AJS Science Learning Journeys

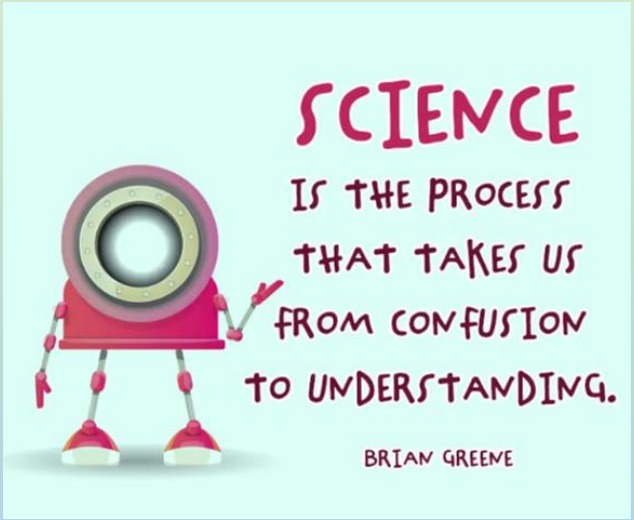
Ashley Junior School

Science

A scientist researches, examines and investigates our world to gather a better understanding of how it works.

As **scientists** we are learning to...

- be curious and question what we **think** we know
- **independently** and **collaboratively** observe and investigate different types of scientific enquiries
- gather, record and present data in different ways
- **reflect** upon and question our findings from research and experiments to inform our understanding of the world, the uses and implications of science today and for the future



Intent

It is our aim that all children will:

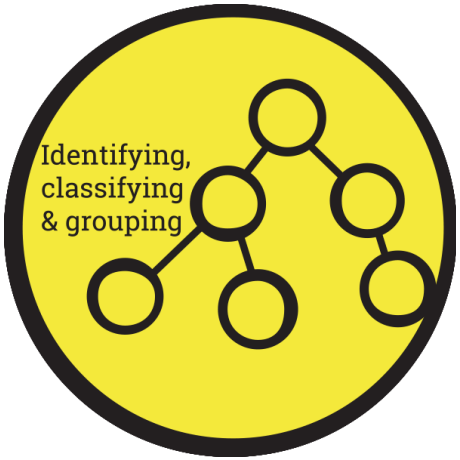
- Have a passion for science and recognise its application in past, present and future technologies.
- Develop confidence and competence in their working scientifically skills by taking the initiative in planning and carrying out scientific investigations.
- Solve challenging problems and report scientific findings through a variety of methods including written, verbal, modelled and visual explanations according to their learner style and ability.
- Through a range of investigations and enquiries, develop their skills in observation, identification, classification, interpretation of data, predicting, drawing conclusions and communicating scientifically.

We intend that all children will develop the ability to work scientifically through a range of investigations that include practical experiments, hypothesising using existing knowledge and drawing conclusions from their observations.They will leave our school with a solid foundation of scientific knowledge that will serve as a bedrock for their future secondary Science lessons.

Implementation:

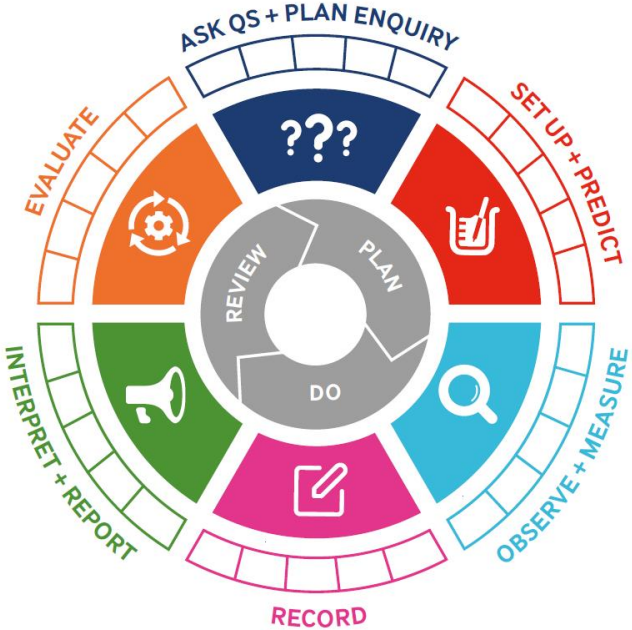
Enquiry types - each learning journey is constructed as a series of lessons involving a range of enquiry types.
Children have access to the enquiry types at the back of their science book and in resources issued from the subject lead and class teachers.
Example from Year 4 Sound Learning Journey:

Scientific enquiry:
What makes the best string telephone?



Implementation:

TAPS Working Scientifically Cycle



Asking questions
Asking questions that can be answered using a scientific enquiry.

Setting up tests
Deciding on the method and equipment to use to carry out an enquiry.

Making predictions
Using prior knowledge to suggest what will happen in an enquiry.

Observing and measuring
Using senses and measuring equipment to make observations about the enquiry.

Recording data
Using tables, drawings and other means to note observations and measurements.

Interpreting and communicating results
Using information from the data to say what you found out.

Evaluating
Reflecting on the success of the enquiry approach and identifying further questions for enquiry.

BATH SPA UNIVERSITY

Primary Science Teaching Trust

Working Scientifically Skills - Embedded in all lessons are the full range of working scientifically skills. Children have access to the working scientifically skills at the back of their science book and in resources issued from the subject lead and class teachers. These documents demonstrate the progression between the year groups of each of the skills, and acts as a guide for staff and pupils in the assessment of their age- related working scientifically skills.

