

# Cantrell Primary School Science Curriculum

	Autumn	Spring	Summer
<b>EYFS</b>	<p style="text-align: center;"><b>Everyday Materials</b></p> <ul style="list-style-type: none"> <li>- Look at materials for building a home.</li> <li>- Name brick, sticks, straw. Link to '3 Little Pigs' story.</li> <li>- Look at houses and identify materials, wood, brick, plastic, glass.</li> <li>- Explore materials through play. Eg. Sand and water to make 'cement'.</li> </ul> <p style="text-align: center;"><b>Seasonal changes</b> (Autumn/Winter)</p> <ul style="list-style-type: none"> <li>- Explore own environment. Talk about features and how the environments vary from one another.</li> <li>- Autumn: woodland walk. Collect natural objects, and observe colours, textures and changes.</li> <li>- Winter: changes in ice to water. Think about what clothing do we need to wear? Observe daily weather.</li> </ul>	<p style="text-align: center;"><b>Everyday Materials</b></p> <ul style="list-style-type: none"> <li>- Notice and talk about similarities and differences when exploring Toys.</li> <li>- Sort real objects into hard/soft.</li> <li>- Begin to explore different materials in relation to Toys. Eg. Wood, plastic, fabric, metal.</li> </ul> <p style="text-align: center;"><b>Plants</b></p> <ul style="list-style-type: none"> <li>- Plant seeds and talk about what they need to grow.</li> <li>- Observe the changes and label the parts of a plant, root, stem, leaves.</li> </ul> <p style="text-align: center;"><b>Seasonal changes</b> (Spring)</p> <ul style="list-style-type: none"> <li>- Explore own environment. Talk about features and how the environments vary from one another.</li> <li>- Forest School sessions.</li> <li>- Woodland walk. Collect natural objects, and observe colours, textures and changes.</li> </ul>	<p style="text-align: center;"><b>Animals, including humans</b></p> <ul style="list-style-type: none"> <li>- Mini- beast hunt in garden-identify worm, snail, spider.</li> <li>- Life cycle of a chick/frog/butterfly - first hand experiences to observe.</li> <li>- Look at the effects of exercise on our bodies.</li> <li>- Healthy eating-talking about healthy choices.</li> <li>- Trips to farm/nature reserve-first hand experiences.</li> </ul> <p style="text-align: center;"><b>Seasonal changes</b> (Summer)</p> <ul style="list-style-type: none"> <li>- Explore own environment. Talk about features and how the environments vary from one another.</li> <li>- Woodland walk. Collect natural objects, and observe colours, textures and changes.</li> <li>- 'Safe in the Sun'. Children learn how to take care of themselves on a hot day.</li> </ul>

# Cantrell Primary School Science Curriculum

	Autumn	Spring	Summer
Year 1	<p><b>What lives on our planet?</b> <i>NC reference: Animals, including humans (Autumn Term)</i></p> <p><b>What are objects made out of and why do we use them?</b> <i>NC reference: Everyday materials</i></p> <p><b>What happens in each season?</b> <i>NC reference: Seasonal changes (autumn/winter)</i></p>	<p><b>What is a plant?</b> <i>NC reference: Plants</i></p> <p><b>What happens in each season?</b> <i>NC reference: Seasonal changes (spring)</i></p>	<p><b>What are the parts of a human body?</b> <i>NC reference: Animals, including humans</i></p> <p><b>What happens in each season?</b> <i>NC reference: Seasonal changes (summer)</i></p>
Year 2	<p><b>Where do animals live and why?</b> <i>NC reference: Living things in their habitats</i></p> <p><b>Which material shall I use?</b> <i>NC reference: Everyday materials</i></p>	<p><b>Which material shall I use?</b> <i>NC reference: Everyday Materials</i></p> <p><b>How do we take care of ourselves?</b> <i>NC reference: Animals, including humans</i></p>	<p><b>What happens as I grow up?</b> <i>NC reference: Animals, including humans</i></p> <p><b>How does your garden grow?</b> <i>NC reference: Plants</i></p>
Year 3	<p><b>Rock Detectives – How are rocks, soil and fossils connected?</b> <i>NC reference: Rocks</i></p>	<p><b>How does light help us to see?</b> <i>NC reference: Light</i></p> <p><b>What are the attractions of magnets?</b> <i>NC reference: Forces and magnets</i></p>	<p><b>How do the different parts of a plant help it to grow and reproduce?</b> <i>NC reference: Plants</i></p> <p><b>What do all living things need to survive?</b> <i>NC reference: Animals, including humans</i></p>
Year 4	<p><b>How does electricity make things work?</b> <i>NC reference: Electricity</i></p> <p><b>How do solids, liquids and gases differ?</b> <i>NC reference: States of matter</i></p>	<p><b>How do solids, liquids and gases differ?</b> <i>NC reference: States of matter</i></p> <p><b>How do we hear?</b> <i>NC reference: Sound</i></p>	<p><b>Local living things - what are they?</b> <i>NC reference: Living things and their habitats</i></p> <p><b>Where does my food go?</b> <i>NC reference: Animals, including humans</i></p>
Year 5	<p><b>How do forces change the way objects move?</b> <i>NC reference: Forces</i></p> <p><b>How can materials be changed reversibly or irreversibly?</b> <i>NC reference: Properties of materials</i></p>	<p><b>Where is the Earth in Space?</b> <i>NC reference: Earth and Space</i></p>	<p><b>What are the different stages of life?</b> <i>NC reference: Living things and their habitats</i></p> <p><b>How do humans change as they get older?</b> <i>NC reference: Animals, including humans</i></p>
Year 6	<p><b>Can you sort this mess? How are living things grouped together?</b> <i>NC reference: Living things and their habitats</i></p> <p><b>Everything Changes! How has evolution led to me?</b> <i>NC reference: Evolution and inheritance</i></p>	<p><b>What can we learn from studying circuits?</b> <i>NC reference: Electricity</i></p> <p><b>Light Up Your World! How do we see?</b> <i>NC reference: Light</i></p>	<p><b>Body Pump! Which organs of the body make up the circulation system, and where are they found?</b> <i>NC reference: Animals, including humans</i></p>

## Year 1: Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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

# Cantrell Primary School Science Curriculum

## Year 1: What lives on our planet?

NC reference: Animals, including humans (Autumn Term)

### Objectives:

- 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)

### Key Factual Learning:

- ✓ Earthworms live underground in moist soil. Earthworms do not have noses, eyes or ears but do have mouths.
- ✓ Earthworms eat dirt, leaves and dead grass. They also eat plants, fruits and vegetables.
- ✓ They also have tiny hairs on their bodies which help them to feel.
- ✓ Earthworms do not have legs. Instead, they have lots of little rings on their bodies called segments.
- ✓ Earthworms have 5 hearts.
- ✓ A beetle is made up of different body parts – abdomen, thorax, head, wing case, 6 legs, 2 wings, 2 antennae, 2 mandibles (pincers).
- ✓ Fish are cold blooded, have gills, fins and scales. They live in water, lay eggs and have a skeleton.
- ✓ Snakes, lizards, crocodiles, tortoises, turtles are reptiles.
- ✓ Reptiles are cold blooded, lay eggs, have scales, have 4 or 0 legs.
- ✓ Birds have feathers, wings, a beak, legs, oviparous (lays eggs).
- ✓ A robin, barn owl, black bird and wood pigeon are bird names and birds are different to other animals.
- ✓ Birds need food, water and a nest to live in. People feed birds in their garden.
- ✓ Amphibians can be compared to other animals because they live in/near to water.
- ✓ Mammals are warm blooded, hairy, have lungs to breathe air.
- ✓ Some mammals live in water. They have no legs or 4 legs.
- ✓ All mammals have live babies.

### Practical Tasks (Working Scientifically):

- Explore the outdoor environment where worms live and dig for worms. Collect worms and use magnifying glass to observe and draw what they look like. **1.2, 1.5**
- Recognise that insects are made up of different body parts by drawing and labelling. Play beetle drive game to reinforce this knowledge. **1.4**
- Discuss the 5 main groups of animals and some of their features. Then design your own imaginary animal, thinking about features that we discussed e.g. does it have gills like a fish, feathers like a bird, scales like a reptile or smooth skin like an amphibian. **1.4, 1.5**
- Sort pictures into a fish and not a fish by observing a real fish (fishmongers). **1.4, 1.5**
- Draw and label a fish. **1.4, 1.6**
- Complete fact sheet about mammals. **1.4, 1.6**
- Identify the mammals on the sheet and colour and label them. **1.4**
- Identify the reptiles from photographs and label them. **1.4**
- Identify facts about reptiles by circling whether they are true or false. **1.6**
- Sort photographs of animals into amphibians and not amphibians. Cut and stick the amphibians into the pond. **1.4**
- Read and find frog key words in a word search. **1.6**
- Label parts of a bird and write key facts about the birds. **1.4**
- Identify and match the names to some photos of common British birds. **1.4**
- Make bird food to identify what type of food birds eat eg: fat ball, bird feeder. **1.1**

### Key Vocabulary:

Animals, humans, basic needs, fish, amphibians, reptiles, birds, water, food, air, energy, seeds, fat, warmth, land, water, skin, lungs, legs

### Cross-Curricular Links:

Computing – Draw and label the features of a bird using 2simple.  
D&T – design and make own bird feeder.  
Art – observational drawings of worms.

