Year 2 Science **Physics- Forces and Magnets** Autumn Term Year A

Working Scientifically:

- Which shoe/ surface is the most slippery? **(comparative test)**
- If I change the car, what happens to the distance travelled? **(comparative test)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching. (Y2 - Uses of everyday materials)

Key Essential Skills and sticky knowledge:

- Friction is a force between two surfaces that are sliding or trying to slide across each other. Friction works in the opposite direction to which the object is moving. It slows down the moving object. It slows down the moving object. Things move differently on different surfaces depending on friction.
- Magnets are objects or materials that produce a magnetic field and attract or repel magnetic objects.
- Not all materials are magnetic.

Topic Vocabulary:

attract, repel, magnetic, friction, push, pull

Sequence:

What is a force? Which forces act upon moving objects?
Are all materials magnetic? Do all magnets have the same strength? How do magnets attract or repel each other? Who developed electromagnets?

Thinking Deeper:

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

Possible books/resources:

- The Iron Man - Ted Hughes
- The Tin Snail - Cameron McAllister

Links:

Subject Specific links – explain idiom 'Opposites attract'.
Personal development – apply knowledge of electro-magnets and the impact it has upon human lives
SMSC/outdoor learning – to develop collaborative work within a group
Cultural Capital – appreciate the influence of a scientist and the impact they have upon modern day life
Careers/ community– Scrap metal dealer, industries where magnets are used.
British Values – making decisions together within groups and sharing ideas
Equality- equality within class/group work, everyone having opportunities and share their findings
Independence- experimenting with different forces

Year 3 & 4 Science **Physics- Forces and Magnets** Autumn Term Year A

Working Scientifically:

- Which shoe/ surface is the most slippery? **(comparative test)**
- If I change the car, what happens to the distance travelled? **(comparative test)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching. (Y2 - Uses of everyday materials)

Key Essential Skills and sticky knowledge:

- Gravity is the force that pulls things to the ground. Gravity also holds Earth and other planets in their orbits around the sun.
- Friction is a force between two surfaces that are sliding or trying to slide across each other. Friction works in the opposite direction to which the object is moving. It slows down the moving object. Things move differently on different surfaces depending on friction.
- Forces need contact between 2 objects but magnetic forces can act at a distance.
- Magnets are objects or materials that produce a magnetic field and attract or repel magnetic objects.
- Magnets have 2 poles: north and south.
- Not all materials are magnetic.

Topic Vocabulary:

attract, repel, magnetic pole, friction, poles, push, pull, gravity, forces, surface

Sequence:

What is a force? Which forces act upon moving objects?
Are all materials magnetic? Do all magnets have the same strength? How do magnets attract or repel each other? Who developed electromagnets?

Thinking Deeper:

Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.

Possible books/resources:

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British Values – making decisions together within groups and sharing ideas
Equality- equality within class/group work, everyone having opportunities and share their findings
Independence- experimenting with different forces

Year 2 Science **Chemistry- Materials- States of Matters** Spring Term Year A

Working Scientifically:

- Place ice cubes in a glass, observe and discuss what happens **(observation over time)**
- Which type of chocolate melts the quickest*?* **(fair test enquiry)**
- Grouping and classifying materials as solids, liquids or gases
- Record and measure the evaporation of a beaker of water over 2 weeks **(observation over time)**
- How does the surface area of a container of water affect how long it takes to evaporate? **(pattern seeking)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

- - Distinguish between an object and the material from which it is made (Y1)
- - Identity and name a variety of everyday materials. Including wood, plastic, glass, metal, water and rock (Y1)
- - Compare and group together a variety of everyday materials and the basis of their simple properties (Y1)

Key Essential Skills and sticky knowledge:

- There are 3 states of matter: solids, liquids and gases.
- Name some solids, liquids and gases and group materials on this basis
- Some materials change when they are heated or cooled (eg ice/water/steam)
- Adding heat to water makes it evaporate
- Cooling steam condenses it back into water
- Water continually moves around the Earth in the water cycle

Topic Vocabulary:

matter, solid, liquid, gas, freezing, melting, steam, condensation, precipitation, evaporation

Sequence:

What are materials? What are particles? What is the difference between solids, liquids and gasses?
Does gas have mass? How do materials change state? What affects the speed of evaporation? Where does our water come from?