Implementation

'As an AJS Scientist' definition:
Our 'As an AJS Scientist' poster is a visual prompt in all classrooms to support the children's understanding of what it means to be a scientist and how we can all associate ourselves with these scientific abilities and skills.

In alignment with our Scientific Enquiry types and our Working Scientifically skills,the definition of a scientist scaffolds the children's understanding of how best to seize the moment to be a scientist in school and prepares them for the demands of our Science curriculum.
In addition to planned Learning Journeys, other opportunities in school such as school visits, trips and termly challenges encourage and expose the children to be a scientist outside the classroom.

Impact

By the end of their time at Ashley Junior School, children will be able to:

- Demonstrate clear progression and a deeper understanding of a range of scientific ideas through end of topic assessment.
- Be independent with practical science and be able to choose and plan appropriate types of investigation to answer enquiry questions.
- Be confident to read, spell, pronounce and use scientific vocabulary accurately.
- Use ideas and knowledge to predict how the world works and understand that scientific ideas have, and will, change over time.
- Ask questions about their science learning and reflect on their knowledge.
- Enjoy science and find enthusiasm in their learning which they can build upon in secondary school.

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Year 3

Animals Incl Humans
Nutrition and Skeletons

Light

Forces and Magnets

Living Things: Plants

Rocks

Year 3: Animals Including Humans- Nutrition and Skeletons Learning Journey

WALT: ask questions about how the different joints in our body work

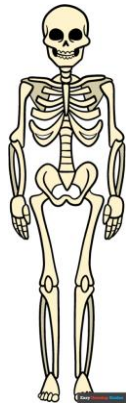
WALT:identify the similarities and differences between different animal skeletons

WALT:ask questions about the differences in human skeletons (Focused assessment)

WALT:create and evaluate our own model skeletons

WALT:use secondary sources to help us label a skeleton

WALT: classify food according to their fat and sugar content



Key Vocabulary

Nutrition	Skeleton
Nutrients	Bones
Carbohydrates	Muscles
Sugars	Joints
Protein	Support
Vitamins	Protect
Minerals	Move
Fibre	Skull
Fat	Ribs
Water	Spine

Linked to PSHE Autumn 1 for knowledge of food groups.

Retrieval:

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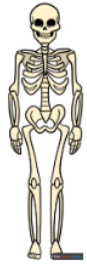

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Key Questions:

1) Name two foods high in sugar:

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Name two foods high in fat:

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2) From your class investigation, explain two differences between human skeletons:

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3) Explain how our joints work:

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Year 3: Light

Learning Journey

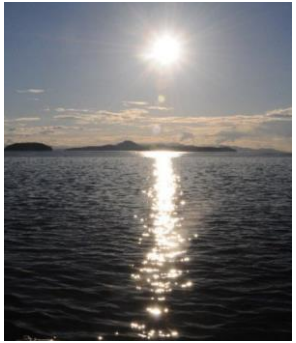
WALT: record which materials block light to form shadows (Focused assessment)

WALT: find patterns when investigating how shadows change size

WALT: explain how the sun can be dangerous and ways to protect our eyes

WALT: predict which surfaces are best at reflecting light

WALT: classify natural and artificial light sources



Key Vocabulary

light	Sun
light source	sunlight
dark	dangerous
absence of light	shadow
surface	reflect mirror

Retrieval:

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Key Vocabulary

light		Sun
light source		sunlight
dark		dangerous
absence of light		shadow
surface	reflect	mirror

Key Questions:

1) How are shadows formed?

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2) How is the sun harmful to your eyes?

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3) Which surfaces are best at reflecting light?

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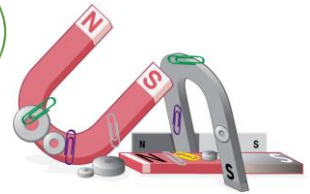
Year 3: Forces and Magnets

Learning Journey

WALT: investigate the strength of different magnets

WALT: explain our understanding of contact and non-contact forces

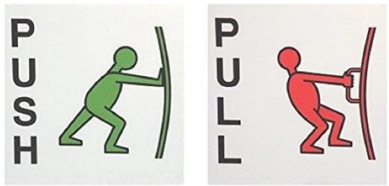
WALT: observe how magnets attract and repel each other



WALT:classify materials as magnetic or non-magnetic

WALT: compare and record how objects move on different surfaces

WALT: explain our understanding that forces are a push or pull action



Key Vocabulary

bar magnet
ring magnet
button magnet
horseshoe magnet
attract
repel
metal
poles
north pole
south pole
force
push
pull
contact force
non-contact force
magnetic force
magnetic material
magnet
strength

Retrieval:

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WALT: observe how magnets attract and repel each other

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WALT: explain our understanding that forces are a push or pull action

Key Vocabulary

bar magnet	force
ring magnet	push
button magnet	pull
horseshoe magnet	contact force
attract	non-contact force
repel	magnetic force
metal	magnetic material
poles	magnet
north pole	strength
south pole	

Key Questions:

1) What affects how objects move on different surfaces?

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Attract or repel?

I think these magnets will _____

Attract or repel?

