



WOOTTON PARK

'Ipsum quod faciendum est diutius'

Knowledge Maps

8C

Term 4

Unit 7 - Key skills:

Key point

It's important to use the correct priority of operations when you are doing calculations.

- Brackets
- Indices (powers and roots)
- Division and Multiplication
- Addition and Subtraction

Indices is the plural of index (say 'in-di-seez').

Key point

A prime factor is a factor that is itself a prime number.

Key point

An ordinary number is one without a power or index.

For example, 2^3 is 8, as an ordinary number.

Key point

Finding the cube root is the inverse of cubing.

The inverse of an operation is its reverse or opposite.

$\sqrt[3]{}$ means 'the cube root of'.

$8 = 2^3$

so $\sqrt[3]{8} = 2$

Key point

When you multiply a number by itself three times, you get a cube number.

You can write $2 \times 2 \times 2$ more compactly as 2^3 .

Key point

Finding the square root is the inverse of squaring.

$\sqrt{}$ means 'the square root of'

$64 = 8^2$

so $\sqrt{64} = 8$

Key point

A prime factor is a factor that is itself a prime number.

Key point

An ordinary number is one without a power or index.

For example, 2^3 is 8, as an ordinary number.

Key point

Finding the cube root is the inverse of cubing.

The inverse of an operation is its reverse or opposite.

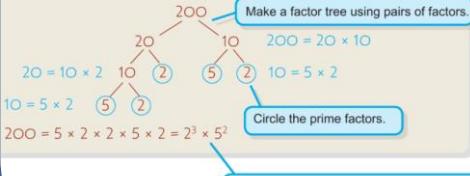
$\sqrt[3]{}$ means 'the cube root of'.

$8 = 2^3$

so $\sqrt[3]{8} = 2$

Worked example

Write 200 as the product of its prime factors.



Key Terms – Can you add the definitions (meanings)?

Square Root: _____

Prime Factor: _____

Ascending: _____

BIDMAS: _____

Unit 7 - Test Your Understanding

Work out

a $\sqrt{36}$

b $\sqrt{81}$

Work out

a 4^3

c 6^3

e 8^3

b 5^3

d 7^3

f 9^3

Work out each calculation using the priority of operations.

a $(10 + 2) \times (3 + 6)$

b $(20 - 10) \div (17 - 7)$

c $5(3 + 4)$

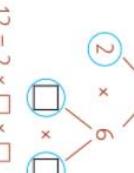
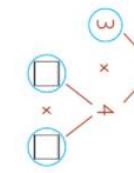
a List the first 10 multiples of each number in the pair.

i 3 and 5

ii 4 and 6

b What is the lowest common multiple of each pair of numbers?

Write down the first 10 square numbers.

- a Copy and complete each factor tree.
 Then use it to write 12 as the product of its prime factors.
- i 
 $12 = 2 \times \square \times \square$
- ii 
 $12 = \square \times \square \times \square$
- b Write 12 as the product of its prime factors using index notation.

Websites and further reading

- Pearson Active Learn: <http://pearsonactivelearn.com>
- Maths Watch: <http://mathswatch.co.uk/>
- BBC Bitesize: <http://www.bbc.co.uk/education/subjects/zqhs34j>
- Numeracy and Foundation level practice questions and answers: <https://corbettmaths.com/5-a-day/gcse1/>

Unit 8 - Key Skills:

Key point

A sequence is a set of numbers that follow a rule. Each number in a sequence is called a term.

A sequence can be described by giving a **first term** and a **term-to-term rule**. The term-to-term rule tells you how to get from one term to the next.

Key point

In a **geometric sequence** the term-to-term rule is 'multiply or divide by a number'.

For example:

$$\begin{array}{cccccc} x2 & x2 & x2 & x2 \\ \curvearrowright & \curvearrowright & \curvearrowright & \curvearrowright \\ 1, & 2, & 4, & 8, & 16, & \dots \end{array}$$

Each term is multiplied by 2.

Worked example

A sequence has first term -4.

The term-to-term rule is 'add 5, then multiply by 2'. Write the first three terms in the sequence.

1st term = -4

2nd term	-4 →	$\boxed{+5}$	→ 1	$\boxed{\times 2}$	→ 2
3rd term	2 →	$\boxed{+5}$	→ 7	$\boxed{\times 2}$	→ 14

Worked example

The n th term of a sequence is $3n$. Work out the first five terms.

