Year 9

Planner 2

2025/2026

Independent Study

Name & LF:

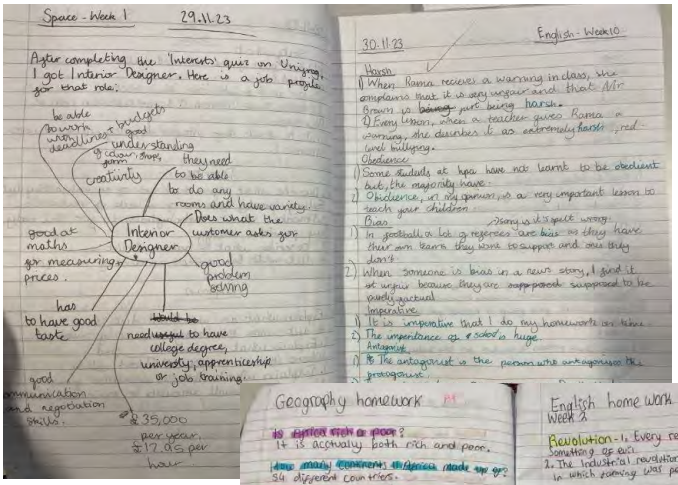
Hans Price Academy

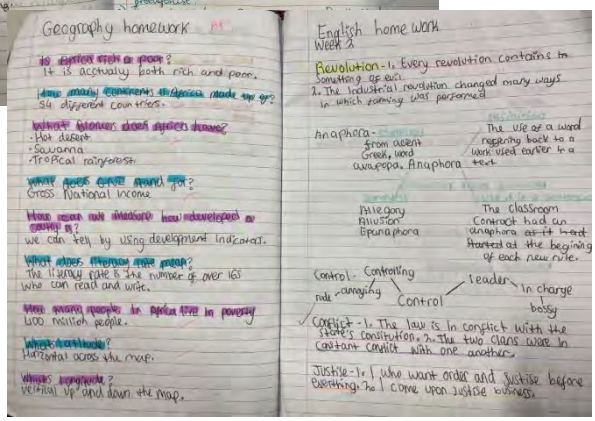
Cabot Learning Federation

How to Complete Independent Study

Completed IS is valued by teachers as it extends and supports the learning in lessons as well as embedding independent learning habits. It is rewarded with achievement points.

- Three pieces of compulsory IS are due each week for the core subjects: English, Maths and Science. The schedule is included in this booklet for clarity.
- Additional IS projects are introduced throughout the year for other subjects. These allow more creativity and challenge. They are rewarded and celebrated within each department.
- Independent study is introduced, supported and recorded by subject teachers. Further information is posted in Bromcom.
- To complete your independent study, you will need this knowledge organiser and your grey, IS exercise book. Most IS is set using this booklet. Maths will be set online in SPARX.
- IS resources can be collected from the library. Electronic copies of the booklets are available online, on the HPA website, alongside a video explaining IS.
- Compulsory IS Workshops on Tuesdays at 3pm for students who are not completing the core IS independently.





If students are struggling to complete the compulsory, core IS they will be expected to attend the workshop session after school the following week to address any barriers they are facing and ensure the work is completed successfully. This session sets them up for the coming week, rather than focusing on work that has been missed.

Contents

Joint Winners of the Expressive Cup Fan Art Competition 2025

Challenge Task Schedule

The challenge tasks will be introduced by teachers in the term they are set. The are not compulsory but incredibly valuable to stretch and challenge learning. They will be recognised and rewarded within departments and allow students to be creative and tackle different projects.

Term	Subject	Task
Term 4	Computing	Python Programming Challenge (Dice Game)
Term 4	DT	The Design Process: From Concept to Creation
Term 4	History	Create a presentation, poster or essay which explores the following question: How far did one individual change the course of British history?
Term 5	Art	Draw/paint/collage (your choice) an A5 portrait of a famous person you admire. Your Art teacher will discuss ideas and hand in dates.
Term 5	Geography	Create a presentation, poster or essay which explores the following question: How can we make our local area more sustainable?
Term 6	RS	Create a presentation, poster or essay which explores the following question: What does it mean to live a good life?

Independent Study Hand-In Schedule

The schedule below shows which pieces of independent study will be due each week. They will be checked by the teacher of the subject due in the lesson that week.

Date	Schedule	
Term 4		
23rd February	English	
	Maths	
	Science	
2nd March	English	
	Maths	
	Science	
9th March	English	
	Maths	
	Science	
16th March	English	
	Maths	
	Science	
23rd March	English	
	Maths	
	Science	
30th March	English	
	Maths	
	Science	
Term 5		
20th April	English	
	Maths	
	Science	
27th April	English	
	Maths	
	Science	
4th May	English	
	Maths	
	Science	
11th May	English	
	Maths	
	Science	
18th May	English	
	Maths	
	Science	

Date	Schedule	
Term 6		
1st June	English	
	Maths	
	Science	
8th June	English	
	Maths	
	Science	
15th June	English	
	Maths	
	Science	
22nd June	English	
	Maths	
	Science	
29th June	English	
	Maths	
	Science	
6th July	English	
	Maths	
	Science	
13th July	English	
	Maths	
	Science	
20th July	No IS	
	No IS	
	No IS	

Extra-Curricular	

#ReadyToLearnHPA

Hans Price Academy

Independent Study Challenge Tasks

Subject		**Task**
Date Set		
Date Due		
Subject		**Task**
Date Set		
Date Due		
Subject		**Task**
Date Set		
Date Due		
Subject		**Task**
Date Set		
Date Due		
Subject		**Task**
Date Set		
Date Due		
Subject		**Task**
Date Set		
Date Due		

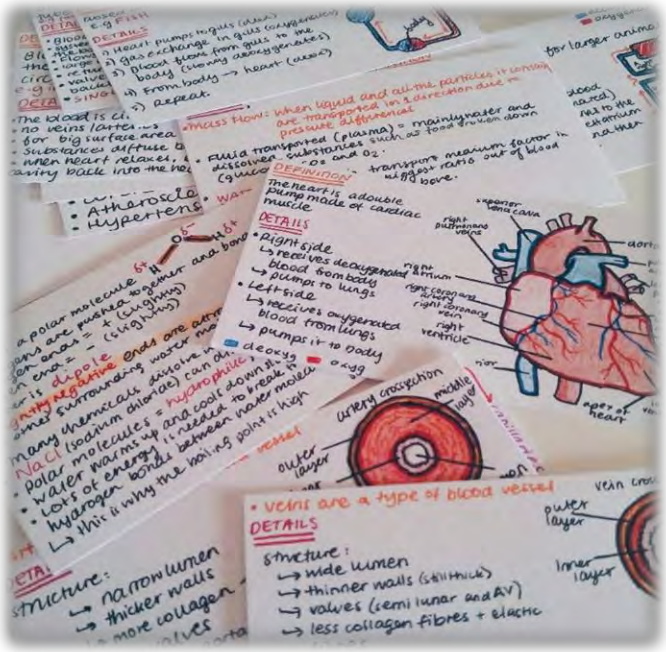
Revision Techniques

Flash Cards

Great for revising key terms and remembering definitions, dates, facts etc.

Split the page of your I.S textbook into four using a ruler or use flash cards which you can collect from the LRC and keep in your I.S folder.

Make brief notes on the information in the knowledge organiser, use colour coding and diagrams where you can to highlight key information.

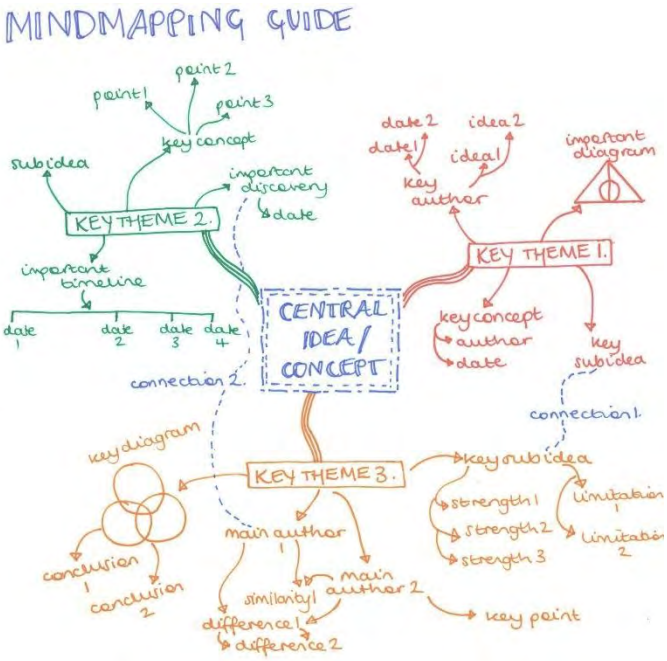


Mind Maps

Great for revising if you are a visual learner, allowing you to select and link key information.

Use a full page to add as much detail as you can to your mind map, starting with a key concept or topic at the centre. Use the knowledge organisers and your own ideas.

You can use colour coding, diagrams and connections to support your learning.



Self-Quizzing Questions

Here is a section of a Science Knowledge Organiser. You could test your grasp of this knowledge by asking yourself,

"What ions are found in acids? Acids contain hydrogen ions."

"What does corrosive mean? A corrosive acid can destroy skin cells and cause burns."

These are examples of self-quizzing questions. Write 10-20 self-quizzing questions and answers based on the subject knowledge organiser and focusing on the areas where you need to strengthen your knowledge.

2. Acids (pH 1-6)

- **Acids** are a family of chemicals, examples are lemon juice, vinegar and Coca Cola. There is also acid in our stomach.
- Acids contain Hydrogen (H^+) ions.
- **Strong acids** like hydrochloric acid are very corrosive this means they destroy skin cells and cause burns.
- **Weak acids** like vinegar are safe to eat but are still irritant to sensitive parts of the body.

Termly Planner

Term 4						
	Monday	Tuesday	Wednesday	Thursday	Friday	Weekend
Week 1 23rd February	INSET Day					
Week 2 2nd March					INSET Day	
Week 3 9th March						
Week 4 16th March						
Week 5 23rd March						
Week 6 30th March					Bank Holiday	
Easter Holiday						

Term 5						
	Monday	Tuesday	Wednesday	Thursday	Friday	Weekend
Easter Holiday						
Week 1 20th April						
Week 2 27th April						
Week 3 4th May	Bank Holiday					
Week 4 11th May						
Week 5 18th May						
Half Term						

Term 6						
	Monday	Tuesday	Wednesday	Thursday	Friday	Weekend
Week 1 1st June						
Week 2 8th June						
Week 3 15th June						
Week 4 22nd June						
Week 5 29th June					INSET Day	
Week 6 6th July						
Week 7 13th July						
Week 8 20th July			Summer Holiday			

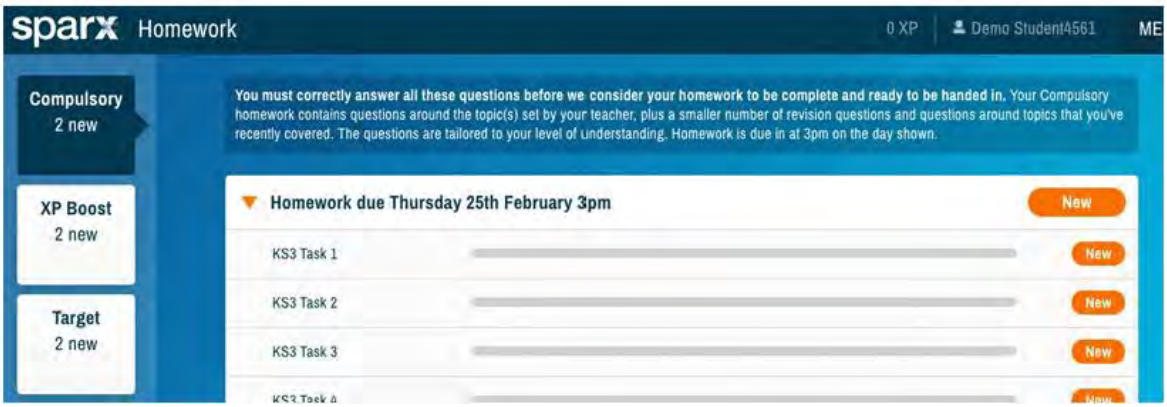
Maths Department – Independent Study Information

Sparx Maths

All Independent Study in the Maths department is set using the online platform SparxMaths.

Students need to log into their SparxMaths accounts from the HPA navigation page. Independent study contains 3 elements: Compulsory, XP Boost and Target.

Compulsory: Sparx independent study is tailored to your child and should offer them just the right level of challenge, based on the topics that their teacher has set. All questions in the Compulsory section must be answered correctly for the independent study to be marked as complete. Students need to use pen and paper to write out the bookwork codes and workings to each of their questions as the platform will check they are recording their work. Each task bar will show as green when fully complete. For the Independent study to be classed as complete, all task bars for that independent study need to be fully green. The percentage of independent study complete will show on the menu page:



XP Boost and Target sections are additional resources that the students can complete if they wish. They will support the students to make greater progress in Maths, but do not form part of the compulsory independent study.

If a student receives too much assistance with their independent study, Sparx may think they're able to tackle more difficult questions and their work could get harder. To prevent this, always encourage them to attempt the question first and to watch the support video before getting help.

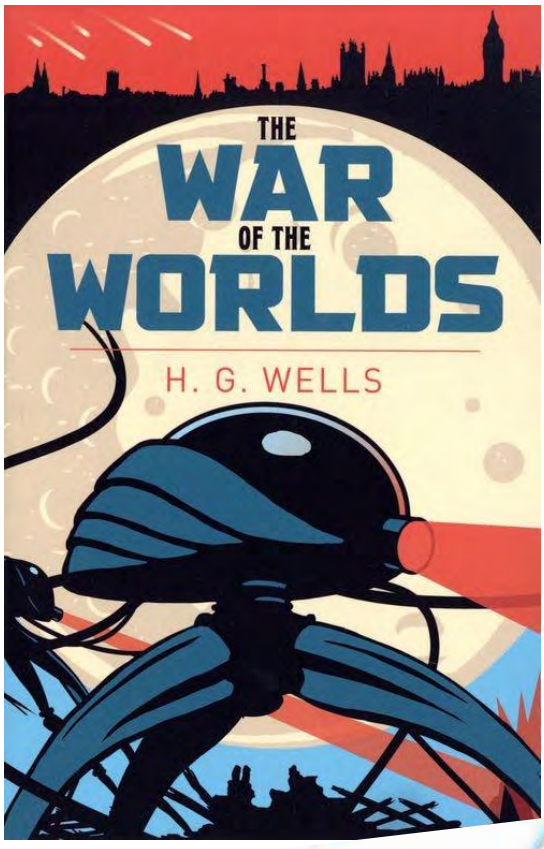
Parents whose children have been set compulsory independent study will receive a weekly email from Sparx, which includes an update on how much independent study their child has completed as well as any they have outstanding from the previous few weeks. Most importantly, the email contains a link to a short video that parents can watch and use to help support their child in answering one of their target questions.