I think these magnets will _____

3) Explain the difference between contact and non-contact forces:

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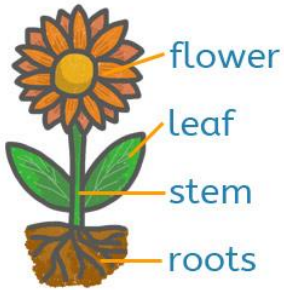
Year 3: Plants
Learning Journey

WALT: enquire how different flowers disperse their seed

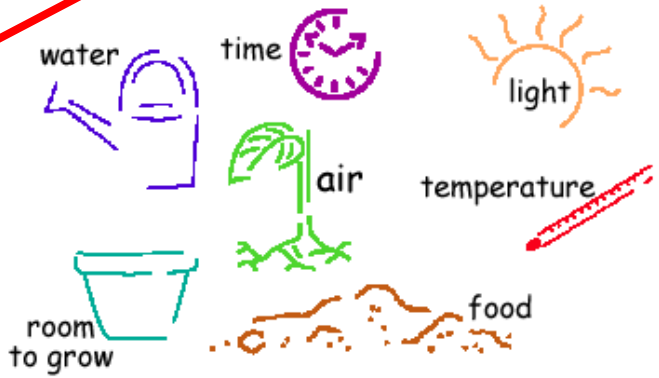
WALT:explore the role of a flower in the life cycle of a plant



WALT: observe how water is transported in a plant

WALT: identify and describe the functions of different parts of flowering plants

WALT:investigate the requirements of plants for life and growth



Key Vocabulary

photosynthesis
pollen
insect/wind pollination
male
female
seed formation
seed dispersal
wind/animal/water dispersal
air
nutrients
minerals
soils
absorb
transport

Retrieval:

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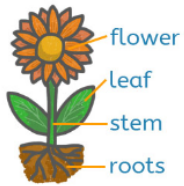
Year 3: Plants
Learning Journey



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Key Vocabulary

photosynthesis
pollen
insect/wind pollination
male
female
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seed dispersal
wind/animal/water dispersal
air
nutrients
minerals
soils
absorb
transport

Key Questions:

1) Name three things plants require to help them grow:

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2)Fill in the missing gaps:

…….. are brightly coloured to attract birds and insects.

…… take in water and …….. from the soil.

…… catch the sunlight so plants can make their own……

The …….. holds up the plant up and …….. water.

3) Describe using key vocabulary one way in which animals can help plants:

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Year 4

States of matter

Sound

Electricity

Animals Incl Humans:
Teeth and Digestion

Living Things:
Food chains and habitats

Year 4: States of Matter
Learning Journey

WALT: demonstrate our understanding of the stages of the water cycle by creating our own models

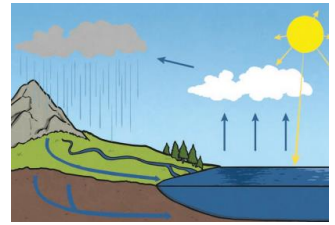
WALT: construct a table to record our observations of the process called condensation

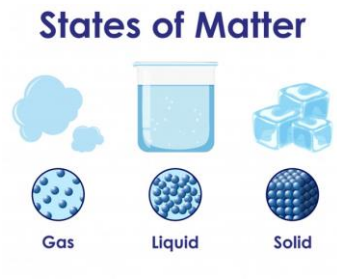
WALT:plan a fair test to find the best conditions for evaporation to take place (focused assessment)

WALT: use a thermometer to record the temperatures of the different states of water

WALT: observe how materials change state when heated or cooled

WALT:classify materials according to their states of matter





Key Vocabulary

particle	melting
states of matter	melting point
solid	freezing
gas	boiling point
liquid	temperature
state change	evaporation
water cycle	condensation

Year 4: States of Matter
Learning Journey

Retrieval:

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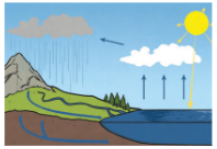

Key Vocabulary

particle	melting
states of matter	melting point
solid	freezing
gas	boiling point
liquid	temperature
state change	evaporation
water cycle	condensation

Key Questions:

1) What can a gas or liquid do that a solid cannot?

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2) Explain how water changes state from a solid to a gas:

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3) Name two stages of the water cycle and the states of matter involved:

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Year 4: Sound Learning Journey

WALT: evaluate how different materials absorb sound

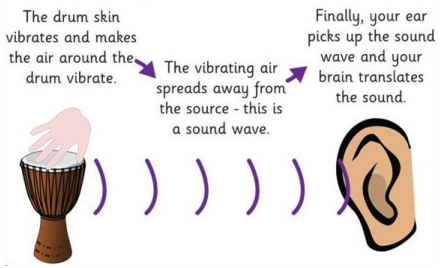
WALT: identify how sound changes over distance

WALT: explore and explain how the size of vibrations affect the volume of a sound

WALT: find and record patterns between the pitch of the sound and the object that made it

WALT: explain how to make the best string telephone
(Focused assessment)

WALT: question how different sounds are made



Key Vocabulary

Sound	Pitch (high/low)
Source	Volume
Medium	Faint
Vibrate	Quiet
Vibration	Loud
	Insulation

Retrieval:

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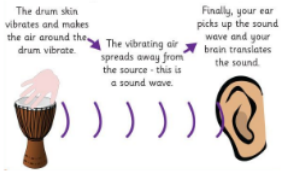

Key Vocabulary

Sound	Pitch (high/low)
Source	Volume
Medium	Faint
Vibrate	Quiet
Vibration	Loud
	Insulation

Key Questions:

1) How are sounds made?

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2) What affects the pitch of a sound?

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3) How do vibrations affect the volume of a sound?