Position (n)	1	2	3	4	5
Term ($3n$)	$3 \times 1 = 3$	$3 \times 2 = 6$	$3 \times 3 = 9$	$3 \times 4 = 12$	$3 \times 5 = 15$

Key point

Sequences where the numbers increase are **ascending sequences**. Sequences where the numbers decrease are **descending sequences**.

Key point

Each term in a sequence has a position.

The 1st term is in position 1, the 2nd term is in position 2, the 3rd term is in position 3 and so on.

The **position-to-term** rule tells you how to work out a term in a sequence when you know its position.

Unit 8 - Test Your Understanding

Copy and complete the tables to work out the first five terms of each sequence.

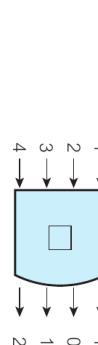
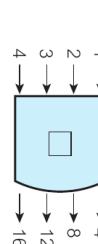
a General term = $n + 2$

Position (n)	1	2	3	4	5
Term ($n + 2$)	$1 + 2 = 3$	$\square + 2 = \square$			

Work out the first three terms of the sequence with n th term
 a $6n$
 b $n + 4$
 c $n - 3$

c What is the 5th term of the sequence?

Work out the missing function for each machine.



This pattern sequence is made from beams.

- a Draw the next term.
 b Copy and complete the table.

Pattern number	1	2	3	4
Number of beams				

Unit 9:

Match pairs of equivalent fractions.

A		
B		
C		
D		
E		
F		

Use the HCF to simplify these fractions.

a $\frac{16}{32}$ b $\frac{15}{35}$ c $\frac{10}{40}$ d $\frac{24}{42}$

Work out

a $\frac{1}{4}$ of 24 b $\frac{1}{10}$ of 80
 c $\frac{1}{5}$ of 45 d $\frac{1}{6}$ of 300
 e $\frac{1}{7}$ of 420 f $\frac{1}{8}$ of 320

Multiply each fraction, simplifying where possible.

a $2 \times \frac{1}{3}$ b $\frac{1}{9} \times 6$
 c $8 \times \frac{1}{5}$ d $\frac{1}{8} \times 10$
 e $6 \times \frac{1}{10}$ f $14 \times \frac{1}{7}$

Work out

a $\frac{1}{3} + \frac{2}{5}$ b $\frac{2}{5} + \frac{1}{4}$

An **arithmetic sequence** goes up or down in equal steps.
 For example, 7, 11, 15, 19, ... goes up in steps of 4.

Substitute the position number into the expression $3n$.

Key Terms:

Infer
Deduce
Evocative description
Sensory language
Dialect
Accent
Atmosphere
Figurative language
Metaphor
Simile
Personification
Humour

Exaggeration/hyperbole
Personification
Emotive language
Form
Free verse
stanza
Rhyme
Rhythm
Syllables
Repetition
Paralinguistic
features/Presentation
techniques
Body language

Tone
Gesture
Facial expression
Pace
Concrete/abstract nouns
Propaganda
Subterfuge
Collaborative

Further Reading**The History of WW1**

<https://historykids.net/history/world-war-1-facts-and-information/>

<http://primaryfacts.com/1645/world-war-1-facts-and-information/>

Key Poets and Poems**Wilfred Owen**

http://www.bbc.co.uk/history/historic_figures/owen_wilfred.shtml

<http://www.wilfredowen.org.uk/home>

Siegfried Sassoon

http://www.bbc.co.uk/history/historic_figures/sassoon_siegfried.shtml

Structuring your Analytical Paragraphs

- P: Make your point
- E: Use word/line from the extract to support your point
- A: Name the technique used and discuss the why the writer has used it
- C: Has the writer been influenced by something happening at the time they were writing?
- E: Conclude your point

Poetic Devices

Simile

Compares two things using 'as' or 'like'.

Eg. The sun blazed like an angry fire.



Metaphor

Compares, without using like or as.

Eg. The road was a ribbon of moonlight.



Personification

Makes something which is not alive sound like it is.

Eg. The flowers danced in the breeze.



Onomatopoeia

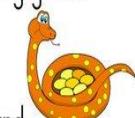
Words which sound like the noise they describe.

Eg. pop, buzz, splash.