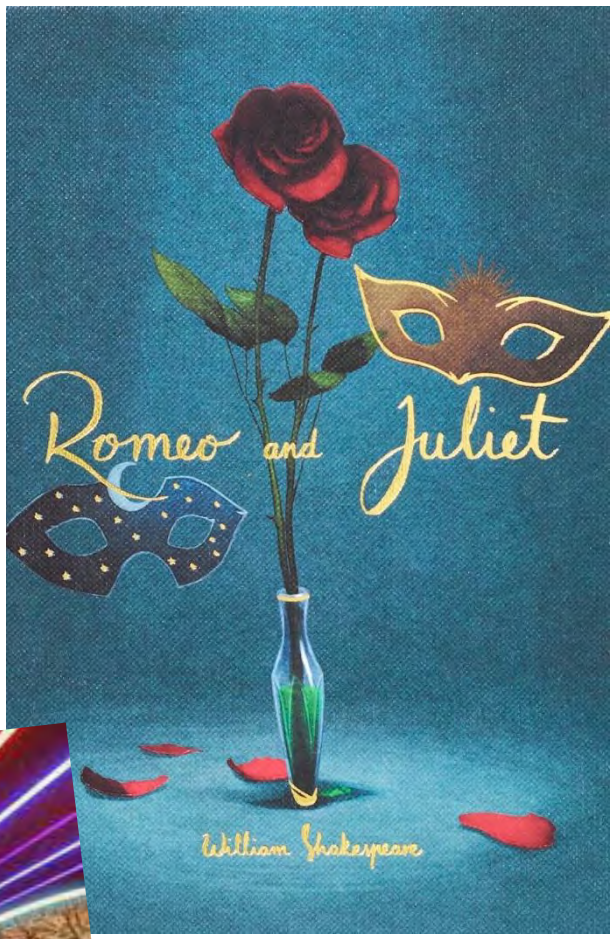
English Department – Independent Study Information

Independent study for English is based around revision of Great Expectations and The Tempest. You will find the tasks for each week outlined below with a reminder of hand-in dates. Complete all tasks in your IS book.

You will find a variety of tasks for the next three terms, including vocabulary, punctuation and creative writing.

Tasks will be marked in English lessons. You can find the topics and reminders of hand-in dates outlined in this booklet.





Term 4 Topic – War of the Worlds

Week	Task
w/c 23rd February	**Vocabulary:** **Exploit** **Futuristic** **Oppress** For each word write the following: ● Definition ● Synonym (word which means the same) ● Antonym (word which means the opposite) ● Example sentence linked to War of the Worlds
w/c 2nd March	**Themes:** Write one or two sentences explaining how each of the following themes/ideas link to War of the Worlds: 1) Survival 2) Imperialism 3) Science/Technology
w/c 9th March	**Punctuation:** Re-write this paragraph adding in the correct punctuation: the sky darkened as the alien ship descended over the silent city lights flickered and buildings shook beneath its shadow people ran through the streets shouting warnings but the machines moved without sound a beam of blue light struck the ground tearing metal and stone apart in seconds by morning the world felt changed and humanity no longer seemed alone in the universe
w/c 16th March	**Vocabulary:** Neatly draw/sketch an image or an icon to represent each of the following words: **Authority** **Extra-terrestrial** **Exodus** And, write a sentence explaining how each word links to War of the Worlds
w/c 23rd March	**Creative:** Create a piece of fan art based on an important moment from *The War of the Worlds* by H.G. Wells. Your artwork should show: ● A specific event from the novel ● The mood or atmosphere of the moment Options: The first Martian cylinder landing on Horsell Common The Martians using the Heat-Ray against humans London after the Martian invasion
w/c 30th March	**Creative:** What is Earth like 10 years after the invasion? Write a description of six lines. Use: ● Three ambitious words/adjectives ● A simile ● A metaphor

Term 4 – War of the Worlds Knowledge Organiser

Year 9 English
Science Fiction: War of the Worlds

Page 1

Vocabulary to learn	
Extra-terrestrial	of or from outside the earth or its atmosphere
Futuristic	having or involving very modern technology or design
Imperialism	a policy of extending a country's power and influence through colonisation, use of military force, or other means.
Exploitation	the action or fact of treating someone unfairly in order to benefit from their work
Exodus	a mass departure of people
Evolution	he process by which animals and living organisms are transformed into different forms over generations

Vocabulary to learn	
Authority	the power or right to give orders, make decisions, and enforce obedience
Oppression	prolonged cruel or unjust treatment or exercise of authority.

Context

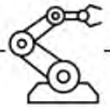
- Written in 1898 when the British Empire was the most dominant colonial power on earth.
- In the 19th century there was a very real fear that an apocalypse could begin.
- Queen Victoria died in January 1901.
- Fears included the fear of mass immigration from other parts of the British Empire
- HG Wells was an author of science fiction
- HG Wells used the novel to explore his own reservations about imperialism

Year 9 English
Science Fiction: War of the Worlds

Page 2

Terminology/context	
Colonialism	the policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it economically.
Empire	At the time Wells wrote War of the Worlds, Britain was at the height of its power as the largest Empire that the world has ever seen.
Apocalypse	Towards the end of the 19th century, there was much anxiety and fear over the future. Queen Victoria was approaching 80 and the successful Victorian era was all Britain had ever known.
The Science Fiction Genre	Whilst speculative fiction had been around for hundred of years, many scholars argued that Science Fiction only became possible due to the technological advancements of the Industrial Revolution

Science Fiction Conventions	
Time travel 	Teleportation
Aliens 	Mind control 
Space Travel 	Parallel Universes
Alternative Histories	Fictional Worlds
Advanced technology	Computers and Robots



Term 5 Topic – Romeo and Juliet

Week	Task
w/c 20th April	**Vocabulary:** **Vengeance** **Impulsive** **Feud** For each word write the following: ● Definition ● Synonym (word which means the same) ● Antonym (word which means the opposite) ● Example sentence linked to Romeo and Juliet
w/c 27th April	**Characters:** Finish these sentences using because, but, so connectives: ● Romeo is love sick **because** ● Romeo is love sick, **but** ● Romeo is love sick, **so** and , complete these: ● Tybalt is hot tempered **because** ● Tybalt is hot tempered, **but** ● Tybalt is hot tempered, **so**
w/c 4th May	**Characters:** Choose one character (Romeo, Juliet, Benvolio). Write **three adjectives** to describe them and **three sentences** explaining why each word links to the character. **Example:** **Mercutio** *Three adjectives:* witty, hot-tempered, loyal *Sentence 1:* Mercutio quickly turns angry during the confrontation with Tybalt, allowing his emotions to control his actions and leading to his fatal duel.
w/c 11th May	**Vocabulary:** Neatly draw/sketch an image or an icon to represent each of the following words/vocabulary: **Fate** **Honour** **Rebellion** And, write a sentence using each word linking them to Romeo and Juliet.
w/c 18th May	**Themes:** Write two sentences explaining why you think each of the following themes/ideas link to Romeo and Juliet: 1) Conflict 2) Fate 3) Love
w/c 30th March	**Vocabulary:** Write a sentence for each of the following words. Link your sentences to the play, Romeo and Juliet. **Subverting** **Femininity/feminine** **Masculinity/masculine** **Feud**

Term 6 Topic – Romeo and Juliet

Week	Task
w/c 1st June	**Analysis:** Complete a quotation explosion for the following quotation. **"My only love sprung from my only hate!"** (Juliet, Act 1 Scene 5) Use these sentence starters: ● **This means that…** ● **The word 'sprung' suggests…** ● **The word "love" / "hate" suggests…** ● **This links to the play because…**
w/c 8th June	**Analysis:** Complete a quotation explosion for the following quotation. **"Did my heart love till now? forswear it, sight! For I ne'er saw true beauty till this night."** (Romeo, Act 1, Scene 5) Use these sentence starters: ● **This means that…** ● **The question suggests…** ● **The word "never" tells us…** ● **This shows that Romeo…**
w/c 15th June	**Opinion Task:** Do you think Romeo and Juliet's love is true love or just infatuation? Give reasons for your answer: In my opinion, Romeo and Juliet's love is … because … I think their relationship shows … rather than true love because… One reason I believe their love is (true love/infatuation) is…. For example, when…, it shows that….
w/c 22nd June	**Themes:** Write two sentences explaining why you think each of the following themes/ideas link to Romeo and Juliet: 1) Honour 2) Gender 3) Marriage
w/c 29th June	**Creative Task:** 1) Create 5 interview questions that you would like to ask any characters in Romeo and Juliet. State which character you would like to ask them to. 2) For three questions, imagine how the character may respond. **Example:** **Romeo:** How did you feel when you first met Juliet at the Capulet party? **Romeo's response:** The moment I saw her, everything else disappeared. I forgot about Rosaline completely and felt like I finally understood what true love was.
w/c 6th July	**Vocabulary:** Write a sentence for each of the following words. Link your sentences to the play, Romeo and Juliet. **Unrequited** **Fate** **Free-will**

Week	Task
w/c 13th July	**Opinion task:** Who do you think is **most responsible** for Romeo and Juliet's deaths? **Circle one:** Romeo / Juliet / Friar Lawrence / The Families / Fate Write **one paragraph (5 sentences)** explaining why. **Marking:** • Clear choice • Reason given
w/c 20th July	**Creative Task:** Write a sonnet (a 14-line love poem) as Romeo to Juliet

Term 6 – Romeo and Juliet Knowledge Organiser

Year 9 English
Shakespeare: Romeo and Juliet

Page 1

Vocabulary to learn	
Fate	Events predetermined by a supernatural power.
Free-will	The ability to make your own choices and decisions, rather than having them decided for you by someone else or by fat
Femininity	A set of qualities, behaviors, and roles that are traditionally associated with girls and women
Masculinity	Traits, behaviors, and roles traditionally associated with boys and men, such as strength, courage, and independence
Feud	A long-lasting, bitter argument or fight between two people, families, or groups that continues for a long time

Vocabulary to learn	
Vengeance	punishment for a wrongdoing towards someone
Rebellion	when a person or group refuses to obey rules, leaders, or a government, often fighting against them because they feel things are unfair
Impulsive	acting or speaking suddenly on a whim, without thinking about what might happen next.
Honour	treating others with high respect, acting with honesty, and doing the right thing even when it is difficult
Subverting	Undermining the power or authority of others

Year 9 English
Shakespeare: Romeo and Juliet

Page 2

Characters	
Romeo	**Protagonist.** A Montague. Teenager. Peace loving until Mercutio is killed. Then vengeful
Juliet	**Protagonist.** A Capulet.Teenager. Wants to marry for love. Doesn't want an arranged marriage to Paris.
Tybalt	**Antagonist.** Capulet. Cousin to Juliet. Tybalt seeks revenge for Romeo coming to the party. Fights Mercutio instead and kills him. Tybalt is killed by Romeo.
Mercutio	Best friend to Romeo. Hot tempered. Fights Tybalt on Romeo's behalf. Is killed. Curses both families.
Benvolio	Cousin to Romeo. He takes Romeo to the Capulet party to stop his lovesickness for Rosaline.

Themes	
Fate: The belief in a higher power which controls what happens to you. It is made clear in the prologue that Romeo and Juliet are 'star-cross'd lovers'	**Marriage and Courtship:** Marriages for people of wealth were often arranged by parents and focused on financial arrangements and social status.
Conflict and honour: Reputation was an important part of life, especially if you came from a wealthy or influential family. Furthermore, men were expected to behave in certain ways such as defending their name or honour. This in turns leads to the violence that we see in the play.	**Religion:** This was an important part of life in Shakespeare's time and is represented by Friar Lawrence in the play. Marriage was sacred and could not be undone. In Italy, where the play is set the main religion was Catholicism.
Gender: Men controlled society. This was known as a patriarchy. Women were seen as being weaker and were expected to obey father ♂ bands.	**Love:** Romeo and Juliet fall in love at first sight. Their love is genuine but impulsive and destructive. Romeo was previously infatuated with Rosaline but his love was unrequited.

Science Department – Independent Study Information

Independent study for science is completed in this booklet with knowledge organisers to help you recall or research information.

You will find the worksheets over the next series of pages and the knowledge organisers to help you answer the questions.

The questions will be marked in your science lessons, and any misconceptions will be corrected to support your learning.

You can find the topics and reminders of hand-in dates outlined below.

TERM 4-6

TERM	TITLE	HAND IN DATE
4	CP1 – Motion	w/c 23.02.26
	CP2 – Forces and motion	w/c 02.03.26
	CP2 – Forces and motion	w/c 09.03.26
	CP8 – Work done by forces	w/c 16.03.26
	CP3 – Conservation of energy	w/c 23.03.26
	CP3 – Conservation of energy	w/c 30.03.26
5	CP7 - Energy	w/c 20.04.26
	CB3 – boxes 1 & 2	w/c 27.04.26
	CB3 – boxes 3-5	w/c 04.05.26
	CB3 – boxes 6-9	w/c 11.05.26
6	CB4 – boxes 1 & 2	w/c 01.06.26
	CB4 – boxes 3 & 4	w/c 08.06.26
	CB4 – boxes 5 & 6	w/c 15.06.26
	CP4 – boxes 1-4	w/c 22.06.26
	CP4 – boxes 5-8	w/c 29.06.26
	CP5 – boxes 1-4	w/c 06.07.26
	CP5 – boxes 5-8	w/c 13.07.26

CP1 MOTION

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1. Scalars and Vectors

Scalars are quantities that only have magnitude (size).
Examples include mass, time, speed, temperature, energy and distance.

Vectors are quantities that have both magnitude (size) and direction.
Examples include force, velocity, momentum, displacement, acceleration and weight.

2. Speed and Velocity

Speed (scalar) in a given direction is known as velocity (vector). Both speed and velocity are measured in metres per second (m/s).

Speed	*How fast an object moves*	The speed of a car is 30m/s. A car moves forward with a velocity of 30m/s.
Velocity	*Speed + direction*	

3. Distance and Displacement

Distance is how far an object how travelled and is a scalar. This can be measured in metres (m) or kilometres (km).

Displacement is the distance travelled in a straight line and is a vector.

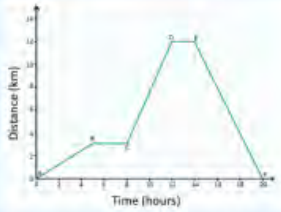
An athlete runs once around an athletics track.
This athlete has travelled a distance of 400m but the displacement of the athlete is 0m.

4. Distance Time Graphs

A distance time graph shows how far an object moves along a straight line.

The speed of an object can be calculated from the gradient of a line.

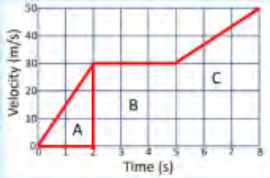
When the line goes flat or has no gradient, the object is stationary.



