Understanding of the World (EYFS)
Science (KS1/KS2)
Curriculum Map

Understanding of the World EYFS

		Nursery	Reception
Autumn	**Title and Objectives**	Talks about what he/she sees, using a wide vocabulary. Uses all his/her senses in hands-on exploration of natural materials. Explores collections of materials with similar and/or different properties.	Explores the natural world around him/her. Describes what he/she can see, hear and feel whilst outside. Recognises some environments that are different to the one in which he/she lives.
	Vocabulary	Material, hard/soft, rough/smooth, light/heavy, twist, slot, size, sort, order, tactile, match, magnetism, body parts, exercise, ability, features, change, season, weather, senses, natural, nature, re-cycle, environment, atmosphere, temperature.	Material, hard/soft, rough/smooth, light/heavy, twist, slot, size, push/pull, sort, order, tactile, match, magnetism, body parts, exercise, ability, healthy, fit, bones, muscle, blood, skin, animal, reptile, mini-beasts, life cycle, dinosaur names, features, carnivore, herbivore, omnivore, outdoors, planting, parts of a plant, change, season, weather, senses, habitat, natural, nature, re-cycle, environment, atmosphere, temperature, world, space, planets.
	Key Facts	To understand all my senses. To understand a range of materials and their properties.	To explain changes in seasons using features and vocabulary To recognise environments are different.
	Sticky knowledge	To recognise and be able to use my senses in the environment.	To describe the natural world.
	Possible Texts	I’ve got senses! Look, listen, taste, touch and smell.	Autumn. Seasons. Tree, Seasons come, seasons go. Bee my Friend.
Spring	**Title and Objectives**	Explores and talks about the different forces he/she can feel. Talks about the differences between materials and changes he/she	Understands the effect of changing seasons on the natural world around him/her. Understands some important processes and changes in the natural world around him/her

		notices.	including the seasons and changing states of matter.
	Vocabulary	Material, hard/soft, rough/smooth, light/heavy, twist, slot, size, push/pull, sort, order, tactile, match, magnetism.	Material, hard/soft, rough/smooth, light/heavy, twist, slot, size, push/pull, sort, order, tactile, match, magnetism, change, season, weather, senses, habitat, natural, nature, re-cycle, environment, atmosphere, temperature, world, space, planets.
	Key Facts	To understand the different forces around me. To name a variety of materials.	To understand the different seasons. To understand states of matter.
	Sticky knowledge	To understand the differences between materials and changes.	To have an understanding of processes and change in the natural world.
	Possible Texts	Pushes and Pulls Motion Everyday materials	What's the Season? States of Matter Many kinds of Matter
Summer	**Title and Objectives**	Plants seeds and cares for growing plants. Understands the key features of the life cycle of a plant and an animal. Is beginning to understand the need to respect and care for the natural environment and all living things.	Explores the natural world around him/her, making observations and drawing pictures of animals and plants. Knows some similarities and differences between the natural world around him/her and contrasting environments, drawings on his/her experiences and what has been read in class.
	Vocabulary	Planting, parts of a plant, change, season, weather, senses, habitat, natural, nature, re-cycle, environment, atmosphere, temperature.	Animal, reptile, mini-beasts, life cycle, dinosaur names, features, carnivore, herbivore, omnivore, outdoors, planting, parts of a plant, change, season, weather, senses, habitat, natural, nature, re-cycle, environment, atmosphere, temperature, world, space, planets.
	Key Facts	To understand how to care for growing plants. To understand the need to respect our environment/living things.	To identify seasons and changes in the immediate environment. To identify change in temperature and how that affects the world and atmosphere. To understand about plants and growth, naming plant parts and food stuff.
	Sticky knowledge	To understand the life cycle of a plant/animal.	To recall some similarities and differences between the natural world and contrasting environments,
	Possible Texts	Animals and plant life cycles. Planting a rainbow	Somebody Swallowed Stanley Change starts with us.

KS1/KS2

Year 1 – Plants

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• 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. • Identify and name the roots, trunk, branches and leaves of trees.	• Plants grow from seeds/bulbs • Plants need light and water to grow and survive • Plants are important • We can eat lots of plants	Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen

Key Scientists	Linked Texts
Beatrix Potter (Author & Botanist)	*Tree: Seasons Come, Seasons Go* *(Patricia Hegarty and Britta Teckentrup)* *A Little Guide to Wild Flowers* *(Charlotte Voake)* *The Things That I LOVE about TREES* *(Chris Butterworth)* *Harry's Hazelnut* *(Ruth Parsons)*

Prior Learning	Key Question(s):	Future Learning
In EYFS Children should: • Make observations of plants • Know some names of plants, trees and flowers • May be able to name and describe different plants, trees and flowers • Show some care for their world around them	• How do Plants grow? • What do Plants need to grow? • Do all plants need water? • Are all plants green? • Why do seeds look different? • Can plants grow as big in the shade? • What is the biggest/smallest/smelliest (etc) tree/flower/plant on the planet?	In Year 2 Children will: • Observe and describe how seeds and bulbs grow into mature plants. • Find out and describe how plants need water, light and warmth to grow and stay healthy.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question: Assessment Opportunity
Which type of compost grows the tallest sunflower? Which tree has the biggest leaves?	How can we sort the leaves that we collected on our walk?	How does a daffodil bulb change over the year? How does my sunflower change each week? How does the oak tree change over the year?	Do trees with bigger leaves lose their leaves first in autumn? Is there a pattern in where we find moss growing in the school grounds?	What are the most common British plants and where can we find them? How did Beatrix Potter help our understanding of mushrooms and toadstools?	How many types of plant are there?

Cross Curricular Links		
Geography	History	English Genre
Geography of school grounds – what plants/ living things/ habitats etc are in our immediate environment. When looking at continents/ oceans – look at habitats and what grows or lives there. Do we have the same plants growing in rivers as in the oceans? How are trees different around the world? Palm leaves and oak leaves – compare sizes etc.		Instructions – how to plant a bean. Diary – Bean diary.

