

Science Progression Map

Cycle A

“Somewhere something incredible is waiting to be known.”

Carl Sagan



Science Curriculum Map

Cycle A



Working
Scientifically



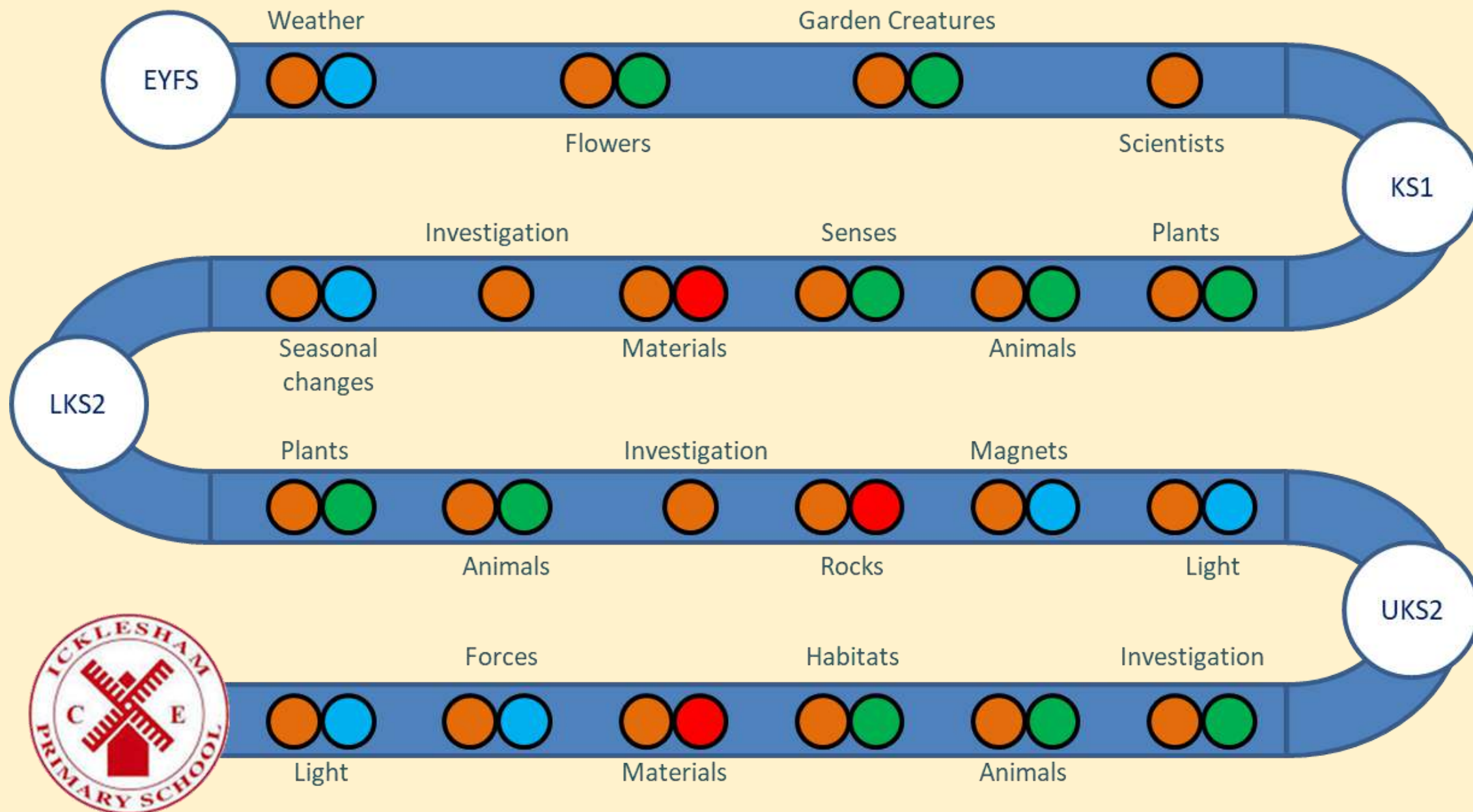
Biology



Chemistry



Physics



Objective

To compare different weathers and seasons.

I wonder...

What is the weather?



Substantive Knowledge (Content)

- To know that there are different kinds of weather
- To know that weather changes across the year
- To know that the weather has an impact on the things we do
- To know that weather has an impact on the world around them
- To know that there are different types of cloud
- To know that rain comes from water droplets in clouds
- To know that rain is important for living things
- To know that there are four seasons: autumn, winter, spring, summer
- To know that summer is when it is most warm and winter is when it is most cold
- To know that sunshine brings warmth
- To know that when it is very cold, water can freeze and become ice, frost, hail and snow
- To know that wind is caused by air around them moving

Future Learning

KS1

Children will be looking at seasonal changes including weather and day length differences.

LKS2

Children will be learning about rocks and soil and seeing how these are formed over time.

Skills

Recognise	Name and point out who or what something is
Identify	Distinguish something or someone from others that may be similar
Describe	‘Say what you see’. Give an account in words of something or someone
Observe	Identify and distinguish with a degree of analysis some things that may potentially be more noteworthy or important than others
Compare and contrast	Find similarities and differences
Recall	Remember and recount something learned

Concepts

Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Process	The natural or human events and actions that maintain equilibrium or cause change.
Environment	The surroundings of a place in which a person, animal or plant lives and interacts.