A steeper line means the object is travelling at a faster speed.

5. Velocity Time Graphs

A velocity time graph shows the velocity of an object over a period of time. It simply shows how fast an object is moving.



A flat line on the graph shows an object moving at constant (same) speed.
A steeper line shows the an object with greater acceleration.
A diagonal line going up shows constant acceleration (speeding up).
A diagonal line going down shows constant deceleration (slowing down).
The area under a line is the distance travelled. This can either be a triangle or a rectangle.

6. Calculating Speed

Measure the distance between 2 points using a tape measure.

Measure the time taken for an object to move between the 2 points.

Use speed = distance / time

Usain Bolt runs the 100m in 9.58 seconds.
Calculate his average speed.

$\frac{100 \text{ metres}}{9.58 \text{ seconds}} = 10.44$ m/s

7. Acceleration

Acceleration is how quickly an object speeds up. It is also the change in velocity in a certain amount of time. It is measured in m/s/s which can be written as m/s^2.

Acceleration can be calculated by dividing the change in velocity (final velocity – initial velocity) by the time taken.

$$a = (v - u) \div t$$

A car accelerates from 13m/s to 31m/s in 12 seconds.
Calculate the acceleration of the car.

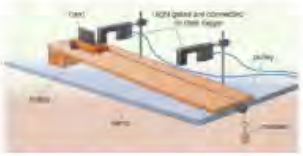
31m/s – 13m/s = 18m/s

$\frac{18 \text{m/s}}{12 \text{s}} = 1.5 \text{m/s}^2$

8. Investigating acceleration

Acceleration is affected force and mass.

This can be investigated using light gates and a ramp.
Light gates are used to calculate the speed at point A and the speed at point B. They also measure the time taken between point A and point B. The ramp is used to reduce the effect of friction.



Weights are added to the pulley to increase the force.

Masses are added to the trolley to increase the mass.

CP1 MOTION week commencing 23.02.26

1. Define scalar quantities.	2. State an example of a vector quantity.	3. State whether each of the following quantities is a scalar or a vector: a) Speed b) Velocity c) Distance d) Acceleration
4. Describe the difference between speed and velocity.	5. Explain why velocity is described as a vector quantity.	6. Calculate the average speed of a cyclist who travels 600 m in 50 seconds.
7. Describe what the gradient of a distance–time graph shows.	8. Describe what a flat (horizontal) section on a distance–time graph indicates about the motion of an object.	9. Calculate the acceleration of a car that changes speed from 10 m/s to 25 m/s in 5 seconds.

Additional Notes

CP2 FORCES & MOTION

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1. Resultant Forces

Free body diagrams are drawn to represent the forces acting on an object. The length of the arrow represents the size of the force.
The resultant force is the overall effect of all the forces acting on an object.

To calculate resultant force:
- Add forces acting in the same direction
- Subtract forces acting in opposite directions

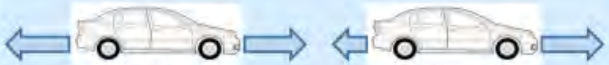
Resultant force = 5N – 2N = 3N left

Resultant force = 5N – 5N = 0N

2. Newton's first law

"A moving object will continue to move at the same speed and direction unless an external force acts on it."
"A stationary object will remain at rest unless an external force acts on it."

If the resultant force is 0N = balanced forces
If the resultant force is not 0N = unbalanced forces
Unbalanced forces change the speed and/or direction of an object.



Balanced forces | Unbalanced forces

3. Mass and Weight

Mass is the quantity of matter there is in an object.
Mass is measured in kilograms (kg).

Weight is a measure of the pull of gravity on an object. This depends on the size of gravity.
Weight is a force so is measured in Newtons.

Weight can be calculated by multiplying the mass by the gravitational field strength.
Weight (N) = mass (kg) x gravitational field strength (N/kg)

What is the weight of a 90kg astronaut on the surface of Earth.
Earth has a gravitational field strength of 10N/kg.
90kg x 10N/kg = 900 N

4. Newton's second law

"Acceleration depends on the size of the force and the mass of an object."

The force needed to accelerate a particular object can be calculated using the equation:

Force = mass x acceleration
(N) (kg) (m/s^2)

A motorcycle has a mass of 200kg.
What force is needed to give it an acceleration of $7m/s^2$?

200 kg x $7m/s^2$ = 1400N

5. Newton's third law

"Balanced forces act on the same object. Action-reaction forces act on 2 different objects."

Action reaction forces are always the same size and in opposite directions. They are also the same type of force (push or pull).

The rope pulls the dog to the right and the dog pulls the rope to the left.

6. Momentum (H)

Momentum is a measure of the tendency of an object to keep moving – or how hard it is to stop it moving.

The momentum of an object depends on its mass and its velocity.

Momentum is calculated using the following equation:

Momentum = mass x velocity
(kg m/s) (kg) (m/s)

When moving objects collide, the total momentum of both objects is the same before the collision as it is after the collision.
This is called **conservation of momentum**.

7. Stopping Distances

In order to stop a moving vehicle, the driver has to think about stopping before they press the brakes to actually stop the vehicle.

Stopping distance = thinking distance + braking distance
(m) (m) (m)

A drivers reaction time will affect the distance travelled whilst thinking. Some factors that affect reaction time include:
- Tiredness
- Drugs
- Alcohol
- Distractions

The braking distance of a car is dependent on friction. Some factors that affect the braking distance include:
- Mass
- Road conditions
- Tyre conditions
- Brake conditions

8. Crash Hazards

In a car crash, the vehicles come to a stop very quickly in a short amount of time.

Slowing down is deceleration (negative acceleration).

Large decelerations can cause injury and unfortunately in some instances, death!

Modern cars have several safety features to reduce the size of the force on the driver and passengers.
1. Crumple zones
2. Seat belts
3. Air bags

CP2 FORCES AND MOTION week commencing 02.03.26

1. Define *resultant force*.	2. State the resultant force if the forces are balanced.	3. Describe what two outcomes could be possible when forces become unbalanced.
4. Define *mass* and state its unit.	5. Define *weight* and state its unit.	6. Calculate the force needed to accelerate a 200 kg motorcycle at 7 m/s^2
7. State Newton's third law.	8. Define the term *momentum.*	9. State two factors that affect braking distance.

CP2 FORCES AND MOTION week commencing 09.03.26

1. Calculate the resultant force on the object. 	2. State the units for force.	3. State the units for mass.
4. List two factors that affect a driver's thinking distance.	5. Calculate the stopping distance for a car where the driver's thinking distance is 50m and the car's braking distance is 20m.	6. Calculate the force needed to accelerate a 325 kg motorcycle at 5 m/s^2
7. Explain how a car can still be moving even if the forces are balanced.	8.Calculate the weight of an object on Earth that has a mass of 5.5kg.	9. Explain how crumple zones and seat belts increase the safety of a car.

1. Energy stores

Energy is needed to make things happen or change. It is scalar quantity measured in Joules (J).

1. **Chemical** (food, fuel and batteries)
2. **Kinetic** (moving objects)
3. **Thermal** (hot objects)
4. **Elastic potential** (stretched, squashed or twisted objects)
5. **Gravitational potential** (objects in high positions)
6. **Nuclear** (inside atoms)

2. Work done

Work done is the amount of energy transferred by a force. The amount of energy depends on the size of the force and how far the force moved.

Worke done (J) = Force (N) x Distance (m)

Example: Danny uses a force of 200N to push a box 3m along the floor. Calculate the work Danny does.
Work done = 200N x 3m = 600J

3. Power

Power is the rate at which energy is transferred or the rate of doing work. Power is measured in Watts (W).

Power (W) = energy (J) / time (s)

Example: A motor transfers 600 joules of energy in 15 seconds. Calculate the power of the motor.

Power = 600 J / 15 s
= 40 W

4. Contact forces

A force is a push or a pull. We cannot see forces but we can see the effects of a force. A force changes the speed, direction or shape of an object.

Forces are vector quantities as they have both size (magnitude) and direction.

Contact forces are push or pulls that happen when 2 objects physically touch.

Examples include thrust, friction, air resistance, water resistance, tension and upthrust.

CP7/8
Energy, Forces and their Effects

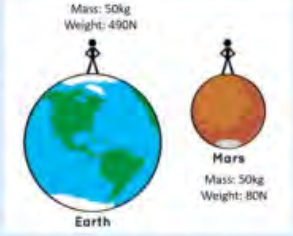
Hans Price Academy

5. Gravitational force

Any object that has a mass is pulled towards the centre of the Earth. This gravitational pull (gravity) explains why objects fall towards Earth.

The heavier an object, the more weight it has. This is because the size of the gravitational pull on Earth is constant.

If an astronaut visits the moon, their weight changes but their mass remains unchanged.



Weight (N) = mass (kg) x gravitational field strength (N/kg)

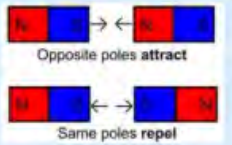
6. Electrostatic force

An object charged with static electricity has an electric field (electrostatic field) around it. The electric field can affect objects within it.

Two objects with the same charge that are close to each other produce a force equal in size but opposite in direction.

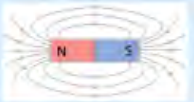
7. Magnetic force

The ends of a magnet are called poles. A bar magnet has a North pole and a South pole.



A magnet will either attract (pull towards) or repel (push away) from another magnet due to the interaction of poles.

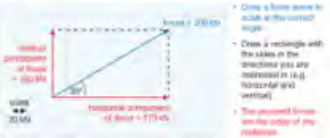
A magnet can attract objects made from magnetic materials (iron, nickel, cobalt).



The space around a magnet where a magnetic object experiences a force is called the magnetic field.

8. Vector diagrams (HT only)

An aeroplane's engines thrust it forwards and upwards during take off. We can work out how much thrust is pushing it forwards and pushing it upwards by resolving the thrust force into 2 components.



CP8 WORK DONE BY FORCES week commencing 16.03.26

1. State two examples of energy stores.	2. Define *work done.*	3. State the equation for work done.
4. Define *power* and state its unit.	5. Describe a contact force.	6. Describe the effect of gravitational force.
7. Describe what happens to like charges vs opposite charges.	8. Calculate the work done when a force of 150 N moves an object 4 m.	9. Calculate the power when 800 J of energy is transferred in 20 s.

Additional Notes

CP3 CONSERVATION OF ENERGY

Hans Price

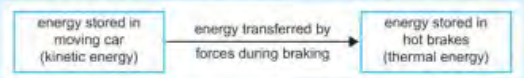
1. Energy stores

Energy is needed to make things happen or change. It is scalar quantity measured in Joules (J).

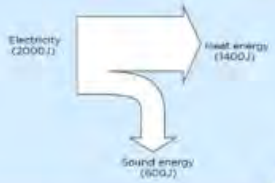
1. **Chemical** (food, fuel and batteries)
2. **Kinetic** (moving objects)
3. **Thermal** (hot objects)
4. **Elastic potential** (stretched, squashed or twisted objects)
5. **Gravitational potential** (objects in high positions)
6. **Nuclear** (inside atoms)

2. Energy efficiency

The law of conservation of energy states that energy cannot be created or destroyed. Sometimes energy is transferred to less useful stores such as the thermal energy. This energy is **dissipated.**



Sankey diagrams show the transfer of energy. This Sankey diagram shows the energy transfer in a kettle.



Efficiency = $\frac{\text{useful energy}}{\text{total energy}}$

3. Conduction

Energy can be transferred by conduction.

Conduction involves the transfer of energy in solids between neighbouring particles.

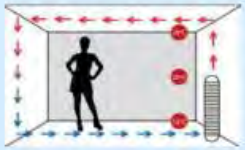
Metals are good thermal conductors and are said to have high thermal conductivity.

Wood and plastic are poor thermal conductors. These are examples of thermal insulators which have a low thermal conductivity.

4. Convection

Energy can be transferred by convection.

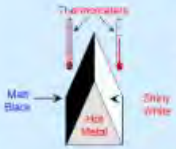
As particles in the liquid or gas state gain energy, they become less dense and start to rise. This generates convection currents and explains why an entire room heats up despite only having one radiator on one wall.



5. Radiation

Energy can be transferred by radiation.

Infrared and ultraviolet radiation from the Sun travel through a vacuum (an area with no particles) before reaching Earth's atmosphere.



Infrared radiation can travel through gases and some solid materials. Infrared radiation is absorbed and emitted easily by dull, dark surfaces but absorbed and emitted poorly by light, shiny surfaces.

6. Stored Energies

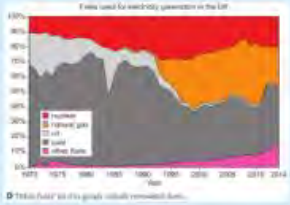
Objects stored at a height have the potential to fall. This is known as gravitational potential energy (GPE). This potential energy is then transferred to kinetic energy if the object falls towards Earth due to the force of gravity. If no energy is wasted GPE=KE.

Change in gravitational energy (J)	=	Mass (kg)	x	Gravitational field strength (N/kg)	x	Change in vertical height (m)
Kinetic energy (J)	=	1/2	x	Mass (kg)	x	(velocity)^2

7. Non-renewable Energy Sources

Non-renewable resources are those that generate electrical energy which are finite. This means they will run out one day. They include fossil fuels (coal, oil and natural gas) as well as nuclear fuel (uranium).

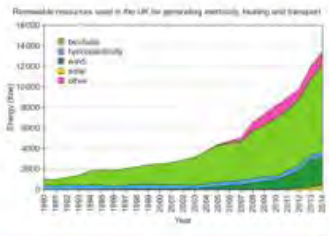
Fossil fuels release carbon dioxide and other greenhouse gases which contribute to climate change. As coal is the most damaging its use has been reduced in recent years.



8. Renewable Energy Sources

Renewable resources are those that generate electrical energy that will not run out. They are generally better for the environment as they produce less greenhouse gases. However, renewable sources can have an environmental cost to install them.

They include biofuels, hydroelectricity, wind and solar. The use of these have increased in recent years.



CP3 CONSERVATION OF ENERGY week commencing 23.03.26

1. Describe what is meant by the conservation of energy.	2. State one example of how energy can be transferred to a less useful store.	3. Describe what a Sankey diagram shows.
4. State the equation used to calculate energy efficiency.	5. Describe how energy is transferred by conduction.	6. Describe how energy is transferred by convection.
7. State the name given to an area with no particles.	8. Calculate the change in gravitational potential energy when a 3 kg object is lifted 4 m vertically.	9. Calculate the kinetic energy of a 2 kg object moving at 5 m/s.