## Year 1: What are objects made out of and why do we use them?

NC reference: *Everyday materials*

### Objectives:

- 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

### Key Factual Learning:

- ✓ Objects can be made out of different materials. Objects (eg a chair) are different to the materials they are made from (eg plastic and metal).
- ✓ Materials have different properties.
- ✓ Different materials (sponge, playdough, foil, plastic ruler and biscuit) can be tested to see if they are bendy, stretchy or absorbent (use water) and these are called properties of materials.
- ✓ Opaque means not seeing through it, translucent means light comes through but you can't see through it (eg: a blind) and transparent means you can see through it (eg: a window).

### Practical Tasks (Working Scientifically):

- Explore different materials (glass, wood, plastic, wool and metal) and find different objects made of these materials and put in a table. **1.4, 1.6**
- Investigate materials by holding different types of paper materials (foil, card, tissue paper, paper towel, tracing paper, Clingfilm and Sellotape) up to the light and sort into whether they are opaque, translucent or transparent. **1.3, 1.5, 1.6**
- Investigate if different materials (foil, tissue paper, bin liner, cotton fabric, cotton wool) are waterproof by pouring water on them. **1.3, 1.5**
- Identify the waterproof materials and decide which one is most suitable to use to make a cape for a superhero. **1.1, 1.4**

### Key Vocabulary:

stretchy, bendy, absorbent, waterproof, brittle, materials, properties, wood, metal, material, glass, plastic, fabric, wool, object, opaque, transparent, translucent, light, see-through, waterproof, investigate, investigation, absorb, absorbent, cape, test, grid, table

### Cross-Curricular Links:

D&T – Draw and label a superhero cape  
Computing/Maths – Play material sorting games

# Cantrell Primary School Science Curriculum

## Year 1: What happens in each season? (Autumn Term)

NC reference: Seasonal changes (autumn/winter)

### Objectives:

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

### Key Factual Learning:

- ✓ There are 4 different seasons of the year (Autumn, Winter, Spring, Summer).
- ✓ In Autumn/Winter the hours of day light are less and it gets darker earlier.
- ✓ Some animals can hibernate in winter.
- ✓ Leaves change from green to red/orange/brown in Autumn and fall off the trees and identify the animals/objects (acorns/pinecones.) that are seen in Autumn (Autumn walk).
- ✓ The temperature gets colder in winter and it can snow.

### Practical Tasks (Working Scientifically):

- Complete a treasure hunt of Autumn objects by going on an Autumn walk. **1.2**
- Draw what the weather is like in each season. **1.5, 1.6**
- Complete a chart which shows how many hours of day light each season has and identify which has the most/least daylight hours. **1.6**
- Collect different coloured leaves to make comparisons. **1.1, 1.2, 1.4**
- Compare changes in clothing by sorting different articles of clothing and label a person with correct Autumn/Winter clothes. **1.4, 1.5**
- Recognise that the temperature gets colder in winter and it can snow by going outside. **1.2**
- Look at the trees to identify the differences between Autumn and Winter. **1.1, 1.2, 1.5**
- Recognise that the trees have no leaves and that the temperature gets colder in winter and it can snow (Winter walk) and using photographs. **1.1, 1.2, 1.5**
- Make a seasonal display to represent what happens in Autumn/Winter. **1.6**

### Key Vocabulary:

Weather Autumn, seasons, changes, length of day, sun, light, dark, leaves, colour, clothes, cold, tables, charts, rain, jumper, scarf, coat, hat, trees, leaves, acorns, Winter, snow, ice

### Cross-Curricular Links:

Art – Create a colourful autumn tree /winter scene  
 Computing – Draw an Autumn/Winter picture  
 Literacy – Autumn Poetry

# Cantrell Primary School Science Curriculum

## Year 1: What is a plant?

NC reference: Plants

### Objectives:

- 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

### Key Factual Learning:

- ✓ Some plants grow in the wild and some plants need to be looked after in a garden.
- ✓ Plants have different names and have different characteristics e.g. leaves, colour.
- ✓ Some trees shed their leaves every year in Autumn and grow again in Spring (oak).
- ✓ Some trees are green and have leaves all year round (Fir).
- ✓ Plants have different parts and uses (leaf, flower, petal, root, seed, stem).
- ✓ Plants change over time.

### Practical Tasks (Working Scientifically):

- Explore local wildlife area and identify different trees and other plant names by going on a walk. **1.1, 1.2, 1.5**
- Identify plants by matching them to named images. **1.4**
- Observe plants in the local environment and draw their features. **1.2, 1.5**
- Describe key features of trees and plants e.g. shape and colour and identify trees which have lost their leaves and those that have kept them all year round. **1.2, 1.4, 1.5**
- Draw and label the different parts of a plant, recognising they are not always the same by planting a seed and observing and recording how it grows using photographs. **1.2, 1.4, 1.5**
- Make observations about how plants change over time using a simple chart. **1.5, 1.6**

### Key Vocabulary:

leaf, flower, blossom, petal, fruit, berry, root, seed, stem, trunk, branch, bud, bark, stalk, Oak, Fir, Daisy, Bluebell, Rose, Daffodil, Pansy, Tulip

### Cross-Curricular Links:

Computing – Draw and label a wild flower and the key parts  
Computing – Copy and paste images of seasonal flowers  
Art – Observational drawings

# Cantrell Primary School Science Curriculum

## Year 1: What happens in each season? (Spring Term)

NC reference: Seasonal changes (spring)

### Objectives:

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

### Key Factual Learning:

- ✓ There are 4 different seasons of the year (Autumn, Winter, Spring, Summer).
- ✓ In Spring the hours of day light are slightly longer.
- ✓ Animals come out of hibernation in Spring.
- ✓ Flowers and shoots start to come out of plants in Spring and trees are greener.
- ✓ Trees start to grow new leaves in Spring.
- ✓ The temperature begins to get warmer in Spring.
- ✓ In Spring you still need some warm clothes.

### Practical Tasks (Working Scientifically):

- Identify the correct Spring clothes. **1.4**
- Complete a treasure hunt of Spring objects by going on a Spring walk. **1.2**
- Draw what the weather is like in Spring. **1.1, 1.5**
- Recognise that the temperature gets slightly warmer in Spring by going outside. **1.5**
- Recognise the signs of Spring (leaves growing on trees and plants starting to flower) on the Spring walk and record by drawing and photographs. **1.2, 1.5**
- Make a seasonal display to represent what happens in Spring. **1.6**

### Key Vocabulary:

seasons, changes, length of day, sun, light, dark, leaves, colour, clothes, cold, tables, charts. Spring, rain, flowers, buds, animals

### Cross-Curricular Links:

Computing – Correct clothing game  
Art – Drawing Spring pictures

# Cantrell Primary School Science Curriculum

## Year 1: What are the parts of a human body?

NC reference: Animals, including humans (Summer Term)

### Objectives:

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

### Key Factual Learning:

- ✓ Humans have key parts in common but this varies from person to person.
- ✓ Humans and animals have different body parts e.g. hands, feet, head etc.
- ✓ Humans and animals find out about the world using their senses.
- ✓ Humans have 5 senses – sight, touch, taste, hearing and smelling.
- ✓ The senses are linked to particular parts of the body.

### Practical Tasks (Working Scientifically):

- Make observations about parts of their bodies by comparing with their peers and make drawings. **1.1, 1.2, 1.5**
- Investigate parts of their body using non- standard measures e.g. hands/feet. **1.6**
- Classify people according to their features by using photographs. **1.1, 1.4**
- Label the parts of the body on pictures and diagrams. **1.4, 1.5**
- Investigate objects using different senses and identify which part of their body they are using (food, flavours, smells) by using different foods. **1.3, 1.4**

### Key Vocabulary:

Senses, parts of the body, head, mouth, nose, ears, eyes, neck, shoulder, arm, body, legs, feet, toes, fingers, touch, see, hear, smell, taste, skin, tongue

### Cross-Curricular Links:

Maths – Measuring using non-standard units  
Art – Keith Haring blobby people.

# Cantrell Primary School Science Curriculum

## Year 1: What happens in each season? (Summer Term)

NC reference: Seasonal changes (summer)

### Objectives:

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

### Key Factual Learning:

- ✓ There are 4 different seasons of the year (Autumn, Winter, Spring, Summer).
- ✓ In Summer the hours of day light are longer because the sun is out.
- ✓ Flowers and trees are blossoming in Summer.
- ✓ The temperature gets warmer in Summer.
- ✓ In Summer you need fewer clothes.