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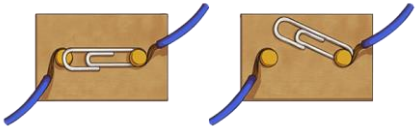
Year 4: Electricity
Learning Journey

WALT: identify which materials conduct electricity

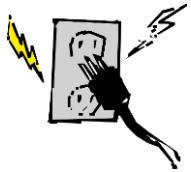
WALT: explore the role of a switch in a circuit

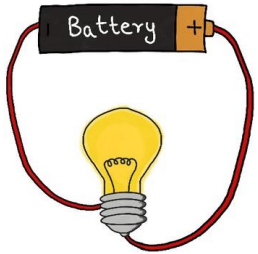
WALT: identify whether or not a lamp will light in a simple series circuit



WALT: investigate how to construct a simple circuit and name its components

WALT: classify mains and battery powered electrical devices in a Venn diagram





Key Vocabulary

electrical circuit	cell/battery
complete circuit	crocodile clip
incomplete circuit	bulb
component	wire
positive/negative	switch
connect	buzzer
connection	conductor
metal/non-metal	insulator

Retrieval:

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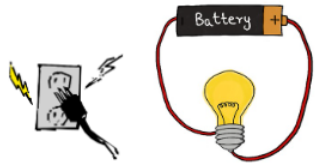

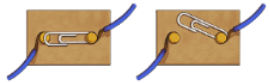

Key Vocabulary

electrical circuit	cell/battery
complete circuit	crocodile clip
incomplete circuit	bulb
component	wire
positive/negative	switch
connect	buzzer
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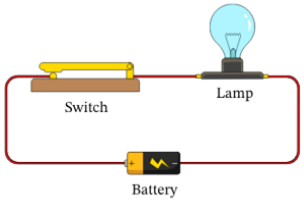
metal/non-metal	insulator

Key Questions:

1) Draw a simple series circuit:

2) Will this bulb light up?



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Explain why:

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3) What does a material need to be to conduct electricity?

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Give two examples:

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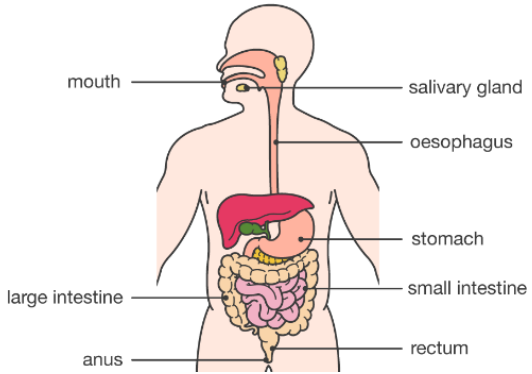
Year 4: Animals Including Humans -Teeth and Digestion

Learning Journey

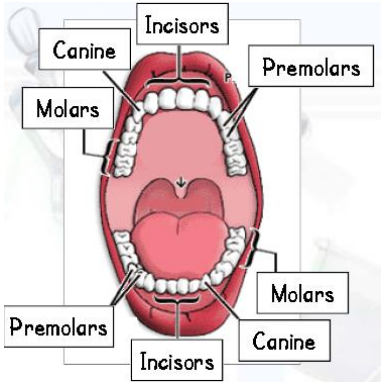
WALT: explain the functions of the organs in the digestive system



WALT: model the process of digestion (Focused assessment)

WALT:identify and name the organs in the digestive system

WALT: observe the effect of different substances on teeth



WALT:identify the different types of teeth in humans and their functions

Key Vocabulary

digestive system
mouth
teeth
incisor
canine
molar
premolar
saliva
digestion
oesophagus
stomach
small intestine
large intestine
rectum
anus

Retrieval:

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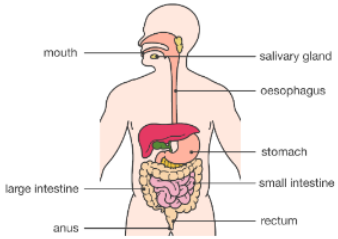
Year 4: Animals Including Humans -Teeth and Digestion

Learning Journey

WALT: explain the functions of the organs in the digestive system

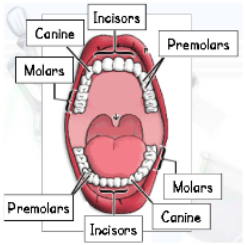


WALT: model the process of digestion
(Focused assessment)

WALT:identify and name the organs in the digestive system

WALT: observe the effect of different substances on teeth

WALT:identify the different types of teeth in humans and their functions



Key Vocabulary

digestive system

mouth	digestion
teeth	oesophagus
incisor	stomach
canine	small intestine
molar	large intestine
premolar	rectum
saliva	anus

Key Questions:

1) Name TWO different types of teeth and their function:

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2) What is the first stage of digestion?:

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3) Choose an organ from the digestive system and explain its function::

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Year 4: Animals Including Humans + Living Things and Their Habitats Learning Journey

WALT: observe negative and positive effects of human impact on the local environment

WALT: recognise how environments can change naturally over time

WALT: observe and identify living organisms in our school grounds (Outdoor lesson) (Focused assessment)

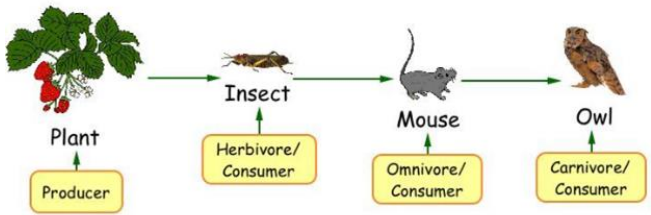
WALT: explore classification keys to group, identify and name living things

WALT: recognise that living things can be grouped in a variety of ways

WALT: model food chains(Outdoor lesson)

WALT: interpret food chains and identify producers, predators and prey

WALT:classify animals according to their different types of teeth



Key Vocabulary

herbivore
carnivore
omnivore
producer
consumer
predator
prey
classification
classification keys
environment
habitat
human impact
positive
negative
migrate
hibernate

Retrieval:

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Year 4: Animals Including Humans + Living Things and Their Habitats Learning Journey

WALT: observe negative and positive effects of human impact on the local environment

WALT: recognise how environments can change naturally over time

WALT: observe and identify living organisms in our school grounds (Outdoor lesson) (Focused assessment)

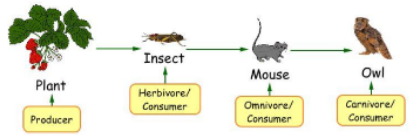
WALT: explore classification keys to group, identify and name living things

WALT: recognise that living things can be grouped in a variety of ways

WALT: model food chains(Outdoor lesson)

WALT: interpret food chains and identify producers, predators and prey

WALT:classify animals according to their different types of teeth



Key Vocabulary

herbivore
carnivore
omnivore
producer
consumer
predator
prey
classification
classification keys
environment
habitat
human impact
positive
negative
migrate
hibernate

Key Questions:

1) Explain how and why the teeth of a carnivore are different to the teeth of a herbivore:

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2) What is a classification key used for?

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3) Explain one negative and one positive effect of humans on their environment.

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Year 5

Forces

Earth and Space

Properties of Materials

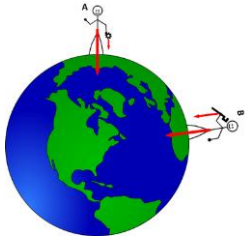
Living Things : Life Cycles

Animals Including Humans: Human development

Year 5: Forces Learning Journey

WALT: identify different forces and raise questions for future enquiries about them.

WALT:draw scientific diagrams to demonstrate the effect of gravity on Earth.



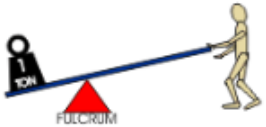
WALT: use force meters correctly to investigate the effect of gravity on an object.

WALT: control and change variables in an investigation about the effects of air resistance.

WALT: examine the repeatability of an investigation about water resistance.

WALT: plan and carry out an enquiry to demonstrate our understanding of friction

WALT: ask questions and research different mechanisms which allow a smaller force to have a greater effect



WALT: discover and present graphically our findings about different mechanisms

WALT: suggest,devise and present a mechanism to lift a load

Key Vocabulary

force	mechanisms
gravity	simple machines
Earth	levers
air resistance	pulleys
water resistance	gears
friction	

Retrieval:

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Year 5: Forces Learning Journey

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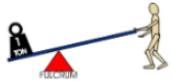

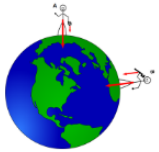

Key Vocabulary

force	mechanisms
gravity	simple machines
Earth	levers
air resistance	pulleys
water resistance	gears
friction	

Key Questions:

1) Label gravity and one other force in this diagram showing the directions of these forces using arrows.

An aeroplane flying

2) Circle the correct word:

Friction is a force/weight that happens between two surfaces rubbing together. Friction always acts in the same/opposite direction to the moving object, and always slows down/ speeds up a moving object. Smooth surfaces like ice create some/no friction.

3) Choose a mechanism we have looked at and describe how it works:

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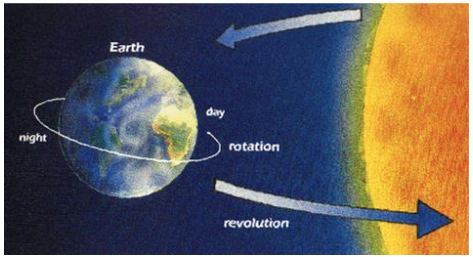
Year 5: Earth and Space
Learning Journey

WALT: research and present information about planets in the solar system
(Focused assessment)

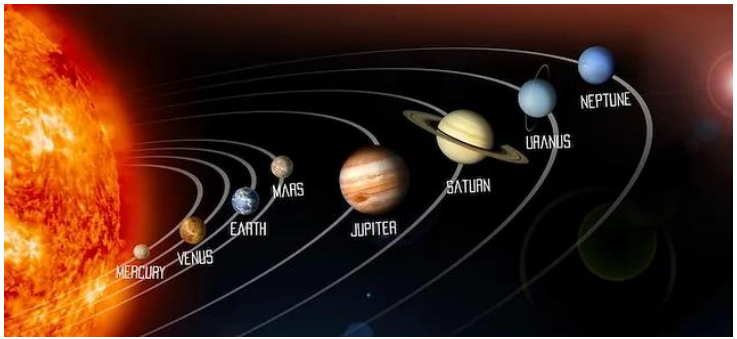
WALT: describe the movement of the Moon relative to the Earth



WALT: explain how the movement of the Earth creates night and day

WALT: question then demonstrate how the Earth and planets orbit around the Sun

WALT: construct a model of the solar system with the Sun at the centre



Key Vocabulary

Earth	Planets
Sun	Mercury
Moon	Venus
Spherical	Mars
Solar system	Jupiter
Orbit	Saturn
Star	Uranus
Rotates	Neptune

Retrieval:

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Year 5: Earth and Space
Learning Journey

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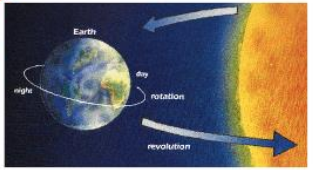

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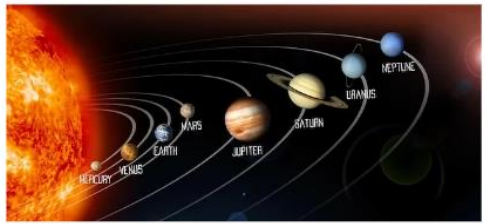

Key Vocabulary

Earth	Planets
Sun	Mercury
Moon	Venus
Spherical	Mars
Solar system	Jupiter
Orbit	Saturn
Star	Uranus
Rotates	Neptune

Key Questions:

1) How does the Earth orbit around the Sun?