Alliteration

Repetition of the same consonant sound(s).

Eg. Slowly the sly snake slithered over the slimy grass.



Assonance

Repetition of the same vowel sound(s).

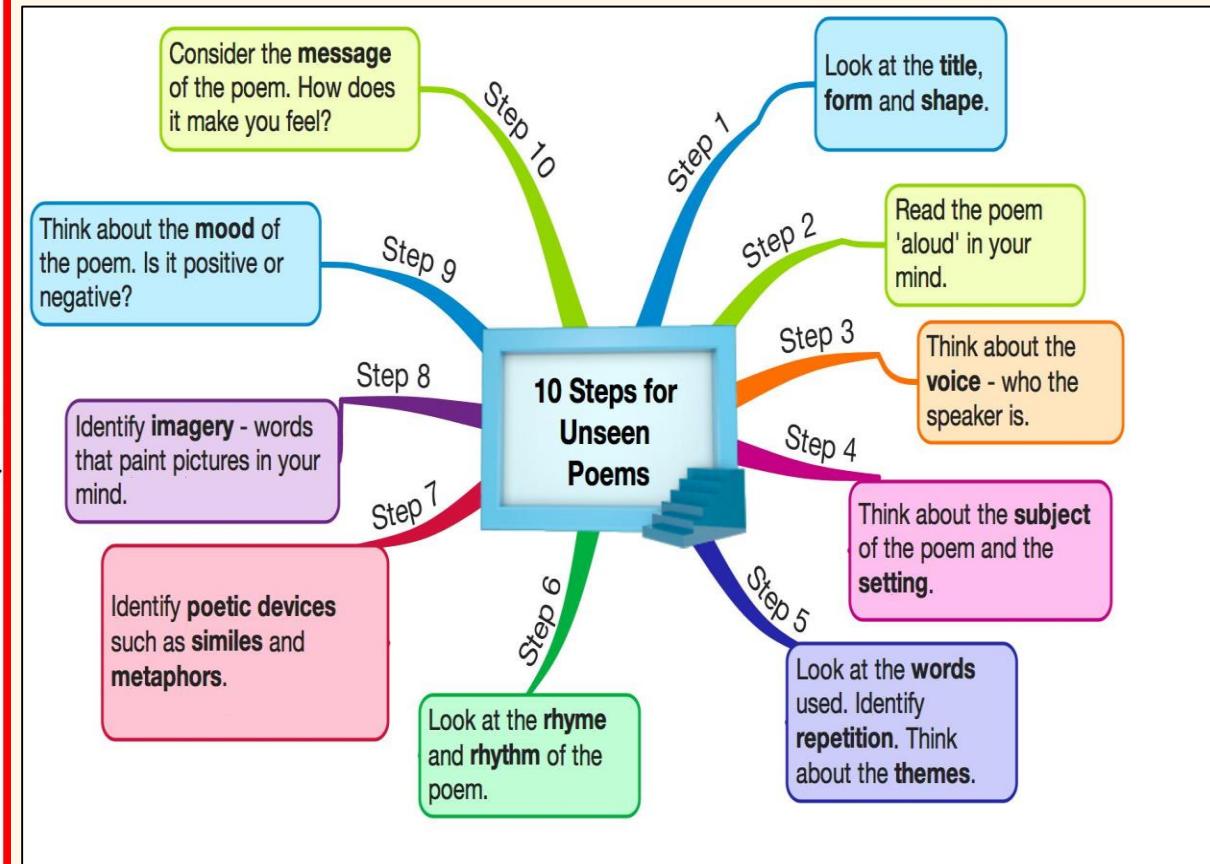
Eg. The bombs dropped softly onto the hot sand.



Rhyme

When words have the same sound.

Eg. cat and hat, heather and leather



The sound made by the pattern of stressed and

unstressed syllables in each line.

Eg. de dum, de dum, de dum.

