Saint Nathaniel's Academy
Crucial Knowledge Organisers
Autumn Term One
Summer Term
Year 6

Year 6 Maths —Summer 1

Crucial Knowledge

Multiplication and division vocabulary

Term	Definition	Example
factor	a number that divides exactly into another number	factors of 12 = 1, 2, 3, 4, 6, 12
common factor	factors of two numbers that are the same	common factors of 8 and 12 = 1, 2, 4
prime number	a number with only 2 factors: 1 and itself	2, 3, 5, 7, 11, 13, 17, 19...
composite number	a number with more than two factors	12 (it has 6 factors)
prime factor	a factor that is prime	prime factors of 12 = 2, 3
multiple	a number in another number's times table	multiples of 9 = 9, 18, 27, 36...
common multiple	multiples of two numbers that are the same	common multiples of 4 and 6 = 12, 24...
square numbers	the result when a number has been multiplied by itself	25 (5^2 = 5 × 5) , 49 (7^2 = 7 × 7)
cube numbers	the result when a number has been multiplied by itself 3 times	8 (2^3 = 2 × 2 × 2) , 27 (3^3 = 3 × 3 × 3)

2-D shapes

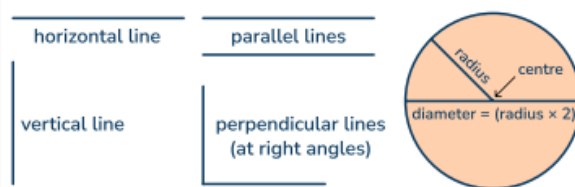| Name	No. of sides
quadrilateral	4
pentagon	5
hexagon	6
heptagon	7
octagon	8
nonagon	9
decagon	10

polygon = shape with straight sides
regular = all sides / angles the same
irregular = sides / angles **not** the same

Types of triangle

scalene   equilateral   isosceles

Types of quadrilateral

parallelogram   trapezium   rhombus

Area is the amount of space inside a 2D shape, usually measured in cm² or m².
Area of a triangle = (base × height) ÷ 2
Area of a parallelogram = base × height
(Height = perpendicular height)

Angles

full turn	360°
half turn	180°
right angle	90°
acute angle	< 90°
obtuse angle	> 90°, < 180°
reflex angle	>180°
angles on a straight line	180°
angles in a triangle	180°
angles in a quadrilateral	360°

Shape vocabulary

Perimeter = measure around the edge
Circumference = perimeter of a circle

horizontal line   parallel lines

vertical line   perpendicular lines
                       (at right angles)

radius   centre
diameter = (radius × 2)

Measurement conversions

Month	Days
January	31
February	28 (29 in leap year)
March	31
April	30
May	31
June	30
July	31
August	31
September	30
October	31
November	30
December	31

1 year = 365 days (≈ 52 weeks)
Leap year = 366 days

1 **centi**metre	10mm
1 metre	100cm
1 **kilo**metre	1,000 m
1 mile	1.6 km
1 kilometre	0.625 ($\frac{5}{8}$) mile
1 **kilo**gram	1,000 grams
1 litre	1,000 **milli**litres

Roman numerals

1	I	100	C
5	V	500	D
10	X	1000	M
50	L		

Coordinates

Read coordinates along the x-axis (horizontal) first, then the y-axis (vertical). e.g. (3,-4) = go right 3, down 4.

3-D shapes

	square-based pyramid	triangular-based pyramid or tetrahedron	triangular prism
faces (the flat sides)	5	4	5
edges	8	6	9
vertices (the points where the edges meet)	5	4	6

Volume = the amount of space a 3D shape takes up, usually measured in cm³ or m³
Volume of a cuboid = length × width × height

height   width   length
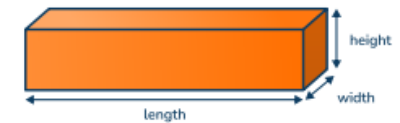
Fractions, decimals and percentages

$\frac{1}{100}$	0.01	1%	÷ 100
$\frac{1}{20}$	0.05	5%	÷ 20
$\frac{1}{10}$	0.1	10%	÷ 10
$\frac{1}{5}$	0.2	20%	÷ 5
$\frac{1}{4}$	0.25	25%	÷ 4
$\frac{1}{2}$	0.5	50%	÷ 2
$\frac{3}{4}$	0.75	75%	÷ 4, × 3
1	1	100%	÷ 1