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2) Why do we experience night and day?

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3) How does the Moon move around the Earth?

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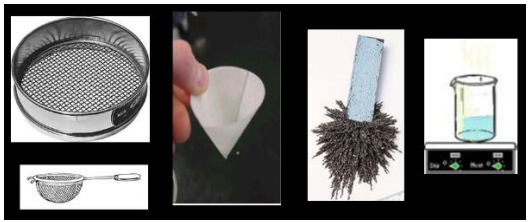
Year 5: Properties of Materials
Learning Journey

WALT: observe, record and explain an irreversible change

WALT: use a range of apparatus to demonstrate reversible changes



WALT: use a range of apparatus to separate mixtures

WALT:observe what happens when a solid dissolves in a liquid to form a solution
(Focused assessment)

WALT: categorise materials according to observed properties

Key Vocabulary:

thermal/electrical insulator/conductor
change of state
mixture
dissolve
solution
soluble
insoluble
filter
sieve
reversible change
irreversible change
burning
rusting
new material

Retrieval:

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Year 5: Properties of Materials
Learning Journey

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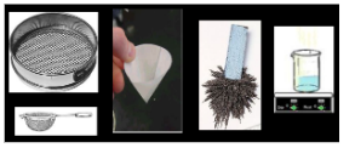

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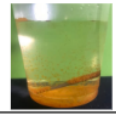

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change of state
mixture
dissolve
solution
soluble
insoluble
filter
sieve
reversible change
irreversible change
burning
rusting
new material

Key Questions:

1) What is a solution? Give an example.

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2) Explain TWO ways to separate a mixture -use examples:

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3) Describe an irreversible change and the new material made:

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Year 5:Living Things and Their Habitats

Learning Journey

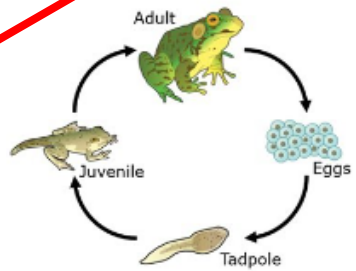
Key Vocabulary

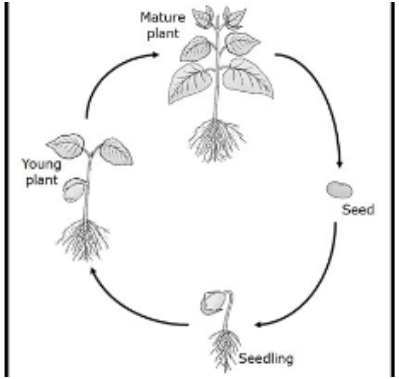
life cycle	
reproduce	
sexual	metamorphosis
sperm	asexual
fertilises	plantlets
egg	runners
live young	cuttings

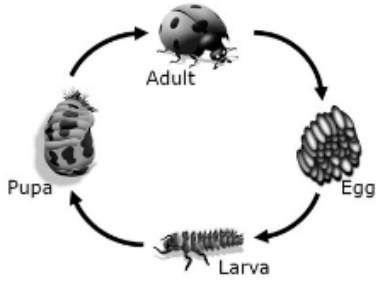
WALT: research the stages of the life cycle of a plant

WALT: research and present life cycles involving metamorphosis

WALT:compare the life cycles of different animals







WALT:identify differences in the life cycles of mammals

Retrieval:

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Year 5:Living Things and Their Habitats

Learning Journey

Key Vocabulary

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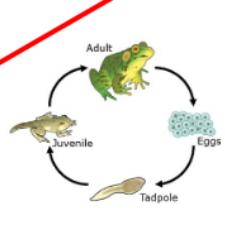

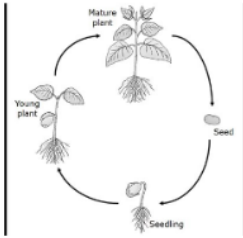

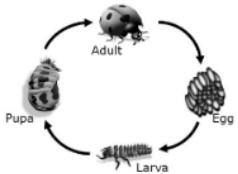

WALT:identify differences in the life cycles of mammals

Key Questions:

1) Define the term **life cycle:**
Give examples.

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2) What does **metamorphosis** mean?
Give examples.

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3) What is the difference between **sexual** and **asexual** reproduction in plants?

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Year 5:Animals Including Humans
Learning Journey

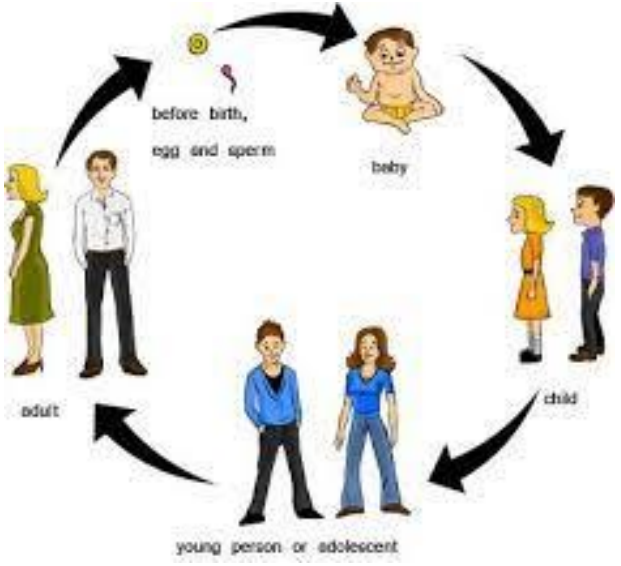
WALT: research what happens to the body in old age