Year 2 – Plants

National Curriculum Objectives

- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and warmth to grow and stay healthy.

Sticky Knowledge

- Plants grow from seeds/bulbs
- Plants need light, water and warmth to grow and survive
- Flowers make seeds to make more plants (reproduce)
- Plants are important
- We need plants to survive (to clean air, to eat)
- We can eat different parts of the plants (leaves, stems, roots, seeds, fruit)

Vocabulary

Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen, observe, grow, compare, record, temperature, predict, measure, diagram, germinate, warmth, sunlight.

Key Scientists	Linked Texts
Agnes Arber (Botanist) Alan Titchmarsh (Botanist & Gardener)	*The Tin Forest* *(Helen Ward)* *Jack and the Beanstalk* *(Richard Walker)* *Ten Seeds* *(Ruth Brown)* A Seed Is Sleepy (Dianna Aston)

Prior Learning

In Year 1 Children should:

- 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.
- Identify and name the roots, trunk, branches and leaves of trees.

Key Question(s):

- Do cress produce seeds, how could we find out?
- Do all plants produce flowers and seeds?
- What is different between freshly cut and planted flowers?
- Do plants flower all year round?
- What are flowers for?
- What happens to a plant after it has produced seeds?

Future Learning

In Year 3 Children will:

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

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Do cress seeds grow quicker inside or outside?	How can we identify the trees that we observed on our tree hunt?	What happens to my bean after I have planted it?	Do bigger seeds grow into bigger plants?	How does a cactus survive in a desert with no water?	What should I do to grow a healthy plant?

Cross Curricular Links					
Geography		History		English Genre	
Where did Christopher Columbus travel to? What different habitats/ environments/ living things would he have seen? Hot and cold habitats/ UK/ other countries and seas – what grows/ lives there – Could compare with a non-european country. Habitats: looking at physical features – seas/ ports/ mountains etc.		Queen Victoria – loved gardening! Research what plants she liked and what they needed – favourite flower was violets and she had many water lilies in her grounds too.		Invitations to Queen Elizabeths garden party.	

Year 3 – Plants

National Curriculum Objectives

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

Sticky Knowledge

- Plants are producers, they make their own food.
- Their leaves absorb sunlight and carbon dioxide
- Plants have roots, which provide support and draw water from the soil
- Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production
- Seed dispersal improves a plants chances of successful reproduction
- Seeds/bulbs require the right conditions to germinate and grow.
- Seeds contain enough food for the plant's initial growth

Vocabulary

Air, light, water, nutrients, soil, support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll

Key Scientists	Linked Texts
Jan Ingenhousz (Photosynthesis) Joseph Banks (Botanist)	*The Hidden Forest* *(Jeannie Baker)* *George and Flora's Secret Garden* *(Jo Elworthy)*

Prior Learning

In Year 2 Children should:

- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and warmth to grow and stay healthy.

Key Question(s):

- How do plants reproduce?
- Do all flowers look the same?
- How do insects know which flowers to pollinate?
- Why do flowers smell?
- What do seeds do?
- Can a plant live without its leaves?
- Do grass/trees make flowers?
- What conditions are perfect for a seed to grow?
- Where do weeds come from?
- How does the space between seeds affect how well they grow?
- Does seed size match plant size?
- Do plants take in water through their roots?
- How does water move through the plant?
- How do plants make their food?
- How does light affect plant growth?
- How does a plant get carbon dioxide?

Future Learning

In Year 6 Children will:

- Recognise that living things have changed over time and that fossils provide information about living things
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Identify how animals and plants are adapted to suit their environment in different ways, and that adaptation can lead to evolution.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals? Which conditions help seeds germinate faster?	How many different ways can you group our seed collection?	What happens to celery when it is left in a glass of coloured water? How do flowers in a vase change over time?	What colour flowers do pollinating insects prefer?	What are all the different ways that seeds disperse?	Why do plants have flowers?

Cross Curricular Links

Geography	History	English Genre
Biomes and vegetation belts Comparison between lives/ environment between Russia, Europe, North and South America –	Changes in farming – Skara Brae Stone Age people lived in many of the places covered in Geography. What would the habitats have been like back then? Compare the climate from then and now.	Information texts – stems role/ what happens.

Year 1 – Animals, including Humans

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• 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	• There are many different animals with different characteristics. • Animals have senses to help individuals survive. When animals sense things they are able to respond. • Animals need food to survive. • Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.	Amphibians, birds, fish, mammals, reptiles, carnivores, herbivore, omnivore, sight, hearing, touch, taste, smell, head, neck, ear, mouth, shoulder, hand, fingers, leg, foot, thumb, eye, nose, knee, toes, teeth, elbow

Key Scientists	Linked Texts
Chris Packham (Animal Conservationist)	*One Year with Kipper* *(Mick Inkpen)* Snail Trail (Ruth Brown) Superworm (Julia Donaldson & Axel Scheffler)

Prior Learning	Key Question(s):	Future Learning
In Early Years children should: • be able to identify different parts of their body. • Have some understanding of healthy food and the need for variety in their diets. • Be able to show care and concern for living things. • Know the effects exercise has on their bodies. • Have some understanding of growth and change. • Can talk about things they have observed including animals	• What do animals eat? • Do all animals eat the same food? • Which of our senses is the most accurate at identifying food? • Do all animals hunt? • Why are animals different colours and patterns?	In Year 2 children will: • Know that animals, including humans, have offspring which grow into adults • Know the basic stages in a life cycle for animals, including humans. • Find out and describe the basic needs of animals, including humans, for survival (water, food and air). • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Is our sense of smell better when we can't see?	How can we organise all the zoo animals? What are the names for all the parts of our bodies?	How does my height change over the year?	Do you get better at smelling as you get older?	Do all animals have the same senses as humans?	What are animals like?