The mean

The mean is a type of average. To find the mean, add up all the numbers and divide by how many there are. E.g. the mean of 4, 5, 3, 4 is 4, because 4 + 5 + 3 + 4 = 16, and 16 ÷ 4 = 4

SAINT NATHANIEL'S ACADEMY

Four Operations
Knowledge Organiser

Crucial Knowledge Organiser

SAINT NATHANIEL'S ACADEMY

Key Vocabulary

- Add
- Total
- Make
- Plus
- Sum
- More
- Altogether
- Difference
- Leave
- Subtract
- Difference between
- Less
- Minus
- Take away
- Mentally, Orally
- Column Addition
- Column Subtraction
- Estimate
- Inverse operation
- Solve problems
- Number facts
- Place Value
- Complex

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Add and Subtract Whole Numbers

Column Method

	4	5	8	6	4
+	2	3	4	9	7
	6	9	3	6	1
			1	1	1

Starting with the ones, add each column in turn. Regroup tens, hundreds, thousands, ten thousands as required.

	3	5	⁶7̶	¹³4̶	¹2̶
-		3	4	7	6
	3	2	2	6	6

Starting with the ones, subtract each column in turn. Exchange tens, hundreds, thousands and/or ten thousands as required.

Multiply up to 4-digit by 2-digit

1	3̶	2̶	
	1	5	4
×		2	6
	9	2	4
3	0	8	0
4	0	0	4
1	1		

Start with the ones.

$154 \times 6 = 924$

$154 \times 20 = 3080$

$3080 + 924 = 4004$

Order of Operations

B	Brackets	$10 \times (4 + 2) = 10 \times 6 = 60$
O	Order	$5 + 2^2 = 5 + 4 = 9$
D	Division	$10 + 6 \div 2 = 10 + 3 = 13$
M	Multiplication	$10 - 4 \times 2 = 10 - 8 = 2$
A	Addition	$10 \times 4 + 7 = 40 + 7 = 47$
S	Subtraction	$10 \div 2 - 3 = 5 - 3 = 2$

Year 6 Maths —Summer 1

Four Operations — Knowledge Organiser

Short Division

Start from the left.

		4	4	0 .	5
12	5	⁵2	⁴8	6	⁶0

$5 \div 12 = 0\ r5$
$52 \div 12 = 4\ r4$
$48 \div 12 = 4$
$6 \div 12 = 0\ r6$

Long Division

		1	2	0	r	3
14	1	6	8	3		
	1	4	0	0		
		2	8	3		
		2	8	0		
				3		

Common Factors

Factors of 48

| 1 | 2 | 3 | 4 | 6 | 8 | 12 | 16 | 24 | 48 |

Factors of 30

| 1 | 2 | 3 | 5 | 6 | 10 | 15 | 30 |

Common factors: 1, 2, 3, 6

Primes

A prime number has only 1 and itself as factors: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 33, 37, 41, 43

A composite number has factors other than 1 and itself.

Mental Calculations and Estimation

Order of calculations:

$50 \times 34 \times 2 = 50 \times 2 \times 34 = 100 \times 34 = 3400$

Money: £8.99 + £3.49 = £12.48

Use £9 + £3.50 = £12.50 and subtract 2p

Estimate on a number line

```
-8      0       8      16  20  24
|-------|-------|-------|---|---|
```

Subdivide line to estimate: **17**

Common Multiples

Multiples of 3

| 3 | ... | 18 | 21 | 24 | ... | 39 | 42 |

Multiples of 7

| 7 | 14 | 21 | 28 | 35 | 42 |

Common multiples: 21, 42...