### Practical Tasks (Working Scientifically):

- Identify the correct Summer clothes. **1.4**
- Complete a treasure hunt of Summer objects by going on a Summer walk. **1.2**
- Draw what the weather is like in Summer. **1.2, 1.5.**
- Recognise that the temperature is warmer in Summer and the sun stays out for longer by going outside. **1.5**
- Recognise the signs of Summer (flowers blossoming etc) on the Summer walk. **1.1, 1.5**
- Make a seasonal display to represent what happens in Summer. **1.6**

### Key Vocabulary:

seasons, changes, length of day, sun, light, dark, leaves, colour, clothes, warm, tables, Summer, rain, flowers, buds, animals

### Cross-Curricular Links:

Art – observational drawing

## Year 2: Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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

## Year 2: Where do animals live and why?

*NC reference: Living things in their habitats*

### Objectives:

- explore and compare the differences 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 different sources of food.

### Key Factual Learning:

- ✓ All objects are either living, dead or have never been alive.
- ✓ Living things are plants including seeds and animals. Dead things include dead animals, plants and parts of plants and animals that are no longer attached eg. Leaves and twigs, shells, fur, hair and feathers.
- ✓ An object made of wood is classed as dead.
- ✓ Objects made of plastic, metal and rock have never been alive.
- ✓ Living things need food, water and air. Living things breath, grow, move on their own, reproduce, eat.
- ✓ Animals and plants live in a habitat which is suited to help them move, find food and grow. A habitat provides shelter, food and water (the basic needs for an animal or plant).
- ✓ Animals adapt to the different conditions within their habitat e.g. weather, where there is food
- ✓ Animals feed on different things and build up a food chain e.g. the grass is the source of energy for a rabbit, a rabbit is the source of energy for a fox
- ✓ A habitat is a natural environment or home for different plants and animals (seashore, woodland, ocean, rainforest, arctic).
- ✓ Within a habitat there are different micro habitats e.g in a woodland on leaves, under stones.
- ✓ Plants and animals in a habitat depend on each other for food and shelter.
- ✓ A food chain shows the way that animals obtain their food from plants and other animals.

### Practical Tasks (Working Scientifically):

- Compare living, dead and never been alive objects using a Venn diagram **2.1, 2.4**
- Explore the local woodland environment (forest school area) and identify different plants and animals in their habitat (*observing animals and plants*). **2.2, 2.4-2.6**
- Observe mini beasts in their micro habitats and draw and label diagrams. **2.2, 2.4-2.6**
- Classify animals found in world habitats. **2.1, 2.4**
- Identify that living things live in a habitat to which they are suited by looking at world habitats (arctic, desert, ocean, rainforest) and the animals/plants that live in them. **2.1, 2.4, 2.5**
- Describe how different habitats provide for the basic needs of different animals and plants e.g. a camel in the desert **2.1, 2.5**
- Construct simple food chains identifying how animals and plants obtain their food **2.1, 2.5**

### Key Vocabulary:

Living, dead, never been alive, suitable, basic needs, food, shelter, move, feed, breathing, growing, dead, habitats, conditions, survive, urban, woodland, pond, coast, desert, micro-habitat, minibeasts, adapt, food chain, predator, herbivore, omnivore, carnivore, energy source

### Cross-Curricular Links:

Maths – sorting with a Venn diagram  
 Geography – different habitats and where we would find them  
 Literacy – dinosaurs

# Cantrell Primary School Science Curriculum

## Year 2: Which material shall I use?

NC reference: *Everyday materials (Autumn Term 2, Spring 1)*

### 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 the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

### Key Factual Learning:

- ✓ All objects are made of one or more materials that have been chosen specifically because of their properties e.g. wood, plastic, glass, metal, rock, brick, paper and cardboard.
- ✓ Materials have different properties such as: hard, soft, hard, bendy, smooth, rough, dull, shiny, transparent, waterproof, bendy, absorbent, squashy, opaque, translucent, rigid, reflective, non-reflective and these are considered when choosing a material to make something out of.
- ✓ A material can be suitable for different purposes and an object can be made of different materials e.g. a spoon can be made of wood, plastic or metal dependent on purpose.
- ✓ Objects made from some materials can be changed in shape by bending, squashing, stretching and twisting.
- ✓ Different materials are suitable for different purposes.
- ✓ Materials have different properties (*finding objects around the classroom that are bumpy, bendy, stretchy, hard, rough etc*).
- ✓ The shape of solid objects made from some materials can change by squashing, bending, twisting and stretching (*investigation with different objects – can you squash it? etc*).

### Practical Tasks (Working Scientifically):

- Classify everyday objects by identifying the material they are made from. **2.4**
- Name objects and say what material it is made from and identify its properties and use. **2.4**
- Test the properties of different materials for particular uses (classroom objects) e.g. waterproof, transparent, rigid. **2.2, 2.5**
- Compare a variety of everyday materials and explore whether they are suitable or not suitable for a specific purpose e.g. a tent made of paper. **2.1, 2.2, 2.5, 2.6**
- Make suggestions about alternative for a purpose that are both suitable and unsuitable e.g. a cup for a toddler made out of plastic/glass. **2.1, 2.5**
- Recognise that the shape of solid objects made from some materials can change by squashing, bending, twisting and stretching (*investigation with different objects – can you squash it? etc*). **2.2, 2.3, 2.4, 2.6**

### Key Vocabulary:

identify, materials, glass, wood, metal, plastic, uses, man-made, natural, paper, cardboard, brick, rock, compare, suitable, unsuitable, properties, materials, soft, hard, bendy, smooth, rough, dull, shiny, transparent, waterproof, bendy, absorbent, squashy, opaque, translucent, changeable, squash, bend, twist, stretch, solid

### Cross-Curricular Links:

Geography - how to recycle, and the benefits of recycling and the effects on the environment

# Cantrell Primary School Science Curriculum

## Year 2: How do we take care of ourselves?

NC reference: Animals, including humans (Spring Term)

### Objectives:

- find out about 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 Factual Learning:

- ✓ All animals including humans have basic needs of eating, drinking and breathing which are needed in order to survive and grow.
- ✓ To grow into a healthy adult, you need the right amount and types of exercise.
- ✓ A balanced diet includes a selection of food types: bread, meat, fish, vegetables, rice, pasta.
- ✓ Some food types (e.g. sweets, chocolates, fizzy drinks) are unhealthy and some are healthy e.g. fruit, fish, meat.
- ✓ The right amount of exercise helps you stay fit and healthy. Exercise has a good effect on your body e.g. your heart and muscles. Different exercises work different parts of your body.
- ✓ Good hygiene is important in preventing infections and illnesses (e.g hand washing).

### Practical Tasks (Working Scientifically):

- Identify the basic needs of humans and animals to survive and grow. **2.1, 2.4**
- Compare the way in which we meet our basic needs to other animals such as sea creatures. **2.1, 2.5**
- Classify food into different food types. **2.4**
- Design a healthy meal plan including a balanced diet of all food types. **2.5**
- Investigate the benefits of exercise and identify the effect it has on our bodies (circuit training activity). **2.3, 2.5, 2.6**
- Conduct an experiment to show how germs spread and discuss how to stop germs spreading. **2.1, 2.2, 2.3, 2.5**
- Create a poster highlighting the importance of good hygiene. **2.1, 2.5**

### Key Vocabulary:

exercise, heartbeat, breathing, hygiene, germs, disease, food types (meat, fish, vegetables, bread, rice, pasta)

### Cross-Curricular Links:

PE – exercise, healthy eating

# Cantrell Primary School Science Curriculum

## Year 2: What happens as I grow up?

NC reference: Animals, including humans (Summer Term)

### Objectives:

- notice that animals, including humans, have offspring which grow into adults

### Key Factual Learning:

- ✓ Animals including humans have offspring that grow into adults.
- ✓ In humans and some animals these offspring will be young e.g. babies or kittens that grow into adults. In other animals such as chickens or insects there may be eggs laid that hatch to young or other stages which then grow into adults.
- ✓ Humans go through different stages of growth in their lifetime (e.g. baby, toddler, child, teenager, adult, elderly).
- ✓ The young of some animals do not look like their parents (e.g. tadpoles).
- ✓ All animals including humans have basic needs of feeding, drinking and breathing to survive and turn into healthy adults.

### Practical Tasks (Working Scientifically):

- Describe, using diagrams, the life-cycle of some animals including humans and their growth into adults by creating a life cycle book. **2.5, 2.6**
- Sort and match animals to their young. **2.4**
- Identify whether animals have come from an egg or are born alive. **2.1, 2.4**
- Demonstrate what they know about looking after a pet by creating a simple pet owners guide. **2.1, 2.4**
- Ask questions to a parent about how they look after their baby. **2.1, 2.6**

### Key Vocabulary:

Growth, offspring, child, young/old, stages, chick/hen, baby/child, adult, caterpillar/butterfly, toddler, teenager, elderly, life-cycle

### Cross-Curricular Links:

# Cantrell Primary School Science Curriculum

## Year 2: How does your garden grow?

NC reference: Plants

### Objectives:

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

### Key Factual Learning:

- ✓ Plants may grow from either seeds or bulbs.
- ✓ The seeds/bulbs germinate and grow into seedlings which then continue to grow into mature plants.
- ✓ Germinate means they begin to grow and put shoots out.
- ✓ Plants may have flowers which then develop into seeds/berries/fruits.
- ✓ Seeds and plants need to be planted outside at different times of the year and they will germinate and grow at different rates.
- ✓ Some plants are better suited to growing in full sun and some grow better in some shade.
- ✓ Plants need different amounts of water and light to stay healthy.

