Year 2 Science **Physics- Electricity** Autumn B
Working Scientifically: • **Testing whether different materials conduct electricity (pattern spotting)** • **What happens when we add more bulbs to a circuit (pattern spotting)**
Enrichment: Malton Secondary School- Science bus
Prior Learning: Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal)
Key Essential Skills and sticky knowledge: • Common appliances that use mains electricity are appliances with a plug eg toaster, tv, kettle, washing machine • Some appliances use batteries (eg mobile phone, torch) • A simple circuit requires a cell (battery), wires and an output (bulb, buzzer, motor) • A circuit must be complete to work • A switch opens and closes the circuit
Topic Vocabulary: electricity, electrical appliance, electrical circuit, electrical component, switch, cell (battery), buzzer, bulb, motor
Sequence: What is electricity? How do you stay safe with electrical energy? How do we use electrical energy? What is a simple circuit? How can you turn a lamp off? Which materials conduct electrical energy? What happens when you add bulbs or cells to a circuit?
Thinking Deeper: Renewable vs non-renewable energy - Maria Telkes and her application of solar energy
Possible books/resources: • The Boy who Harnessed the Wind- Bryan Mealer and William Kamkwamba • The Magic School Bus and the Electric Field Trip- Joanna Cole
Links: **Subject Specific links** – DT electrical systems, Maths-data handling **Personal development** – teamwork and making sensible choices together **SMSC/ outdoor learning** – Understanding how to stay safe around electricity **Cultural Capital** – considering different faith celebrations which use lights and outdoor sports facilities in UK and abroad **Careers** – Scientists (Thomas Edison) and electricians **British Values** – The rule of law – following safety rules and instructions to keep everyone safe during experiments. **Equality-** Promotion of both men and women as scientists. Respecting different faiths and their celebrations **Independence-** Children can create circuits on their own and be safe around electricity.

Year 3 & 4 Science **Physics- Electricity** Autumn B

Working Scientifically:

- **Testing whether different materials conduct electricity (pattern spotting)**
- **What happens when we add more bulbs to a circuit (pattern spotting)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes. (Early Learning Goal)

Key Essential Skills and sticky knowledge:

- Common appliances that use electricity are toasters, lamps, kettles, laptops, games consoles, phones, torches, TVs, washing machines and irons. Some appliances use batteries and some use mains electricity.
- In a series circuit all the components are joined together and the electricity can only flow in one direction.
- Simple electrical circuits consist of cells, wires, bulbs, switches and buzzers
- To light a lamp, the circuit needs to be complete
- Switches open or close a circuit to break, or complete it.
- Many metals, such as copper, iron and steel, are good electrical conductors. That is why the parts of electrical objects that need to let electricity pass through are always made of metal.
- Plastic, wood, glass and rubber are good electrical insulators. That is why they are used to cover materials that carry electricity

Topic Vocabulary:

electricity, electrical appliance, electrical circuit, electrical component, conductor, insulator, switch, cell, wire, bulb, buzzer, series circuit

Sequence:

What is electricity?
How do you stay safe with electrical energy? How do we use electrical energy?
What is a simple circuit? How can you turn a lamp off? Which materials conduct electrical energy?
What happens when you add bulbs or cells to a circuit?

Thinking Deeper:

Renewable vs non-renewable energy - Maria Telkes and her application of solar energy

Possible books/resources:

- The Boy who Harnessed the Wind- Bryan Mealer and William Kamkwamba
- The Magic School Bus and the Electric Field Trip- Joanna Cole

Links:

Subject Specific links – DT electrical systems, Maths-data handling
Personal development – teamwork and making sensible choices together
SMSC/ outdoor learning – Understanding how to stay safe around electricity
Cultural Capital – considering different faith celebrations which use lights and outdoor sports facilities in UK and abroad
Careers – Scientists (Thomas Edison) and electricians
British Values – The rule of law – following safety rules and instructions to keep everyone safe during experiments.
Equality- Promotion of both men and women as scientists. Respecting different faiths and their celebrations
Independence- Children can create circuits on their own and be safe around electricity.