Squares and Cubes

Square numbers result from a number being multiplied by itself (e.g. 5 × 5 = 25):

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Cube numbers result from a number being multiplied by itself twice (2 × 2 × 2 = 8):

1, 8, 27, 64, 125

Reason from Known Facts

$90 \div 10 = 9$ so $90 \div 20 = 4.5$ and $90 \div 5 = 18$

$16 \times 9 = 144$ so $1.6 \times 9 = 14.4$

$4352 \div 17 = 256$

so $256 \times 18 = 4352 + 256 = 4608$

$3786 + 2850 = 6636$

so $4786 + 2850 = 7636$

and $2786 + 3850 = 6636$

and $8636 - 3786 = 4850$

Crucial Knowledge

Word Classes

Does your text include the following word classes...

determiners?	
nouns?	
adjectives?	
verbs and modal verbs?	
adverbs?	
pronouns?	
relative pronouns?	
conjunctions?	
prepositions?	

Verbs
(action or doing words)

jump swim live climb work sing
sleep move talk breathe think

Modal Verbs
must shall will should would can
could may might

Nouns and Proper Nouns

(common and proper names of people, places, things and ideas)

boy girl woman Alex Mr Brennan
castle Oxford Street tiger
house Windsor

Adverbs

(words that describe how, when or where a verb is being done)

slowly silently
upstairs yesterday
nearby kindly
occasionally easily
tomorrow

Adjectives

(words that describe nouns)

shiny ancient smooth gigantic
rosy tiny clear thin heavy

Conjunctions

(words that join words, phrases, clauses or sentences)

and because until when while
since if for however although as
but after

Determiners

(words that introduce a noun)

a the an these those her his
whose some many

Relative Pronouns

(words that introduce relative clauses)

which that who whom whose

Pronouns

(words that take the place of a noun)

his her she I
it this he they

Prepositions

(words that link nouns, pronouns and phrases)

across on above
below over in
through around

SAINT NATHANIEL'S ACADEMY

SPaG Knowledge Organiser: Writing Complex (Multi-Clause) Sentences

Crucial Knowledge

Key Vocabulary

main clause: A simple sentence that includes a subject and a verb.

relative clause: A dependent clause that adds more information about the noun or clause directly before it.

dependent clause: A dependent clause can be added to a main clause to make a complex sentence.

subordinate clause: Another word for a dependent clause. Subordinate clauses often start with subordinating conjuctions.

subject: The person, animal or object that is doing or being the verb.

verb: A doing or being word, such as: kicking; walk; touched.

simple sentence: A sentence that contains a subject and a verb with no conjunctions.

complex sentence: A multi-clause sentence that includes a main clause and a dependent clause.

Starting Out!

A **main clause** is a simple sentence that includes a **subject** and a **verb**.

The giraffe stretched its neck.

The giant carried the cow.

Craig sat down.
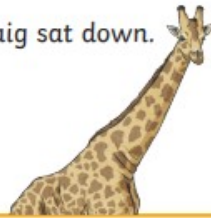
Use It!

Now, choose a **subordinating conjunction**.

The giraffe stretched its neck **because...**

The giant carried the cow **although...**

Craig sat down **before...**

TOP TIP: **I SAW A WABUB** can help you to remember common subordinating conjunctions.

Extend It!

Next, turn your simple sentences into **complex sentences** by completing your **subordinate clause**.

The giraffe stretched its neck **because the leaves were so high up.**

The giant carried the cow **although it wriggled and squirmed.**

Craig sat down **before eating the delicious bowl of custard.**

Become an Expert!

To become an expert at writing complex sentences, try using the subordinate clause at the beginning of the sentence:

Although it was a cold day, Anita refused to wear her coat.

Instead of using a **subordinating conjuction**, try adding a **relative clause** instead:

The firefighter ran towards the house, **which was engulfed in thick, black smoke.**

Slowly, the black cat, **who was well known in this neighbourhood,** crept up the path.

Congratulations – you have reached expert status!

TOP TIP: Always use a comma after your subordinate clause if it is at the beginning of the sentence.

Try to remember...

The best pieces of writing use a mix of complex sentences, compound sentences and simple sentences.