### Practical Tasks (Working Scientifically):

- Recognise key parts of a plant and identify what plants need to grow by drawing and labelling a simple diagram. **2.4**
- Perform a simple test to identify what a plant needs to grow e.g. light, dark, water, no water. **2.1, 2.2, 2.3, 2.6**
- Observe and make comparisons between plants growing in different conditions. **2.2, 2.5, 2.6**
- Observe and identify different plants growing in their natural environment and make observational drawings. **2.2, 2.5**
- Follow instructions to plant a seed and a bulb and look after the plants as they grow recording investigations in a class book. **2.2, 2.3, 2.5, 2.6**
- Observe and record the growth of a seed into a plant by drawing and measuring. **2.1, 2.5, 2.6**

### Key Vocabulary:

leaf, flower, blossom, petal, fruit, berry, root, seed, stem, trunk, branch, bud, bark, stalk, Oak, Fir, Daisy, Bluebell, Rose, Daffodil, Pansy, Tulip, light, shade, sun, warm, temperature, cool, dark, water, grow, healthy, nutrients, mature

### Cross-Curricular Links:

Art – observational drawing

## Year 3: Working Scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 3.1** asking relevant questions and using different types of scientific enquiries to answer them
- 3.2** setting up simple practical enquiries, comparative and fair tests
- 3.3** making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- 3.4** gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- 3.5** recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- 3.6** reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- 3.7** using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- 3.8** identifying differences, similarities or changes related to simple scientific ideas and processes
- 3.9** using straightforward scientific evidence to answer questions or to support their findings.

# Cantrell Primary School Science Curriculum

## Year 3: Rock Detectives – How are rocks, soil and fossils connected?

NC reference: Rocks

### Objectives:

- 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

### Key Factual Learning:

- ✓ Rocks are a natural material.
- ✓ Rocks can be classified by the way they are formed and their appearance.
- ✓ Rocks can be hard or soft. Hard rocks include granite. Soft rocks include limestone.
- ✓ There are human-made rocks such as concrete.
- ✓ Rocks can change over time.
- ✓ Soil is found on land and is the top layer of the Earth. It is formed when small rocks and organic materials are mixed together.
- ✓ Some rocks may contain fossils.
- ✓ Fossils occur when plants or animals that have lived become trapped in rocks over millions of years.
- ✓ Mary Anning was a famous fossil hunter who discovered fossils in England.

### Practical Tasks (Working Scientifically):

- Look at a collection of rocks and observe and classify them. **3.4, 3.9**
- Sort and classify rocks making a key using post it notes and actual rocks. **3.4**
- Explore the school grounds to find how rocks are used in our environment. **3.4**
- Use evidence from the rock walk to classify and research how and why rocks are chosen and used. **3.4, 3.5**
- Test rocks to investigate their hardness by using a scratch test then order them from hardest to softest. Suggest when a hard rock might be more useful than a soft one. **3.2-3.5**
- Investigate how much water a rock absorbs or repels –consider are rocks waterproof? **3.2-3.5**
- Observe how rocks change over time in a range of places. **3.8-3.9**
- Observed of different types of soils. **3.4, 3.9**
- Classify and research how some soils are formed. **3.4, 3.9**
- Investigate the water retention of soils. **3.1-3.5**
- Observe how soil can be separated through sedimentation. **3.8**
- Classifying fossils and observing a range of different fossils **3.4, 3.9**
- Explain how fossils are formed and explain the difference between a bone and a fossil. Order the steps of how a fossil is formed. **3.9**
- Research Mary Anning and create fact file of information about this paleontologist. **3.5, 3.6**

### Key Vocabulary:

rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil

### Cross-Curricular Links:

History – Egyptian Farming and the Nile

Geography – Volcanoes

Computing – Research and presenting findings

English – Creating fact file and Volcanoes booklet

# Cantrell Primary School Science Curriculum

## Year 3: What are the attractions of magnets?

NC Reference: Forces and magnets

### Objectives:

- 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.

### Key Factual Learning:

- ✓ Forces are pushes or pulls.
- ✓ We cannot see forces but may feel their effects.
- ✓ Magnetic forces can act at a distance and attract some materials and not others.
- ✓ Some metals are magnetic (iron is magnetic) and others are non-magnetic.
- ✓ Magnets have different strengths and we can measure this.
- ✓ Magnets have two poles – a north pole and south pole.
- ✓ Magnets can attract each other and this depends on the opposite poles being put together.
- ✓ Magnets repel each other when like poles come together.
- ✓ Magnets have a field of magnetism.

### Practical Tasks (Working Scientifically):

- Describe the push and pull forces in action from a range of sources such as photographs or video clips. **3.5**
- Carry out an investigation to explore how objects move on different surfaces, spinning top/coins, rolling balls/cars, clockwork toys, soles of shoes. **3.1-3.5**
- Sort materials into magnet and non-magnetic and identify which materials are magnetic. **3.4, 3.9**
- Test the strength of a magnet. **3.2-3.5**
- Investigate the polarity of a magnet and test which ends attract and which ends repel each other. **3.5, 3.8, 3.9**
- Observe the magnetic field of a magnet. **3.3**
- Research the uses of magnets and forces in our everyday life. **3.4**

### Key Vocabulary:

push, pull, twist, force, air, turns, fast, slow, slows down, material, surface, magnet, attracts, magnetic material, magnetism, non-magnetic material, metal, non-metal, strength, north pole, south pole, repel

### Cross-Curricular Links:

Shared Reading – Iron Man  
Geography – Planet Earth – iron core and poles

# Cantrell Primary School Science Curriculum

## Year 3: How does light help us to see?

NC Reference: Light

### 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 an opaque object
- find patterns in the way that the size of shadows changes.

### Key Factual Learning:

- ✓ We need light in order to see objects.
- ✓ Dark is the absence of light.
- ✓ Objects reflect light in different ways and amounts.
- ✓ We do not look directly at the sun as it can damage our eyes
- ✓ The good effects of the sun are it helps us to make vitamins to keep healthy.
- ✓ The bad effects of the sun are skin or eye damage over long periods of exposure.
- ✓ We can protect our eyes from the harmful rays of the sun by not looking directly at the sun and by wearing a hat or sunglasses on sunny days.
- ✓ Reflective materials can keep us safe at night.
- ✓ Mirrors reflect light into our eye and show us an image.
- ✓ Shadows are formed when an object blocks light.
- ✓ Sources of light can be changed to change the shape of a shadow.

### Practical Tasks (Working Scientifically):

- Identify and sort sources of light. **3.4**
- Investigate the absence of light or darkness on small objects. **3.4**
- Rank objects from least shiny to most shiny. **3.1, 3.4**
- Design a bookbag that has a suitable reflective material in its design for use at night.
- Create a fact file about the good and bad effects of the sun. Design some sunglasses or hat to help with protection. **3.4, 3.6**
- Test mirrors and the effects they have. **3.1, 3.8, 3.9**
- Draw and label pictures of their shadows outside. **3.4**
- Investigate changing shapes of shadows. **3.1-3.5, 3.7**

### Key Vocabulary:

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous

### Cross-Curricular Links:

English – The Lighthouse

# Cantrell Primary School Science Curriculum

## Year 3: How do the different parts of a plant help it to grow and reproduce?

NC Reference: Plants

### Objectives:

- 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

### Key Factual Learning:

- ✓ Many plants (but not all) have roots, stem/trunk, leaves flowers/blossoms.
- ✓ Roots absorb water and nutrients from the soil and anchor the plant.
- ✓ The stem transports water and nutrients around the plant and holds the plant upright.
- ✓ The leaves use sunlight to produce the plant's food.
- ✓ Some plants produce flowers to enable them to reproduce.
- ✓ Pollen is made by the male part of the plant and this is transferred to the female part of another plant and this is called pollination.
- ✓ After pollination, seeds are formed sometimes in berries or fruits and these can be dispersed in a different way.
- ✓ Plants need different conditions for growth and germination.

### Practical Tasks (Working Scientifically):

- Labelling parts of a plant and explaining functions. **3.4**
- Observe the effects of plants that have their leaves or root removed. **3.5**
- Explore the effects of plants growing without light, water or heat and compare outcomes. **3.1-3.5, 3.7**
- Study and dissect a flower to identify parts of the reproductive system. Compare with other flowers used in room. **3.4**
- Identify and label the male and female reproductive structures of flowers. **3.4**
- Explore and research seed dispersal to create a booklet. **3.4, 3.6, 3.7**
- Classify seeds by their dispersal. **3.4**
- Describe the life cycle of a flowering plant and explain each step. **3.4-3.7**
- How plants adapt to their environments **3.3, 3.4, 3.8, 3.9**

### Key Vocabulary:

Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal

### Cross-Curricular Links:

Visit Bulwell Forest Gardens  
Visit local environment  
Art – Observational drawings

# Cantrell Primary School Science Curriculum

## Year 3: What do all living things need to survive?

NC Reference: Animals, including humans

### Objectives:

- 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.