Cross Curricular Links

Geography	History	English Genre
Geography of school grounds – what plants/ living things/ habitats etc are in our immediate environment. When looking at continents/ oceans – look at habitats and what grows or lives there. Do we have the same plants growing in rivers as in the oceans? How are trees different around the world? Palm leaves and oak leaves – compare sizes etc.	x	Instructions – how to plant a bean. Diary – Bean diary. Poetry- Link to senses.

Year 2 – Animals, including Humans

National Curriculum Objectives

- Know that animals, including humans, have offspring which grow into adults
- Know the basic stages in a life cycle for animals, including humans.
- Find out and describe the basic needs of animals, including humans, for survival (water, food and air).
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Sticky Knowledge

- Animals move in order to survive.
- Different animals move in different ways to help them survive.
- Exercise keeps animal's bodies in good condition and increases survival chances.
- All animals eventually die.
- Animals reproduce new animals when they reach maturity.
- Animals grow until maturity and then don't grow any larger.

Vocabulary

Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade,

Key Scientists	Linked Texts
Steve Irwin (Crocodile Hunter)	*The Gruffalo* *(Julia Donaldson)*
Robert Winston (Human Scientist)	*Meerkat Mail* *(Emily Gravett)*
Joe Wicks (Personal Trainer)	*Tadpole's Promise* *(Jeanne Willis and Tony Ross)*

Prior Learning

In Year 1 children should:

- 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.

Key Question(s):

- How long do should my pets live for?
- Do all animals grow and live the same way?
- Do bigger animals live longer?
- Why are we all different heights?
- How and why do we grow and change?

Future Learning

In Year 3 children will:

- Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
- Know how nutrients, water and oxygen are transported within animals and humans.
- Know about the importance of a nutritious, balanced diet.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement:

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Do amphibians have more in common with reptiles or fish? Do bananas make us run faster?	Which offspring belongs to which animal? How would you group things to show which are living, dead, or have never been alive?	How does a tadpole change over time? How much food and drink do I have over a week?	Which age group of children wash their hands the most in a day?	What food do you need in a healthy diet and why? What do you need to do to look after a pet dog/cat/lizard and keep it healthy?	Do living things change or stay the same?

Cross Curricular Links

Geography	History	English Genre
Where did Christopher Columbus travel to? What different habitats/ environments/ living things would he have seen? Hot and cold habitats/ UK/ other countries and seas – what grows/ lives there – Could compare with a non-european country. Habitats: looking at physical features – seas/ ports/ mountains etc.	Florence Nightingale	Letters from and to Florence Nightingale. Report on Priestly's drink machine.

Year 3 – Animals, including Humans

National Curriculum Objectives

- Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
- Know how nutrients, water and oxygen are transported within animals and humans.
- Know about the importance of a nutritious, balanced diet.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement:

Sticky Knowledge

- Different animals are adapted to eat different foods.
- Many animals have skeletons to support their bodies and protect vital organs.
- Muscles are connected to bones and move them when they contract.
- Movable joints connect bones.

Vocabulary

Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles, contract, relax,

Key Scientists

Adelle Davis
(20th Century Nutritionist)

Marie Curie
(Radiation / X-Rays)

Linked Texts

The Story of Frog Belly Rat Bone
(Timothy Basil Ering)

Funnybones
(Janet and Allan Ahlberg)

I Will Never Not Ever Eat a Tomato
(Lauren Child)

Goldilocks and the Three Bears
(Samantha Berger)

Prior Learning

In Year 2 children should:

- Know that animals, including humans, have offspring which grow into adults
- Know the basic stages in a life cycle for animals, including humans.
- Find out and describe the basic needs of animals, including humans, for survival (water, food and air).
- Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Key Question(s):

- Why do we need a skeleton?
- What types of skeleton are there?
- Are all skeletons the same?
- Can something survive without a skeleton?
- What happens if we break a bone?
- How do we move?
- Are bones that are bigger, stronger?
- Why do we need joints?
- Why do muscles get tired?
- Can we 'break' muscles?

Future Learning

In Year 4 children will:

- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the different types of teeth in humans and their simple functions.
- Construct and interpret a variety of food chains, identifying producers, predators and prey

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh? How does the skull circumference of a girl compare with that of a boy?	How do the skeletons of different animals compare?	How does our skeleton change over time? (from birth to death)	Do male humans have larger skulls that female humans?	Why do different types of vitamins keep us healthy and which foods can we find them in?	Why do animals have skeletons? What is a healthy diet and why is it important?

Cross Curricular Links

Geography	History	English Genre
Biomes and vegetation belts Comparison between lives/ environment between Russia, Europe, North and South America –	Diet through the ages – stone – iron – now. Skeletons found of Stone Age animals – look at and compare. Compare skeleton of a Stone Age human and a modern day human.	Leaflet – eating healthy foods/ balanced diet

Year 4 – Animals, including Humans

National Curriculum Objectives

- Describe the simple functions of the basic parts of the digestive system in humans.
- Identify the different types of teeth in humans and their simple functions.
- Construct and interpret a variety of food chains, identifying producers, predators and prey

Sticky Knowledge

- Animals have teeth to help them eat.
- Different types of teeth do different jobs.
- Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood.
- The blood takes nutrients around the body.
- Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.

Vocabulary

Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.