CP3 CONSERVATION OF ENERGY week commencing 30.03.26

1. State the units for energy.	2. Name one energy store that increases when an object speeds up.	3. Describe how energy is transferred when a hot object is placed in contact with a cold object.
4. State which type of energy transfer can occur through a vacuum.	5. Describe how convection currents are formed in a liquid.	6. Explain why a room can be heated by a radiator placed on one wall.
7. State one example of a non-renewable energy source.	8. State one example of a renewable energy source.	9. Calculate the change in gravitational potential energy when a 5 kg object is lifted 2m vertically.

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CP7/8
Energy, Forces and their Effects

Hans Price Academy

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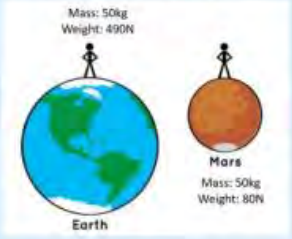

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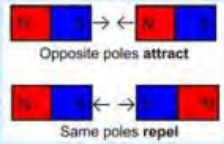
The ends of a magnet are called poles. A bar magnet has a North pole and a South pole. 

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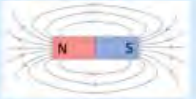
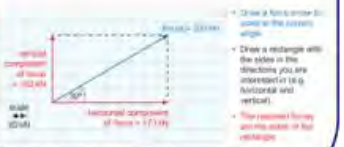


The space around a magnet where a magnetic object experiences a force is called the magnetic field.

8. Vector diagrams (HT only)

An aeroplane's engines thrust it forwards and upwards during take off. We can work out how much thrust is pushing it forwards and pushing it upwards by resolving the thrust force into 2 components.



CP7 ENERGY: week commencing 20.04.26

1. State the store of energy in a a) moving car - b) a hamburger - c) spring -	2. Name 2 non-contact forces.	3. State the unit for a) Power - b) Work done - c) Energy -
4. Calculate the work done by a weightlifter when a 280N barbell weight is lifted 1.5m straight up.	5. Calculate the work done by a teacher when she lifts a 10N box of books, 30m along the corridor.	6. Explain why force is a vector quantity.
7. Aesha weighs 500N and runs up a 3m flight of stairs in 10 seconds. Calculate Lesha's power.	8. Explain why a copper coin will not be attracted to a magnet.	9. Explain why the weight of an astronaut changes if they visit the moon.

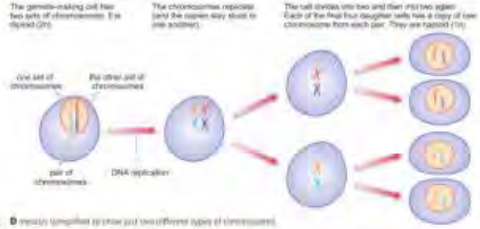
CB3 GENETICS week commencing 27.04.26

1. Name the two types of cell division.	2. Describe the cells produced by mitosis.	3. Compare the number of cells produced by mitosis and meiosis.
4. Define the term *haploid.*	5. Name two animal cells which are haploid.	6. Chicken body cells have 78 chromosomes. Calculate the number of chromosomes in a chicken sperm cell.
7. Human gametes have 23 chromosomes. Suggest why a human zygote has 46 chromosomes.	8. Describe the haploid cells in the human body.	9. Explain why humans have both diploid and haploid cells in their bodies.

CB3 Genetics

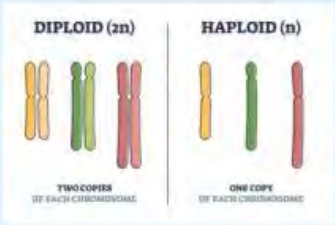
1. Meiosis

There are two types of cell division called mitosis and meiosis . Mitosis produces **2** genetically identical, diploid body cells for growth and repair (revisit using the CB2 knowledge organiser). **Meiosis produces 4 haploid, genetically unidentical sex cells (gametes)**. These fuse to form a diploid zygote after fertilisation.



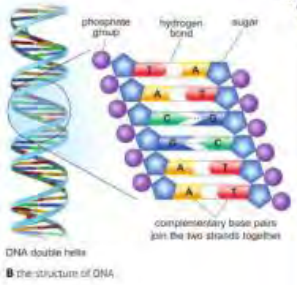
2. Diploid v haploid

Gametes are **haploid**, only carrying one set of the chromosome. When the **gametes** are made in meiosis, only one of the alleles is used. When the sperm and the egg come together in fertilisation, a **diploid zygote** is produced (now with both alleles - one from the father and one from the mother).



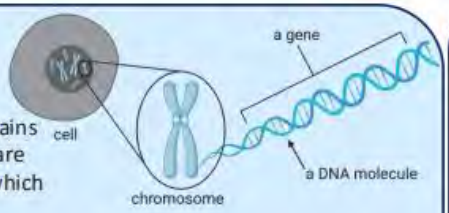
3. Structure of DNA

There are four bases in DNA: Adenine (A), Thymine (T), Cytosine (C) and Guanine (G). They pair together by **weak hydrogen bonds**.
A pairs with T, forming **two** bonds (apple on the tree).
C pairs with G, forming **three** bonds (car in the garage).
T for two (bonds), C and G rhyme with 3!



B the structure of DNA

4. DNA code



Chromosomes
The cell's **nucleus** contains **chromosomes**. These are long threads of DNA, which are made up of many **genes**.

Genes
A gene is a small section of DNA. Each gene codes for a particular sequence of amino acids which produces a specific protein. Genes are inherited down different generations.

5. Extracting DNA

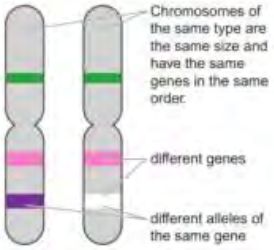
Aim: Describe how to extract DNA from a fruit.
Method
1.Peel the skin from half a kiwi fruit and mash it up.
2.Mix a teaspoon of salt and small volume of washing up liquid and pineapple juice into the fruit.
3.Gently heat this mixture at about 60°C for five minutes.
4.Filter the mixture and retain only the filtrate (the filtered liquid).
5.Cool using an ice bath and gently pour chilled ethanol onto the top of the filtrate.

Why use...
Salt: Breaks the cell wall
washing up liquid Remove cell/nuclear membrane
Pineapple juice Enzymes to break apart proteins
Chilled ethanol To precipitate the DNA so we can see it

6. Alleles

We have two copies of each chromosome. Each gene on each chromosome is called an allele. A certain allele can be the same (**homozygous**) or different (**heterozygous**).

Each allele can also be dominant (this one will always be used) represented by a capital letter or recessive (will only be used if the other allele is also recessive) represented as a lower case letter.

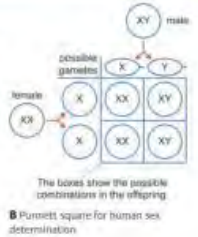


B Each gene can exist in a number of different forms called alleles.

7. Inheritance (sex determination)

A Punnett square shows the possible outcomes for the sex of a baby.

Male (body) cells have an XY chromosome (an X allele and a Y allele). Female (body) cells have an XX chromosome (two X alleles).

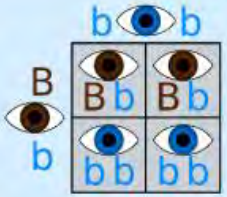


B Punnett square for human sex determination

The sperm then either has an X chromosome or a Y chromosome
The egg cell can only have an X chromosome.
The completed punnett square shows that there are 2 possible outcomes: XX (girl) or XY (boy). So 50% chance of a baby being male or female.

8. Inheritance (characteristics)

A Punnett square can also be used to look at characteristics of a baby.



In this example the father has blue eyes
Phenotype (what it looks like: Blue)
Genotype (the alleles that code for it: bb)
The mother has brown eyes
Phenotype (brown) **genotype** (Bb).
As the mother's genotype is Bb we call this **heterozygous**. The fathers genotype bb is **homozygous recessive**.
If the dominant (B) allele is used, then the baby will have brown eyes
If both recessive (b) allele is used, then the baby will have blue eyes.

9. Variation

Some of the variation between individuals of the same species is the result of variation in their genes. **Genetic variation** is caused by the different alleles inherited during sexual reproduction. Different alleles are produced by mutations, some of which cause changes in the phenotype. However, many characteristics also show **environmental variation**, because they are affected by their surroundings. For example, how well a plant grows is affected by how much light, water and nutrients it gets.

CB3 GENETICS week commencing 04.05.26

1. Name the four DNA bases.	2. Name the bonds that hold DNA bases together.	3. State how many bonds are formed between A and T base pairs.
4. Describe the location of chromosomes in the cell.	5. Define the term *gene*.	6. Fill in the blanks: *Each gene codes for an a_ _ _ _ acid which produces a specific p_ _ _ _ _ _.*
7. Explain why salt is added to the DNA during extraction.	8. Pineapple juice is a protease enzyme. Describe its role.	9. Explain why ethanol is added at the end of DNA extraction.

CB3 GENETICS week commencing 11.05.26

1. Define the term *allele*.	2. Name the term given to two alleles that are different.	3. Name the term given to two alleles that are the same.
4. State the biological sex of a person with an XX sex chromosome.	5. Complete the Punnett square for sex determination. **X** **X** **X** **Y**	6. Millie has brown eyes (Bb). a) State her genotype b) State her phenotype
7. Jack has blue eyes (bb) a) State his genotype b) State his phenotype	8. Complete the Punnett square for Millie and Jack's offspring. **B** **b** **b** **b**	9. Calculate the likelihood of Millie and Jack's offspring having: a) Brown eyes b) Blue eyes

CB4 Natural Selection

1. The Theory of Natural Selection

Charles Darwin studied populations of species and made the following observations:

1. there is **variation** in organisms of same species.
2. parents pass on characteristics to **offspring**.
3. organisms have to **compete** for resources and avoid being eaten.

From his observations he devised the Theory of Natural Selection: the idea that populations change over time. Below are the main stages of the theory, with reference to *antibiotic resistance in bacteria*.

GENETIC VARIATION – within the population, some have a mutation which gives them antibiotic resistance.

ENVIRONMENT – the bacteria are exposed to antibiotics.

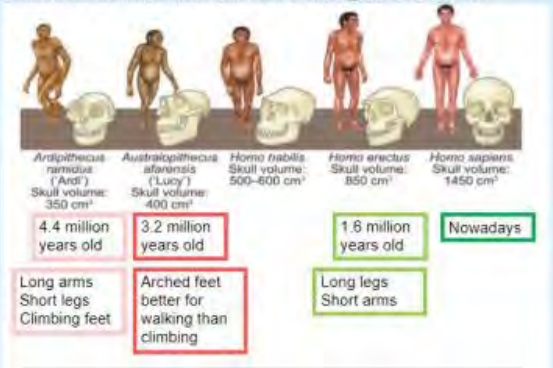
NATURAL SELECTION – those with the resistance survive and reproduce.

INHERITANCE – the gene for antibiotic resistance is passed on to the bacteria's offspring when they reproduce.

EVOLUTION – over many generations, all individuals in the population have antibiotic resistance.

2. Evidence of Human Evolution

Scientists believe humans have changed over time.



Other evidence for human evolution is **stone tools**. They were used for activities such as hunting. The depth of rock they were found in tells us when they were used. Rocks that were found in younger rock are more specialised, suggesting a higher level of intelligence.

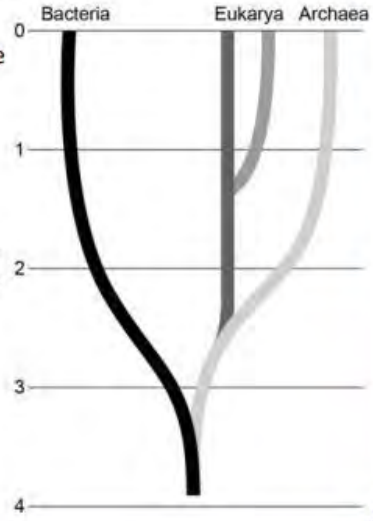
3. Classification

Organisms are grouped based on their features. Carl Linnaeus developed the five-kingdom system. The genus and species form the scientific name of the species.

Classification systems have continued to be developed by other scientists, such as Carl Woese, who developed the three-domain system. This is based on evidence from genetic analysis, which groups archaea and eukaryota as more similar, based on sections of unused genes.

4. Phylogenetic Trees

Phylogenetic trees are used to show the **diversification of species** during **evolution.**



From this phylogenetic tree, eukarya and archaea share a **more recent common ancestor**.

5. Selective Breeding

Selective breeding is when **humans artificially select** the plant or animals that are going to breed, depending on the **genes.**

We choose characteristics that are useful or attractive:

- Cows which produce lots of milk
- Plants that don't get many diseases
- Dogs which are friendly

Process of Selective Breeding

1. choose parents with the desired characteristic from a mixed population e.g. the cow with the biggest muscle mass
2. They are bred together
3. From the offspring those with the desired characteristic are bred together.
4. This continues over many generations until all the offspring show the desired characteristic.

6. Genetic Engineering

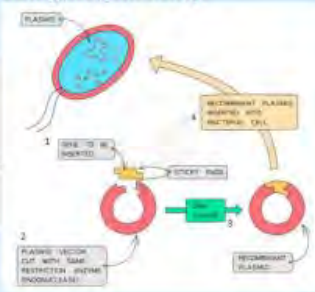
Artificial transfer of a gene responsible for a desired characteristic from one organism into another organism, so that it also has the desired characteristic.

Examples of genetic engineering:

- Golden Rice – rice that contains **beta-carotene**
- Bacteria containing the **human insulin gene.**

The stages of genetically engineering:

1. Cut gene using restriction enzymes
2. Cut plasmid vector with restriction enzymes
3. Complementary sticky ends left
4. Join DNA using ligase



CB4 NATURAL SELECTION week commencing 01.06.26

1. Name the scientists who developed the Theory of Natural Selection.	2. State one observation Charles Darwin made about organisms of the same species.	3. List the five stages in Natural Selection.
4. Some moths have dark-coloured wings, some have light-coloured wings. State the characteristic that shows variation.	5. In polluted areas, the bark of the tree is dark-coloured. State whether dark-coloured or light-coloured moths are better adapted to polluted areas.	6. Over many generations, all moths in polluted areas have dark-coloured wings. Name the stage of the Theory of Natural selection this best describes.
7. State how many years ago Ardi lived on planet Earth.	8. Order these human ancestors from oldest to most recent: *Homo erectus* → Ardi → Lucy	9. State one piece of evidence used to support human evolution.

CB4 NATURAL SELECTION week commencing 08.06.26

1. Name the scientist who developed the five-kingdom system.	2. List the missing stage of classification: 	3. List the missing stage of classification: 
4. Name the two parts of the classification system that make up the scientific name of a species.	**5.** Name the scientist who developed the three-domain system of classification.	**6.** Describe the evidence Carl Woese used for the three-domain system of classification.
7. State what phylogenetic trees are used to show.	**8.** Using the phylogenetic tree, state which two groups share a more recent common ancestor.	9. State the number of years ago bacteria diversified from Archaea and Eukarya.