Year 2 Science **Physics- Light** Autumn B

Working Scientifically:

- **Which pair of sunglasses is most effective? (comparative test)**
- **What happens to shadows when the light source moves? (pattern seeking)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) i.e., reference to seeing.

Key Essential Skills and sticky knowledge:

- Light is needed in order to see.
- Dark is the absence of light. We cannot see anything in complete darkness.
- Light shines on different surfaces and is then reflected into our eyes.
- Shadows are formed when an opaque or translucent object blocks some of the light.

Topic Vocabulary:

light, dark, reflection, reflective, mirror, shadow, opaque, translucent

Sequence:

What do I know about Light and Shadow? What are light sources? How do we see objects?
Which material is most reflective? How do mirrors show and change reflections?
How can we protect ourselves from the sun? Which materials successfully block light?
How are shadows formed?

Thinking Deeper:

Children use a mirror to create a symmetrical pattern. Position the mirror on the centre line and ensure the pattern is the same on both sides of this mirror line.

Possible books/resources:

- Orion and the Dark - Emma Yarlett
- Peter Pan - J.M. Barrie
- The Little Match Girl - Hans Christian Andersen

Links:

Subject Specific links – Literacy - use of the dictionary in defining words and use of alphabetical order
Personal development – to be aware of the safety aspect of the sun and looking at it directly
SMSC/ outdoor learning – sense of wonder in using mirrors to change shapes
Cultural Capital – Learning about scientists from different eras and countries connected to the subject.
Careers – Physical sciences, environmental science.
British Values – to learn the law about how light travels
Equality- The sun universally shines down on us all; we are all at risk of damaging rays.
Independence- Children to show sun/light safety and use of equipment safely.
Community-

Year 3 & 4 Science **Physics- Light** Autumn B

Working Scientifically:

- **Which pair of sunglasses is most effective? (comparative test)**
- **What happens to shadows when the light source moves? (pattern seeking)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans) i.e., reference to seeing.

Key Essential Skills and sticky knowledge:

- The sun, light bulbs and candles are sources of light. We can see light sources shining directly into our eyes.
- To see other objects, light from a source must first shine on the object and then be reflected into our eyes.
- Light from the sun can be dangerous and we need to protect our eyes (eg sunglasses, shelter, avoiding looking directly at the sun)
- Dark is the absence of light. We cannot see anything in complete darkness.
- Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light.
- The size of the shadow depends on the position of the source, object and surface.

Topic Vocabulary:

light, light source, dark, reflection, reflective, mirror, shadow, opaque, transparent, translucent

Sequence:

What do I know about Light and Shadow? What is light energy?
Which material is most reflective? How do mirrors show and change reflections?
How can we protect ourselves from the sun? Which materials successfully block light?
How can we change shadows?

Thinking Deeper:

Children use a mirror to create a symmetrical pattern. Position the mirror on the centre line and ensure the pattern is the same on both sides of this mirror line.

Possible books/resources:

- Orion and the Dark - Emma Yarlett
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Independence- Children to show sun/light safety and use of equipment safely.
Community-

Year 2 Science	**Biology- Animals including Humans**	Spring B

Working Scientifically:

- **Which liquid decays our teeth the most? Eggs in liquid investigation (comparative test)**
- **Grouping and classifying the teeth of carnivores and herbivores (grouping and classifying)**
- **Are foods that are high in energy always high in sugar? (pattern seeking)**

Enrichment:

Malton Secondary School- Science bus/Doctor visit

Prior Learning:
Identify and name a variety of common animals that are carnivores, herbivores, and omnivores. (Y1 - Animals, including humans) - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)

Key Essential Skills and sticky knowledge:

- Animals, including humans, have offspring, which grow into adults
- Animals have basic needs for survival: water, food and air
- Teeth are used for cutting and chewing food. They start the digestive process which gives us the energy we need to live.
- The teeth of an animal are designed to eat different foods depending on the diet of the animal.
- Exercise, diet and hygiene are important to keep humans healthy

Topic Vocabulary:
Offspring, survival, digestion, exercise, diet, hygiene

Sequence:
How are animals' offspring similar and different? What 3 basic needs do animals need to stay alive?
How do humans change when they grow?
What should animals eat to be healthy? Should humans exercise and why?
How can we stop illnesses spreading?