Key Scientists	Linked Texts
Ivan Pavlov (Digestive System Mechanisms) Joseph Lister (Discovered Antiseptics)	*Human Body Odyssey* *(Werner Holzwarth)* *Crocodiles Don't Brush Their Teeth* *(Colin Fancy)* *Wolves* *(Emily Gravett)*

Prior Learning

In Year 3 children should:

- Identify that animals, including humans, need the right types and amount of nutrition, and they cannot make their own food; they get their nutrition from what they eat.
- Know how nutrients, water and oxygen are transported within animals and humans.
- Know about the importance of a nutritious, balanced diet.
- Identify that humans and some other animals have skeletons and muscles for support, protection and movement:

Key Question(s):

- What different types of food are there?
- Why do we need a variety of different foods?
- Do all organisms eat the same things?
- Why do some people need different diets? (weightlifter vs marathon runner)
- Why are teeth important?
- What happens to our food?
- What is our digestive system?
- How does our food turn into poo and wee?

Future Learning

In Year 5 children will:

- Know the life cycle of different living things, e.g. Mammal, amphibian, insect bird.
- Know the differences between different life cycles.
- Know the process of reproduction in plants.
- Know the process of reproduction in animals

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
In our class, are omnivores taller than vegetarians?	What are the names for all the organs involved in the digestive system? How can we organise teeth into groups?	How does an egg shell change when it is left in cola?	Are foods that are high in energy always high in sugar?	How do dentists fix broken teeth?	What do our bodies do with the food we eat?

Cross Curricular Links

Geography	History	English Genre
Trade links – link to foods eaten/ economic activity can effect settlement	Link to settlements – romans/ Boudicca Egyptians – used to clean their teeth with cloth and twig – what would their teeth have been like linked to what their diet consisted of? How was roman armour used to protect the body of a roman soldier? How do parts of our boy or skeleton protect our internal organs? How do animals protect themselves?	Persuasive text – clean your teeth properly!

	Roman farmers grew crops – what conditions are needed?	

Year 2 – Living Things & their Habitats

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• Explore and compare the difference between things that are living, dead and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including micro habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food.	• Some things are living, some were once living but now dead and some things never lived. • There is variation between living things. • Different animals and plants live in different places. Living things are adapted to survive in different habitats. • Environmental change can affect plants and animals that live there.	Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade, **Key Scientists** Terry Nutkins (TV Presenter) Liz Bonnin (Conservationist) **Linked Texts** *The Gruffalo* *(Julia Donaldson)* *Meerkat Mail* *(Emily Gravett)* *No Place Like Home* *(Jonathon Emmett)*

Prior Learning	Key Question(s)	Future Learning
In Early Years children should: • Comments and questions about the place they live or the natural world. • Shows care and concern for living things and the environment. • Can talk about things they have observed such as plants and animals. • Notices features of objects in their environment. • Comments and asks questions about their familiar world.	• How to animals eat? • Do all animals eat the same thing? • Which animals hunt, and which animals are hunted? Why? • What animals live in our school environment? • How are animals and plants 'adapted' to live in their habitats • Why do animals and plants like to live in different places? • How do seasons affect our animals and plants? • Which animals hibernate and why? • Why do snails hibernate, but slugs don't? • How to habitats change over our school year?	In Year 4 children will: • Recognise that living things can be grouped in a variety of ways. • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. • Know and label the features of a river • Recognise that environments can change and that this can sometimes pose danger to living things.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Which pets are the easiest to look after? Is there the same level of light in the evergreen wood compared with the deciduous wood?	How would you group these plants and animals based on what habitat you would find them in?	How does the school pond change over the year?	What conditions do woodlice prefer to live in? Which habitat do worms prefer – where can we find the most worms?	How are the animals in Australia different to the ones that we find in Britain? How does the habitat of the Arctic compare with the habitat of the rainforest? What ideas did botanist Arthur Tansley have about habitats in 1935?	Why do different animals live in different places?

Cross Curricular Links

Geography	History	English Genre
Where did Christopher Columbus travel to? What different habitats/ environments/ living things would he have seen? Hot and cold habitats/ UK/ other countries and seas – what grows/ lives there – Could compare with a non-european country.	Great fire of London – wiped out the plague … link to rats and their habitats.	Christopher Columbus – report on what he would have seen during his travels.

Habitats: looking at physical features – seas/ ports/ mountains etc.		

Year 4 – Living Things & their Habitats

National Curriculum Objectives

- Recognise that living things can be grouped in a variety of ways.
- Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
- Recognise that environments can change and that this can sometimes pose danger to living things.

Sticky Knowledge

- Living things can be divided into groups based upon their characteristics
- Environmental change affects different habitats differently
- Different organisms are affected differently by environmental change
- Different food chains occur in different habitats
- Human activity significantly affects the environment

Vocabulary

Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.

Key Scientists	Linked Texts
Cindy Looy (Environmental Change and Extinction) Jaques Cousteau (Marine Biologist)	*The Vanishing Rainforest* *(Richard Platt)* *The Morning I Met a Whale* *(Michael Morpurgo)* *Journey to the River Sea* *(Eva Ibbotson)*

Prior Learning

In Year 2, children should:

- Explore and compare the difference between things that are living, dead and things that have never been alive.
- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.
- Identify and name a variety of plants and animals in their habitats, including micro habitats.
- Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name the different sources of food.

Key Question(s):

- What food chains and webs are there in our local habitat?
- How does energy move through the food chain?
- How does removal of one species from an environment, affect others? (keystone species)
- How does environmental change affect different organisms?
- What are the most important things we could do to improve our outside area? (big hotels, pond, compost, wildflowers)
- How does human activity affect our environment (ferries on the Solent? Sandown Airport? KFC?)

Future Learning

In Year 5 (Animals, Including Humans):

- 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.

In Year 6 (Living things & their Habitats):

- Classify living things into broad groups according to observable characteristics and based on similarities and differences.
- Give reasons for classifying plants and animals based on specific characteristics.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Does the amount of light affect how many woodlice move around? How does the average temperature of the pond water change in each season?	Can we use the classification keys to identify all the animals that we caught pond dipping?	How does the variety of invertebrates on the school field change over the year?	How has the use of insecticides affected bee population?	Why are people cutting down the rainforests and what effect does that have?	Are living things in danger?