Subject: Science

Term: 4

Topic: Respiration and Photosynthesis

Topics Covered

Biology – Respiration and photosynthesis

9.3.1 Aerobic respiration

9.3.2 Anaerobic respiration

9.3.3 Biotechnology

9.4.1 Photosynthesis

9.4.2 Leaves

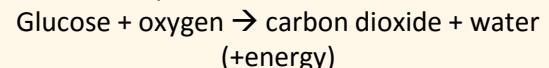
9.4.3 Investigating photosynthesis

9.4.4 Plant minerals

9.3.1 Aerobic respiration

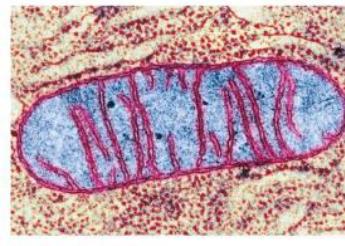
Aerobic respiration is a chemical reaction that transfers energy stored in food to your cells.

The word equation is:



Respiration happens in the mitochondria. But how does glucose and oxygen get into cells?

Glucose is transported to your cells via the blood, it dissolves in blood plasma. The oxygen is carried in haemoglobin in the red blood cells.



▲ A mitochondrion.

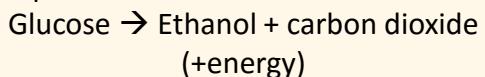
9.3.2 Anaerobic respiration

Anaerobic respiration is a type of respiration that does not use oxygen.

The equation is:



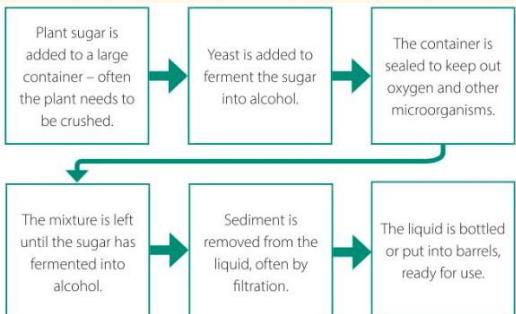
If you respire anaerobically when exercising you breath heavily. The extra oxygen is needed to break down the lactic acid. The oxygen needed for this process is called the **oxygen debt**. Fermentation uses anaerobic respiration to make alcohol:



9.3.3 Biotechnology

Biotechnology is the use of biological process or organisms to create useful products, like food or drink.

Yeast is a microorganism that is needed to make alcohol in fermentation and to make bread. Below is the process of brewing:

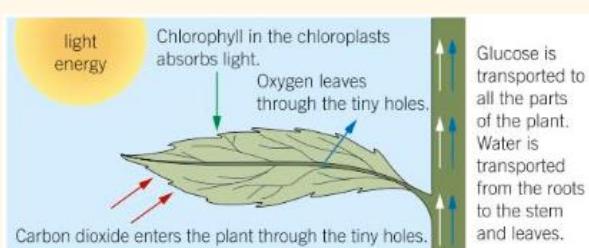


9.4.1 Photosynthesis

Photosynthesis is a chemical reactions in which plants take in carbon dioxide and water and change them into glucose and oxygen.

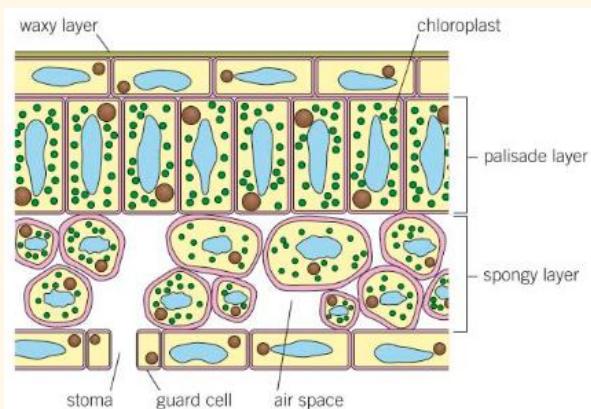


Plants are good at photosynthesis because they contain **chlorophyll** which is green and uses light from the sun.



9.4.2 Leaves

The inside of a leaf:



Topics Covered**Biology – Respiration and photosynthesis**

9.3.1 Aerobic respiration

9.3.2 Anaerobic respiration

9.3.3 Biotechnology

9.4.1 Photosynthesis

9.4.2 Leaves

9.4.3 Investigating photosynthesis

9.4.4 Plant minerals

9.4.4 Plant minerals

Plants need 4 minerals:

1. **Nitrates** – for healthy growth
2. **Phosphates** – for healthy roots
3. **Potassium** – for healthy leaves and flowers
4. **Magnesium** – for making chlorophyll

If a plant does not get enough minerals, its growth will be poor.