Key vocabulary

air	The mixture of gasses that surrounds the earth and that we breathe
calm / still	Absence of wind
cloud	White mass in sky made of water droplets
droplet	A small drop of liquid
freeze / freezing / frozen	Temperature lower than 0°C, cold and often hard
frost / frosty	Thin, white layer of ice
hot/cold/warm/cool	temperatures
ice / icy / icicle	Water that has frozen and become solid
light / dark	Brightness that allows things to be seen / absence of
melt /melting	Turn from solid to liquid
morning / afternoon / evening / night /day	Times of day
plant / flower / grass	Living things growing in earth
puddle	Small pool of liquid on the ground from rain
rain	Drops of water from clouds
season - Autumn, Winter, Spring, Summer	One of the four periods of the year
shade / shadow	Slight darkness caused by blockage of light from sun
sky	The area above the earth in which clouds etc. can be seen
snow	Small, soft, white pieces of ice that fall from the sky
storm	Extreme weather condition
sun / sunny / sunshine	the star that gives light and heat to Earth
temperature	The measured amount of heat in a place
today / yesterday	The present day / the day before
water	Clear liquid necessary for plant and animal life
waterproof	Not allowing water to go through
weather	The conditions in the air above the earth.
wet / dry	Covered / not covered in water or other liquid
wind / breeze	Natural current of air strong enough to be felt

Assessment points

- **Recognise** features of different kinds of weather
- **Identify** different kinds of weather
- **Identify** seasons
- **Describe** the effect of weather on the environment and on the things we do
- **Observe** and record the weather
- **Observe** seasonal changes in their immediate environment
- **Compare and contrast** the weather at different times of the year
- **Recall** the names of the four seasons

EYFS coverage

- Explore the natural world around them, making observations and drawing pictures. *The Natural World ELG*
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class *The Natural World ELG*
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. *The Natural World ELG*

SEN/D minimum expectations

- **Recognise** features of different kinds of weather
- **Identify** different kinds of weather
- **Describe** the effect of weather on the environment and on the things we do

High prior attainment and extension opportunities

Look at examples of extreme weather and how it can damage the environment.



Objective
To know about features of flowers and how they grow

I wonder...
Why do people like to give and receive flowers?



Substantive Knowledge (Content)

- To know that flowering plants grow from bulbs and / or seeds
- To know that plants need soil, sunlight and water to grow
- To know that flowers have a stem, leaves and petals
- To be able to name some flowering plants
- To know that flowering plants look different at different times of year

Future Learning

KS1
Children will be naming a variety of plants and their parts.

LKS2
Children will be learning about the functions of the different parts of a plant and how water is transported.

Skills

Recognise	Name and point out who or what something is
Identify	Distinguish something or someone from others that may be similar
Describe	‘Say what you see’. Give an account in words of something or someone
Observe	Identify and distinguish with a degree of analysis some things that may potentially be more noteworthy or important than others
Compare and contrast	Find similarities and differences
Recall	Remember and recount something learned

Concepts

Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Process	The natural or human events and actions that maintain equilibrium or cause change.
Environment	The surroundings of a place in which a person, animal or plant lives and interacts.

Key vocabulary

plant	To put a plant into the ground so that it will grow.
bulb	A round root from which some plants grow
sow	To put seeds in soil so they will grow
seed	The small, hard part of a plant from which a new plant grows.
trowel	Small tool used for digging in the garden
watering can	Container for water with a handle and long tube, used for pouring water onto garden plants
stem	The thin, upright part of the plant on which the flowers and leaves grow.
petal	The colourful, or white parts of the flower.
leaf, leaves	The part of the plants that is flat, thin and usually green, but may change colour in Autumn.
soil	The substance on the surface of the earth in which plants grow.
seedling	A young plant that has been grown from seed
sunlight	Light that comes from the sun
water	Clear liquid necessary for plant and animal life
sweet pea	Sweet scented climbing flowering plant
cosmos	Large daisy-shaped flower, often pink or white
cornflower	Plant with flowers that are often blue
calendula	Plant with orange or yellow daisy-shaped flowers
poppy	Plant with a large, delicate flower
lavender	Plant with sweet-smelling purple flowers

Assessment points

- Recognise** different flowers
- Identify** different flowers
- Describe** different flowers – their features, colours, shape etc
- Observe** the changes in plants as they grow from seed to seedling to full flowering plant
- Compare and contrast** the Giving Garden at different times of the year
- Compare and contrast** different flowers
- Recall** the things that are necessary for plants to grow
- Recall** the names of some flowers

EYFS coverage

- Explore the natural world around them, making observations and drawing pictures. *The Natural World ELG*
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class *The Natural World ELG*
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. *The Natural World ELG*

SEN/D minimum expectations

- Recognise** different flowers
- Identify** different flowers
- Describe** different flowers – their features, colours, shape etc

High prior attainment and extension opportunities

Investigate the different seeds and seed pods for different flowers – poppy, sweet pea, calendula. Observe the change from flower with petals to seed / seed pods and discuss how seeds then self-sow to grow more flowers.



Objective
To know about invertebrates

I wonder...
What creatures can we find in the garden?



Substantive Knowledge (Content)

- To know that invertebrates are small animals that do not have a spine or a skeleton inside their body.
- To know that some have a hard shell (exoskeleton) outside their body (insects, spiders)
- To know that some have soft bodies (e.g. worms, slugs)
- To know that invertebrates have different numbers of legs and wings. Some have antennae.
- To know that invertebrates need shelter, food, water and air to survive.
- To know that some invertebrates go through a process of metamorphosis (caterpillars)

Future Learning

KS1
The children will be learning about different animal types.

LKS2
Children will be learning about why some animals have skeletons and how they survive.

UKS2
Children will learn about how humans change as they get older.

Skills

Recognise	Name and point out who or what something is
Identify	Distinguish something or someone from others that may be similar
Describe	‘Say what you see’. Give an account in words of something or someone
Observe	Identify and distinguish with a degree of analysis some things that may potentially be more noteworthy or important than others
Classify	To divide things into groups according to their type
Compare and contrast	Find similarities and differences
Recall	Remember and recount something learned

Concepts

Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Process	The natural or human events and actions that maintain equilibrium or cause change.
Organization / structure and function	The way in which the parts of a system are arranged and their purposes

Key vocabulary

invertebrate	An animal with no spine
spine	The line of bones down the centre of the back that provides support for the body
skeleton	The frame of bones supporting a human or animal body
shell	A hard-outer covering
legs	Part of the human / animal body used for standing and walking
wings	The flat part of the body that an insect uses for flying
antennae	A pair of long, thin organs found on the head of some invertebrates, used to feel with
metamorphosis	The process by which the young form develops into the adult form
caterpillar	A small long invertebrate with many legs
chrysalis	A butterfly at the stage of development when it is covered by a hard case
cocoon	The silk casing that a moth caterpillar spins around itself before it transforms into a moth
butterfly	Insect with large, often brightly coloured and patterned wings
moth	Insect with wings similar to a butterfly
spider	Invertebrate with eight thin legs that catches insects in a web
ladybird	Small, red beetle that is round and has black spots
bee	Yellow and black flying insect that can sting
ant	Very small insect that lives under the ground
worm	invertebrate with long, narrow, soft body without legs or wings
snail	Invertebrate with a soft, wet body and a round shell that moves very slowly
slug	Invertebrate with a soft, wet body and no shell