Cross Curricular Links

Geography	History	English Genre
Describing distinctive characteristics of settlements – looking at habitats – water supply/ coastal/ towns etc. Maps/ grid references – what living things would you find in different grid references? Physical and human characteristics	Link to settlements – romans/ Boudicca Egyptians – used to clean their teeth with cloth and twig – what would their teeth have been like linked to what their diet consisted of? How was roman armour used to protect the body of a roman soldier? How do parts of our boy or skeleton protect our internal organs? How do animals protect themselves? Roman farmers grew crops – what conditions are needed?	Newspaper – Stop Press! Critters found in local pond/ habitats.

Year 4 – Electricity

National Curriculum Objectives

- Identify common appliances that run on electricity.
- Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
- Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.
- Recognise that a switch opens and closes the circuit and associate this with whether or not a lamp lights in a simple series circuit. Recognise some common conductors and insulators, and associate metals with being good conductors.
- Know the difference between a conductor and an insulator; giving examples of each.
- Safety when using electricity.

Sticky Knowledge

- A source of electricity (mains of battery) is needed for electrical devices to work.
- Electricity sources push electricity round a circuit.
- More batteries will push the electricity round the circuit faster.
- Devices work harder when more electricity goes through them.
- A complete circuit is needed for electricity to flow and devices to work.
- Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.

Vocabulary

Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.

Key Scientists	Linked Texts
Thomas Edison (First Working Lightbulb) Joseph Swan (Incadesecant Light Bulb)	Until I Met Dudley (Roger McGough) Oscar and the Bird: A Book about Electricity (Geoff Waring) Electrical Wizard: How Nikola Tesla Lit Up the World (Elizabeth Rusch)

Prior Learning

In Early Years children:

- May have some understanding that objects need electricity to work.
- May understand that a switch will turn something on or off.

Key Question(s):

- What would life be like without electricity?
- What sorts of things use/need electricity?
- What electricity do I use?
- In which ways can we 'get' electricity? (mains/plugs/batteries/wireless)
- How do we make electricity?
- How do batteries work?
- How quickly can batteries run out? Does this make a difference depending on number of components?
- How does the number of batteries added to the circuit affect a device?
- What materials can carry electricity? (conductors/insulators)

Future Learning

In Year 6 children will:

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
- Use recognised symbols when representing a simple circuit in a diagram.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the thickness of a conducting material affect how bright the lamp is? Which metal is the best conductor of electricity?	How would you group these electrical devices based on where the electricity comes from?	How long does a battery light a torch for?	Which room has the most electrical sockets in a house?	How has electricity changed the way we live? How does a light bulb work?	What can we do with electricity?

Cross Curricular Links

Geography	History	English Genre
x	Modernise an ancient tomb! Create lights, buzzer to stop tomb raiders etc.	Leaflet – Electrical circuit for newly discovered Tomb.

Year 3 – Forces (& Magnetism)

National Curriculum Objectives

- Compare how things move on different surfaces.
- Know how a simple pulley works and use making lifting an object simpler
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
- Observe how magnets attract and 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 with attract or repel each other, depending on which poles are facing.

Sticky Knowledge

- Magnets exert attractive and repulsive forces on each other.
- Magnets exert non-contact forces, which work through some materials.
- Magnets exert attractive forces on some materials.
- Magnet forces are affected by magnet strength, object mass, distance from object and object material.

Vocabulary

Force, push, pull, friction, surface, magnet, magnetic, magnetic field, pole, north, south, attract, repel, compass

Key Scientists	Linked Texts
William Gilbert (Theories on Magnetism) Andre Marie Ampere (Founder of Electro-Magnetism)	The Iron Man (Ted Hughes) Mrs Armitage: Queen of the Road (Quentin Blake) Mr Archimedes' Bath (Pamela Allen)

Prior Learning

In Year 2 children:

- May have an awareness of how to make things stop and start, using simple pushes and pulls.
- They may know about floating and sinking.

Key Question(s):

- What are magnetic materials? How can we find out?
- Can I make a magnetic material non-magnetic?
- How far away does a magnet have to be before it attracts a magnetic material?
- How far away can the magnetic attraction between two magnets be experiences?
- Is the repulsive force the same size?
- How is the magnetic attraction of repulsion force affected by putting materials between the magnets?
- Are bigger magnets stronger?
- How could you use magnets to measure the number of pages in a book?

Future Learning

In Year 5 children will:

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object and the impact of gravity on our lives.
- Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- Describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- Describe the movement of the Moon relative to the Earth
- Describe the Sun, Earth and Moon as approximately spherical bodies
- Describe the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the mass of an object affect how much force is needed to make it move? Which magnet is strongest? Which surface is best to stop you slipping?	Which materials are magnetic?	If we magnetise a pin, how long does it stay magnetised for?	Do magnetic materials always conduct electricity? Does the size and shape of a magnet affect how strong it is?	How have our ideas about forces changed over time? How does a compass work?	How can we move magnets?

Cross Curricular Links

Geography	History	English Genre
x	The Stone Age came to an end when metals were discovered – what metals are magnetic? Look at metals with magnetic properties	Persuasive texts – magnet game – why should you choose our game?