SAINT NATHANIEL'S ACADEMY

Crucial Knowledge Organiser

Co-ordinating Conjunctions

There are seven co-ordinating conjunctions.
They give equal importance to the words or sentences they connect.

for and nor but or yet so
F A N B O Y S

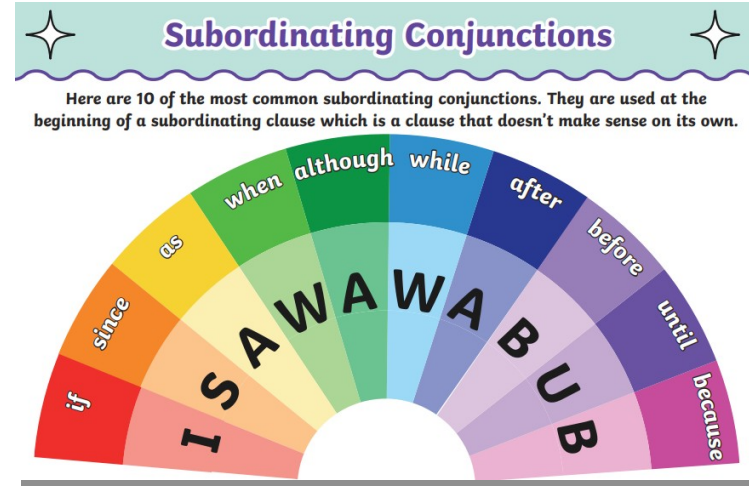ink saving Eco

Subordinating Conjunctions

Here are 10 of the most common subordinating conjunctions. They are used at the beginning of a subordinating clause which is a clause that doesn't make sense on its own.

if   since   as   when   although   while   after   before   until   because

ISAWAWABUB

Week 1: home spellings

rule - y to i then add es

bodies	cries
cities	tries
families	parties
babies	puppies
worries	lorries

Week 2: home spellings

rule - double last letter for ing/ed

planning	occurred
beginning	trapped
swimming	stopped
grabbing	wrapped
slipping	hugged

Week 3: home spellings

rule - drop the e, add ing

escaping	raising
challenging	arriving
exciting	judging
moving	deciding
including	choosing

Week 4: home spellings

rule - silent letters

know (known, knowledge)	climb
knife	subtle
knight	muscle
knuckle	calm
kneel	gnaw

Week 5: home spellings

rule - ei

neighbour	heir
protein	receipt
ceiling	reign
deceive	vein
receive	eight

Another common SATs spelling pattern: ture eg: mixture, adventure, puncture, creature, fracture, structure, pasture, torture, sculpture, nurture.

SAINT NATHANIEL'S ACADEMY

Crucial Knowledge Organiser

Electrical energy is the movement of electrons between atoms to make current electricity.
This movement happens at the speed of light!

Simplified atoms in a wire

Key Vocabulary

circuit	A path that an electrical current can flow around.
symbol	A visual picture that stands for something else.
cell/battery	A device that stores chemical energy until it is needed. A cell is a single unit. A battery is a collection of cells.
current	The flow of electrons, measured in amps.
amps	How electric current is measured.
voltage	The force that makes the electric current move through the wires. The greater the voltage, the more current will flow.
resistance	The difficulty that the electric current has when flowing around a circuit.
electrons	Very small particles that travel around an electrical circuit.

What will make a bulb brighter or a buzzer louder?
- More batteries or a higher voltage create more power to flow through the circuit.
- Shortening the wires means the electrons have less resistance to flow through.

What will make a bulb dimmer or a buzzer quieter?
- Fewer batteries or a lower voltage give less power to the circuit.
- More buzzers or bulbs mean the power is shared by more components.
- Lengthening the wires means the electrons have to travel through more resistance.

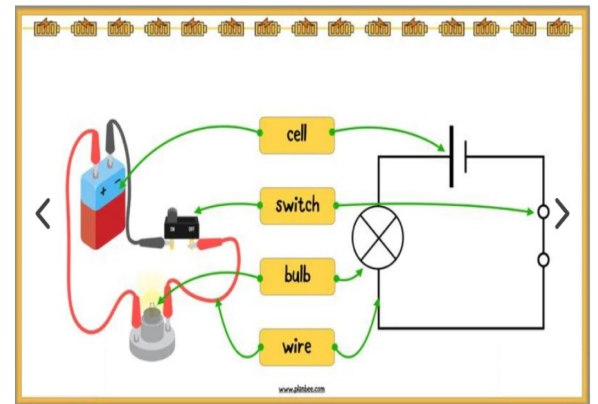**Series Circuit**
A circuit that has only one route for the current to take. If more bulbs or buzzers are added, the power has to be shared and so they will be dimmer or quieter. If just one part of this series circuit breaks, the circuit is broken and the flow of current stops.