Assessment points

- Recognise** different invertebrates
- Identify** different invertebrates
- Describe** different invertebrates – their features, colours, shape etc
- Observe** the process of metamorphosis from caterpillar to butterfly
- Classify** invertebrates by features
- Compare and contrast** different invertebrates
- Recall** the names and features of some invertebrates

EYFS Coverage

- Explore the natural world around them, making observations and drawing pictures. *The Natural World ELG*
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. *The Natural World ELG*

Minimum expectations, including for pupils with SEND

- Recognise** different invertebrates
- Identify** different invertebrates
- Describe** different invertebrates – their features, colours, shape etc
- Observe** the process of metamorphosis from caterpillar to butterfly

High prior attainment and extension opportunities, including for pupils with SEND

Choose an invertebrate to research in more detail.



Skills	
Predict	To say what you think will happen
Observe	Identify and distinguish with a degree of analysis some things that may potentially be more noteworthy or important than others
Recall	Remember and recount something learned
Reason / speculate	Try to understand and make judgments based on facts / to guess possible answers
Concepts	
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Process	The natural or human events and actions that maintain equilibrium or cause change.
Cause and consequence	models and laws, reactions between materials, observing processes
Key vocabulary	
scientist	An expert who works in science
experiment	A test done in order to learn something
observe	To watch carefully
predict	To say what you think will happen
melt	To change from solid to liquid due to heating
freeze	To change from liquid to solid due to cold
evaporate	To change from liquid to gas, especially due to heating
solid	A substance that is hard or firm, keeping a clear shape
liquid	A substance that can be poured easily
gas	A substance in a form like air that is neither solid nor liquid

Assessment points • Predict what might happen as a result of a process • Observe changes in matter as a result of different processes • Recall the names of some famous scientists • Reason / speculate as to why different changes occur
EYFS Coverage • Explore the natural world around them, making observations and drawing pictures. <i>The Natural World ELG</i> • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. <i>The Natural World ELG</i>
Minimum expectations, including for pupils with SEND • Observe changes in matter as a result of different processes
High prior attainment and extension opportunities, including for pupils with SEND Children to record their observations and experiments through drawing and writing.


Objective
To name a variety of plants and their parts

I wonder...
Is an oak tree deciduous?



Substantive Knowledge (Content)

- To know that deciduous describes a tree that loses its leaves every year
- To know that evergreen describes a tree that keeps its leaves all year round
- To be able to name some deciduous and evergreen trees i.e. oak tree and pine tree
- To know that some trees are deciduous because it means the tree spends less energy through the harsh winter. It conserves moisture within the trunk and keeps it from drying out. It allows wind to blow through the branches, putting less strain on the tree
- To be able to name some of common flowers i.e. rose, tulip, primrose and daffodil
- To know that the main parts of a tree are roots, crown, leaves, branches and trunk
- To know that the main parts of a flower are sepals, petals, stamens, and carpels. The stamens are the male part whereas the carpels are the female part of the flower
- To be able to describe the main parts of trees and flowers
- To know the function of different parts of plants: The roots absorb water and minerals from the soil and anchor the plant in the ground. The stem supports the plant above ground, and carries the water and minerals to the leaves. The leaves collect energy from the Sun and make food for the plant, using an amazing process called photosynthesis.

Prior Learning

EYFS
Children have learnt what plants need to grow.

Future Learning

LKS2
Children will be learning about the functions of the different parts of a plant and how water is transported.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

deciduous	A tree that loses its leaves every year
evergreen	A tree that keeps its leaves all year round
leaves	Help the plant to make its own food.
oak tree	A type of deciduous tree
pine tree	A type of evergreen tree
branches	
daffodil	
daisy	
dandelion	
flower	
petal	
roots	
rose	
seed	
stem	
sunflower	
trunk	

Assessment points

- Recognise** the name of some common plants
- Identify** deciduous and evergreen trees
- Observe** the differences between evergreen and deciduous trees
- Describe** the differences between deciduous and evergreen trees
- Record** the different parts of a plant
- Question** why some plants are deciduous
- Explain** why some trees are deciduous

National Curriculum Coverage

- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- Identify and describe the basic structure of a variety of common flowering plants, including trees

Minimum expectations, including for pupils with SEND
Children to know the names of some common plants. With support, can identify their parts.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about, discuss and reason why it is harder to identify deciduous trees in the summer.



Objective

To name and identify a variety of animal types

I wonder...

Is a dog an amphibian?



Substantive Knowledge (Content)

- To know the different animal types are amphibian, bird, fish, mammal, reptile
- To be able to tell the difference between animal types
- To be able to name some animals and their type
- To know that a carnivore is an animal that feeds on other animals.
- To know that a herbivore is an animal that feeds on plants
- To know that an omnivore is an animal that feeds on plants and animals
- To know that the basic structure of all animals is head, tail, body, limbs and sense organs. These differ as to whether they are external or internal for different species.

Prior Learning

EYFS

Children have identified creatures that can be found in the garden.

Future Learning

LKS2

Children will be learning about why some animals have skeletons and how they survive.

UKS2

Children will learn about how humans change as they get older.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

amphibian	An animal type
bird	An animal type
fish	An animal type
mammal	An animal type
reptile	An animal type
carnivore	
duck	
frog	
herbivore	
human	
lizard	
omnivore	
salmon	

Assessment points

- **Recognise** different animal types
- **Identify** some animals in each animal type
- **Describe** the difference between carnivores, herbivores and omnivores
- **Classify** animals into different groups
- **Record** a list of animals by type
- **Compare** the different animal types
- **Answer** questions about the features of animal types
- **Question** how to research what animal type an animal is

National Curriculum Coverage

- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- Identify and name a variety of common animals that are carnivores, herbivores and omnivores
- Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

Minimum expectations, including for pupils with SEND

Children to know the names of some animal types. With support, can identify some animals that belong to each type.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about and discuss the similarities and differences between animal types.