Year 1 – (ENERGY) Seasons and How they Change

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• Observe changes across the four seasons • Observe and describe weather associated with the seasons and how day length varies.	• Weather can change • There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc • Days are longer and hotter in the summer • Days are shorter and colder in the winter • There are four seasons: Spring, Summer, Autumn, Winter	Seasons, spring, summer, autumn, winter, windy, sunny, overcast, snow, rain, temperature

Key Scientists	Linked Texts
Dr Steve Lyons (Extreme Weather) Holly Green (Meteorologist)	Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup) One Year with Kipper (Mick Inkpen) After the Storm (Nick Butterworth)

Prior Learning	Key Question(s):	Future Learning
In Early Years children should: • Developing an understanding of change. • Observe and explain why certain things may occur (e.g leaves falling off trees, weather changes). • Look closely at similarities, differences, patterns and change. • Comments and questions about the place they live or the natural world.	• Why do more frequent days of rain saturate the ground? • How long does it take for the ground to dry after it has been raining? • Does more rain take longer to dry? • Do countries with higher temperatures have less rain? • How does rainfall and temperature change over time in our school grounds? • Which leaf is the strongest/best shade cover/best at directing water? • What do you notice about different leaves? • What purpose to leaves serve for a tree? • Why do you think leaves turn brown in Winter? • What colours can we find outside? Does this change across the seasons? • What effect does rain have on the environment? • What would happen if there was too much rain? • What would happen if there wasn't enough rain?	In Year 3 children will: • 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 a solid object. • Find patterns in the way that the sizes of shadows change.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
In which season does it rain the most?	How could you organise all the objects in the solar system into groups?	How does the colour of a UV bead change over the day?	Does the wind always blow the same way?	Are there plants that are in flower in every season? What are they?	What is it like in Winter, Spring, Summer and Autumn?

Cross Curricular Links

Geography	History	English Genre
What to other places around the world look like during the seasons? Compare.	x	Poetry- Seasons poetry.

Year 3 – (ENERGY) Light & Sight

National Curriculum Objectives

- 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 a solid object.
- Find patterns in the way that the sizes of shadows change.

Sticky Knowledge

- There must be light for us to see. Without light it is dark.
- We need light to see things even shiny things.
- Transparent materials let light through them and opaque materials don't let light through.
- Beams of light bounce off some materials (reflection).
- Shiny materials reflect light beams better than non-shiny materials.
- Light comes from a source

Vocabulary

Light source, dark, reflect, ray, mirror, bounce, visible, beam, sun, glare, travel, straight, opaque, shadow, block, transparent, translucent.

Key Scientists	Linked Texts
James Clerk Maxwell (Visible and Invisible Waves of Light)	The Owl Who Was Afraid of the Dark (Jill Tomlinson) The Dark (Lemony Snicket) The Firework-Maker's Daughter (Philip Pullman)

Prior Learning

In Year 1 children should have:

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

Children may:

- have some knowledge of were light comes from.
- have seen their shadows and may know they appear when it is sunny.
- Have some understanding of a reflection.
- May understand they need light to be able to see things.

Key Question(s):

- A coin is lost, what would be the best way to find it? (Turn the lights out and see it shine? Use a torch to see it reflect?)
- How does distance from a light source affect how bright it looks?
- How does being in darkness affect your sense of hearing?
- What colour would be the best to make a safety jacket from?
- How does the colour of a material affect how reflective it is?
- What would be the best material to make a blind for a baby's room?
- How does thickness of a material affect how much light can pass through it?
- How many pieces of tracing paper are as translucent as a single piece of white paper?
- How does the shape of a mirror affect how the light reflects?
- How can we change the darkness, size and shape of a shadow?

Future Learning

In Year 6 children will:

- 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.
- Know how simple optical instruments work, e.g. periscope, telescope, binoculars, mirror, magnifying glass etc.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the distance between the shadow puppet and the screen affect the size of the shadow? Which pair of sunglasses will be best at protecting our eyes?	How would you organise these light sources into natural and artificial sources?	When is our classroom darkest? Is the Sun the same brightness all day?	Are you more likely to have bad eye sight and to wear glasses if you are older?	How does the Sun make light?	What is a shadow?

Cross Curricular Links

Geography	History	English Genre
Position in north/ south hemisphere – equator – daylight etc.	x	Explanation texts – linked to results of what happens in light experiments.

Year 4 – (ENERGY) Sound

National Curriculum Objectives

- Know how sound is made associating some of them with vibrating.
- Know what happens to a sound as it travels from its source to our ears.
- Know the correlation between the volume of a sound and the strength of the vibrations that produced it.
- Know how sound travels from a source to our ears.
- Know the correlation between pitch and the object producing a sound.

Sticky Knowledge

- Sound travels from its source in all directions and we hear it when it travels to our ears.
- Sound travel can be blocked.
- Sound spreads out as it travels.
- Changing the shape, size and material of an object will change the sound it produces.
- Sound is produced when an object vibrates.
- Sound moves through all materials by making them vibrate.
- Changing the way an object vibrates changes it's sound.
- Bigger vibrations produce louder sounds and smaller vibrations produce quieter sounds.
- Faster vibrations (higher frequencies) produce higher pitched sounds

Vocabulary

Amplitude, volume, quiet, loud, ear, pitch, high, low, particles, instruments, wave.

Key Scientists	Linked Texts
Aristotle (Sound Waves)	*Horrid Henry Rocks* *(Francesca Simon)*
Gailileo Galilei (Frequency and Pitch of Sound Waves)	*Moonbird* *(Joyce Dunbar)*
Alexander Graham Bell (Invented the Telephone)	*The Pied Piper of Hamelin* *(Natalia Vasquez)*

Prior Learning

In KS1 children:

- May have some understanding that objects make different sounds.
- Some understanding that they use their ears to hear sounds.
- Know about their different senses.

Key Question(s):

- How can you change the volume of a sound?
- How does the size of an ear trumpet affect the volume of sound detected?
- How does the type of material affect how well is blocks a sound?
- How does thickness of material affect how well it blocks a sound?
- Which materials vibrate better and produce louder sounds? Can we identify any patterns?
- Which materials make the best string telephone components? (tin cans, paper cups, plastic cups, wire, cable, string, plastic or elastic – predict and test)
- How does length of the tube (when making a straw oboe) affect the pitch and volume?
- Can you predict the relative pitch of tuning forks from the patterns of ripples they make in the water?

