaning that collisions are more frequent between reactants.

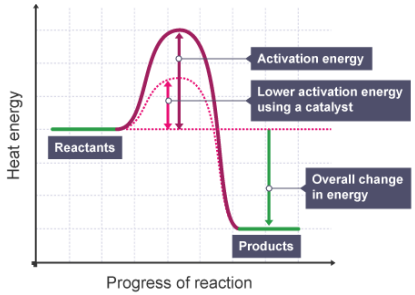
By increasing the surface area to volume ratio (e.g. using a powder instead of a lump) more reactant particles are exposed and the frequency of collisions increases.

By increasing the temperature of the reaction mixture, the particles are given more energy and will increase the speed and frequency of successful collisions of particles.

3: Catalysts

Catalysts are additional chemicals used to increase the rate of a reaction. They do not alter the products of a reaction. Enzymes are an example of biological catalysts.

Only a very small mass of catalyst is needed to increase the rate of a reaction. However, not all reactions have suitable catalysts.



A catalyst provides an alternative reaction pathway that has a lower activation energy than the uncatalyzed reaction.

A catalyst increases the number of successful collisions but does not change the overall frequency of collisions.

Questions

1. **List three ways that the rate of reaction can be made faster.**
2. **Explain how increasing the concentration increases the rate of reaction.**
3. **What are catalysts in biological systems called?**
4. **Explain how increasing surface area (having marble chips) increases the rate of reaction.**
5. **Explain how increasing temperature increases the rate of reaction.**
6. **What does a catalyst do to make a reaction faster?**

Timetable:

Please stick a copy of your timetable here.

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