### Key Factual Learning:

- ✓ A habitat is used to describe where a living thing lives and an example maybe a woodland or an ocean.
- ✓ Animals can be sorted according to a range of groupings such as mammals, reptiles, mollusc, amphibians, insects and birds.
- ✓ There are some life processes that all organisms have in common.
- ✓ Land animals breathe using lungs but fish have gills.
- ✓ Humans and some other animals have a skeleton and muscles that help them to move and provide protection and support
- ✓ Animals need to eat in order to get nutrients, unlike plants that make their own food.
- ✓ Foods have a range of different nutrients that are needed by the body to stay healthy.

### Practical Tasks (Working Scientifically):

- Compare and contrast the diets of different animals (including their pets) and decide on ways of grouping the according to what they eat. **3.4-3.5**
- Research food groups such as carbohydrates, sugars, proteins, vitamins, minerals, fibre, fats and water. **3.4**
- Use food labels to find the nutrient content of a food and answer an enquiry question such as how much sugar in soft drinks? **3.1, 3.3-3.6**
- Design a healthy diet for a human containing a good balance of nutrients. **3.4, 3.9**
- Research how and why animals need to move. Consider why humans and some animals have a skeleton. **3.4, 3.9**
- Research and compare vertebrate and invertebrates (such as humans, fish and other undersea creatures). **3.4, 3.9**
- Create and design a new fish vertebrate species. **3.8**
- Research and investigate muscles in the body and how they help us to move using a variety of PE based tests. **3.1, 3.9**
- Sort animals into correct habitats. **3.4**
- Grouping animals by appearance and habitats. **3.4**
- Learning/ researching the seven life processes (MRS NERG) **3.4**
- Looking at pictures and video clips of mammals and sea animals to identify how they respire. **3.9**
- Investigate a pattern seeking question such as can bigger hand catch balls better? Or can longer legs run faster? **3.1-3.5**

### Key Vocabulary:

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints

### Cross-Curricular Links:

Summer term Year 3 topic - 'Under the Sea'  
 Literacy – research for Non – Chronological reports about Sea creature; Dougal's Deep-Sea Diary  
 D&T – make a sea creature from felt  
 Art – sketch and paint sea creatures to create a sea scene

## Year 4: Working Scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 4.1 asking relevant questions and using different types of scientific enquiries to answer them
- 4.2 setting up simple practical enquiries, comparative and fair tests
- 4.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- 4.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- 4.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- 4.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- 4.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- 4.8 identifying differences, similarities or changes related to simple scientific ideas and processes
- 4.9 using straightforward scientific evidence to answer questions or to support their findings.

# Cantrell Primary School Science Curriculum

## Year 4: How does electricity make things work?

NC reference: Electricity

### 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 a 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

### Key Factual Learning:

- ✓ There are many dangers in the home linked to electricity.
- ✓ Cookers, torches, mobile telephones, kettles and televisions are all examples of electrical appliance and they use different sources of power.
- ✓ Electrical energy can be converted into other types of energy such as light, heat, movement or sound.
- ✓ A circuit must be complete in order to work.
- ✓ A circuit must include a source of power and an output.
- ✓ Materials can be either conductors or insulators.

### Practical Tasks (Working Scientifically):

- Design and make safety posters to reinforce the dangers of electricity inside and outside of the home. **4.1, 4.6**
- Make electrical series circuits, and take on-going notes. **4.1-4.2, 4.4-4.6**
- Identify dangers in the home using a range of photographs of kitchens and living rooms. **4.9**
- Add a switch to a circuit and make on-going notes. **4.1-4.2, 4.4-4.9**
- Recognise that plastic and wood are examples of materials that act as insulators. **4.8-4.9**
- Recognise that copper and water act as conductors - supported by YouTube clip. **4.8-4.9**
- Use iPads/computers to research electricity facts for children. **4.1, 4.8-4.9**

### Key Vocabulary:

electricity, light, heat, movement, sound, dangerous, electrical appliances, circuits, complete series electrical circuit, battery, bulbs, switches, buzzers, cells, conductors, insulators

### Cross-Curricular Links:

Art – safety poster

English – researching key questions linked to electricity.

D&T – make a simple electrical toy/light for someone

# Cantrell Primary School Science Curriculum

## Year 4: How do solids, liquids and gases differ?

NC reference: States of matter

### Objectives:

- compare and group materials together, according to whether they are solids, liquids or gases.
- know and understand the difference between the particles in solids, liquids and gases by sorting.
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

### Key Factual Learning:

- ✓ Matter is what makes up the physical aspects of our universe. All matter exists in one of just three states.
- ✓ Solid matter holds its shape. For example, the solid form of water is ice.
- ✓ Liquid matter, such as water, forms a pool. It can flow or run but cannot be stretched or squeezed.
- ✓ Gas matter can expand, flow and be squeezed.
- ✓ If gas is in an unsealed container then it can escape. Steam is water's gaseous form.
- ✓ There are spaces between particles of gas and liquids.
- ✓ There are no spaces between particles of solids.
- ✓ States of matter can change from one to another.
- ✓ Solids can change to liquids and vice versa.
- ✓ Liquids can change to gas and vice versa.
- ✓ Temperature rise and decrease can cause these changes.
- ✓ These changes can happen all around us even in Nature, eg as seasons change.
- ✓ These changes can be found in your own home.

### Practical Tasks (Working Scientifically):

- Identify three main elements and examine their properties, liquid, gas, solids. **4.1, 4.8, 4.9**
- Draw a diagram to show the three states of matter, showing an understanding of how the particles behave in solids, liquids and gases. **4.1, 4.8, 4.9**
- Sort the given materials into solids, liquids or gases.
- Discuss choices and reasons for each one.
- Discuss and explain how hard or easy it is to squeeze the air out of an empty bottle with the lid on/off.
- Explain and demonstrate how a perfume (liquid) can travel as a gas around the room, by spraying some on a tissue then hiding it around the room.
- Experiment and explain how ice cubes melt and change state from solid to liquid and why this would happen (link to temperature).
- Demonstrate explain how chocolate can change from a solid to a liquid state and why this happens (link to temperature).
- Discuss and explain how to reverse the procedure to go from a liquid state back into a solid state.
- Discuss and explain how water is transferred and re-used through the Water Cycle.
- Explain the terms Evaporation, Condensation, Precipitation and Collection in terms of the Water Cycle.
- Explore which of these states of matter can be found in the real world and in our own homes.
- Evaluate and write up all conclusions into books.
- Watch 'Dangers of Electrical Fires' video on YouTube **4.1**

### Key Vocabulary:

solid, liquid, gas, evaporation, condensation, particles, temperature, freezing, heating, salt, particulate theory, water molecules, prediction, overflowing, mass, weight, water, time, minutes, seconds, reservoir, stopwatch, measure, grams, kilograms, chromatography, substances, mixtures of substances, filter paper, separation, molecules move at a different rate, speed, time, speed, distance, analysis, travelled.

### Cross-Curricular Links:

History - The Romans – How the Romans moved water?

Maths – mass, time, measuring, temperature.

Geography – A detailed study of the water cycle is undertaken in year 4

# Cantrell Primary School Science Curriculum

## Year 4: How do we hear?

NC reference: Sound

### Objectives:

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.

### Key Factual Learning:

- ✓ Sounds are made when an object vibrates.
- ✓ We hear sounds when the vibrations travel from a source through a medium to our ears.
- ✓ Sounds get fainter when you are further from the source of the sound.
- ✓ We live in a world of sound, but our ability to hear the world around us declines as we age.
- ✓ Sound travels through different mediums, including air, water and solids.
- ✓ Vibrations from sounds travel through a medium to the ear.
- ✓ The sound waves are gathered by the outer ear and sent down the ear canal to the eardrum.
- ✓ The sound waves cause the eardrum to vibrate, which sets the three tiny bones in the middle ear into motion.
- ✓ The motion of the bones causes the fluid in the inner ear or cochlea to move.
- ✓ Animals hear in different frequencies. eg. Dog, elephant, bat and dolphin.

### Practical Tasks (Working Scientifically):

- Recognise that sounds get fainter as the distance from the sound source increases. **4.7-4.9**
- Watch 'Understanding how the human ear works' film on YouTube. **4.1, 4.7-4.9**
- Investigate differences in hearing low and high frequency sounds. **4.1-4.9**
- Use iPads and reference books to research the human ear and draw detailed diagrams to show how the human ear works. **4.7-4.9**
- Explain that sound travels in waves called soundwaves.
- Name the three small bones that are inside the human ear.
- Name and explain other parts of the human ear.
- Explain how the pitch of a sound can affect how you hear it.
- Explain how sound vibrations travel from the source through the human ear.
- Watch 'How Your Ears Work' clip from YouTube. **4.1**
- Discuss how getting older affects our hearing.
- Discuss if this might be true for all animals not just humans.
- Explore and discuss which animals can hear higher/ lower frequencies.

### Key Vocabulary:

Vibrate, vibration, vibrating, air, medium, ear, hear, sound, volume, pitch, faint, fainter, loud, louder, soft, softer, string, percussion, woodwind, loudness, frequency, sound waves, tone, speaker, Vibrate, delicate hearing mechanism, auricle, external acoustic meatus, tympanic membrane, incus (anvil), malleus (hammer), semi-circular canals, nerve, cochlea, stapes (stirrup), auditory tube, pinna – collect sound, protection, eardrum, wax, ossicles, length, thickness and tautness

### Cross-Curricular Links:

Music – Wider Opportunities Programme – Learning baritones, trumpets and cornets. Vocabulary to support this. There are major links to the Music curriculum particularly related to definition and understanding of vocabulary.