Future Learning

In KS3 children will learn about:

- frequencies of sound waves, measured in hertz (Hz); echoes, reflection and absorption of sound
- sound needs a medium to travel, the speed of sound in air, in water, in solids
- sound produced by vibrations of objects, in loud speakers, detected by their effects on microphone diaphragm and the ear drum; sound waves are longitudinal
- auditory range of humans and animals.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the volume of a drum change as you move further away from it? How does the length of a guitar string/tuning fork affect the pitch of the sound? Are two ears better than one?	Which material is best to use for muffling sound in ear defenders?	When is our classroom the quietest?	Is there a link between how loud it is in school and the time of day? If there is a pattern, is it the same in every area of the school?	Do all animals have the same hearing range?	How can we make different sounds?

Cross Curricular Links

Geography	History	English Genre
When exploring seas/ oceans location on maps – link to dolphin sonar – how sound travels underwater	Ancient Egyptians – link to God of Sun Ra. Travel through the underworld at night.	Information text – linked to sound experiments -

Year 1 – Materials

National Curriculum Objectives

- Distinguish between and object and the material from which it is made.
- Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties

Sticky Knowledge

- There are many different materials that have different describable and measurable properties.
- Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).
- The properties of a material determine whether they are suitable for a purpose.

Vocabulary

Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, opaque,

Key Scientists	Linked Texts
William Addis (Toothbrush Inventor)	*The Great Paper Caper* *(Oliver Jeffers)*
Charles Mackintosh (Waterproof coat)	*Who Sank the Boat* *(Pamela Allen)*
John MacAdam (roads)	*The Story of Cinderella* *(Walt Disney)*

Prior Learning

In Early Years children should:

- be able to ask questions about the place they live.
- Talk about why things happen and how things work.
- Discuss the things they have observed such as natural and found objects.
- Manipulates materials to achieve a planned effect.

Key Question(s):

It is recommended that materials be taught three times through KS1. Give a theme for each topic e.g. buildings, exploration, toys, the seaside. Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage

Buildings

- Which rocks are the least crumbly?
- Which materials absorb the most water?
- Which type of brick would be the easiest to drag to make a pyramid?
- Which material would be the strongest to use as a floor tile?

Toys & Nice things

- Which fabric would make the softest blanket?
- The baby has spilt her drink, which material would absorb the drink the best?
- We want to make a really slippy slide, which liquid would be best to use?
- Which chocolate will melt the fastest on a warm plate (a model of a warm hand)
- Which wrapping papers are strong enough to wrap and send a present?

Clothing & Materials

- Which material could be used to make a waterproof hat for the teacher when she is on the playground at playtime?
- Which plastic would be flexible enough to make a belt?
- Which material could I wrap my ice egg / snowman in to stop it melting, or would it make it melt quicker?
- What could I wrap a chicken egg in to keep it warm when it is waiting to hatch?
- What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?

Future Learning

In Year 2 children will:

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
Which materials are the most flexible? Which materials are the most absorbent?	We need to choose a material to make an umbrella. Which materials are waterproof?	What happens to materials over time if we bury them in the ground? What happens to shaving foam over time?	Is there a pattern in the types of materials that are used to make objects in a school?	How are bricks made? Which materials can be recycled?	What are the things I use made from?

Cross Curricular Links

Geography	History	English Genre

x	Changes and development – linking to the way buildings have changed over the years – materials used have changed and progressed. Brunel – link to materials used to build structures – why were these used? King Alfred – link to homes, boats and buildings years ago.	Link to narrative- Three little pigs. Descriptive writing- describing materials used.

Year 2 – Materials

National Curriculum Objectives

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Sticky Knowledge

- Materials can be changed by physical force (twisting, bending, squashing and stretching)

Vocabulary

Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting, squashing, bending, matches, cans, spoons,

Key Scientists	Linked Texts
William Addis (Toothbrush Inventor) Charles Mackintosh (Waterproof coat) John MacAdam (roads)	*The Tin Forest* *(Helen Ward)* *Traction Man* *(Mini Grey)* *Three Little Pigs* *(Lesley Sims)*

Prior Learning

In Year 1 children should:

- Distinguish between and object and the material from which it is made.
- Identify and name a variety of everyday materials, including wood, metal, plastic, glass, 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 properties.

Key Question(s):

It is recommended that materials be taught three times through KS1. Give a theme for each topic e.g. buildings, exploration, toys, the seaside. Plan to investigate a couple of classes of materials and properties in each topic so children get a depth of experience each topic and cover all the classes of materials over the key stage

<u>Buildings</u>

- Which rocks are the least crumbly?
- Which materials absorb the most water?
- Which type of brick would be the easiest to drag to make a pyramid?
- Which material would be the strongest to use as a floor tile?

<u>Toys & Nice things</u>

- Which fabric would make the softest blanket?
- The baby has spilt her drink, which material would absorb the drink the best?
- We want to make a really slippy slide, which liquid would be best to use?
- Which chocolate will melt the fastest on a warm plate (a model of a warm hand)
- Which wrapping papers are strong enough to wrap and send a present?

<u>Clothing & Materials</u>

- Which material could be used to make a waterproof hat for the teacher when she is on the playground at playtime?
- Which plastic would be flexible enough to make a belt?
- Which material could I wrap my ice egg / snowman in to stop it melting, or would it make it melt quicker?
- What could I wrap a chicken egg in to keep it warm when it is waiting to hatch?
- What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?

Future Learning

In Year 3 children will:

- 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.

Teaching Ideas

<u>Comparative tests</u>	<u>Identify & Classify</u>	<u>Observation over time</u>	<u>Pattern Seeking</u>	<u>Research</u>	<u>BIG Question – Assessment Opportunity</u>
Which shapes make the strongest paper bridge? Which material would be best for the roof of the little pig's house?	Which materials will float and which will sink? Which materials will let electricity go through them, and which will not?	How long do bubble bath bubbles last for? What will happen to our snowman?	How do materials change with heat? *leave outside in sunshine/windowsill/radiator* How does amount of water affect the strength of a kitchen towel?	How have the materials we use changed over time? How are plastics made?	Can we change materials? How do we choose the best material?