More components sharing less power.

A broken circuit with no electrical current.

cell
switch
bulb
wire

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Crucial Knowledge Organiser

Unit: 6.5
Text Adventures

Key Vocabulary

Text-based Adventure
A computer game that uses text instead of graphics.

Debug\ Debugging
Fixing code that has errors so that the code will run the way it was designed to.

Sprite
A computer graphic which may be programmed to move on-screen.

Selection
When selection is used, a program will choose a different outcome depending on a condition.

Function
In this context, a section of code that gets run when it is called from the main code. A function in a program is usually a piece of code that gets run lots of times.

Flow of Control
The order that the computer program executes the commands it contains.

Step Through
A way of executing one line of code at a time to help programmers see what happens at each stage of a program. This can be helpful when debugging.

Key Learning

- To find out what a text adventure is.
- To use 2Connect to plan a story adventure.
- To make a story-based adventure using 2Create a Story.
- To read and understand given code for a text adventure game.
- To debug and improve a text adventure game.

Key Resources

purple mash

2Create a Story

2Connect

Unit: 6.6
Networks

Crucial Knowledge

Key Vocabulary

Hub\Switch
The connection point for networks where data packets from many locations converge and are then sent out to different devices.

Network
Several interconnected computers, machines, or operations.

Wide area network (WAN)
A collection of local-area networks (LANs) or other networks that communicate with one another over a large physical area or even globally.

Internet
A global computer network providing a variety of information and communication facilities consisting of interconnected networks using standardized communication protocols.

World Wide Web
An information system on the Internet which allows documents to be connected to other documents by hypertext links, enabling the user to search for information by moving from one document to another.

Local area network (LAN)
A computer network that links devices within a building or group of adjacent buildings, especially one with a radius of less than 1 km.

Router
A device which forwards data packets to the appropriate parts of a computer network.

Wi-Fi
A facility allowing computers, smartphones, or other devices to connect to the Internet or communicate with one another wirelessly within a particular area.

Key Learning

- To learn about what the Internet consists of.
- To find out what a LAN and a WAN are.
- To find out how the Internet is accessed in school.
- To research and find out about the age of the Internet.
- To think about what the future might hold.

Key Resources

purple mash

Tim Berners- Lee Profile

Communication Questionnaire

Crucial Knowledge Organiser

Knowledge Organiser

How has life in Britain changed since 1948?

Chronological Understanding

Children will learn;
- To summarise what they know about different British time periods
- How life in Britain changed since 1948
- To order key events on a timeline

Historical Enquiry

Children will learn;
- To use primary and secondary sources to learn about the past
- To investigate what life was like in different periods

Historical Understanding

Children will learn;
- Some of the main events that have taken place in Britain since 1948
- What life was like in Britain in the 50's, 60's, 70's, 80's and 90's
- How technology and industry has changed over time

|	1950s	1960s	1970s	1980s	1990s
Work life	Lots of factory workers due to expanding industries	More employed in service industries than manufacturing	Women given equal pay rights for doing the same job as men	More and more women entering employment	Over half of people in employment working with computers
Home life	Women stayed at home to look after the house and children	Supermarkets opened across town and cities	90% of families had a TV. Microwave ovens went on sale	More single-parent families due to divorce than death of a spouse	One in three marriages ended in divorce
Population	Large number of immigrants from Commonwealth countries	Race Relations Act introduced to stop racism in public places	Commission for Racial Equality introduced	Lots of families migrated to Australia, New Zealand and South Africa	Almost 10% of British population non-white or of mixed race
Technology	Silicon chip invented to make computers smaller	Apranet, an early version of the internet was developed	Personal computer invented. Jumbo jet starts service	First version of Microsoft Windows launched	World Wide Web available to the public
Popular culture	Commercial television started	Beatlemania took Britain and the rest of the world by storm	Culture of liberation and self-expression. Colour TV and cinema	More people going on holiday to foreign places than ever before	130 million World Wide Web users in the UK