# Cantrell Primary School Science Curriculum

## Year 4: Local living things - what are they?

NC Reference: Living things and their habitats

### 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 dangers to living things.

### Key Factual Learning:

- ✓ The 7 characteristics of a living things are movement, reproduction, sensitivity, nutrition, excretion, respiration, and growth.
- ✓ The environment may change both naturally and also due to human impact.
- ✓ Animals can be put in to groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.
- ✓ The three distinct body regions of an insect are head, thorax, and abdomen.
- ✓ One reason scientists classify living things is to understand the relationships between different organisms.

### Practical Tasks (Working Scientifically):

- List the different characteristics for a living thing
- Explain how each one helps something to live and grow
- Explore and use classification/identification keys to help group, living things. **4.1– 4.9**
- Make observational drawings and a large-scale group drawing of an insect found in the potato hotel. **4.3-4.5**
- Understand the characteristics of a living thing and to begin to consider that living things can be grouped in a variety of ways. **4.8, 4.9**
- Ask relevant questions about living things and their habitats. **4.9**

### Key Vocabulary:

Alive, dead, never been alive, movement, reproduction, sensitivity, nutrition, excretion, respiration, growth, habitat, local, habitat, living thing, plant, animal, insect, local, natural, man-made, observation, record, vertebrate, invertebrate, arachnid, question

### Cross-Curricular Links:

Art - Create sketch books to record their observations and use them to review and revisit ideas. Improve their mastery of art and design techniques, including drawing

## Year 4: Where does my food go?

*NC Reference: Animals, including humans*

### 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.

### Key Factual Learning:

- ✓ Food enters the body through the mouth. Digestion starts when the teeth start to break the food down.
- ✓ Saliva is added and the tongue rolls the food into a ball.
- ✓ The food is swallowed and passes down the oesophagus to the stomach.
- ✓ Here the food is broken down further by being churned around and other chemicals are added.
- ✓ The food passes into the small intestine.
- ✓ Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body.
- ✓ The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body.
- ✓ What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.
- ✓ Humans have four types of teeth - incisors for cutting, canines for tearing, molars and premolars for grinding (chewing).
- ✓ Humans can also have wisdom teeth.
- ✓ These do not develop in some people.
- ✓ Different animals have different types of teeth based on their diet.
- ✓ A food chain is a way of explaining how different animals pass energy to each other.
- ✓ A food chain has to start with a source, usually the sun.
- ✓ A food chain often ends with a predator normally at the top of the chain.
- ✓ Living things can be classified as producers, predators and prey according to their place in the food chain.

### Practical Tasks (Working Scientifically):

- ✓ Research the function of the parts of the digestive system **4.1**
- ✓ Create a model of the digestive system **4.1-4.9**
- ✓ Label the parts of a human digestive system
- ✓ Explain in simple terms the functions of the different parts of the digestive system
- ✓ Explain how the different type of teeth in a human mouth are used
- ✓ Explain their functions in terms of food
- ✓ Consider why our teeth are different shapes and understand that they have different functions.
- ✓ Classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls **4.9**
- ✓ Research information using the Internet (and/or information books). **4.1,4.8,4.9**
- ✓ Construct and interpret a variety of food chains, identifying producers, predators and prey.
- ✓ Make links between plants and animals in the form of food chains. **4.1-4.9**
- ✓ Discuss with others the impact a break in the food chain may have. **4.1, 4.8, 4.9**
- ✓ Begin to understand that humans have a responsibility to care about their impact on food chains.
- ✓ Use secondary sources to identify animals in a habitat and find out what they eat.
- ✓ Listen to an expert talk about teeth and how/why to look after them.
- ✓ Discuss what they know about how to keep our teeth healthy.
- ✓ Digestive System -Human Body for Kids-How Body Works- makemegenius.com.

### Key Vocabulary:

Question, digestive system, nutrition, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, faeces, teeth, incisors, molars, canines, jaw, evidence, digestion, chew, saliva, herbivore, carnivore, omnivore, digestion, food chain, producer, predator, prey, consumer, herbivore, omnivore, carnivore, impact

### Cross-Curricular Links:

PE - to be physically active for sustained periods of time  
PSHE – Healthy lifestyle choices

## Year 5: Working Scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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

# Cantrell Primary School Science Curriculum

## Year 5: How do forces change the way objects move?

NC reference: Forces

### Objectives:

- 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

### Key Factual Learning:

- ✓ A force is a push or pull. It changes the way an object moves.
- ✓ Some forces are balanced and some are unbalanced.
- ✓ Weight and mass are different things.
- ✓ Weight (measured in N) is the force of gravity pulling down upon an object.
- ✓ Mass (measured in KG) is the amount of stuff inside (matter).
- ✓ Isaac Newton discovered gravity. (Newton's Law of Gravity) He discovered it by watching an apple fall from a tree and began to ask questions about why this was.
- ✓ Air resistance is the force that pushes against gravity.
- ✓ The Moon has less gravity than the Earth. This is why astronauts 'bounce' around on the moon.
- ✓ The moon is held in orbit by Earth's gravity.
- ✓ Friction slows down or speeds up the movement of an object.
- ✓ Water resistance is the force that pushes against a moving object under water.
- ✓ If an object is streamlined, it is able to move through water easily as it has little water resistance.

### Practical Tasks (Working Scientifically):

- Identify balanced and unbalanced forces **5.6**
- Drop a ball and discuss the forces acting upon it. **5.6**
- Identify the various different names of forces (gravity, reaction force, air resistance and buoyancy). **5.6**
- Measure the weight and mass (in N and KG) of objects around the classroom and found the link. **5.2 5.3**
- Read and comprehend information about Isaac Newton. **5.6**
- Make an information poster all about Sir Isaac Newton. **5.6**
- Design a WW1 parachute and test the effects of air resistance on different materials. They design a fair test experiment to design a WW1 parachute, using 3 different materials. Which will fall the slowest? Which material creates the most air resistance? **5.1-5.4**
- Test vehicles and the effects of friction with a variety of different materials. **5.1-5.3**
- Design and make a German U-boat with streamlined features. **5.2 5.6**
- Make streamlined shapes out of playdough. **5.2**

### Key Vocabulary:

forces, push, pull, balanced, unbalanced, gravity, friction, air resistance, reaction force, water resistance, equal, Isaac Newton, newtons, newton metre, weight, mass, prediction, method, conclusion, parachute, shape, streamlined, cylinder, cube, sphere, slippery, useful, opposite, heat, not useful

### Cross-Curricular Links:

Design and make a WW1 parachute and investigate the effects of air resistance.  
Links to weight and mass in Maths  
Design a German U-boat and investigate the effects of water resistance

# Cantrell Primary School Science Curriculum

## Year 5: How can materials be changed reversibly or irreversibly?

NC reference: *Properties of materials*

### Objectives:

- 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.

### Key Factual Learning:

- ✓ Materials can be described using different words such as thermal, flammable, flexible, reflective, permeable, translucent, hard, transparent, absorbent.
- ✓ Liquids are always runny (viscous).
- ✓ Solids, liquids and gases can be separated through sieving, filtering and evaporating.
- ✓ We can clean up our environment using these processes – solving a real-world problem.
- ✓ Thermal insulators are materials which hold in heat and thermal conductors allow heat to travel through them easily.
- ✓ A thermal insulator keeps the temperature constant.
- ✓ Dissolving and melting are not the same. Melting is caused by heat.
- ✓ Soluble means that the solid will dissolve into a liquid completely.
- ✓ Insoluble means that the solid will not dissolve into a liquid completely.
- ✓ Heat can speed up the dissolving process.
- ✓ If a process is reversible, it can be changed back to its original state. If it is irreversible, it cannot.

### Practical Tasks (Working Scientifically):

- Test different materials investigating their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. They will answer yes or no when testing the materials and record on a chart. **5.1-5.5**
- Observe how metals and other materials are used around school and in the wider world. **5.5, 5.6**
- Investigate the wide-ranging properties of plastics and their different uses. **5.1**
- Plan an investigation to clean up contaminated water. **5.5**
- Investigate soluble and insoluble materials – making predictions first and then testing if they dissolve in water. **5.1-5.3**
- Separate various materials by sieving, filtering or evaporating. **5.1-5.6**
- Investigate whether a solution is reversible or irreversible depending on the material. **5.1-5.5**
- Investigate factors which speed up the dissolving process. **5.1-5.3**
- Sort a range of processes into reversible and irreversible. **5.3**
- Investigate different brands of nappies coming up with their own questions and methods of enquiry. **5.1-5.6**
- Design a thermal lunch box to keep food hot or cold. **5.2**
- Sort objects into thermal conductors and thermal insulators. **5.3**

### Key Vocabulary:

Properties, hardness, solubility, transparency, conductivity, thermal, magnets, dissolve, liquid, substance, solids, gases, filtering, sieving, evaporating, fair test, metals, wood, plastic, mixing, changes of state, reversible change, irreversible change, soluble and insoluble.