Objective

To name body parts and the 5 main senses

I wonder...

Where would you find a cochlea?



Substantive Knowledge (Content)

- To know that an adult human skeleton is made up of 206 bones. These include the bones of the skull, spine (vertebrae), ribs, arms and legs.
- To be able to describe where in the body these parts can be found
- To know the function of different body parts
- To know that the five sense are taste, sight, touch, hearing, smell
- To know that the mouth is associated with taste
- To know that the eyes are associated with sight
- To know the skin is associated with touch
- To know the ears are associated with hearing
- To know the nose is associated with smell
- To be able to describe how different body parts help us
- To know that humans also have a sense of balance, a sense of temperature and proprioception (body awareness)

Prior Learning

EYFS

Children have learnt the names of different body parts.

Future Learning

Y1

Children will be learning that humans and some other animals have skeletons and muscles for support, protection and movement.

Y2

Children will be learning about the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Use equipment	Understand and demonstrate how different scientific tools can be used
Perform tests	Conducting an experiment
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

hear	The sense associated with the ears
look	The sense associated with the eyes
smell	The sense associated with the nose
taste	The sense associated with the mouth
touch	The sense associated with the hands
ears	
eyes	
femur	
hands	
hip	
mouth	
nose	
senses	
skull	
spine	

Assessment points

- **Recognise** different body parts
- **Identify** where body parts can be found in the body
- **Describe** what sense are
- **Record** a list of the five senses
- **Answer** body parts associated with the five senses
- **Question** whether other living things have senses

National Curriculum Coverage

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Minimum expectations, including for pupils with SEND

Children to point to body parts and name some of them. With support, identify the body part associated with a sense.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about, discuss and reason whether other living things have senses.



Objective
To identify, name and compare a variety of everyday

I wonder...
What is in the box?



Substantive Knowledge (Content)

- To know that common names of different materials include paper, wood, plastic, glass, water, chalk, ceramics and composites (two or more materials combined)
- To be able to describe the difference between an object and the material it is made from
- To be able to describe which materials have been used to make an object
- To know that different materials have different properties which could include hard, soft, waterproof, transparent, strong, delicate
- To be able to compare and group different materials according to their properties

Prior Learning

EYFS
Children have explored different materials through play.

Future Learning

LKS2
Children will be learning about rocks and soil and seeing how these are formed over time.

UKS2
Children will be learning about the different states of matter.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Use equipment	Understand and demonstrate how different scientific tools can be used
Perform tests	Conducting an experiment
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

glass	A material
metal	A material
plastic	A material
rock	A material
wood	A material
delicate	
hard	
materials	
object	
properties	
soft	
transparent	
waterproof	

Assessment points

- Recognise** different materials
- Identify** objects and the materials they are made from
- Perform tests** on the properties of materials
- Observe** the properties of different materials
- Record** the properties of materials through testing
- Describe** the properties of materials
- Compare** the similarities and differences between materials

National Curriculum Coverage

- Distinguish between an object and the material from which it is made
- Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- Describe the simple physical properties of a variety of everyday materials
- Compare and group together a variety of everyday materials on the basis of their simple physical properties.

Minimum expectations, including for pupils with SEND
Children to know that objects are made of materials and can separate the two things. With support, can describe some of the properties of materials.

High prior attainment and extension opportunities, including for pupils with SEND
Children will begin to think about and discuss the similarities and differences between materials.



Objective

To conduct a comparative test

I wonder...

Does fruit float?



Substantive Knowledge (Content)

- To know that scientists need specific skills
- To be able to perform a simple test
- To know that to observe an experiment you have to look carefully
- To be able to record data
- To understand what equipment can be used for an investigation
- To investigate what happens to fruit when put in water
- To investigate what happens to raisins when put in lemonade
- To be able to answer simple questions

Prior Learning

EYFS

Children have learnt what scientists do.

Future Learning

LKS2

Children will be learning how to conduct a fair test investigation.

UKS2

Children will be using scientific evidence to support or refute arguments.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

classify	Put things into groups
comparative test	A test to compare things
identify	Knowing what something is
observe	Looking closely at something
record	A way of remembering what happened
experiment	
scientist	
test	

Assessment points

- **Recognise** that scientists need specific skills
- **Identify** some of the skills scientists need
- **Observe** what happens during a scientific test
- **Describe** what you observed during the test
- **Record** findings of a test
- **Compare** results with other tests
- **Answer** questions about why scientists need specific skills

National Curriculum Coverage

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

Minimum expectations, including for pupils with SEND

Children will use equipment designed to help perform a simple test. With support, can perform a simple test and explain what happened.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about and discuss some ideas for other simple experiments, including how to plan and conduct it.



Objective

To observe and describe seasonal changes

I wonder...

Should I have a picnic in January?



Substantive Knowledge (Content)

- To know that there are four seasons each year
- To know that winter is during the months of December, January and February
- To know that Spring is during the months of March, April and May
- To know that Summer is during the months of June, July and August
- To know that Autumn is during the months of September, October and November
- To be able to describe how the seasons can differ
- To know that each season has different weather
- To be able to describe the weather is associated with different seasons
- To know that in summer there are more hours of daylight than in winter because the Earth is leaning more towards the sun as it spins

Prior Learning

EYFS

Children have learnt the names of the four seasons and explored how the natural world around them changes (and stays the same) in each season.

Future Learning

LKS2

Children will be learning about light sources and how shadows are made.

UKS2

Children will be learning about lifecycles and the different stages of human development.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

season	A period of time throughout the year
Autumn	A season
Spring	A season
Summer	A season
Winter	A season
day length	
month	
temperature	
weather	

Assessment points

- **Recognise** the different seasons
- **Identify** the different seasons
- **Observe** the differences between seasons
- **Describe** some of the differences between seasons
- **Recall** when each season happens throughout the year
- **Record** how trees may look in different seasons
- **Compare** day length across the seasons
- **Answer** questions about the weather associated with each season

National Curriculum Coverage

- Observe changes across the four seasons
- Observe and describe weather associated with the seasons and how day length varies.