CB4 NATURAL SELECTION week commencing 15.06.26

1. Define the term *selective breeding*.	2. Give one example of selective breeding in plants or animals.	3. Describe the first step in the process of selective breeding.
4. Describe what happens to the offspring during selective breeding.	5. Define the term *genetic engineering*.	6. Give one example of genetic engineering.
7. Name the enzyme used to cut DNA during genetic engineering.	8. Name the enzyme used to join DNA together.	9. Describe one difference between selective breeding and genetic engineering.

Additional Notes

1. Waves

Waves transfer energy from one place to another. They do not transfer particles or matter.

Wave **frequency** is the number of waves passing a point each second. It is measured in **hertz** (**Hz**). A frequency of 1 hertz means 1 wave passing per second. For sound, the wave frequency determines the pitch (how high or low it sounds) and for light the frequency determines the colour.

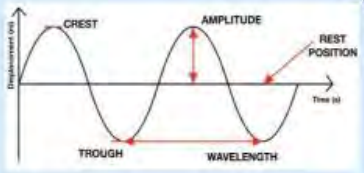
The **period** is the length of time it takes one wave to pass a given point. The **wavelength** of a wave is the distance from a point on one wave to a point in the same position on the next wave, measured in metres.

The **amplitude** of a wave is the maximum distance of a point on the wave away from its rest position, measured in metres. The greater the amplitude of a sound wave, the louder the sound.

The **velocity** of a wave is the speed of the wave in the direction it is travelling. Waves travel at different speeds in different materials.

2. Transverse waves

In **transverse waves**, the vibrations are at right angles to the direction of energy transfer.



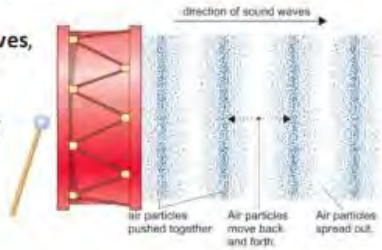
Examples of transverse waves include:

- ripples on the surface of water
- vibrations in a guitar string
- electromagnetic waves - eg light waves, microwaves, radio waves
- seismic (Earthquake) S-waves

3. Longitudinal waves

Sound waves also transfer energy. Sound waves are **longitudinal** waves. Particles in the material through which the wave is travelling move backwards and forwards as the wave passes.

In **longitudinal waves**, the vibrations are parallel to the direction of energy transfer.



4. Calculating wave speed

Worked example W1

A surfer travels 52 m on the front of a wave in 8 s. Calculate the wave speed.

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

$$\text{wave speed} = \frac{52\text{ m}}{8\text{ s}}$$

$$= 6.5\text{ m/s}$$

The speed of a wave can be calculated from the distance it travels in a certain time. This is the same equation we use for calculating the speed of moving objects.

$$\text{speed (m/s)} = \frac{\text{distance (m)}}{\text{time (s)}}$$

CP4 Waves

Hans Price Academy

5. Calculating wave speed (again)

The wave speed is linked to the wave frequency and wavelength by this equation.

wave speed (m/s) = frequency (Hz) × wavelength (m)

Worked example W2

Some waves have a wavelength of 13 m and a frequency of 0.5 Hz. Calculate their speed.

$v = f \times \lambda$

$= 0.5\text{ Hz} \times 13\text{ m}$

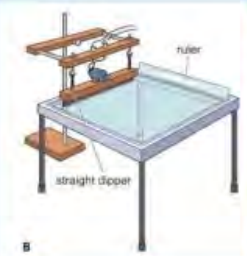
$= 6.5\text{ m/s}$

6. Measuring the speed of waves

You can find the speed of sound by measuring the time it takes for a sound to travel a certain distance. For example, if you stand in front of a large wall you can measure the time it takes for an echo of a loud sound to reach you. The speed can be calculated using the speed, time, distance equation.

One way of measuring the speed of waves on water is to measure the time it takes for a wave to travel between two fixed points such as buoys. The speed can be calculated from the time and the distance between the points.

7. Investigating waves



Method

Measuring waves on water

A Set up a ripple tank with a straight dipper near one side of the tank. Fasten a ruler to one of the adjacent sides so you can see its markings above the water level.

B Vary the current to the motor until you get waves with a wavelength about half as long as the ripple tank (so you can always see two waves).

C Count how many waves are formed in 10 seconds and write it down.

D Look at the waves against the ruler. Use the markings on the ruler to estimate the wavelength of the waves. Use the wavelength and frequency to calculate the speed of the waves.

E Mark two points on the same edge of the ripple tank as the ruler. Measure the distance between your points. Use the stopwatch to find out how long it takes a wave to go from one mark to the other. Use this information to calculate the speed of the waves.

Measuring waves in solids

F Suspend a metal rod horizontally using clamp stands and rubber bands.

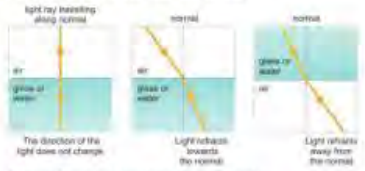
G Hit one end of the rod with a hammer. Hold a smartphone with a frequency app near the rod and note down the peak frequency.

H Measure the length of the rod and write it down. The wavelength will be twice the length of the rod.

I Use the frequency and wavelength to calculate the speed of sound in the rod.

8. Refraction

Most waves travel in straight lines. However, waves can change direction when they move into a different medium. The change in direction is called refraction. When a wave goes through a more dense material the wave slows down and therefore changes direction



A Light is refracted when it goes from one material to another.

CP4 WAVES week commencing 22.06.26

1. State what waves transfer.	2. State whether waves transfer particles or energy.	3. Define the term *frequency*.
4. Define the term *wavelength*.	5. Describe the direction of vibrations in a transverse wave.	6. Name two examples of transverse waves.
7. Describe the direction of vibrations in a longitudinal wave.	8. State what type of wave a sound wave is.	9. Describe how particles move in a longitudinal wave.

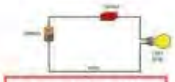
CP4 WAVES week commencing 29.06.26

1. State the equation used to calculate wave speed.	2. State the units for: A) wave speed B) frequency C) wavelength	3. Calculate the wave speed of a wave with a frequency of 0.5 Hz and a wavelength of 13 m.
4. Describe one way the speed of sound can be measured.	5. State the equation used to calculate speed using distance and time.	6. Name one piece of equipment used to investigate waves in a ripple tank.
7. Define the term *refraction.*	8. Describe what happens to a wave when it enters a more-dense medium.	9. Describe what will happen to a wave when it travels from the air into a glass block.

1. Waves

Waves are a **transfer of energy**. They do **not** transfer particles.

Mechanically



Electrically

Ways energy can be transferred

By heating

By light and sound

2. Light and sound waves

	Light waves	Sound waves
What type of wave are they?	Transverse (oscillate perpendicular to direction of energy transfer)	Longitudinal (oscillate parallel to direction of energy transfer)
Can they travel through matter (solids, liquids and gases)?	Yes (if transparent or translucent)	Yes
Can they travel through a vacuum?	Yes	No
How are they detected?	Eyes, cameras	Ears, microphones
Can they be reflected?	Yes	Yes
Can they be refracted?	Yes	Yes
What is the wave speed?	$3.0 * 10^8$ m/s 300,000,000 m/s	340 m/s in air

3. Refraction

When light changes passes from one medium to another, its speed and direction change. This is called **refraction**.

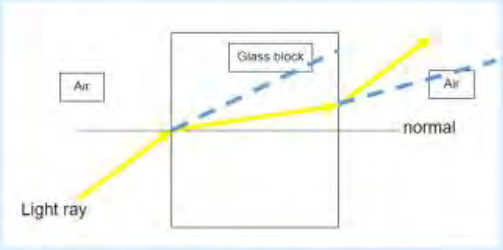
When light moves from a less dense medium, to a more dense, medium it **slows down** and changes direction **towards the normal**.

When light moves from a more dense medium, to a less dense medium it **speeds up** and changes direction **away** from the normal.

FASTER AWAY, SLOWER TOWARDS

Refraction shows that although light travels in straight lines, a change in the direction of travel can occur.

4. Ray diagrams



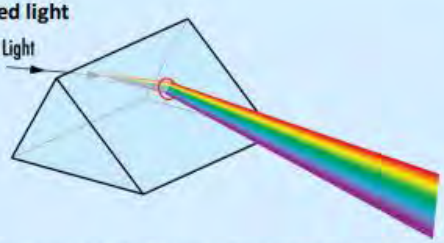
Yellow shows the pathway of light.

Blue shows the direction the light would take if the density of the medium had NOT changed.

CP5 EM spectrum

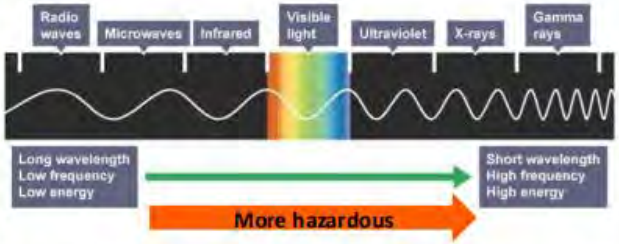
Hans Price Academy

5. Coloured light



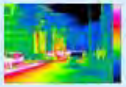
Light separates into different colours when shone through a prism because it **is bent, or refracted, by the angles and plane faces of the prism, and each wavelength of light is refracted by a slightly different amount**. Violet has the highest frequency and is refracted the most. Red has the lowest frequency and is refracted the least.

6. EM spectrum



Waves with a wavelength between 380nm and 730nm are known as visible light.

7. Uses of EM waves



Wave	Use
Radio	• Communication (radio and TV)
Microwave	• Heating food • Communication (WiFi, mobile phones, satellites)
Infrared	• Remote controls • Fibre optic communication • Thermal imaging (medicine and industry) • Night vision • Heating or cooking things • Motion sensors (for security alarms) • Electrical heaters • Infrared cameras
Visible light	• Seeing and taking photographs/videos • Fibre optic communications
Ultraviolet	• Security marking (fluorescence) • Fluorescent bulbs (energy efficient lamps) • Getting a suntan
X-Rays	• X-Ray images (medicine, airport security and industry)
Gamma Rays	• Sterilising medical instruments • Treating cancer

8. Dangers of EM waves

•As the frequency of electromagnetic (EM) waves increases, so does the energy.

•Beyond the visible part of the spectrum, the energy becomes large enough to **ionise** atoms.

Wave	Danger
Radio	• No known danger
Microwave	• Possible heat damage to internal organs
Infrared	• Skin burns
Visible light	• Bright light can cause eye damage
Ultraviolet	• Eye damage • Sunburn • Skin cancer
X-rays	• Kills cells • Mutations • Cancer
Gamma Rays	• Kills cells • Mutations • Cancer

CP5 EM SPECTRUM week commencing 06.07.26

1. State what a wave transfers.	2. Give two ways energy can be transferred.	3. Identify which type of wave is a light wave and which type of wave is a sound wave.
4. True or false: sound waves travel through a vacuum.	5. State the speed of light in a vacuum.	6. State the wavelength range of visible light.
7. Name the colour of visible light with the highest frequency.	8. Name two uses of electromagnetic waves.	9. Describe what happens to the level of danger of the EM waves as the frequency increases.

CP5 EM SPECTRUM week commencing 13.07.26

1. State whether electromagnetic waves are transverse or longitudinal.	2. Explain why sound waves cannot travel through a vacuum.	3. A student shines light from air into a glass block. Describe how the ray changes direction as it enters the glass.
4. State the colour of visible light with the: a) highest frequency b) lowest frequency	5. Explain why white light separates into colours when it passes through a prism.	6. State what happens to the frequency and energy of EM waves as you move across the spectrum towards gamma rays.
7. Identify the electromagnetic wave used for cooking food and taking medical images of bones	8. Explain why some electromagnetic waves are more dangerous than others.	9. Put the following electromagnetic waves in order from lowest frequency to highest frequency: Microwaves, Infrared, Gamma rays, Radio waves

Computing Knowledge Organisers

Network Security: Methods of Prevention and Detection

There are four main prevention and detection methods that can keep your system **SAFE** - **S**trong passwords, **A**nti-malware, **F**irewall, **E**ncryption

Strong Password

- Needs to be at **least 8 characters** long.
- Should include UPPERCASE, lowercase, numbers and Symbols (e.g. ! $ @ -).
- **Stops unauthorised users** from accessing your account/profile and changing/deleting/stealing your files.

Firewall

Controls which programs **can send or receive data packets** from your computer or network.

- Stops unauthorised users from accessing your computer system.
- **Only trusted programs** should be allowed to send and receive data packets

Anti-malware

Scans your computer **periodically** for malware.

- **Quarantines** or **deletes** malware so that it doesn't spread to other files or computers.
- You need to scan all downloads and email attachments before opening them.
- Needs to be updated regularly in order to keep up to date with the latest threats.

Encryption

Scrambles data packets using a **cipher** so that they **cannot be understood** by unauthorised users.

- You **need a key to decrypt** the data packets so that they can be understood.
- Websites which require you to send personal information should be encrypted (HTTPS).
- WiFi connections should also be encrypted to stop unauthorised users from accessing your network.

10

Network Security: More Methods of Prevention and Detection

Brute Force Attack

Brute-force Attack can be prevented by:

- ✔ Using strong passwords
- ✔ Locking accounts after a certain number of login attempts
- ✔ Using 2 step verification (e.g. a code sent to mobile phone to confirm identity)

Passive Attacks (Data Interception)

Passive attacks can be detected and prevented by:

- ✔ Using **encryption**
- ✔ Using **network forensics**
- ✔ Using **penetration testing**

Denial-of-Service Attack (DoS & DDoS)

Denial-of-Service Attack (DoS) and **Distributed Denial-of-Service Attack (DDoS)** - can be prevented by:

- ✔ Using a **firewall** to control which programs can send and receive data packets, so that only authorised users & trusted programs can access the network.

Social Engineering Threats

Social engineering threats can be detected and prevented by:

- ✔ Creating **user access levels**
- ✔ Using an effective **network policy**
- ✔ Ensuring users have **strong passwords**
- ✔ Using **biometric identification measures**
- ✔ Installing **physical security** (e.g. locked rooms)
- ✔ Ensuring **user awareness** of unsolicited texts, emails and phone calls. Users should not give personal, confidential information away
- ✔ Applying **email filtering** to prevent suspect emails getting through.
- ✔ Ensuring that users check the URL in the website address.
- ✔ Using a **website filter**
- ✔ Ensuring users are aware of who is around them when they are typing in their password.

Preventing Malware

Malware can be detected and prevented by:

- ✔ Running **anti-malware software** regularly
- ✔ NOT downloading software from unknown sources
- ✔ NOT clicking on unknown links
- ✔ Scanning downloaded files before opening them
- ✔ NOT using removable media (e.g. a USB drive) as they may contain malware
- ✔ Using **automatic software updates**: up-to-date software will include patches for known vulnerabilities and up-to-date anti-malware uses the most current database of threats

11

System Security Threats

Brute-force Attack – when all possible password combinations are systematically tried, with the hope of getting it right.