This is called a mineral **deficiency**.

A nitrate deficiency – plant will have poor growth and older leaves are yellow.

A phosphorus deficiency – plant will have poor root growth, and younger leaves look purple

A potassium deficiency – plant has yellow leaves, with dead patches.

A magnesium deficiency – plant leaves will turn yellow.

9.4.3 Investigating photosynthesis

Plants turn glucose into starch so we know if a plant is photosynthesising if we do a chemical test with iodine and prove that starch is present. To do this you boil the leaf to kill it. Then put the leaf in ethanol to remove chlorophyll. Put the leaf on a white tile and drop iodine onto it. If the leaf turns from yellow-brown to blue-black then starch is present and the leaf is photosynthesising.

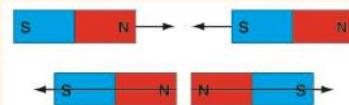


▲ Testing leaves for starch.

Topics Covered**Physics – Magnetism and electromagnets**

2.3.1 Magnets and magnetic fields

- 2.4.1 Electromagnets
- 2.4.2 Using electromagnets

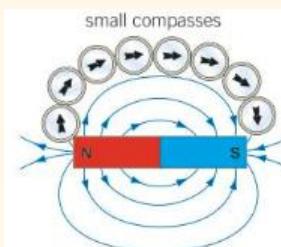


▲ Magnets can attract or repel other magnets.

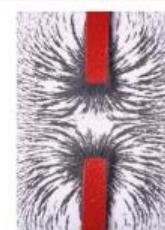
2.3.1 Magnets and magnetic fields

A magnet has two magnetic poles, a north-seeking pole and a south-seeking pole.

If you put iron in a **magnetic field** they experience a **magnetic force**. This is a non-contact force. The force is stronger the closer you are to the magnet. We can draw the field lines on a diagram:



▲ The field around a bar magnet.



▲ Two magnets repelling.

2.4.1 Electromagnets

An electromagnet is a magnet that can be turned on and off using electricity.

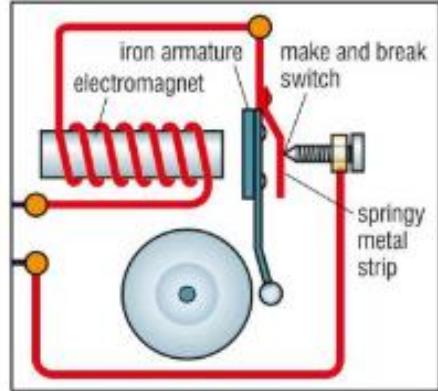
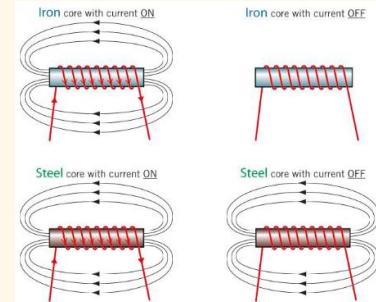
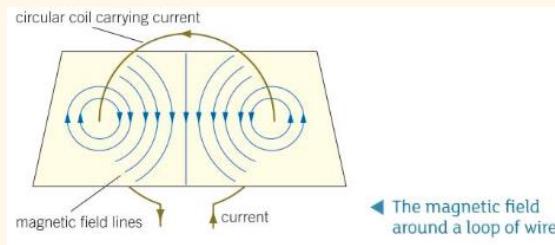
To make an electromagnet you can make a circular loop of wire and pass a current through it.

If you wind lots of loops together to make a coil it is called a **solenoid**.

Electromagnets usually have a magnetic material in the center of the coil, called a **core**. This makes the electromagnet much stronger.

Iron is easily magnetised but loses magnetism easily.

Steel is hard to magnetise but keeps its magnetism.



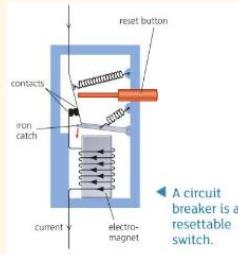
▲ An electric bell contains a 'make and break' switch, which keeps the bell ringing.

2.4.2 Using electromagnets

Electromagnets can be used for bells.

An electric bell contains a circuit with an electromagnet, a switch and a battery. Look at the diagram to the left.