### Cross-Curricular Links:

Links to History curriculum, why did they make a parachute out of silk?

# Cantrell Primary School Science Curriculum

## Year 5: Where is the Earth in Space?

NC Reference: Earth and Space

### Objectives:

- 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
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

### Key Factual Learning:

- ✓ The Sun, Earth and Moon are approximately spherical. In the past, people thought the Earth was flat.
- ✓ The Sun is a star. It is at the centre of our solar system. Geocentric means Earth centred and Heliocentric means Sun centred.
- ✓ There are 8 planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. These travel around the Sun in fixed orbits.
- ✓ Earth takes 365¼ days to complete its orbit around the Sun.
- ✓ The Earth rotates (spins) on its axis every 24 hours.
- ✓ As Earth rotates half faces the Sun (here it is day) and half is facing away from the Sun (night).
- ✓ As the Earth rotates the Sun appears to move across the sky. In fact, the sun is not moving, it is the Earth that is orbiting the sun.
- ✓ The Moon orbits the Earth. It takes about 28 days to complete its orbit.
- ✓ The world is made up of different time zones. GMT is the time zone we are in and all other times can be calculated according to this.
- ✓ The 4 seasons are dependent on how the Earth is tilted on its axis.

### Practical Tasks (Working Scientifically):

- Planets are spherical (ball shaped)
- Investigate theories of the past that indicate the Earth was flat. **5.6**
- Analyse information, articles and non-fiction texts to dispute the fact that the Earth was flat. **5.6**
- Research the order and related facts about the planets using a range of non-fiction books. Making a poster to inform.
- Sort information about Ptolemy and Copernicus and research their theories about how the planets move within the solar system. **5.6**
- Move as a class to show how the planets orbit and rotate. **5.5**
- Describe how the movement of the Earth and the Moon create night and day. **5.5**
- Explore different time zones around the world and find out how this is linked to longitude using tables and charts. **5.3, 5.6**
- Explore how the tilt of the Earth causes seasonal changes. **5.3**
- Keep a moon diary over the course of a month. **5.2-5.4**
- Observe the night sky, making observations and posing questions. **5.2**

### Key Vocabulary:

Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets, Ptolemy and Copernicus, heliocentric, geocentric

### Cross-Curricular Links:

Reading comprehension skills taught through the non-fiction books (research)  
Creative homework is linked to knowledge of each of the planets.

## Year 5: What are the different stages of life?

*NC Reference: Living things and their habitats*

### Objectives:

- 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.

### Key Factual Learning:

#### Plants

- ✓ The stamens produce fine, dust-like grains, called pollen, and the carpels produce ovules. The male and female parts are surrounded by the petals of the flower. In many flowers, it is the job of the petals to attract insects, so that pollen can be transferred to other flowers. This process is called pollination.
- ✓ Most plants require seeds to reproduce.
- ✓ There are different methods of growing new plants from a parent plant e.g. seeds, stems, root cuttings, bulbs, tubers

#### Animals

- ✓ A life cycle is a diagram showing the various stages of an animal, plant or animal life
- ✓ Amphibians, mammals, insects and bird life cycles have some similarities and differences
- ✓ Endangered animals are being helped by humans to complete their life cycles.
- ✓ Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.
- ✓ Animals including humans have offspring which grow into adults.

### Practical Tasks (Working Scientifically):

#### Plants

- Revise the reproductive structures of a flower. Label the various parts, describing their jobs and using the scientific names. **5.5**
- Use secondary sources to find out about wind and insect pollination. Create a presentation on how plants reproduce. **5.5, 5.6**
- Observe a plant growing over time from other methods than seeds e.g. growing from bulbs, cuttings, tubers and record information and plot on a scatter/line graph. **5.1**

#### Animals

- Compare, contrast and sort different life cycles of mammals, amphibians, birds, plants and humans. **5.5**
- Group a mixture of animals including amphibians, insects and birds. **5.5**
- Invent their own animal and describe their life cycle **5.6**
- Observe and describe the life cycle of an insect, amphibian (frog), using a cyclical diagram to show this. Use this to move onto the life cycle of a butterfly (metamorphosis) **5.2**
- They research and create a fact file on Jane Goodall who helps secure the numbers of chimpanzees in the world. **5.6**
- Make comparisons between three life cycles using a Venn diagram. Identify and label the parts of an egg. **5.5**
- Describe the life processes of the reproduction of mammals. **5.5**
- Investigate the gestation periods of different mammals and compare. **5.5.**

### Key Vocabulary:

Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings, gestation, mammal, amphibian, bird, reptile, warm blooded, cold blooded,

### Cross-Curricular Links:

SRE topic

# Cantrell Primary School Science Curriculum

## Year 5: How do humans change as they get older?

NC Reference: Animals, including humans

### Objectives:

- describe the changes as humans develop to old age (includes non-recorded work in SRE)

### Key Factual Learning:

- ✓ Humans follow a life cycle also. We are born, hit puberty, reproduce and then die.
- ✓ Humans are mammals.
- ✓ Human gestation lasts 9 months.
- ✓ Other mammals have longer or shorter gestation periods.
- ✓ When babies are young they grow rapidly. They are very dependent on their parents. As they develop they learn many skills.
- ✓ At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.
- ✓ Girls experience changes to their bodies in order to fulfil their life cycle – this includes menstruation and the development of female reproductive organs.
- ✓ Boys also experience changes to their bodies to fulfil their life cycle. This includes the development of the male reproductive organs. This then leads to the ability to reproduce.
- ✓ Emotional changes occur within puberty also.

### SRE scheme of work

- ✓ Puberty occurs sometime between the ages of 8 and 16.
- ✓ Male and female sex hormones become very active and are responsible for growth and development during puberty.
- ✓ Puberty changes are a normal part of growing up.
- ✓ Each person will start puberty at a slightly different time and will develop in their own way – it's important to respect these differences.
- ✓ Some changes happen only to males, some only to females; some happen to both.
- ✓ The whole process of change can take a few years.

### Practical Tasks (Working Scientifically):

- Identify the stages of human life cycle, including puberty and pregnancy and compare the gestation lengths of different mammals. **5.3**
- Identify the stages of a human life cycle, labelling images and giving a description of various milestones. **5.3**
- Research the different gestation periods for mammals. **5.3**
- Explore the various physical and emotional changes males and females go through during puberty. **5.5**
- Label male and female reproductive organs. **5.5**
- Play the menstrual cycle card game. **5.5**

### SRE lessons

- Explore menstrual sanitary products and understand their specific jobs (tampons, sanitary towels etc).
- Share a variety of puberty problem scenarios as a class and discuss ways they could help
- Explain how to keep clean during puberty.
- Ask questions about puberty with confidence
- Describe the changes as humans develop into adults and through to old age.

### Key Vocabulary:

Development, old, young, mature, immature, adolescent, puberty, babies, reproductive organs, menstruation, periods

### Cross-Curricular Links:

Life cycles research within reading sessions and internet research

## Year 6: Working Scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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

# Cantrell Primary School Science Curriculum

## Year 6: Can you sort this mess? How are living things grouped together?

NC reference: *Living things and their habitats*

### Objectives:

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

### Key Factual Learning:

- ✓ Animals have different physical features and abilities, such as number of legs, wings, ability to swim, whether they live on land etc, and they can be organised and sorted according to these features.
- ✓ Animals can be classified as mammals, birds, fish, reptiles, amphibians, insects, arachnids, annelids, molluscs, crustaceans and echinoderms.
- ✓ Carl Linnaeus was an 18<sup>th</sup> Century Swedish scientist who devised a way of classifying living things called the Linnaean System (subdividing each group into progressively smaller groups based on increasingly specific observations of features).
- ✓ The three main types of micro-organism are bacteria, virus and fungus.
- ✓ Mould grows best in damp and warm conditions.