Thinking Deeper:
Do humans have a tail? Research……. Although our primate ancestors had tails, humans and other apes do not. Our ancestors lost their tails in the course of evolution, as they adapted to life on the ground instead of in the trees.

Possible books/resources:

- Watership Down (food chains)- Richard Adams
- The Incredible Journey (food chains) - Sheila Burnford
- The Incredible Book-Eating Boy - Oliver Jeffers

Links:
Subject Specific links – Maths: sorting activities and comparative language. - Computing: learning from activities and videos on IWB
Personal development – health, growth, diet, and hygiene, developing relationships
SMSC/ outdoor learning/Independence/Community – caring for others, caring for animals
Cultural Capital – respecting that people from different cultures may have different appearances
Careers – dietitian, biologist, nutritionist, physio, sports coach, RSPCA, RSPCA zookeepers, animal carers, childcare providers
British Values – mutual respect for others including elderly and young, animals. Rule of law – understanding who to treat and care for animals within the law.
Equality- respect that children have different levels of fitness

Year 3 & 4 Science **Biology- Animals including Humans** Spring B

Working Scientifically:

- **Which liquid decays our teeth the most? Eggs in liquid investigation (comparative test)**
- **Grouping and classifying the teeth of carnivores and herbivores (grouping and classifying)**
- **Are foods that are high in energy always high in sugar? (pattern seeking)**

Enrichment: Malton Secondary School- Science bus/Doctor visit

Prior Learning:

Identify and name a variety of common animals that are carnivores, herbivores, and omnivores. (Y1 - Animals, including humans) - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)

Key Essential Skills and sticky knowledge:

- Animals, including humans, cannot make their own food, they get nutrition from what they eat.
- Animals need water, food and air to survive.
- Humans give birth to babies which go through stages of growth to adulthood.
- Many organs (stomach, small intestine, large intestine and pancreas) are involved in the process of digestion which softens food so that it can pass through the body. As it moves through the body the nutrients required to keep us healthy and have energy are absorbed into the body.
- Teeth are used for cutting and chewing food. They start the digestive process which gives us the energy we need to live.
- There are 4 different types of teeth: molars, premolars, incisors and canines, and they all have different functions.
- Animals, including humans, have skeletons and muscles for support, protection and movement.
- Exercise, eating the right amounts of different food groups and hygiene are important for humans
- Food chains are the connections between producers, prey and predators. All the living things in a food chain rely on each other.

Topic Vocabulary: predators, prey, producers, carnivores, omnivores, herbivores, organ, digestion, decay, molars, canines, incisors, oesophagus, stomach, small intestine, large intestine, pancreas, skeleton, muscles

Sequence:

How are animals' offspring similar and different? What 3 basic needs do animals need to stay alive? How do humans change when they grow? What are the functions of the teeth?
What are the functions of the skeleton and muscles? What should animals do to be healthy?

Thinking Deeper: Do humans have a tail? Research……. Although our primate ancestors had tails, humans and other apes do not. Our ancestors lost their tails in the course of evolution, as they adapted to life on the ground instead of in the trees.