1. The electromagnet attracts the iron arm
2. When the arm moves it breaks the circuit, so a current no longer flows
3. The coil and core are no longer magnetic and the springy metal strip returns to its original position, and the bell rings once
4. Now the circuit is complete again, so the arm moves and the bell rings again



▲ A circuit breaker is a resettable switch.

One safety device in our homes are circuit breakers that prevent faulty devices harming us.

When a large current flows in the wire around the electromagnet, the magnetic field of the electromagnet is strong enough to attract the iron catch. The catch moves down and this breaks the circuit.

Permanent magnet or electromagnet?

A piece of magnetic material that has been magnetised is a permanent magnet. There are two main differences between permanent magnets and electromagnets:

- You can turn electromagnets on and off
- You can make electromagnets that are much stronger than permanent magnets.

The history of the religions

Sikhism



Buddhism

Place of Origin	The Punjab (Panjab or Panj), an area of Northern India	North East India
Founder	Guru Nanak	Siddhartha Gautama (The Buddha)
Sacred Text	Guru Granth Sahib	Tripitaka
Sacred Building	Gurdwara	Stupa / Temple

Buddhism-Practices, worship and beliefs

One important belief involves **reincarnation**: the concept that one must go through many cycles of birth, living, and death.



After many such cycles, if a person releases their attachment to desire and the self, they can attain **Nirvana** - a state of liberation and freedom from suffering.

At the heart of the Buddha's teaching lie **The Four Noble Truths** and **The Eightfold Path** which lead the Buddhist towards the path of Enlightenment

Key vocabulary to define and learn:

Sikhism

Buddhism

Dharma

Gurdwara

Karma

Four Nobel Truths

Meditation

Divine

Nirvana

Eightfold Path

Caste system

Enlightenment

Sikhism -Practices, worship and beliefs**The core beliefs****-One God****-All Are Equal**

Men and Women have the same rights/responsibilities

-Meditation

Remember God

-Live Honestly

Sikhs are supposed to work hard and live honestly

-Share with Others

Give to the needy

**What do Sikhs believe?**

Sikhism teaches that all human beings are equal and can realise the divine within them through devotion to God, truthful living and service to humanity.

Sikhs do not believe in the following:

Fasting, superstitions, ritualism, caste system, alcohol, smoking and drugs

Websites and further reading:

- <http://www.primaryhomeworkhelp.co.uk/religion/buddhism.htm>
- <http://www.telegraph.co.uk/news/religion/10935470/Tibetan-Buddhism-what-is-reincarnation.html>
- <http://www.bbc.co.uk/religion/religions/buddhism/>
- <http://www.bbc.co.uk/schools/religion/sikhism/>
- <http://www.primaryhomeworkhelp.co.uk/religion/sikhism.html>
- <http://www.bbc.co.uk/schools/gcsebitesize/rs/death/sikhbeliefrev2.shtml>

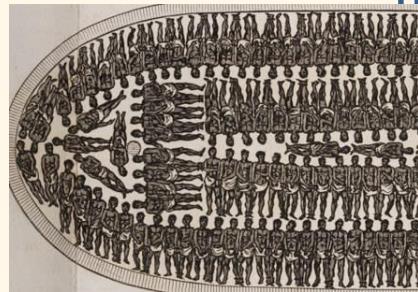
Key concept 1: What was life like in the Middle Passage?

The middle passage was the journey newly enslaved men and women would take from Africa to the Americas.

The slaves were placed into the hold of a ship with very limited space, food or water. Many would not survive the long journey.

Key Facts

- The journey could take up to 3 months.
- Records suggest that until 1750 1 in 5 slaves died during the middle passage.
- Some slaves tried to rebel during the middle passage, by fighting their captors or killing themselves so they could not be sold.

**Key concept 3: How was Slavery abolished (ended)?**

Abolished in 1807 – outlawed slave ownership in 1833

Factor 1	Factor 2
Slavery was not making as much money as it used to. The plantations were closing down so people did not need slaves.	Slaves were organising more rebellions and uprisings, they took back the whole island of Haiti.
Factor 3	Factor 4
Slaves proved the racists wrong by showing they could organise intellectual debate in court about slavery laws.	Anti-slavery campaigners helped to change the minds of common people and helped freed slaves in court cases

Key vocabulary to define and learn:

Slave

Middle Passage

Abolition

Revolution

Dehumanisation

Abolitionist

Plantation

Empire

Rebellion

Slave Triangle

Human Rights

Key concept 2: What was life like on a Plantation?