Denial-of-Service Attack (DoS) - when a network resource becomes deliberately overloaded ('flooded') with unnecessary requests, preventing it from responding normally.

Distributed-Denial-of-Service Attack (DDoS) – when the requests come from many sources so you cannot just block a single IP address.

Malware is software that has been purposely developed to damage, disrupt or take control of computer systems.

Social engineering techniques manipulate people into giving away confidential and personal information.

Malware

Malware is software that is designed to cause harm to computer systems, networks or data (e.g. delete or corrupt data).
Examples:

- **Computer viruses** – insert themselves in normal programs. Viruses can replicate themselves and transfer from one computer to another. They are activated by a user often as email attachments and attachment to other files and programs.
- **Trojan** gains access to a computer by pretending to be legitimate software. The trojan allows unauthorised backdoor access to a computer without the user being aware.
- **Spyware** records the activity on your computer such as your keystrokes, thereby logging your passwords for instance and then sending the data back over the network to the attack instigator. Spyware can also be used to control your webcam and microphone.
- **Adware** includes banners and popups that are automatically installed onto a computer. Whilst this does not cause any damage, adware is undesirable and can slow down the performance of a computer.
- **Worms** spread like viruses but do not require human intervention. They attach themselves to network tools to spread automatically around a network very quickly.

12

Types of Social Engineering

Phishing Normally an email or text messaging scam where victims are conned into believing that they are being contacted by an authentic organisation (e.g. by their bank) and can give sensitive personal details (such as bank account passwords).

Pharming Users are redirected to a fraudulent website that they believe to be genuine because it looks like the real site. For instance, you could be directed to a site that pretends to be an online store which asks you for your credit card information.

Shoulder surfing Fraudsters look over the shoulder of users to see what passwords or PIN numbers are being typed into the device. This can easily occur at computer terminals and at ATMs that are out in the street.

Forms of Attack

Passive Attack – data is monitored e.g. wiretap

Active Attack - data is modified e.g. malware

Inside Attack– by someone within the organisation

Outside Attack – by an illegitimate, external user

Penetration Testing

Penetration testing is used to identify possible weaknesses in a network's security by trying to exploit them. The results are then reported back and any weaknesses are fixed.

A **white box** penetration test is used to simulate an **inside attack** where the attacker may have some knowledge of the system and basic credentials.

A **black box** penetration test is used to simulate an **outside attack** (i.e. hacker)

User Access Levels

User access levels control which part of the network users can access. User access levels are used to limit the number of people with access to important data, helping to prevent **inside attacks** on the network.

Network Policy

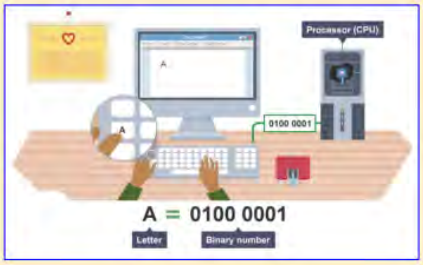
A network policy is a set of rules and procedures that an organisation will follow to ensure their network is protected against attacks. An effective network policy will **encrypt** sensitive data, have an **acceptable use policy**, install **ant-malware** and install a **firewall.** The policy will also enforce the use of **strong passwords** that are changed regularly and will enforce the regular testing of the network for weaknesses.

13

Representing Characters

Why is text represented as a binary number?

Computers don't understand letters and numbers the way that we do. Everything in a computer is represented by an electrical signal which can be in one of two states: **on** or **off**. These two states (**on** and **off**) can be **represented** by two numbers (**1** and **0**). This means that we must **represent** all information, including text, as a **binary number** (made up of 1s and 0s). So we came up with **standard systems** for **representing** each character as a **binary number**. One **standard system** for representing characters is **ASCII Code** and another is **Unicode**



ASCII Code

ASCII stands for **American Standard Code for Information Interchange**. Originally, **ASCII Code** represented each character as a **binary number** with **8 binary digits** (**8 bits**). That's a binary number, made up of 8 values and each value will be either 1 or 0. For example, 1000001. So ASCII Code can represent 256 different characters (2^8).

- the letter 'a' has the binary number 0110 0001
- the letter 'b' has the binary number 0110 0010
- the letter 'c' has the binary number 0110 0011

Character Set

Characters are grouped together to form a **character set**. The **character set** is **all the characters** that a computer **understands** and **can display.** A **character set** includes:

- ✔ letters and numbers
- ✔ symbols (*, &, : etc.)
- ✔ control characters (e.g. Shift, Escape)

Unicode

Unicode was created to allow more characters to be represented. This allowed emoticons and characters from languages other than English to be represented. Unicode uses **16 bits** to represent each character (65,536 different characters: 2^{16}) and adapted versions of Unicode now use up to **32 bits**.

14

Additional Notes

Representing Images

An image is made up of **pixels.** Each **pixel** will have a colour and the **higher the number of colours** that you want to use, the **higher the number of bits** you will need to represent each colour.

The **resolution** of the image is the number of **pixels per inch** that we use to display an image. The higher the resolution the **better the picture quality** but the **larger the file size**

The number of bits needed to represent an image is called the **colour depth.** The greater the colour depth, the **greater the number of colours** and the **better the image quality**...

...but the **more bits** we use for each pixel, the **larger the image file size** because each bit takes up space in the file

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Representing Images: Colour Depth Calculator

00000000	0000000	000000	00000	0000	000	00	0
8 bits	7 bits	6 bits	5 bits	4 bits	3 bits	2 bits	1 bit
2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1
2x2x2x2x2x2x2x2	2x2x2x2x2x2x2	2x2x2x2x2x2	2x2x2x2x2	2x2x2x2	2x2x2	2x2	2
256 colours	128 colours	64 colours	32 colours	16 colours	8 colours	4 colours	2 colours

Converting Binary to Denary

- In **binary**, each **binary digit (bit)** can only have a value of **0** or **1**.
- Our number system (counting in tens) is called **denary**.
- To convert an **8 bit binary number** to a **denary number** we put the binary digits in separate columns (see the table below).
- Each 1 will have the denary value of the column that the 1 is in.

128	64	32	16	8	4	2	1
0	0	0	0	1	0	1	0

We just add the numbers together of all columns with a **1** in. So, this number has a **denary value** of **8 + 2 = 10**

Binary Units

Bit	Nibble	Byte	Kilobyte	Megabyte	Gigabyte	Terabyte
A single 1 or 0	4 bits	8 bits	1000 Bytes (1024)	1000 Kilobytes (1024)	1000 Megabytes (1024)	1000 Gigabytes (1024)

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Adding Binary Numbers

When two numbers that are less than 10 are added together in denary, sometimes we need two columns, two numbers to write the answer.

For example 7 + 5

```
  7
+ 5
 12
```

The same is true in binary.....but in binary, there are four rules that need to be followed. Here are the rules...

Binary Addition Rules

0 + 0 = 0

1 + 0 = 1

1 + 1 = 0 (carry the one)

1 + 1 + 1 = 1 (carry the one)

Overflow Errors

If there are **not enough bits available** to store the result of a calculation (for example adding in binary) it will cause an overflow error. The result is not correct and this can cause catastrophic effects such as the explosion of the Ariane 5 rocket.24

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Converting Hex Digits to Denary

Method

a) Split the hex value

F | 8

b) Work out the nibble for each hex value. If it is a letter, then you will need to know the denary value.

F			
8	4	2	1
1	1	1	1

8			
8	4	2	1
1	0	0	0

c) Join the 2 nibbles and add them to 8 bits in a table

128	64	32	16	8	4	2	1
1	1	1	1	1	0	0	0

d)Add the denary number values of the table

128	+	64	+	32	+	16	+	8	=	248

Denary (Base 10)	Hexadecimal (Base 16)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

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Converting Denary Numbers to Hex

Method

248

a)Convert the denary number to binary

128	64	32	16	8	4	2	1
1	1	1	1	1	0	0	0

b) Split the binary number into two nibbles and work out the hex value of each nibble

F			
8	4	2	1
1	1	1	1

8			
8	4	2	1
1	0	0	0

c)Join the hex digits together

F8

Denary (Base 10)	Hexadecimal (Base 16)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

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Converting Binary to Hex

Method

a) Split into nibbles!

0011 | 1011

b) Work out each nibble as a hex value.

8	4	2	1
0	0	1	1

2+1=3

8	4	2	1
1	0	1	1

8+2+1=11

11 is B in hexadecimal

c) Join the 2 hex values together to get your answer!

3B

Denary (Base 10)	Hexadecimal (Base 16)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

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Converting Hex Digits to Binary

Method

a) Split the hex value

F | 8

b) Work out the nibble for each hex value. If it is a letter, then you will need to know the denary value.

F			
8	4	2	1
1	1	1	1

8			
8	4	2	1
1	0	0	0

F is 15 in denary

c) Join the 2 nibbles to get your answer!

11111000

Denary (Base 10)	Hexadecimal (Base 16)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F

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French Knowledge Organisers

9.11 My school Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

The present tense	ER verb	IR verb	RE verb
Je (I)	-e	-is	-s
tu (you)	-es	-is	-s
Il/Elle/On (he/she/one)	e	-it	-
Nous (we)	-ons	-issons	-ons
Vous (you all)	-ez	-issez	- ez
Ils /Elles (they)	-ent	-issent	-ent

The future tense in French

You can talk about the future by using the **near future** tense.
Use part of the verb ALLER and the infinitive to say what you are **going** to do.

Ce soir, je vais jouer au tennis. This evening I am going to play tennis.
Demain, Paul va faire un gâteau. Tomorrow Paul is going to make a cake.

You can also use the following phrases with an infinitive to refer to the future.
Je veux= I want
Je voudrais = I would like
J'aimerais = I would like
J'espère = I hope
J'ai l'intention de = I intend / I am planning

Adjectives describe nouns e.g., a **black** blazer.

In French, adjectives normally go after the words they are describing e.g., une chemise bleue (a blue shirt) and they must agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g., une veste noire (a black blazer).

If that same noun is also plural, the adjective will be feminine **AND** plural as well e.g., les chaussettes noires (black socks).

Comparatives – to express more or less than
… est plus + adjective + que - is more…adjective…than
… est moins + adjective + que - is less…adjective… than
… est aussi + adjective + que – is as…adjective…as
For example:
L'anglais est plus intéressant que la géographie. (English is more interesting than Geography)
L'histoire est moins amusant que l'E.P.S. (History is less fun than PE)
Le français est aussi difficile que les maths. (French is as difficult as maths).

9.11 My School Life – Vocabulary List

Les matières	School subjects
L'anglais	English
L'espagnol	Spanish
Le français	French
Le théâtre	Drama
Le dessin	Art
Le sport / l'EPS	PE
L'informatique	Computer Science
L'éducation civique	PSHE
La technologie	Technology
Les mathématiques	Maths
Les sciences	Science
Les sciences humaines	Humanities

Quelles sont les règles?	What are the rules?
On doit / On ne doit pas	You must / You must not
On peut / On ne peut pas	You can / You can not
Il faut	You must
Il est interdit de/d'	It is forbidden to
Écouter en classe	(to) listen in class
Utiliser son portable	(to) use your phone in class
Porter des bijoux	(to) wear jewellery
Porter du maquillage	(to) wear make-up
Porter des baskets	(to) wear trainers
Manquer les cours	(to) miss lessons
Être à l'heure	(to) be on time
Mâcher du chewing-gum	(to) chew chewing-gum
Faire ses devoirs	(to) do homework

Qu'est-ce que tu en penses?	What do you think of it?
C'est/Ce n'est pas	Is/It is not
Intéressant (e)	Interesting
Pratique	Practical
Utile/inutile	Useful/not useful
Facile/Difficile	Easy/difficult
Ennuyeux (se) /barbant (e)	Boring
Passionnant (e)	Exciting
Créatif (ve)	Creative
Important (e)	Important
Trop	Too
Très	Very
Assez	Quite
Un peu	A bit (a little)

Qu'est-ce que tu voudrais faire dans le futur?	What would you like to do in the future?
Je vais	I am going
Je voudrais/J'aimerais	I would like
Réussir mes examens	To pass my exams
Recevoir des bonnes notes	To get good results
Faire un apprentissage	To do an apprenticeship
Chercher du travail	To search for a job
Faire du bénévolat	To do voluntary work
Voyager autour du monde	To travel the world
Avoir des enfants	To have children
me marier	To marry
Apprendre à conduire	To learn to drive
Devenir	To become
Médecin/Veterinaire	A doctor/a vet
Professeur/Avocat(e)	A teacher/a lawyer
Mécanicien(ne)/Plombier(ière)	A mechanic/a plumber
Pompier (ière)	A firefighter
Coiffeur(euse)	A hairdresser

Comment est ton uniforme scolaire?	What is your school uniform like?
Je porte	I wear
Il faut porter	You must wear
Une veste/ un blazer	A blazer/jacket
Un pull	A jumper
Une chemise	A shirt
Un t-shirt	A t-shirt
Une cravate	A tie
Une jupe	A skirt
Des chaussettes	Socks
Un pantalon	Trousers
Des chaussures	Shoes
Un collant	Tights
Un hijab	Hijab
Moche	Ugly
Beau/belle	Beautiful
(In)confortable	(un)comfortable
Cher	Expensive
Pas cher/bon marché	Not expensive/cheap
À la mode	Fashionable
Démodé(e)	Old-fashioned

La journée scolaire	The school day
Je quitte la maison	I leave the house
Je vais au collège	I go to school
Les cours commencent à	Lessons start at
Les cours terminent à	Lessons end at
Ça dure	It lasts
La récréation	Breaktime
L'heure du déjeuner	Lunchtime
Le matin	The morning
L'après-midi	The afternoon
Le soir	The evening
Un élève	A pupil
Un prof	A teacher

French Knowledge Organisers

9.12 Festivals and Culture

Listening check-list
Before I listen …
1. read the exercise carefully, paying attention to the instructions and pictures
2. think of possible words, phrases and ideas I might hear
3. think about how these words and phrases would be pronounced
4. think of the different ways certain phrases could be expressed
While I listen, pay attention to…
5. repetition or paraphrase
6. time marker phrases
7. the questions and tasks that go with the passage
8. all the things I predicted (questions, vocabulary, possible answers)
While I listen, I work out any words I don't know by…
9. using the words I understand to get the general meaning of the passage first
10. listening to words that come before or after the unknown word
11. using my general knowledge to think about what the unknown word might logically mean
12. listening to what comes later in the passage for further clues, or to check whether the unknown word does in fact mean what I think it means
13. using what I know about sentence structure to work out what kind of word it is (noun, adjective, verb)
14. thinking whether the unknown word is like a word I know in English or French/German/Spanish, and then checking whether that meaning would make sense

Reading – Top tips
- Read the introduction to the question carefully. This will help you to give sensible answers. Look for titles.
- Answer every question, especially where you have to write a letter. If in doubt, have a guess.
- Read the whole of the sentence so that you can check that your first reaction is right. If you think the answer is 'P' (positive) for example, read on in the text to make sure that the correct answer is not in fact 'P and N' (positive and negative).
- Do not copy whole chunks of the text because you might include the wrong answer as well as the right answer.
- If you are asked to give **one** reason or **one** detail, only give one.