Key Vocabulary

life cycle	
foetus	puberty
baby	adult
child	life span
adolescent	life expectancy

WALT: describe the changes in humans from childhood to adulthood (covered in PSHE - puberty videos)

WALT: show graphically how babies grow and change



WALT:identify and explain the stages of the human life cycle from birth to old age

WALT: research old age and life expectancy

Retrieval:

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Year 5:Animals Including Humans
Learning Journey

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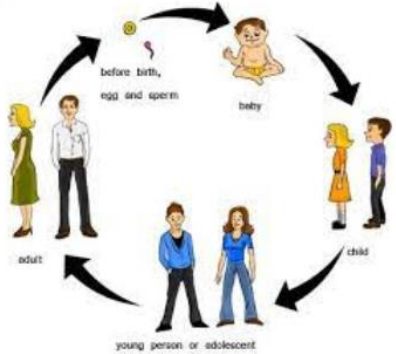

Key Questions:

1) Name the six stages of the human life cycle:

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2) Explain two changes to both boys and girls during puberty:

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3) Explain two changes that happen to the body in old age:

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Year 6

Light

Electricity

Animals Incl Humans: Circulatory system

Living Things: Classification

Evolution and Inheritance

Year 6: Light Learning Journey

WALT: plan and carry out an enquiry to demonstrate our knowledge of shadows (outdoor lesson)

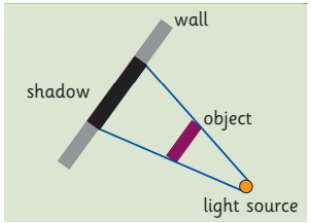
WALT:use scientific drawings to explain how light travels from light sources to our eyes

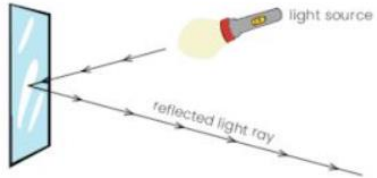
WALT: demonstrate and present our understanding of how light travels in straight lines

WALT: predict how a light ray travels when it hits a plane mirror

WALT: relate scientific theory to our observations of shadows

WALT: devise and present a device to see around a bend





Key Vocabulary

light	surface
light source	mirror
sunlight	reflect
shadow	straight line
absence of light	light ray

Retrieval:

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Year 6: Light Learning Journey

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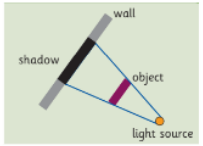

Key Vocabulary

light	surface
light source	mirror
sunlight	reflect
shadow	straight line
absence of light	light ray

Key Questions:

1) Explain how a shadow is formed:

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2) What is reflection?

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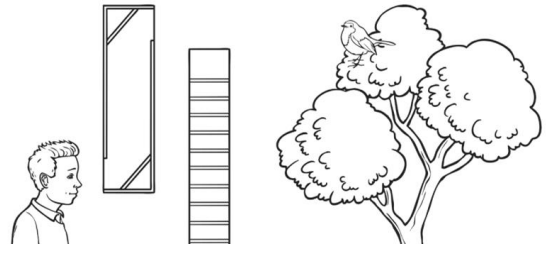
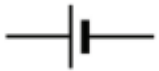
3) Draw 4 lines to show how the person sees the bird with the periscope.



Year 6: Electricity
Learning Journey

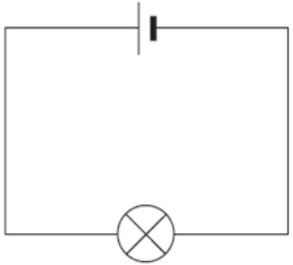
WALT: demonstrate and model our understanding of electrical circuits.

WALT: predict how components will function as different factors are changed within a circuit

WALT: plan a fair test to find the factors that affect the brightness of a bulb


WALT: construct a simple series circuit and use symbols to draw it.



Key Vocabulary

complete circuit	component
incomplete circuit	cell/battery
circuit diagram	bulb
circuit symbol	wires
current	switch
voltage	buzzer
positive/negative	

Retrieval:

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Year 6: Electricity
Learning Journey

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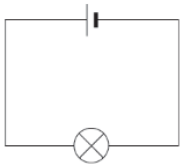

Key Vocabulary

complete circuit	component
incomplete circuit	cell/battery
circuit diagram	bulb
circuit symbol	wires
current	switch
voltage	buzzer
positive/negative	

Key Questions:

1) Draw a closed circuit with a cell, switch and bulb:

2) Explain one factor that can affect the brightness of a bulb:

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3) What happens to components in a circuit as more are added but the number of cells remains the same?

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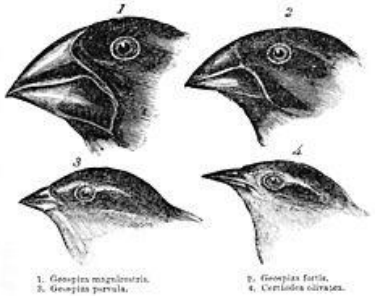
Year 6: Evolution and Inheritance

Learning Journey

WALT: observe and explain how fossils provide evidence of evolution

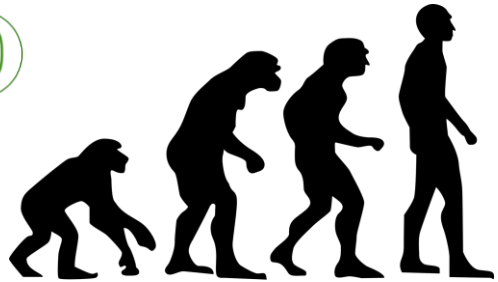
WALT: recognise how living things have evolved over time