Once the slaves reached the Americas they would be sold at auction. Only rich people could afford slaves and they used them to farm their land (usually cotton or sugar cane).

Life was incredibly hard for slaves, they worked all hours it was light, if they did not work hard enough they would be punished. Punishments included whippings, beatings, maiming (cutting off of a foot or a hand), or a 'slave collar'.



Escape attempts were common but most slaves were now born on the plantations and did not want to leave their families.

Websites and further reading:

- <http://www.bbc.co.uk/history/british/abolition/>
- http://www.bbc.co.uk/bitesize/ks3/history/industrial_era/the_slave_trade/revision/1/
- <https://www.bbc.co.uk/education/guides/zy7fr82/revision>
- <http://www.liverpoolmuseums.org.uk/ism/slavery/>
- <https://www.bbc.co.uk/education/guides/zqv7hyc/revision/8>

Key concept: What is crime?

What is a criminal?

crimes?

A person who has committed a crime.



What is crime?

An action which breaks the law and is punishable.

Why do people commit

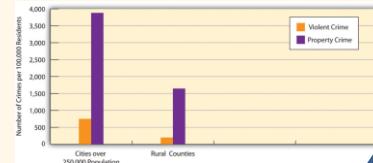
- Opportunity
- Greed
- Power
- A person's psychology (how they are made up)
- Poverty (being poor)

Key concept: Crime Distribution in the United Kingdom – Rural Vs Urban

Crime distribution (where it happens)

investigates how the type of **criminal activity** varies (changes) across different locations. **Rural** (countryside) areas often see a very different type and scale of crime compared to **urban** (city) areas.

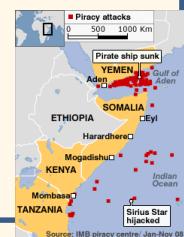
There are higher crime rates in larger cities due to a number of factors such as: **opportunity, population, competition** and **poverty**. However, rural crime is still a large problem in the UK and often due to a lack of population, less security systems and a lack of reporting of rural crime it is on the rise in our countryside areas.



Key concept: International Crime

International crime is complex to investigate and control due to international laws and controls varying in different places. The drug trade and piracy are two of the most difficult to control international crimes of our times.

The Heroin Trail – is a route that the drug takes across parts of Asia and Europe. Poor farmers grow heroin as a means of survival, if people didn't buy it, it would not be grown.



Websites and further reading:

<https://www.police.uk/northamptonshire/SCT162/crime/>

<https://www.bbc.co.uk/education/guides/ztycdm/revision>

<https://www.bbc.co.uk/education/guides/ztycdm/revision/5>

<http://www.bbc.co.uk/bitesize/ks3/geography/spaces/crime/revision/>

Key vocabulary to define and learn:

Criminal

Rural

Heroin Trail

Crime

Urban

Piracy

Crime Mapping

Competition

Pirates

Statistics

Opportunity Poverty

Anomaly

Population

Drug trafficking



Key Content 1 – ¿Qué hacemos? (What shall we do?)

Task 1:

Match the English and Spanish for...

1. Te gustaría ir... a. To my house
2. Al parque b. To the shopping centre
3. Al centro comercial c. To the cinema
4. Al polideportivo d. To the sports centre
5. Al restaurante e. To the café
6. Al museo f. To the restaurant
7. Al cine g. To the bowling alley
8. A la bolera h. Would you like to go...
9. A la pista de hielo i. To the ice-rink
10. A la cafetería j. To the museum
11. A mi casa k. To the park

To go _____

I go _____

You (s) go _____

He/She goes _____

We go _____

You (pl) go _____

They go _____

Vas // va // vamos
 // van // vais // ir //
 voy

Key Content 3 – ¿Cómo te prepares? (How do you get ready?)

Use p94 &95 of Viva 2 and Pearson ActiveLearn to practise vocab!

Task 3: Match the routine verbs and the right picture...


- a. Me lavo los dientes
- b. Me visto
- c. Me ducho
- d. Me baño
- e. Me acuesto
- f. Me despierto/me levanto
- g. Me maquillo
- h. Me peino

Ext. Create a storyboard of your daily routine. Include times and sequencers.