VOCABULARY IS KEY!
Look through the vocab lists and try to refresh your memory of as much vocabulary as possible.

Translation – Top tips
- Read the whole sentence/paragraph first.
- Chunk the sentences e.g. I play / videogames / in my bedroom.
- Highlight what you don't know.
- Be as ACCURATE as you can.
- What are you being tested on, look out for different time markers.
- Make sure you reread your translation, does it make sense?

9.12 Festivals
French Vocab List

¿Quelle est ta fête préférée?	What is your favourite festival
Ma fête préférée est…	**My favourite festival is..**
Le Noël	Christmas
Le Réveillon de Noël	Christmas Eve
La Saint-Sylvestre	New Year's Eve
Le Nouvel An	New Year's Day
Le Divali	Divali
Pâques	Easter
Le Hanoukka	Hanukkah
L'Aïd	Eid
Le premier avril	April Fool's day
L'anniversaire	Birthday
Le premier mai	May day
Une fête	Party
La fête des Mères	Mother's day
La fête de la musique	Music festival
Un jour férié	Bank Holiday
Le mariage/les noces	Marriage/wedding
Le 14 juillet	Bastille Day
La Saint-Valentin	Valentine's day
Le Mardi Gras	Shrove Tuesday

¿Qu'est-ce qu'on fait pour célébrer?	What do we do to celebrate?
Je me lève	I get up
Je me douche	I shower
Je m'habille	I get dressed
Je reçois des cadeaux	I receive presents
J'éteins des bougies	I blow candles out
Je décore l'arbre de Noël	I decorate the Christmas tree
J'achète des nouveaux vêtements	I buy new clothes
Je vais à l'église	I go to church
Je vais à la mosquée	I go to the mosque
Je vais à la place	I go to the square
Je vais à la maison de …	I go to …'s house
… arrive	… arrives
Nous mangeons…	We eat…
Nous jeûnons	We fast
Nous jouons des jeux de société	We play board games
Nous célébrons	We celebrate
Je m'amuse bien	I have a good time
Je regarde des feux d'artifices	I watch the fireworks
Je vais au lit	I go to bed
Je me couche	I go to sleep
C'est comment?	**How is it like?**
passionnant	Exciting
inoubliable	unforgetable
amusant	Fun
insupportable	Unbearable
Un désastre	A disaster

Les phrases/verbes du passé	Phrases/verbs in the past
L'année dernière	Last year
Le mois dernier	Last month
Avant hier	The day before yesterday
La semaine dernière	Last week
Hier	Yesterday
Dans le passé	In the past
Quand j'avais … ans	When I was … years old
L'été dernier	Last summer
L'hiver dernier	Last winter
Il y a … (deux ans)	… ago (two years)
Le weekend dernier	Last weekend
Je suis allé(e)	I went
J'ai célébré	I celebrated
J'ai mangé	I ate
J'ai bu	I drank
J'ai ouvert	I opened
C'était	It was

Les phrases/verbes du futur	Phrases/verbs in the future
L'année prochaine	Next year
Le mois prochain	Next month
Après demain	The day after tomorrow
Demain	Tomorrow
La semaine prochaine	Next week
Dans le futur / à l'avenir	In the future
Quand j'aurais … ans	When I will be … years old
L'été prochain	Next summer
Je vais aller	I am going to go
Je vais célébrer	I am going to celebrate
J'ai l'intention de manger	I intend to eat
Je voudrais/j'aimerais boire	I would like to drink

Spanish Knowledge Organisers

9.11 My school Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

The present tense	AR verb	ER verb	IR verb
yo (I)	-o	-o	-o
tu (you)	-as	-es	-es
él/ella (he/she)	-a	-e	-e
nosotros/as (we)	-amos	-emos	-imos
vosotros/as (you all)	-áis	-éis	- ís
ellos/ellas (they)	-an	-en	-en

The future tense in Spanish

You can talk about the future by using the **near future** tense.
Use part of the verb IR + a + the infinitive to say what you are **going** to do.

Este tarde **voy a jugar** al tenis. *This evening I am going to play tennis.*
Mañana Paul **va a hacer** un pastel. *Tomorrow Paul is going to make a cake.*

You can also use the following phrases with an infinitive to refer to the future.
Quiero = I want
Me gustaría = I would like
Quisiera = I would like
Espero = I hope

Adjectives describe nouns e.g. a **black** blazer.

In Spanish, adjectives normally go after the words they are describing e.g. una camisa azul (a blue shirt) and they have to agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g. una chaqueta negra (a black blazer).

If that same noun is also plural, the adjective will be feminine AND plural as well e.g. las medias negras (black tights).

Comparatives – to express more or less than
… es más…adjective…que - is more…adjective…than
… es menos …adjective ….que - is less…adjective… than
… es tan…adjective….como – is as…adjective…as
For example:
El inglés es **más** *interesante* ***que*** *la geografía. (English is more interesting than Geography)*
La historia es ***menos*** *activa* ***que*** *la educación física. (History is less active than PE)*
El francés es ***tan*** *difícil* ***como*** *las matemáticas. (French is as difficult as maths).*

9.11 My School Life – Vocabulary List

¿Cuál es tu asignatura favorita?	What is your favourite subject?
El inglés	English
El español	Spanish
El francés	French
El teatro	Drama
El dibujo	Art
El deporte	P.E.
La informática	I.C.T. (Computer Studies)
La música	Music
La tecnología	D.T.
La geografía	Geography
La historia	History
La religion	R.S. (Religious Studies)
La educación personal y social	P.S.H.E (Health and Wellbeing)
Las matemáticas	Maths
Las ciencias	Science

¿Cuáles son las reglas?	What are the rules?
Se debe / no se debe	You must / You must not
Se puede / no se puede	You can / You can not
Hay que	You must
Está prohibido	It is forbidden to
Escuchar en clase	(to) listen in class
Usar el móvil en clase	(to) use your phone in class
Llevar joyas	(to) wear jewellery
Llevar maquillaje	(to) wear make-up
Llevar zapatillas de deporte	(to) wear trainers
Dañar las instalaciones	(to) damage the facilities
Ser punctual	(to) be on time
Comer chicle	(to) chew chewing-gum
Hacer los deberes	(to) do homework

¿Cuál es tu opinión?	What is your opinión?
Es / no es	It is/It is not
interesante	Interesting
Práctico	Practical
Útil / Inutil	Useful/not useful
Fácil / Difícil	Easy/difficult
Aburrido	Boring
Emocionante	Exciting
Creativo	Creative
Importante	Important
demasiado	Too
muy	Very
bastante	Quite
Un poco	A bit (a little)

¿Qué quieres hacer en el futuro?	What do you want to do in the future?
Voy a	I am going
Me gustaría / Quiero	I would like / I want
Aprobar mis exámenes	To pass my exams
Sacar buenas notas	To get good results
Hacer un aprendizaje	To do an apprenticeship
Buscar trabajo	To search for a job
Trabajar como voluntario	To do voluntary work
Viajar por el mundo	To travel the world
Tener hijos	To have children
Casarme	To marry
Aprender a conducir	To learn to drive
Médico/a Veterinario	A doctor/a vet
Profesor(a) Abogado/a	A teacher/a lawyer
Mecánico Fontanero	A mechanic/a plumber
Bombero	A firefighter
Peluquero	A hairdresser

¿Qué llevas?	What do you wear?
LLevo	I wear
Se debe llevar	You must wear
Una chaqueta	A blazer/jacket
Un jersey	A jumper
Una camisa	A shirt
Una camiseta	A t-shirt
Una corbata	A tie
Una falda	A skirt
Unos calcetines	Socks
Unos pantalones	Trousers
Unos zapatos	Shoes
Unas medias	Tights
Un hiyab	Hijab
feo	Ugly
bonito	Beautiful
(In)cómodo	(un)comfortable
caro	Expensive
barato	cheap
De moda	Fashionable
Pasado de moda	Old-fashioned

La jornada escolar	The school day
Salgo de casa	I leave the house
Voy al insti	I go to school
Las clases empiezan…	Lessons start …
Las clases terminan…	Lessons end …
Dura	It lasts
El recreo	Breaktime
La hora de comer	Lunchtime
Por la mañana	The morning
Por la tarde	The afternoon

3 Time frames

The preterite tense of **regular verbs** is formed on an infinitive stem with the following endings:

Infinitive:	hablar	comer	vivir
Stem:	habl-	com-	viv-
Yo (I)	hablé	comí	viví
Tú (you)	hablaste	comiste	viviste
él/ella/usted (he/she/you)	habló	comió	vivió
Nosotros (We)	hablamos	comimos	vivimos
Vosotros (You all)	hablasteis	comisteis	vivisteis
ellos/ustedes (They/ you all)	hablaron	comieron	vivieron

Ser / Ir (To be /to go)

fui (I was / I went)
Fuiste (You were / You went)
Fue (he/she was // he /she went)
Fuimos (we were / we went)
Fuisteis (you all were / you all went)
Fueron (they were /they went)

The future tense of **regular verbs** is formed adding the endings **e,as,a emos, eis, an** to the infinitive.

FUTURE SIMPLE			
Person	Verbs		
	Hablar	Comer	Vivir
Yo	hablar - é	comer - é	vivir - é
Tú	hablar - ás	comer - ás	vivir - ás
Usted, él, ella	hablar - á	comer - á	vivir - á
Nosotros-as	hablar - emos	comer - emos	vivir - emos
Vosotros-as	hablar - éis	comer - éis	vivir - éis
Ustedes, ellos, ellas	hablar - án	comer - án	vivir - án

Regular verbs – present tense endings			
	AR verbs	ER verbs	IR verbs
I	o	o	o
you	as	es	es
he/she/it	a	e	e
we	amos	emos	imos
you(pl)	áis	éis	ís
they	an	en	en

Additional Notes

Spanish Knowledge Organisers

9.12 Festivals
Spanish Vocab List

Cabot Learning Federation

¿Cuál es tu festival favorito?	What is your favourite festival
Mi festival favorito es...	My favourite festival is..
La Navidad	Christmas
La Nochebuena	Christmas Eve
La Nochevieja	New Year's Eve
El día de año nuevo	New Year's Day
El día de los Reyes Magos	Three Wise Men Day
La Semana Santa	Easter / Holy Week
Las hogueras	The bonfires
La feria de abril	The April fair
Día de muertos	The day of deaths
El cumpleaños	Birthday
El carnaval	Carnival
La feria	Fair
El día de la madre	Mother's day
El día del padre	Father's day
El día festivo	Bank Holiday
El encierro	The bull running
Las fallas	Fallas
Els castells	Human towers
La Tomatina	Tomato festival

¿Qué hacemos para celebrar?	What do we do to celebrate?
Me levanto	I get up
Me ducho	I shower
Me visto	I get dressed
Recibo regalos	I receive presents
Soplo velas	I blow candles
Monto el árbol de Navidad	I put up the Christmas tree
Compro ropa nueva	I buy new clothes
Voy a la iglesia	I go to church
Voy a la mezquita	I go to the mosque
Voy a la plaza	I go to the square
Voy a casa de...	I go to ...'s house
... llega	... arrives
Comemos...	We eat...
Ayunamos	We fast
Jugamos a juegos de mesa	We play table games
Celebramos	We celebrate
Lo paso muy bien	I have a good time
Me acuesto	I go to bed
Voy a dormir	I go to sleep

¿Cómo es?	How is it like?
Emocionante	Exciting
Conmovedor	Moving
Divertido	Fun
Insoportable	Unbearable
Impactante	Striking

¿Qué pasa en los encierros / las corridas de toros ?	What happens in the bull running / bull fighting?
San Fermín	A bull running festival held in Pamplona every July
Los toros	The bulls
Las calles	The streets
Correr	To run
Las corridas de toros	Bullfighting
Los encierros	Bull running
La plaza de toros	The bullring

¿Qué pasa en las Fallas?	What happens in Fallas?
Fallas	A festival held in Valencia every March
La hoguera	The bonfire
El cartón	Cardboard
Las fallas	Sculptures made of cardboard
Los fuegos artificiales	Fireworks
Los petardos	Firecrackers
Las bandas de música	Music bands

¿Qué pasa en la Tomatina?	What happens in the tomato festival?
La gente	People
Lanza tomates	Throw tomatoes
Aplasta tomates	Squish tomatoes
Se ensucia	Gets dirty
Tiene lugar en Buñol	Takes place in Buñol
La batalla	The battle
El caos	Chaos

9.12 Geography & History
Spanish Vocab List

Cabot Learning Federation

La geografía	Geography
El país	The country
La región / la comunidad	The region
La ciudad	The city
El pueblo	The town/ village
La costa	The coast
Las islas	The islands
El interior	The inland regions

La historia	History
Castellano / Español	Spanish language
La Reconquista	Period of time when the Christian kingdoms "reconquered" the península from the Muslims (Moors).
Moros	Moors – Muslim inhabitants of modern-day Spain in
Conquistadores	Conquerors of American territories in the 16th century
La Colonización	Colonisation of the Americas
La Guerra Civil Española	The Spanish Civil war between 1936 and 1939
La Dictadura fascista	The fascist dictatorship in Spain between 1939 and 1975
La Transición	Transition into democracy after the dictatorship
La monarquía parlamentaria	The current political system in Spain: a parliamentary monarchy, like in the UK

El lenguaje de todos los días	Everyday language
¡Hola!	Hello
Buenos días	Good morning
Buenas tardes	Good afternoon
Buenas noches	Good night
¿Cómo te llamas?	What's your name?
Me llamo...	My name is...
¡Adiós!	Goodbye
Hasta luego / hasta la vista	See you later
Por favor	Please
Gracias	Thank you
Muchas gracias	Thanks a lot
De nada	You are welcome
Perdone / Perdón	Excuse me / Apologies
Lo siento	I'm sorry
¿Habla inglés?	Do you speak English?
Hablo un poco de español	I speak a bit of Spanish
No entiendo	I do not understand
¿Dónde hay un buen restaurante?	Where is a good restaurant?
¿Dónde está el centro / la playa?	Where is the centre / the beach?
Me he perdido	I am lost
Busco un hotel / un hospital / un banco	I am looking for a hotel / hospital / bank
Busco la estación / el aeropuerto / la parada de bus	I am looking for the station / airport/ bus stop
¿Me podría sacar una foto?	Could you take a picture?
¡Cuidado!	Be careful!
¡Vamos!	Let's go!