Possible books/resources:

- Watership Down (food chains)- Richard Adams
- The Incredible Journey (food chains) - Sheila Burnford
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Links:

Subject Specific links – Maths: sorting activities and comparative language. - Computing: learning from activities and videos on IWB
Personal development – health, growth, diet, and hygiene, developing relationships
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British Values – mutual respect for others including elderly and young, animals. Rule of law – understanding who to treat and care for animals within the law.
Equality- respect that children have different levels of fitness

Year 2 Science **Biology- Living Things and Habitats** Summer B

Working Scientifically:

- **Children to explore how the conditions of a habitat affect their food supply/chain (Pattern Seeking)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds, and mammals. (Y1 - Animals including humans) Identify and name a variety of common animals that are carnivores, herbivores, and omnivores. (Y1 - Animals including humans)

Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds, and mammals, including pets). (Y1 – Animals, including humans) Observe changes across the four seasons. (Y1 - Seasonal changes).

Key Essential Skills and sticky knowledge:

- Living things can be split into different groups.
- A classification key is a tool that uses yes/no questions.
- Most living things live in an environment they are suited to. This is their habitat.
- Habitats are suited to the basic needs of animals and plants.
- I can identify and name a variety of living things in their habitat, including micro-habitat
- Animals get their food from plants and other animals eg lettuce – snail – bird (this is a simple food chain)

Topic Vocabulary:

sea, rivers, woodland, ponds, rainforest, desert, species, habitat, microhabitats, prey, predator, carnivore, omnivore, herbivore, survive, food chain, environment, classification

Sequence:

How do we know if something is living, dead & non-living?
What is a habitat?
What types of habitats are there?
How does a habitat provide the basic needs for the life of the creature living in it?
What is a food chain?

Thinking Deeper:

Why Do We Need Bees?
- Bees are great pollinators, carrying pollen from one flower to another. Once pollinated, a flower develops into fruit, which we can eat. Bees are vital for pollinating many commercial crops, such as tomatoes, peas, apples, and strawberries. It would be very time consuming and costly to pollinate these plants in other ways.
Bees make it much easier for farmers and keep the prices of these foods down. Plastic - Villain vs Hero?
- Explore the positives and negatives of plastic's impact upon living things and their habitats.

Possible books/resources:

- A Tadpole's Promise - Jeanne Willis
- The Ladybird Big Book of Dead Things - Ned Hartley
- An Otter Called Pebble - Helen Peters
- The Big Book of the Blue - Yuval Zommer
- When the Bees Buzzed Off - Lula Bell

Links:

Subject Specific links – English: new vocabulary, explaining their work, describing images and processes. Maths: sorting activities, tally charts, pictograms. Computing- learning from activities and videos on IWB. Geography: features of habitats and mapping where they are in the school grounds and beyond.
Personal development – to be aware of harmful germs and how to keep themselves safe.
SMSC/ outdoor learning/Community/independence- learn how to look after the environment
Cultural Capital- investigating habitats from different places around the world
Careers – microbiologist, environmentalist, RSPCS, RSPB, vet, zoologist
British Values – children respect the environment around them and the habitats within the school grounds.
Equality- every animal deserves the same representation as another. Do animals have the same rights as humans?

Year 3 & 4 Science **Biology- Living Things and Habitats** Summer B
Working Scientifically: • **using and making simple guides or keys to explore and identify local plants and animals (researching using secondary sources)** • **grouping plants and animals in environment (identifying and classifying)** • **researching the effects of deforestation (researching using secondary sources)**
Enrichment: Malton Secondary School- Science bus
Prior Learning: Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including

humans) Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)

Key Essential Skills and sticky knowledge:

- All living things, which can also be called organisms, have to do certain things to stay alive. these are the life processes.
- Living things can be grouped according to different criteria—where they live, what type of organism they are, what features they have.
- A classification key is a tool that uses yes/no questions.
- Habitats can change throughout the year and this can have an effect on the plants and animals living there.
- Humans can have positive effects on the environment, e.g. nature reserves, but instead often damage it.
- When environments change, this pose a danger to living things

Topic Vocabulary:

organism, mammal, amphibian, reptile, bird, fish, vertebrate, invertebrate, deforestation, flowering, non-flowering, habitat, micro-habitat, sensitivity, respiration, excretion, nutrition.