Key Content 2 – Lo siento, no puedo (I'm sorry I can't...)
Task 2:

Complete the excuses with the correct missing word...

Tengo que...

1. Cuidar a mi _____ (brother)
2. Pasear al _____ (dog)
3. Lavarme el _____ (hair)
4. Salir con mis _____ (parents)
5. Ordenar mi _____ (bedroom)
6. Hacer mis _____ (homework)
7. Ahorrar _____ (money)

- a. Hermano
- b. Padres
- c. Dormitorio
- d. Deberes
- e. Dinero
- f. Pelo
- g. Perro

Now translate the whole excuses... can you think of any more?

Key Content 4 - ¿Qué vas a llevar? (What are you going to wear?)

Task 4: Label the clothing items with the right words from the box...



- a. Una camiseta
- b. Un jersey
- c. Un vestido
- d. Una falda
- e. Una gorra
- f. Unos pantalones
- g. Unos vaqueros
- h. Una sudadera
- i. Unos zapatos
- j. Una camisa
- k. Unas botas

Ocio - Leisure

 Further vocab help and games can be found on Quizlet!
 Search Viva 2, M4

Key question 1: What is Pop Art?

The Pop Art movement started

- in Britain in the mid-1950s' and
- in the United States in the late 1950s'.

Pop Art artists wanted to challenge tradition and use everyday objects to influence their work.

Key question 2: Who is Andy Warhol?

Andy Warhol (6 August 1928 – 22 February 1987)

- was part of the pop art movement.
- He was famous for exploring everyday objects in his work,
- using brands like Coca Cola and Campbell's Soup (which was one of his favourite things to eat).
- Warhol liked to use bright colours and silk screening techniques to mass-produce artworks based on photographs of celebrities, like this famous image of Marilyn Monroe.



Key question 3: Who is Michael Craig Martin?

Born in 1941, Michael Craig Martin influences many artists and was a teacher of many of the Young British Artists, such as Damien Hirst and Gary Hume, during their time studying at Goldsmiths in London (a really famous art university). His work has been influenced by the Pop Art movement.



Websites and further reading:

Tate Kids:

<https://www.tate.org.uk/kids/explore/what-is/pop-art>

Pinterest: Search "Pop Art"

Tate Modern:

<https://www.tate.org.uk/art/artists/michael-craig-martin-955>

Key vocabulary to define and learn

Simplicity
Influence

Repeated images
Design

Screen Printing
Popular Culture

Mass-media

Design Challenge:

Create a unique response to the Pop Art movement. Select a popular object which represents you. Create a bright and bold colour composition based on the style of Pop Art.

Key topic 4.1: Computer Coding

4.1 Coding micro:bits;

4.1.1 Introduction to programming using different programming languages; Java, Python etc. Origins of 'Python' as a language

4.1.2 Code.org/hour of code challenges;

Angry Birds: Introduction to key vocabulary; code, debugging, program.

Star wars; Basic programming with blocks / Java script.

Flappy bird; Solving a programming problem with their own programming solutions

4.1.3 Using Micro:bit.org's website and Micro:bits to explore a range of different programming problems and solutions;

Programming a digital thermometer, a dice roller, play a game of rock paper scissors using their own-programmed devices.



4.2 Introduction to Python programming language;

4.2.1 History and basics programming steps, in a game – 'code combat' solving problems using the progressive steps to gain confidence in using python.

Key vocabulary to define and learn:

1.Algorithm A sequence of logical instructions for carrying out a task. In computing, algorithms are needed to design computer programs.

2.Execute To run a computer program.

3.Flowchart A diagram that shows a process, made up of boxes representing steps, decision, inputs and outputs.

4.Instruction A single action that can be performed by a computer processor.

5.Program Sequences of instructions for a computer.

6.Programming The process of writing computer software.

7.Programming language A language used by a programmer to write a piece of software.

8.Pseudocode Also written as pseudo-code. A method of writing up a set of instructions for a computer program using plain English. This is a good way of planning a program before coding.

9.Python A high-level programming language.

10.Scratch A high-level programming language that is presented in graphical blocks.



Websites and further reading:

Introduction to computer programming by BBC bitesize: <https://www.bbc.com/bitesize/guides/zts8d2p/revision/1>

Hour of code challenges: <https://hourofcode.com/uk>

Code combat: <https://codecombat.com/>