Minimum expectations, including for pupils with SEND

Children to name the four seasons and some differences between them.
With support, can talk about the weather associated with the seasons.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about, discuss and reason why the clothes we wear often look different throughout the year.



Objective
To know different parts of a plant and their functions

I wonder...
What is the most important part of a flower?



Substantive Knowledge (Content)

- To know that a plant has 6 main parts which are roots, stems, leaves, flowers, fruits, and seeds
- To know that plants need space to grow, the right temperature, light, water, air, nutrients, and time to grow
- To know that the function of the roots is absorb water and minerals and transport them to stems. They also anchor and support a plant, and store food
- To know that the function of the stem is to transport water and nutrients up from the roots all the way to the leaves, and the stem transports sugars from the leaves to the rest of the plant. Stems support leaves, flowers, and fruits.
- To know that the function of the leaves are to change sunlight into energy through photosynthesis. The leaves are the primary food-making part of the plant.
- To know that the function of the flowers is reproduction.
- To know that the function of the fruits is to prevent the seeds from drying and to disperse the seeds.
- To know that the function of the seeds is to protect and nourish the young plant.
- To know that pollination is the transfer of the pollen from one flower to another
- To know that pollination can occur by the wind, bees, birds, butterflies, moths and bats. Bees are very important in this process,

Prior Learning
EYFS
Children have learnt what plants need to grow.

KS1
Children have been naming a variety of plants and their parts.

Future Learning

KS3
Children will be exploring the similarities and differences between plant and animal cells

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

roots	Take in water and keep the plant in the ground
stem	Holds the plant up and carries the nutrients to the leaves and flowers.
leaves	Help the plant to make its own food.
flower	Part of the plant that attracts insects and birds.
pollination	When pollen is moved from the male anther of a flower to the female stigma
anther	
stigma	
seed dispersal	

Assessment points

- Recognise** different parts of a plant
- Identify** the function of parts of a plant
- Observe** how water is transported within a plant
- Describe** how water is transported within a plant
- Record** how water is transported within a plant
- Compare** the requirements of a flower and a tree
- Recall** what seed dispersal means
- Observe** how pollination occurs
- Describe** how pollination occurs
- Answer** questions about which parts of a plant

National Curriculum Coverage

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- Investigate the way in which water is transported within plants
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Minimum expectations, including for pupils with SEND
Children can identify the different parts of a plant. With support, children can explain the function of some parts of the plant.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss what part of a flower is the most important.



Objective
To know why some animals have skeletons and how they survive

I wonder...
What do vertebrates need?



Substantive Knowledge (Content)

- To know that animals need food to survive
- To know that plants can make their own food but animals cannot
- To know that animals can be grouped depending on what they eat in carnivores, herbivores and omnivores
- To know that carnivores have sharp canines and molars, with deep grooves that help them tear meat.
- To know that herbivores have scissor-like incisors and flat molars that help them grind plants.
- To know that omnivores have a mixture of sharp and flat teeth to eat both meat and plants
- To know that animals can die if they do not get the right nutrition
- To know that vertebrates are animals that have a backbone and a skeleton
- To know that invertebrates are animals that don't have a backbone – or any bones at all
- To know that a skeleton is a support structure for the body. It gives the body its shape, allows movement, makes blood cells, provides protection for organs and stores minerals
- To know that muscles have a range of functions from pumping blood and supporting movement to lifting heavy weights or giving birth. Muscles work by either contracting or relaxing to cause movement

Prior Learning
EYFS
Children have identified creatures that can be found in the garden.
KS1
Children have learnt about different animal types.

Future Learning

UKS2
Children will learn about how humans change as they get older.

KS3
Children will be learning about the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

skeleton	The frame of bones supporting a human or animal body
vertebrate	An animal with a spine
invertebrate	An animal without a spine
muscles	Soft tissues in the body that contract and relax to cause movement
nutrition	Nutrition is all about the nutrients in food and how the body uses them.
carnivore	
herbivore	
omnivore	
spine	
teeth	

Assessment points

- Recognise** some animals have a skeleton and muscles
- Identify** animals that have a skeleton and muscles
- Observe** the shape of animal teeth
- Describe** the differences between animal type teeth
- Recall** what a vertebrate/invertebrate is
- Record** the names of vertebrates and invertebrates
- Compare** the difference between vertebrates and invertebrates
- Answer** questions about vertebrates
- Evaluate** why some animals have skeletons and how they survive

National Curriculum Coverage

- Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Minimum expectations, including for pupils with SEND
Children to identify some vertebrates and invertebrates. With support, children can explain why humans have skeletons and muscles.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss whether we can tell what food an animal eats by looking at the shape of its teeth.



Objective
To conduct a scientific test

I wonder...
How can I do the best bottle flip?



Substantive Knowledge (Content)

- To know that a bottle flip is when you attempt to flip a bottle filled with a certain water from an upright position so it returns to an upright position
- To know that a variable is anything that can change and be measured i.e. amount of water in a bottle
- To be able to change a variable
- To know that a fair test is a test that controls all but one variable when attempting to answer a scientific question
- To be able to record results
- To be able to analyse results
- To be able to use knowledge to make predictions
- To be able to test out predictions

Prior Learning

EYFS
Children have learnt what scientists do.

KS1
Children have learnt how to conduct a simple comparative test.

Future Learning

UKS2
Children will be using scientific evidence to support or refute arguments.

KS3
Children will identify further questions arising from their results.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others
Using models	Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

fair test	An investigation where one variable is changed and all other conditions are kept the same
variable	Something that can be changed
prediction	Trying to tell what will happen in the future
evidence	Something that is used to support an argument
conclusion	Explaining the main points of something
observation	
results	
investigation	

Assessment points

- Recognise** what a fair test is
- Identify** variables
- Observe** what happens when a variable is changed
- Describe** what happened in an investigation
- Record** data from the investigation
- Compare** results for analysis
- Answer** questions about the investigation
- Evaluate** the success of the investigation

National Curriculum Coverage

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

Minimum expectations, including for pupils with SEND
Children will use equipment designed to help perform a simple test. With support, can explain what a fair test is.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss some ideas for other simple experiments, including how to make it a fair test.