	Which materials are shiny and which are dull?				

Cross Curricular Links		
Geography	History	English Genre
x	The great fire of London – why did the fire spread? The first aeroplane flights Christopher Coumbus – what did he travel in? Made from what?	Explanation texts – why were certain materials used for specific purposes

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Teaching Ideas

Year 3 – Materials (Rocks and Soils)

National Curriculum Objectives	Sticky Knowledge	Vocabulary
• 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	• There are different types of rock. • There are different types of soil. • Soils change over time. • Different plants grow in different soils. • Fossils tell us what has happened before. • Fossils provide evidence. • Paleontologists use Fossils to find out about the past. • Fossils provide evidence that living things have changed over time.	Rocks, igneous, metamorphic, sedimentary, anthropic, permeable, impermeable, chemical fossil, body fossil, trace fossil, Mary Anning, cast fossil, mould fossil, replacement fossil, extinct, organic matter, top soil, sub soil, base rock. Key Scientists: Mary Anning (Discovery of Fossils); Inge Lehmann (Earth's Mantle) Linked Texts: *The Pebble in My Pocket (Meredith Hooper)*; *Stone Girl, Bone Girl (Laurence Anholt)*; *The Street Beneath My Feet (Charlotte Guillain & Yuval Zommer)*
Prior Learning	**Key Question(s):**	**Future Learning**
In Year 2 children should: • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Children may: • May have some understanding of a variety of different rocks in the natural world. • Some understanding of what soil is. (how to identify soil etc) • May have some knowledge of what a fossil is.	• How are the soils different? • Which do you think has best drainage? • Which is more likely to lead to flooding? • How many soil types have we found? • Where might you find more? • How might the soil be different in different countries? • What rock is best for a kitchen chopping board? What might be the issues with various materials and what they have to withstand? • What types of rocks are there? • How do rocks change? • What would grow best in your soil? • Why do you think worms are important to the creation of soil? • How can we use composting to make our own soil? • Does it currently look like real soil?	In Year 4 children will: • Compare and group materials together, according to whether they are solids, liquids or gases. • Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius. • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. In Year 6 children will: • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

	● How long do you think this process will take and why? ● How are fossils created? ● Why do fossils help us find out about historical events? ● If you could fossilise an object what would it be?	

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does adding different amounts of sand to soil affect how quickly water drains through it? Which soil absorbs the most water?	Can you use the identification key to find out the name of each of the rocks in your collection?	How does tumbling change a rock over time? What happens when water keeps dripping on a sandcastle?	Is there a pattern in where we find volcanos on planet Earth?	Who was Mary Anning and what did she discover?	What are rocks and soils like?

Cross Curricular Links

Geography	History	English Genre
x	Stone Age – Iron Age Stonehenge/ Avebury – link to religious element of the stones. Look at farming tools and weopons from rocks and stones sued by Stone-Age people. – which rocks made the best tools for different uses – why?	Myths and legends Link to rocks/ crystals etc. Note writing – linked to permeability of rocks Newspaper – Mary Anning's finds

Year 4 – Materials - Solids, Liquids & Gases

National Curriculum Objectives

- Compare and group materials together, according to whether they are solids, liquids or gases.
- Observe that some materials change state when heated or cooled, and measure and research the temperature at which this happens in degrees Celsius.
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Sticky Knowledge

- Solids, liquids and gases are described by observable properties.
- Materials can be divided into solids, liquids and gases.
- Heating causes solids to melt into liquids and liquids evaporate into gases. d) Cooling causes gases to condense into liquids and liquids to freeze into solids.
- The temperature at which given substances change state are always the same.

Vocabulary

Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection,

Key Scientists	Linked Texts
Anders Celcius (Celcius Temperature Scale) Daniel Fahrenheit (Fahrenheit Temperature Scale / Invention of the Thermometer)	*Once Upon a Raindrop: The Story of Water (James Carter)* *Sticks (Diane Alber)*

Prior Learning

In KS1 children should:

- 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.
- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
- Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Key Question(s):

- How does the amount of water added to flour affect its state?
- How does the amount of detergent added to water affect how slippy it is?
- How does the temperature affect how viscous a liquid is (use cooking oil)?
- Place a peach in a glass of lemonade and watch it spin. Why does it behave that way and can you prove it?
- How does the material sprinkled on ice and snow affect how quickly it melts?
- What chocolate would be best to smuggle? How does the type of chocolate affect its melting temperature?
- What is the melting temperature of ice and how does it compare with the freezing temperature of water?
- Is the melting temperature of wax the same as its freezing temperature?

Future Learning

In Year 5 children will:

- 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 wood, metals 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 this kind of change is usually not reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Teaching Ideas

Comparative tests	Identify & Classify	Observation over time	Pattern Seeking	Research	BIG Question – Assessment Opportunity
How does the mass of a block of ice affect how long it takes to melt? How does the surface area of water affect how long it takes to evaporate? Does seawater evaporate faster than fresh water?	Can you group these materials and objects into solids, liquids, and gases? How would you sort these objects/materials based on their temperature?	Which material is best for keeping our hot chocolate warm? How does the level of water in a glass change when left on the windowsill?	Is there a pattern in how long it takes different sized ice lollies to melt? How does evaporation rate change as you add more salt to your water?	What are hurricanes, and why do they happen?	Where do ice cubes go when they disappear? Why does it rain and hail?

Cross Curricular Links

Geography	History	English Genre
Water cycle – evaporation. Link to climate change.	Cooking for ancient civilisation – link to food changes in temperature. Romans used reusable writing tablets made form bees wax – make a wax tablet by melting – how would you preserve it in hot weather?	Explanation text – water cycle Letter writing – Climate change