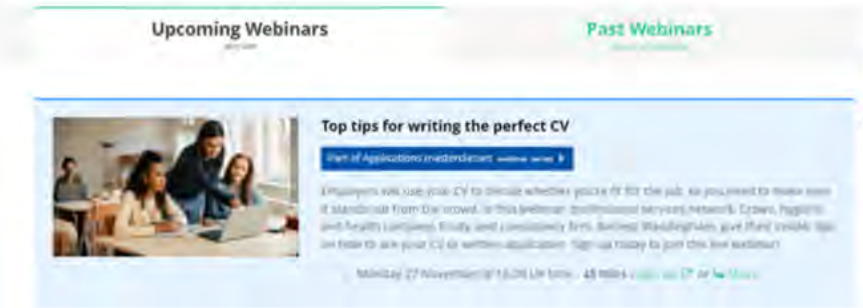
CAREERS AT HPA

Our Careers guidance and provision at Hans Price offers a wide range of experiences and opportunities to inform and develop aspirations for the future. In addition to a careers featuring in our SPACE curriculum and weaving through all subjects taught at Hans Price, all students use UniFrog to support their careers provision and their planning for Post-16 and beyond.

Unifrog is the universal destinations platform and is designed to support learners in making the most informed decisions about their futures. It has a range of tools that are suitable for all year groups. Each student has their own account where they can explore all the career and next step options available to them and find information on everything from managing their workload to writing a winning CV. Students have access to a wide variety of video and written content, and interactive quizzes and tests, information about careers and the local labour market and emerging industries.

Students can access Unifrog through the LCF Student Navigator page or searching for Unifrog online. Students initially sign up to the platform by clicking a link in their welcome email, where they create a password and can begin using the platform. They sign in to Unifrog using their Hans Price email address and password and they can do so from any computer, tablet, or smartphone. We would encourage you to use the platform with your child so you can support them through the process of deciding their next step.

You can also have your own Unifrog account. You'll be able to research careers, attend webinars delivered by employers and universities to learn more about their opportunities, and compare pathways so you can support your child in making an informed decision about their next steps. The sign up code you need is: **HPAMParents** and you can sign up here: www.unifrog.org/code. You can also sign up to Unifrog's parent/carer newsletter when you first sign



PERFORMING ARTS OPPORTUNITIES

SCHOOL MUSICAL:

SCHOOL MUSICAL IS IN JULY - REHEARSALS ARE TUESDAY & WEDNESDAY AFTER SCHOOL READY FOR THE SHOW IN JULY.

DANCE SHOW:

YOU CAN AUDITION FOR THE DANCE SHOW IN APRIL. AUDITIONS ARE USUALLY 3 WEEKS BEFORE THE SHOW.

MUSIC SHOW:

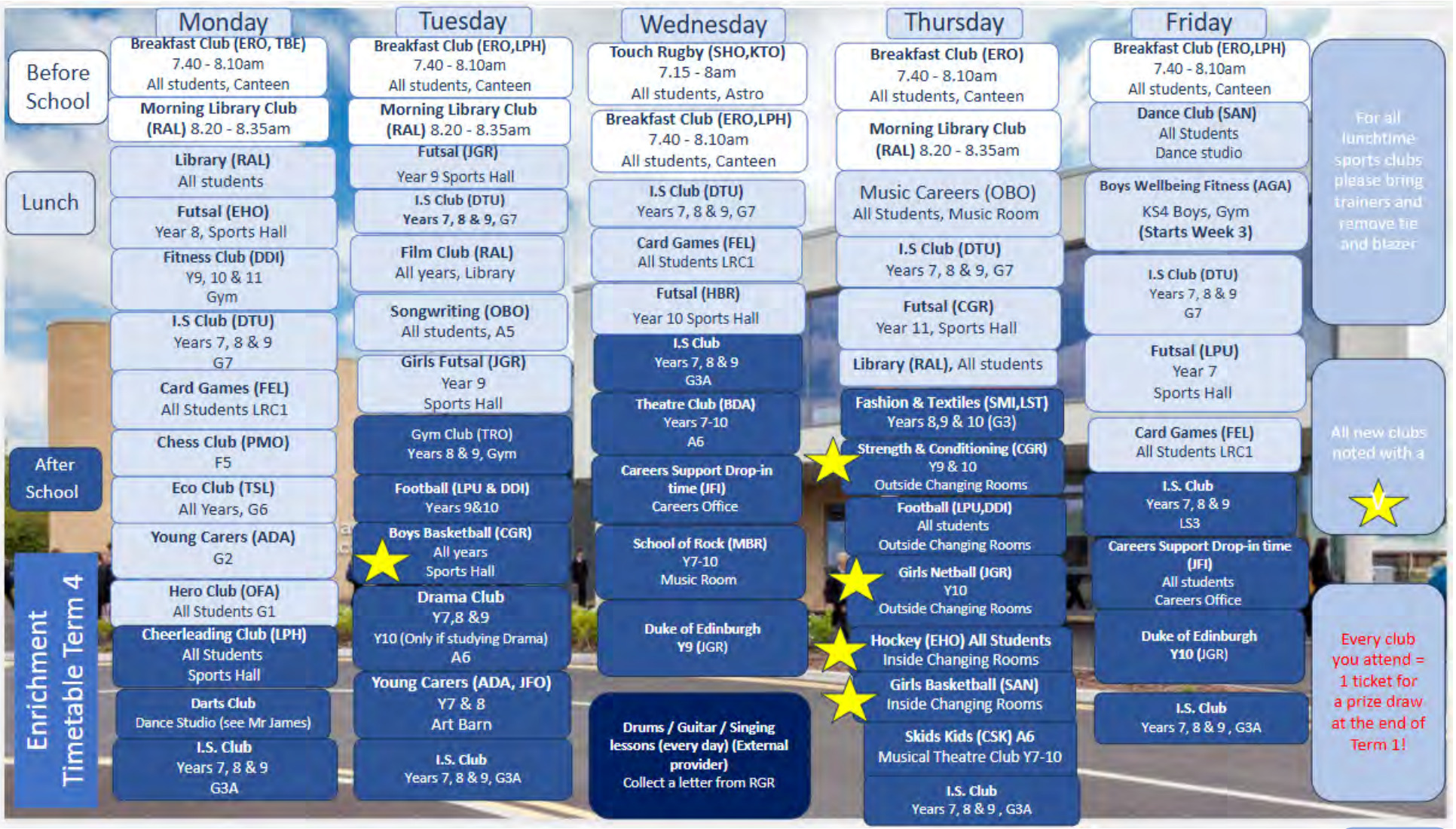
YOU CAN AUDITION FOR THE MUSIC SHOW IN FEBRUARY. AUDITIONS ARE USUALLY 3 WEEKS BEFORE THE SHOW.

PLEASE SEE YOUR MUSIC TEACHER FOR A LIST OF UP TO DATE CLUBS.

DANCE CLUB:

DANCE CLUB WITH ANGELS DANCE ACADEMY IS EVERY FRIDAY LUNCH IN THE DANCE STUDIO.

Extra-Curricular opportunities you can try this term. All clubs are free to attend.



	Monday	Tuesday	Wednesday	Thursday	Friday
Before School	**Breakfast Club (ERO, TBE)** 7.40 - 8.10am All students, Canteen	**Breakfast Club (ERO,LPH)** 7.40 - 8.10am All students, Canteen	**Touch Rugby (SHO,KTO)** 7.15 - 8am All students, Astro	**Breakfast Club (ERO)** 7.40 - 8.10am All students, Canteen	**Breakfast Club (ERO,LPH)** 7.40 - 8.10am All students, Canteen
	Morning Library Club (RAL) 8.20 - 8.35am	**Morning Library Club (RAL)** 8.20 - 8.35am	**Breakfast Club (ERO,LPH)** 7.40 - 8.10am All students, Canteen	**Morning Library Club (RAL)** 8.20 - 8.35am	**Dance Club (SAN)** All Students Dance studio
Lunch	**Library (RAL)** All students	**Futsal (JGR)** Year 9 Sports Hall	**I.S Club (DTU)** Years 7, 8 & 9, G7	Music Careers (OBO) All Students, Music Room	**Boys Wellbeing Fitness (AGA)** KS4 Boys, Gym **(Starts Week 3)**
	Futsal (EHO) Year 8, Sports Hall	**I.S Club (DTU)** **Years 7, 8 & 9,** G7	**Card Games (FEL)** All Students LRC1	**I.S Club (DTU)** Years 7, 8 & 9, G7	**I.S Club (DTU)** Years 7, 8 & 9 G7
	Fitness Club (DDI) Y9, 10 & 11 Gym	**Film Club (RAL)** All years, Library	**Futsal (HBR)** Year 10 Sports Hall	**Futsal (CGR)** Year 11, Sports Hall	**Futsal (LPU)** Year 7 Sports Hall
	I.S Club (DTU) Years 7, 8 & 9 G7	**Songwriting (OBO)** All students, A5	**I.S Club** Years 7, 8 & 9 G3A	**Library (RAL),** All students	**Card Games (FEL)** All Students LRC1
	Card Games (FEL) All Students LRC1	**Girls Futsal (JGR)** Year 9 Sports Hall	**Theatre Club (BDA)** Years 7-10 A6	**Fashion & Textiles (SMI,LST)** Years 8,9 & 10 (G3)	
After School	**Chess Club (PMO)** F5	**Gym Club (TRO)** Years 8 & 9, Gym	**Careers Support Drop-in time (JFI)** Careers Office	**Strength & Conditioning (CGR)** Y9 & 10 Outside Changing Rooms	**I.S. Club** Years 7, 8 & 9 LS3
	Eco Club (TSL) All Years, G6	**Football (LPU & DDI)** Years 9&10		**Football (LPU,DDI)** All students Outside Changing Rooms	**Careers Support Drop-in time (JFI)** All students Careers Office
	Young Carers (ADA) G2	**Boys Basketball (CGR)** All years Sports Hall	**School of Rock (MBR)** Y7-10 Music Room	**Girls Netball (JGR)** Y10 Outside Changing Rooms	
	Hero Club (OFA) All Students G1	**Drama Club** Y7,8 &9 Y10 (Only if studying Drama) A6	**Duke of Edinburgh** **Y9 (JGR)**	**Hockey (EHO) All Students** Inside Changing Rooms	**Duke of Edinburgh** **Y10 (JGR)**
	Cheerleading Club (LPH) All Students Sports Hall	**Young Carers (ADA, JFO)** Y7 & 8 Art Barn	**Drums / Guitar / Singing lessons (every day) (External provider)** Collect a letter from RGR	**Girls Basketball (SAN)** Inside Changing Rooms	**I.S. Club** Years 7, 8 & 9 , G3A
	Darts Club Dance Studio (see Mr James)			**Skids Kids (CSK) A6** Musical Theatre Club Y7-10	
	I.S. Club Years 7, 8 & 9 G3A	**I.S. Club** Years 7, 8 & 9, G3A		**I.S. Club** Years 7, 8 & 9 , G3A	

Enrichment Timetable Term 4

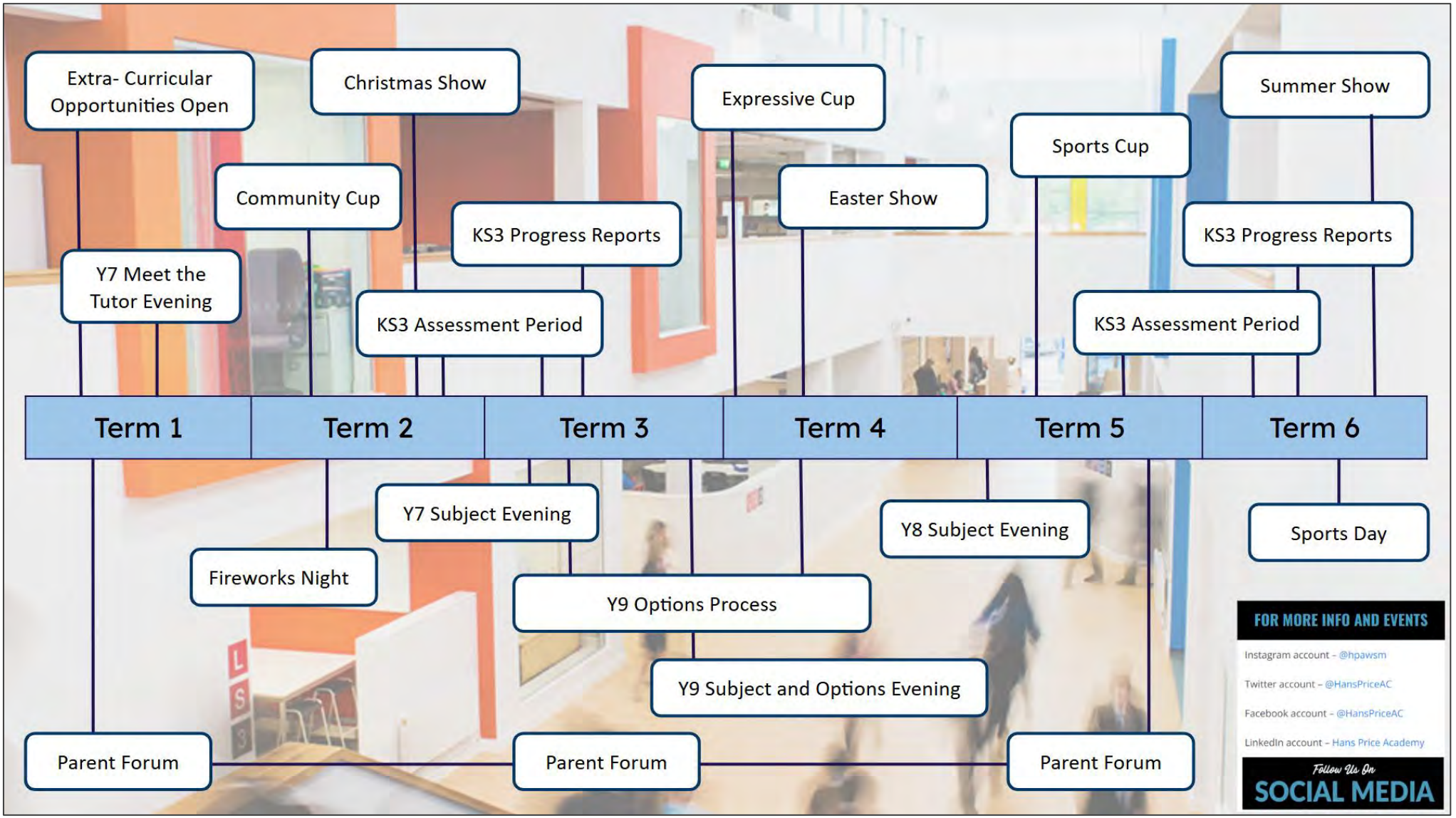
For all lunchtime sports clubs please bring trainers and remove tie and blazer

All new clubs noted with a ★

Every club you attend = 1 ticket for a prize draw at the end of Term 1!

Term 5/6 Additions						

Hans Price Academy KS3 Timeline



Timetable