Objective
To compare different kinds of rocks and soils

I wonder...
How can a dinosaur help plants to grow?



Substantive Knowledge (Content)

- To know that a rock is a natural substance composed of solid crystals of different minerals that have fused together into a solid lump.
- To be able to compare and group different kinds of rock i.e. igneous rock, metamorphic rock, and sedimentary rock.
- To know that a fossils are imprints of long dead plants and animals found in rocks
- To know that fossils are formed after an animal or plant has died and its parts have decayed. The skeleton is covered with sand, earth, rock or seabed before the bones can disappear. Over a very long time, the bones break down and leave a space in the earth, like an empty mould.
- To know that soil is a mixture of organic matter, minerals, gases, liquids, and organisms
- To know there are different types of soil i.e. clay, sand, silt, loam, chalk or peat soil

Prior Learning

EYFS
Children have learnt that plants need soil in order to grow.

KS1
Children have learnt how to classify objects based on their properties.

Future Learning

UKS2
Children will be learning about the different states of matter.

KS3
Children will be learning about properties of ceramics, polymers and composites.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

soil	Soil is the uppermost layer of the Earth.
fossilisation	The process by which fossils are made.
sedimentary rock	Rock that has been formed by layers of sediment being pressed down hard and sticking together.
igneous rock	Rock that has been formed from magma or lava.
metamorphic rock	Rock that changed due to being exposed to extreme heat or pressure.
chalk	
concrete	
clay	
sand	
magma	
lava	

Assessment points

- Recognise** there are different types of rock
- Identify** different types of rock
- Observe** how different types of rock are made
- Describe** the differences between types of rock
- Recall** what a fossil is
- Record** how fossils are formed
- Compare** different soil types
- Answer** questions about rocks and soil

National Curriculum Coverage

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter.

Minimum expectations, including for pupils with SEND
Children to know that soil is made from rocks and dead animals/plants. With support, they can compare different types of rocks and soil.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss if plastic toys will ever become fossils.



Objective
To know how magnets work

I wonder...
How much gold can you pick up with a magnet?



Substantive Knowledge (Content)

- To know that forces make things move. A force is simply a push or a pull in a particular direction
- To know that a magnet is a rock or a piece of metal that can pull certain types of metal toward itself
- To know that all magnets have north and south poles. Opposite poles are attracted to each other, while the same poles repel each other
- To be able to grouping magnetic and non-magnetic materials
- To be able to predict whether two magnets will attract or repel each other
- To be able to compare how things move on different surfaces

Prior Learning

EYFS
Children have explored different materials through play.

KS1
Children have learnt to identify, name and compare everyday materials.

Future Learning

UKS2
Children will be learning that forces have an effect on the way objects move.

KS3
Children will be learning about forces as pushes or pulls, arising from the interaction between two objects.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

forces	Pushes or pulls
magnet	An object which produces a magnetic force that pulls certain objects towards it
poles	North and south poles are found at different ends of a magnet
repel	Pushing something away
attract	Pulling things together
magnetic	Objects which are attracted to magnets are magnetic
magnetic field	
friction	
surface	

Assessment points

- Recognise** what aa magnet is
- Identify** materials that are magnetic
- Observe** what happens when two magnets are put near each other
- Describe** what happens when two magnets are put near each other
- Recall** the names of the magnetic poles
- Record** materials and objects that are magnetic or non-magnetic
- Compare** how things move on different surfaces
- Answer** questions about magnets
- Evaluate** how magnets work

National Curriculum Coverage

- Compare how things move on different surfaces
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance
- Observe how magnets attract or repel each other and attract some materials and not others
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- Describe magnets as having two poles
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Minimum expectations, including for pupils with SEND
Children to know that some metals are magnetic and some are not. With support, children can predict if two magnets will attract or repel each other.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss if magnets could help people find treasure buried underground.



Objective

To know how shadows are made

I wonder...

How can we make pictures with a torch?



Substantive Knowledge (Content)

- To know that light is the electromagnetic radiation with wavelengths between 380 and 750 nm which is visible to the human eye
- To know that light comes from different sources called light sources; our main natural light source is the sun. Other sources include fire, stars and man-made light sources such as light-bulbs and torches
- To know that light travels in a straight line from a light source and if an object passes in front of it, the light can be blocked. Opaque objects let no light through. Translucent objects let some light through. Transparent objects let all light through
- To know that a reflection is when light bounces off a surface, changing the direction of a ray of light
- To know that a shadow is dark patches of shade where light does not reach
- To know that shadows are formed when an opaque, or non-transparent, object blocks light from passing through and reaching a surface on the other side.
- To know that the size of shadows can change, the size of a shadow depends on the distance between the light and the object. The larger the distance, the smaller the shadow. The smaller the distance, the larger the shadow.
- To know that light from the sun can be dangerous because ultraviolet (UV) radiation from the sun can cause sunburn, skin damage, eye damage and skin cancer.

Prior Learning

EYFS

Children will have explored light during play.

KS1

Children have learnt that sunlight varies during different seasons.

Future Learning

UKS2

Children will be learning about how the eye helps us to see.

KS3

Children will be learning about the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

light	A form of energy that travels from a source
dark	Dark is the absence of light
light source	An object that makes its own light
reflection	Where light hits the surface of an object and bounces back into our eyes
shadow	An area of darkness where light has been blocked
opaque	
translucent	
transparent	
pupil	
retina	

Assessment points

- **Recognise** where light comes from
- **Identify** light sources
- **Observe** what happens when light is blocked by objects
- **Describe** the difference between light sources and light reflectors
- **Recall** the what a shadow is
- **Record** how the size of shadows can change
- **Compare** shadows when light sources are in different positions
- **Answer** questions about light and shadows
- **Measure** the length of shadows during experiments
- **Evaluate** how shadows are made

National Curriculum Coverage

- Recognise that they need light in order to see things and that dark is the absence of light
- Notice that light is reflected from surfaces
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- Recognise that shadows are formed when the light from a light source is blocked by an opaque object
- Find patterns in the way that the size of shadows change.