Sequence:

What do all living things have in common? How can we group living things?
How can we use a classification key to identify animals? How do you create a classification key?
Can humans damage animal habitats? Can humans have a positive impact on animal habitats?

Thinking Deeper:

Why do living things have Latin names? Why is a mushroom not a plant?

Possible books/resources:

- Wolves - Emily Gravet
- The clue is in the poo (links to habitats) - Andy Seed
- The promise - Nicola Davies

Links:

Subject Specific links – Computing-making digital knowledge organisers. Geography- protecting local environment
Personal development – Respect the natural world
SMSC/ outdoor learning/Community/independence- learn to respect the natural world
Cultural Capital- to appreciate animals from different countries
Careers – Explore the work of conservationists
British Values – mutual respect- respecting our environment
Equality- looking at hoe each and every one of us has an equal responsibility to protect the world around us

Year 2 Science **Chemistry- Rocks** Summer B

Working Scientifically:

- **Classifying rocks according to whether they have grains or crystals (grouping and classifying)**
- ***"How are fossils formed?"*** **(researching using secondary sources)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

- - Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)
- - Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)
- - Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)

- - Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)

Key Essential Skills and sticky knowledge:

- A fossil is the remains or the impression left by a prehistoric plant or animal embedded in rock.
- There are different types of rocks that have different appearances: sedimentary, igneous, metamorphic
- Soil is made from air, organic matter, water and minerals.

Topic Vocabulary:

fossil, soil, sedimentary, metamorphic, igneous, minerals, permeable, organic, matter

Sequence:

What do we know about rocks and soils? What can you see when you magnify the surface of rocks?

How do rocks differ? How are fossils formed? What could a palaeontologist be? What are soils made of?

How do soils differ?

Thinking Deeper:

Children research the uses of different soil types.

Possible books/resources:

- Ballet Shoes (fossil connections) - Noel Streatfield
- The Street Beneath my Feet - Charlotte Guillian

Links:

Subject Specific links – maths- classifying

Personal development – discussing making sensible decisions and remaining safe around areas rocks are found (quarries, cliffs)

SMSC/ outdoor learning/Community/independence- Challenging the stereotypes of women as scientists and opportunity available to women in a relevant time period

Cultural Capital- famous marble sculptures

Careers – Palaeontologist, Geologist, Horticulture based careers- farmer, gardener, sculptor, civil engineer, builder

British Values – Working together in groups valuing contributions and ideas to develop and investigation

Equality- Promotion of both male and female scientists

Year 3 & 4 Science	**Chemistry- Rocks**	Summer B

Working Scientifically:

- **Classifying rocks according to whether they have grains or crystals (grouping and classifying)**
- ***"How are fossils formed?"* (researching using secondary sources)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

- - Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)
- - Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)
- - Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)

- - Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)

Key Essential Skills and sticky knowledge:

- A fossil is the remains or the impression left by a prehistoric plant or animal embedded in rock.
- Sedimentary rocks are formed by sediment that is deposited over time, usually as layers at the bottom of lakes and oceans. The sediment is compressed over a long period of time before consolidating into solid layers of rock.
- Igneous rocks are very hard, dark and heavy. They are formed when molten magma from a volcano cools down.
- Metamorphic rocks are rocks which have been changed over time by pressure or heat.
- Soil is made from air, organic matter, water and minerals.

Topic Vocabulary:

fossil, soil, crystal, sedimentary, metamorphic, igneous, hard rocks, soft rocks, minerals, permeable, impermeable, organic, matter

Sequence:

What do we know about rocks and soils? What can you see when you magnify the surface of rocks? How do rocks differ? How are fossils formed? What could a palaeontologist be? What are soils made of?
How do soils differ?

Thinking Deeper:

Children research the uses of different soil types.

Possible books/resources:

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Links:

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Cultural Capital- famous marble sculptures
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Equality- Promotion of both male and female scientists