1950s   1960s   1970s   1980s   1990s   2000s
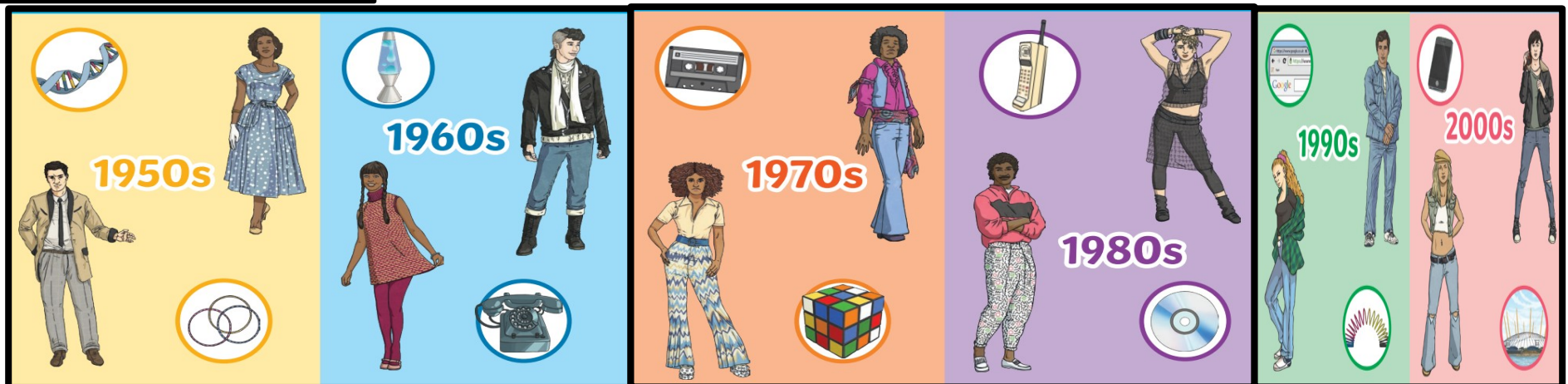
EXPRESS YOURSELF

Drawing line, pattern and texture
I can draw myself in an outfit which reflects my personality and interests
I can observe and draw different facial expressions of a character
I can create a Calligram Portrait
I can experiment with different pressures and thickness of their writing to create light and shadow on my portrait
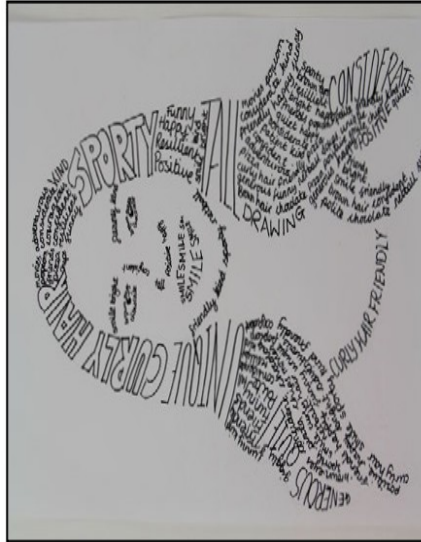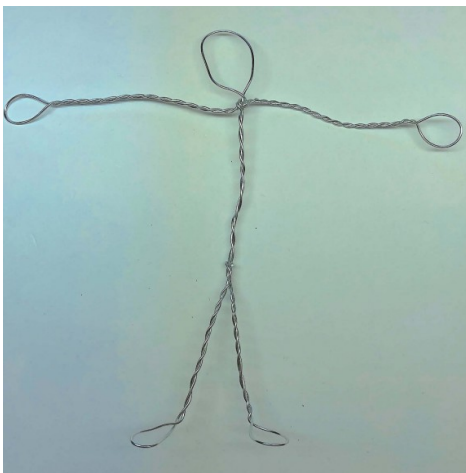

Collage, sculpture and 3D art
I can examine sculptures to understand the emotion represented
I can create wire models which express body language

Painting, printing and colour
I can explore how artists use colour to express themselves in their art
I can use colour and shape to illustrate my chosen emotions on an emotion wheel

Responding to artwork and using a sketchbook
I can describe why I have chosen different elements of an outfit.
I can identify the mood of an art piece through the use of facial expressions
I can examine sculptures to understand the emotion represented
I can study the artwork of Chuck Close and explore his techniques