Minimum expectations, including for pupils with SEND

Children to know that shadows are formed when light is blocked by an object. With support, children can how to make shadows bigger and smaller.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about and discuss how shadows can change size on a sunny day.



Objective
To conduct a scientific investigation

I wonder...
Do heavy things fall faster?


Substantive Knowledge (Content)

- To be able to plan an investigation question
- To be able to take measurements using appropriate equipment and units of measurement
- To be able to record and display data
- To be able to make predictions for further tests
- To be able to report findings of an investigation
- To know that a scientific argument uses evidence to make a case for whether a claim should be accepted or rejected. The process of developing, discussing and evaluating these scientific arguments is called argumentation

Prior Learning

EYFS
Children have learnt what scientists do.

KS1
Children have learnt how to conduct a simple comparative test.

LKS2
Children have learnt how to conduct a fair test investigation.

Future Learning

KS3
Children will identify further questions arising from their results.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others
Using models	Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

investigation	Look into carefully and closely so as to learn the facts
analyse	A careful study of the parts of something in order to understand more about the whole
argument	A reason for or against something
reporting	To prepare and present an account or statement of something
relationship	How things are connected
prediction	
fair test	
evidence	
measuring	

Assessment points

- Identify** what question can be investigated
- Observe** what happens during an investigation
- Describe** what happens during an investigation
- Record** what happens during an investigation
- Compare** measurements and results
- Answer** questions about the investigation
- Evaluate** the success of answering the investigation question

National Curriculum Coverage

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments

Minimum expectations, including for pupils with SEND

Children will identify something they would like to find out within an investigation. With support, children can conduct an investigation to find an answer to their question.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about and discuss some ideas for other experiments, and how the findings of their investigation can be presented.



Objective
To describe how humans change as they get older

I wonder...
What happens to us when we get older?



Substantive Knowledge (Content)

- To know that a lifetime is the amount of measured time from someone’s / something’s birth and death
- To know that there are six stages in the human life cycle (baby, toddler, childhood, adolescence, adulthood and old age).
- To be able to describe what happens in each stage of the life cycle
- To be able to compare the different stages of the life cycle

Prior Learning

EYFS
Children have identified creatures that can be found in the garden.

KS1
Children have learnt about different animal types.

KS1
Children have learnt about why some animals have skeletons and how they survive

Future Learning

KS3
Children will be learning about the interaction between skeleton and muscles, including the measurement of force exerted by different muscles.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

pregnancy	When a female mammal has an unborn baby inside her
infancy	The period of being a baby, toddler or early childhood
adolescence	The social and emotional stage of development between childhood and adulthood
puberty	The physical stage of development between childhood and adulthood
adulthood	The stage of life when the body is fully developed
growth	
reproduce	
childhood	
adulthood	
old age	
life expectancy	

Assessment points

- Recognise** that humans change as they get older
- Identify** the different stages in the human lifecycle
- Observe** what happens during each stage of the lifecycle
- Describe** the differences between the stages of a lifecycle
- Recall** the names of different stages of the lifecycle
- Record** what happens during a human lifecycle
- Compare** the different stages of the human lifecycle
- Answer** questions about the human lifecycle
- Evaluate** how humans change as they get older

National Curriculum Coverage

- Describe the changes as humans develop to old age

Minimum expectations, including for pupils with SEND
Children to know that humans change over time. With support, children can order the six stages of the human life cycle.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss how we can guess the age of someone without asking them.



Objective

To know the differences in the life cycles of animals and plants, including reproduction

I wonder...

How have humans survived for thousands of years?



Substantive Knowledge (Content)

- To know that animals and plants have a lifecycle
- To know that different animals have different life cycles
- To know that the stages of a mammal’s lifecycle are birth, grow, reproduce, and die.
- To know the stages of an amphibian’s lifecycle are egg, larva, and adult
- To know the stages of a bird’s lifecycle are egg, hatchling, nestling, fledgling, juvenile, adult
- To know the stages of an insect’s lifecycle are either four stages: egg, larva, pupa, and adult. Some insects have three stages: egg-nymph-adult
- To be able to describe differences between mammal, amphibian, bird and insect lifecycles
- To know that reproduction is the production of offspring by a sexual (or asexual) process
- To be able to describe the differences between plant and animal reproduction

Prior Learning

EYFS

Children have learnt where many common animals live.

KS1

Children have been learning to identify and name habitats and their properties.

LKS2

Children have learnt that that habitats can change throughout the year.

Future Learning

KS3

Children will be learning about reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

life cycle	A series of stages a living thing goes through during its life.
sexual reproduction	Two parents are needed to make offspring which are similar but not identical
asexual reproduction	One parent is needed to create an offspring, which is an exact copy of the parent
fertilisation	The action of fusing male and female sex cells in order to develop an egg
offspring	the young born of living organisms, produced either by a plant, human or animal
gestation	
metamorphosis	
pollination	
mammal	
amphibian	
insect	
bird	

Assessment points

- **Recognise** that all animals and plants have a lifecycle
- **Identify** different types of lifecycles
- **Observe** what happens to animals and plants during a lifecycle
- **Describe** the differences between different lifecycles
- **Recall** the names of reproduction
- **Record** what happens during different lifecycles
- **Compare** the differences between animal and plant reproduction
- **Answer** questions about lifecycles
- **Evaluate** how humans (and other living things) have survived for thousands of years

National Curriculum Coverage

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

Minimum expectations, including for pupils with SEND

Children to know that all animals and plants have a life cycle. With support, children can identify the differences between plant and animal reproduction.

High prior attainment and extension opportunities, including for pupils with SEND

Children to think about and discuss how plant species have survived for so long.



Objective
To know about the different states of matter

I wonder...
Are chocolate eggs better than real eggs?



Substantive Knowledge (Content)

- To be able to identify materials
- To be able compare and group materials by their properties
- To be able name different states of matter including solid, liquid and gas
- To be able to compare the different states of matter
- To know that reversible changes are when materials can be changed back to how they were before the reaction took place
- To know that irreversible changes are when materials cannot be changed back to how they were before the reaction took place
- To know that some materials dissolve i.e. sugar into water
- To know that some materials can be recovered from liquid and this process is called evaporation and involves heat
- To be able to find different ways of separating materials (filtering, sieving, evaporating, mixing, burning)

Prior Learning

EYFS
Children have explored different materials through play.