### Practical Tasks (Working Scientifically):

- Sort and group animals into 'tree diagrams' by asking questions about physical features and abilities. **6.3**
- Research Carl Linnaeus using iPads. **6.1**
- Classify animals by reading descriptions of characteristics of mammals, birds, fish, reptiles, amphibians, insects, arachnids, annelids, molluscs, crustaceans and echinoderms, and then matching animals to each description. **6.3**
- Research the three main types of micro-organisms using iPads and create information posters to present findings to others. **6.5**
- Investigate the conditions in which mould grows best by leaving slices of bread in plastic bags in different conditions (damp, wet, cold, dry, warm and dark) for two weeks. **6.1, 6.4**
- Explore the school environment and Forest Garden to find and identify vertebrates and invertebrates based on their physical characteristics (such as number of legs, body shape and exoskeleton), and to identify the most common invertebrates. **6.5**

### Key Vocabulary:

characteristics, classification, Carl Linnaeus, taxonomists, identify, arachnids, annelids, molluscs, crustaceans and echinoderms micro-organisms, microscopic, bacteria, fungi, virus, mould

### Cross-Curricular Links:

Art - Mina's sketchbook – observational drawings including specific physical features and characteristics of birds

# Cantrell Primary School Science Curriculum

## Year 6: Everything Changes! How has evolution led to me?

NC reference: Evolution and inheritance

### Objectives:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- 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 may lead to evolution

### Key Factual Learning:

- ✓ Living things produce offspring that are made up from DNA from each parent.
- ✓ Characteristics are inherited and acquired. Inherited characteristics are tongue rolling, hair colour, eye colour, cleft chin, dimples and freckles. Acquired characteristics could be playing an instrument, swimming, reading, drawing, singing, riding a bike.
- ✓ Adaptation - These are characteristics that are influenced by the environment the living thing lives in. Adaptation is the result of mutations which occur randomly. These can result in adaptive traits which confer the living thing with a function that enables it to survive better.
- ✓ Evolution is the process of adaptation over a long period of time. This process, whereby certain inherited and adaptive traits allowed them to live and reproduce while others became extinct, is called natural selection.
- ✓ Darwin believed that there was a single point of origin for all living things and that we then evolved into the living things that we are today through a process of adaptation. Darwin used fossils as evidence to support his theory of evolution.
- ✓ The theory of evolution is seen as the most comprehensive theory of how humans came to be on Earth.
- ✓ Over the course of the last century many fossils have been found that demonstrate the evolution of humans (homo sapiens). Initially, fossils were compared to the human skeleton to indicate the degree of similarity or difference. However, modern scientists have been able to map DNA in great detail and this gives them another way to compare how closely related we are to different living things in ways that could not have been detected by comparing skeletons alone.
- ✓ Selective breeding (or artificial selection as it is sometimes referred to) involves humans deliberately breeding plants and animals to produce particular characteristics. This results in new varieties of plants or breeds of animals. Selective breeding produces new varieties of an existing species, not new species.

### Practical Tasks (Working Scientifically):

- Investigate inherited characteristics by looking at photos and questioning parents. **6.1**
- Sorting animals, habitats and how they have adapted to survive. **6.3**
- Research Charles Darwin using iPads. **6.1**
- Create posters to discuss the different theories of evolution. **6.5**
- Compare different pictures to gather evidence of evolution **6.6**

### Key Vocabulary:

Inheritance, humans, parent, offspring, characteristics, variation, environment, habitat, DNA, genes, adaptive traits, mutation, replication, accidental, evolution, adaption, apes, mammals, homo sapiens, family, genus, species, taxonomy

### Cross-Curricular Links:

Reading – Skellig (theme of evolution)

Geography – Our Changing World – how have our coasts, borders and local environments evolved and changed over time?

RSE – Physical changes during puberty

Whole class text: Darwin's Dragons

# Cantrell Primary School Science Curriculum

## Year 6: What can we learn from studying circuits?

NC reference: Electricity

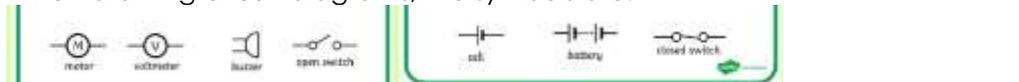
### Objectives:

- 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

### Key Factual Learning:

- ✓ Ancient Egyptians and Greeks were aware of some of the properties of electricity (such as electric shocks and static electricity) but did not know that electrical currents existed.
- ✓ William Gilbert studied and distinguished between magnetism of metals and static electricity.
- ✓ Alexandro Volta invented the first battery. His name was the basis for 'volt' and 'voltage'.
- ✓ Benjamin Franklin was the first person to study electricity in depth. He proved that lightening is electrical. He was also the first person to store electricity and know that it consisted of positive and negative charges.
- ✓ Thomas Edison reinvented the lightbulb.

- ✓ When drawing circuit diagrams, the symbols are:



- ✓ Increasing the voltage in a circuit will increase the output (make a bulb shine brighter or a motor spin faster). Decreasing the voltage in a circuit will decrease the output.
- ✓ Switches can be used to create a break in a circuit and disable the output. Switches make or break a circuit, turning the component (for example, lamp) on when the switch is closed and off when the switch is open.
- ✓ The number of components in a circuit affects the way the circuit performs.

### Practical Tasks (Working Scientifically):

- Research information about key discoveries in the history of electricity **6.1**
- Discuss and evaluate how different electrical inventions have impacted on our lives. **6.1, 6.5**
- Create simple circuits using wires, bulbs and batteries and draw and label them using the correct symbols. **6.1, 6.3**
- Investigate the effects on the bulb by changing the number of cells in a simple circuit. **6.5**
- Investigate what happens in a circuit when the switch is in different positions. **6.5**
- Investigate what happens if there are two switches in a circuit. **6.5, 6.4**
- Create a simple switch using everyday materials.
- Investigate increasing the number of components in a circuit by constructing a circuit with a single 1.5 V cell, switch and buzzer, and then increasing the number of buzzers and recording what happens. **6.6**

### Key Vocabulary:

Electricity, Thomas Edison, Nikola Tesla, Alessandro Volta, Michael Faraday, home, alternating current, direct current, battery, cell. Voltage, circuit, bulb, wires, cell, battery, buzzer, motor, switch, circuit diagram, brightness, loudness, increase, decrease, mains electricity, terminal, types of switches including toggle, push, slide, tilt, plunger, trembler, pressure

### Cross-Curricular Links:

D&T – Travel game

## Year 6: Light Up Your World! How do we see?

NC reference: Light

### Objectives:

- 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

### Key Factual Learning:

- ✓ We see things because light travels from light sources to our eyes or from light sources to objects and then to our eye.
- ✓ Mirrors reflect light.
- ✓ Reflection is when light bounces off a surface, changing the direction of a ray of light. All objects reflect light; smooth and shiny surface reflect all the rays of light at the same angle, rather than scattering the rays of light like rough or dull surfaces.
- ✓ The light ray that hits the mirror or other object is described as the incident ray, and the ray of light that bounces off is known as the reflected ray.
- ✓ Refraction changes the direction in which light travels.
- ✓ When light travels from air through a transparent material, it refracts, or bends.
- ✓ Light travels from a light source, reflects off an object, goes through our pupil (which is a hole in our eyes), through to the lens, where the retina turns the light into electrical signals which travels to our optic nerve that sends messages to our brain that interprets the messages into what we see.
- ✓ Light waves travel at a different speed when they go through other transparent materials, such as water or glass. This causes the rays of light to change direction and bend. This is known as refraction.
- ✓ In 1666, Newton made a discovery about light that led him to develop his Theory of Colour.
- ✓ A prism changes a ray of light to show the visible spectrum.
- ✓ Since each colour's wavelength is slightly different, the colours in the ray of light bend slightly differently. This causes them to separate and become visible to our eyes. Red bends the least, and violet bends the most.
- ✓ Shadows are formed when an opaque object blocks a ray of light.
- ✓ A shadow is always the same shape as the object that casts it. This is because when an object is in the path of light travelling from a light source, it will block the light rays that hit it, while the rest of the light can continue travelling.

### Practical Tasks (Working Scientifically):

- Identify which are light sources or reflectors of light. **6.1**
- Measure the angle of incidence and reflection using a protractor **6.2**
- Investigate refraction using an arrow and a glass of water. **6.1, 6.4, 6.5**
- Research Issac Newton and what he discovered about light. **6.1**
- Understand how we see and how glasses and sunglasses work. Draw labelled diagrams. **6.3**
- Shine a torch through a prism then make a colour wheel to investigate the visible spectrum. **6.5**
- Investigate how to make a rainbow to the different colours of the visible spectrum. **6.5**
- Shadow investigation – shadow puppets. **6.1, 6.5**

### Key Vocabulary:

Light, source, travel, straight line, waves, ray, beam, wave, Reflection, angle, incidence, normal, Refraction, bend, lens, focus, focal point, transparent, opaque, translucent, pupil, retina, optic nerve, cornea

### Cross-Curricular Links:

Maths – Measuring using protractors

# Cantrell Primary School Science Curriculum

## **Year 6: Body Pump! Which organs of the body make up the circulation system, and where are they found?**

*NC reference: Animals, including humans*

### **Objectives:**

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans

### **Key Factual Learning:**

- ✓ The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body.
- ✓ Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed.
- ✓ As they are used, they produce carbon dioxide and other waste products.
- ✓ Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.
- ✓ Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well our heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel.
- ✓ Some conditions are caused by deficiencies in our diet e.g. lack of vitamins.

### **Practical Tasks (Working Scientifically):**

- Model of a heart pumping blood to demonstrate what is happening inside their own bodies. **6.1, 6.2, 6.5**
- Draw the circulatory system, labelling the different parts accurately **6.5**
- Research using iPads and non-fiction books how the heart and lungs work. **6.5**
- Research how the digestive system works – create an information poster. **6.5**
- Keep an exercise diary for a week – set questions for them to answer before/while and after exercising. **6.1, 6.2, 6.5, 6.6**
- Work scientifically to understand the effect of exercise on their pulse rate. The children are to decide how/ what they will do and how they will record their results. **6.1, 6.2, 6.5, 6.6**

### **Key Vocabulary:**

Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle

### **Cross-Curricular Links:**

PE/Daily Mile – Feeling pulse rates, observing effects on own body