WALT: make predictions and conclusions based upon Darwin's theory of evolution
(Focused assessment)

WALT: identify and explain how living things are adapted to their environments

WALT: recognise and report how living things produce offspring of the same kind



Key Vocabulary

offspring
sexual reproduction
vary
variation
characteristics
adapted
inherited
inheritance
species
evolve
evolution

Retrieval:

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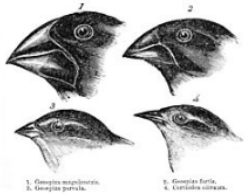
Year 6: Evolution and Inheritance

Learning Journey



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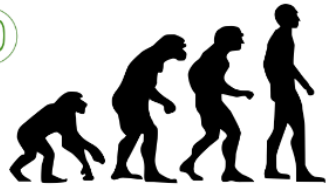

Key Vocabulary

offspring
sexual reproduction
vary
variation
characteristics
adapted
inherited
inheritance
species
evolve
evolution

Key Questions:

1) Define the word inheritance:
Use examples.

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2) Define the word adaptation:
Use examples.

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3) Define the word evolution:
Use examples.

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Year 6:Living Things and Their Habitats

Learning Journey

Key Vocabulary

Mammals
Birds
Fish
Amphibians
Reptiles
Vertebrate
Invertebrate

Insects
Spiders
Snails
Worms

Flowering
Non-flowering
Mosses
Ferns
Conifers

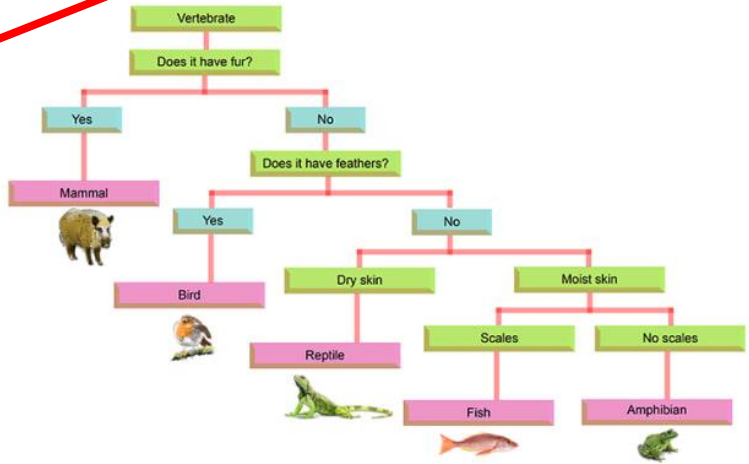
WALT: use our gained knowledge to develop and classify an imaginary animal

WALT: research the five animal classes and identify their key characteristics

WALT: identify and classify invertebrates

WALT: develop a scientific model by generating questions for a classification key

WALT: classify living things



Retrieval:

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Year 6:Living Things and Their Habitats
Learning Journey

Key Vocabulary

Mammals
Birds
Fish
Amphibians
Reptiles
Vertebrate
Invertebrate

Insects
Spiders
Snails
Worms

Flowering
Non-flowering
Mosses
Ferns
Conifers

WALT: use our gained knowledge to develop and classify an imaginary animal

WALT: research the five animal classes and identify their key characteristics

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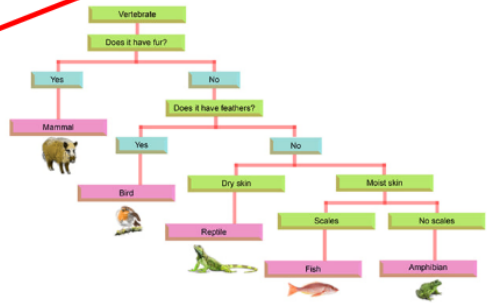

Key Questions:

1) What is the purpose of a classification key?

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2) What is the difference between vertebrates and invertebrates?

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3) What are the key characteristics of mammals?

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Year 6: Animals Including Humans -Systems of the Human Body

Learning Journey

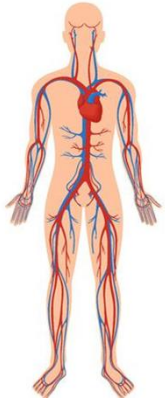
WALT:research and present the negative physical impact of drugs and other lifestyle choices

WALT: recognise the importance of diet and exercise for a healthy body

WALT: investigate the impact of exercise on heart rate

WALT: demonstrate our understanding of the double circulatory system

WALT: identify the different parts of the human circulatory system and describe their functions



Key Vocabulary

heart
pulse
rate
pumps
blood
blood vessels
transported
lungs
oxygen
carbon dioxide
cycle
circulatory system
diet
drugs
lifestyle

Retrieval:

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Year 6: Animals Including Humans -Systems of the Human Body Learning Journey

WALT:research and present the negative physical impact of drugs and other lifestyle choices

WALT: recognise the importance of diet and exercise for a healthy body

WALT: investigate the impact of exercise on heart rate

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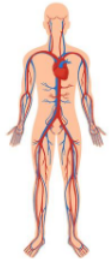

Key Vocabulary

heart	
pulse	oxygen
rate	carbon dioxide
pumps	cycle
blood	circulatory system
blood vessels	diet
transported	drugs
lungs	lifestyle

Key Questions:

1) Name an organ in the circulatory system and explain its function:

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2) Explain the impact of exercise on heart rate:

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3) Explain how exercise would benefit a body that has used drugs:

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