KS1
Children have learnt to identify, name and compare everyday materials.

LKS2
Children have learnt to compare different kinds of rocks and soils.

Future Learning

KS3
Children will be learning about properties of ceramics, polymers and composites.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

state of matter	Anything that takes up space (solid, liquid, gas)
reversible	When materials can be changed back to how they were before the reaction took place
irreversible	When materials cannot be changed back to how they were before the reaction took place
soluble	Can be dissolved in liquid
dissolve	something made transparent when mixed with water
solid	
liquid	
gas	
particles	
transparency	
solution	
filtering	
sieving	
evaporating	
mixing	
burning	

Assessment points

- Recognise** what state of matter means
- Identify** states of matter based on how particles behave
- Observe** what happens when materials during reversible/irreversible changes
- Describe** the difference between reversible and irreversible changes
- Recall** the names of methods for changing states of matter
- Record** what happens during reversible and irreversible changes
- Compare** materials based on their properties
- Answer** questions about states of matter
- Measure** how long chocolate takes to melt using different methods
- Evaluate** how particles behave in different states of matter

National Curriculum Coverage

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Demonstrate that dissolving, mixing and changes of state are reversible changes
- Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Minimum expectations, including for pupils with SEND
Children can group materials on the basis of properties. With support, children can explain how water can be found in different states of matter.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss some ideas for testing if a material can have a reversible or irreversible state of matter.



Objective
To know that forces have an impact on how objects move

I wonder...
Why are rockets long and pointy?



Substantive Knowledge (Content)

- To know that friction is a force between two surfaces that are sliding, or trying to slide, across each other
- To know we need friction because it generates response force, which aids us in walking, writing, holding objects, and nailing nails to walls
- To know that air resistance is a type of friction between air and another material
- To know that water resistance is a type of friction between water and another material
- To know that gravity allows objects to fall to Earth because an invisible force that pulls objects toward each other. Earth's gravity is what keeps you on the ground and what makes things fall.
- To describe some different types of mechanisms i.e. levers, pulleys and gears. To know that mechanisms allow us to use a smaller force to have a greater effect and change motion

Prior Learning

EYFS
Children have explored the idea of cause and effect

KS1
Children have learnt about different types of mechanisms.

LKS2
Children have learnt how magnets work.

Future Learning

KS3
Children will be learning about forces as pushes or pulls, arising from the interaction between two objects.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others
Using models	Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
Similarity and difference	Making comparisons, finding patterns, noting differences and drawing conclusions
Cause and consequence	models and laws, reactions between materials, observing processes
Continuity and change	observing what changes and what stays the same
Significance	significant scientists, discoveries, laws, models and theories
Communication	Using scientific vocabulary, drawing, explaining, evaluating and interpreting data
Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

gravity	An invisible force that pulls objects toward each other
friction	A force between two surfaces that are sliding, or trying to slide, across each other
air resistance	A type of friction between air and another material
water resistance	A type of friction between water and another material
mechanism	Any tool used to convert or control motion or transmit control or power
force	
lever	
pulley	
gear	
pivot	
effect	

Assessment points

- Recognise** what friction is
- Identify** types of resistance (air and water)
- Observe** how friction and resistance work
- Describe** how friction and resistance work
- Recall** the names of some mechanisms
- Record** the forces being used when objects move
- Compare** the amount of force required to make things move
- Answer** questions about the effect of resistance
- Measure** the effect of forces using mechanisms
- Evaluate** why objects fall towards Earth

National Curriculum Coverage

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Minimum expectations, including for pupils with SEND
Children can identify the effect of air resistance of an object. With support, children can describe how mechanisms can help move objects.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss why rockets are long and pointy.



Objective
To know how eyes help us to see

I wonder...
How does the eye detect light?


Substantive Knowledge (Content)

- To know that light is the electromagnetic radiation with wavelengths between 380 and 750 nm which is visible to the human eye
- To know that light is an energy that moves quickly
- To know that light travels in straight lines
- To know that we see things because light travels from a source to our eye
- To be able to explain the process for how the eye helps us to see
- To be able to explain that shadows have the same shape as the objects that cast them

Prior Learning

EYFS
Children will have explored light during play.

KS1
Children have learnt that sunlight varies during different seasons.

LKS2
Children have learnt that shadows are formed when the light from a light source is blocked by an opaque object

Future Learning

KS3
Children will be learning about the transmission of light through materials: absorption, diffuse scattering and specular reflection at a surface.

Skills

Ask and answer questions	Answering questions using data or information that they have not collected firsthand
Identify and classify	Identifying and naming materials/living things and organise them into groups
Observe	Observing or measuring how one variable changes over time
Data recording	Documenting facts and observations
Pattern spotting	Looking for relationships between two sets of data
Comparative and fair testing	Observing or measuring the effect of changing one variable when controlling others
Using models	Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process

Concepts

Responsibility	Working safely, how science can solve problems, climate change and sustainability
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Enquiry	Working scientifically, observing, classifying, patterns, fair testing, using evidence

Key vocabulary

light source	An object that makes its own light
incident ray	A ray of light that hits the surface
reflected ray	A ray of light that has bounced back after hitting a surface
refraction	When light bends when passing from one medium to another
law of reflection	The law states that the angle of the incident ray is equal to the angle of the reflected ray
transparent	
translucent	
opaque	
shadow	
visible spectrum	
prism	

Assessment points

- Recognise** what light is
- Identify** light sources
- Observe** how the eye detects light
- Describe** how the eye detects light
- Recall** the names of rays (incident and reflected)
- Record** how light travels
- Compare** how objects appear to the eye during refraction
- Answer** questions about how light travels
- Measure** the effect of shadows using different light sources
- Evaluate** the law of reflection

National Curriculum Coverage

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Minimum expectations, including for pupils with SEND
Children to know that light travels in straight lines. With support, children can explain why shadows have the same shape as their object.

High prior attainment and extension opportunities, including for pupils with SEND
Children to think about and discuss how we can use spaghetti to represent how shadows are formed.