Thinking Deeper:

- How do snowflakes form? Look at the different between ice forming and snowflakes forming. Look at the different types of snowflakes. The colder the clouds are, the more intricate the snowflakes. - Can you walk on custard? Non-Newtonian Liquids

Possible books/resources:

- The Rhythm of the Rain - Grahame Baker Smith
- Charlie and the Chocolate Factory- Roald Dahl
- Swallows and Amazons - Arthur Ransome
- Once Upon A Raindrop - James Carter

Links:

Subject Specific links – English- explanations, Maths- tables and graphs
Personal development – working cooperatively in a team
SMSC/outdoor learning – create awe and wonder with the fact that the water on our planet today has been here for millions of years
Cultural Capital – Understanding of how the world around us works and the importance of our finite supply of water.
Careers/ community– Scientist and inventor
British Values – understand that sometimes laws are passed about when and how much water can be used

Equality- All children within the groups working together will have high expectations with regards to group investigation outcomes
Independence- researching information about our local area and how it may affect them

Year 3 & 4 Science **Chemistry- Materials- States of Matters** Spring Term Year A

Working Scientifically:

- Place ice cubes in a glass, observe and discuss what happens **(observation over time)**
- Which type of chocolate melts the quickest*?* **(fair test enquiry)**
- Grouping and classifying materials as solids, liquids or gases
- Record and measure the evaporation of a beaker of water over 2 weeks **(observation over time)**
- How does the surface area of a container of water affect how long it takes to evaporate? **(pattern seeking)**

Enrichment:

Malton Secondary School- Science bus

Prior Learning:

- - Distinguish between an object and the material from which it is made (Y1)
- - Identity and name a variety of everyday materials. Including wood, plastic, glass, metal, water and rock (Y1)
- - Compare and group together a variety of everyday materials and the basis of their simple properties (Y1)

Key Essential Skills and sticky knowledge:

- There are 3 states of matter: solids, liquids and gases.
- Solid materials hold their shape. Their particles are closely packed and form a regular pattern. Their shape is fixed and they will always take up the same amount of space.
- Liquid materials hold the shape of the containers they are in and so can change shape. Their particles are close together but can move over each other.
- Gases can escape from open containers. They often cannot be seen. They have particles which can spread it and move in all directions.
- Group and compare materials according to whether they are solids, liquids or gases.
- Water continually moves around the Earth in the water cycle
- Warming solid ice makes it melt into liquid water.
- Adding more heat makes it evaporate, at 100°C, into steam (a gas).
- When it is cooled it condenses back into liquid water.
- If it is cooled to 0°C it freezes and forms ice.

Topic Vocabulary:

matter, solid, liquid, gas, freezing, melting, water vapour, condensation, precipitation, evaporation, transpiration, degrees, Celsius, thermometer, temperature

Sequence:

What are materials? What are particles? What is the difference between solids, liquids and gasses?
Does gas have mass? How do materials change state? What affects the speed of evaporation?
Where does our water come from?

Thinking Deeper:

- How do snowflakes form? Look at the different between ice forming and snowflakes forming. Look at the different types of snowflakes. The colder the clouds are, the more intricate the snowflakes. - Can you walk on custard? Non-Newtonian Liquids

Possible books/resources:

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Equality- All children within the groups working together will have high expectations with regards to group investigation outcomes
Independence- researching information about our local area and how it may affect them

Year 2 Science **Physics- Sound**	Spring Term Year A
Working Scientifically: • "Which milk bottle makes the highest pitch sound?" **(pattern seeking)** • "Which material makes the best ear-muffs?" **(comparative test)**	
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) • - Understand how particles are arranged in a solid, liquid and gas (Y3/4 - States of Matter. This unit should always be taught after the States of Matter unit)	
Key Essential Skills and sticky knowledge: • Sounds are made when an object vibrates.	

- The vibration makes the air around the object vibrate and the air vibrations enter your ear. These are called sound waves.
- Sound waves travel to the ear and make the ear drum vibrate. Messages are sent to the brain which recognises the vibrations as sound.
- High pitched sounds are created by short sound waves
- Low pitched sounds are created by long sound waves
- The closer you are to the source, the louder the volume will be.
- The further away you are from the source, the quieter the sound will be.

Topic Vocabulary:
source, pitch, volume, vibration, frequency, loud, quiet

Sequence:
What is sound energy? How do we hear sound energy? What changes the pitch of a sound energy?
What changes the volume of a sound energy? How can we protect our ears from loud sound energy?
What would life be like without sound energy?

Thinking Deeper:
How do dolphins use sound to hunt?
- - Echolocation.
- - Use the idea of an ultrasound scan to demonstrate how this might look for a dolphin.
- - Why are loud sounds dangerous? Look at why people in many careers need to use ear defenders to protect their hearing.

Possible books/resources:
- The Pied Piper – Emma Chicester Clark
- Julia Donaldson - Poems to perform
- Peter and the Wolf - Sergei Prokofiev

Links:
Subject Specific links – Music – how to create sounds of different pitches and volumes
Personal development – working cooperatively in a team
SMSC/outdoor learning –
Cultural Capital – Appreciate different types of music made by different instruments
Careers/ community– musicians, doctors, local people and families
British Values – Developing mutual respect for and understanding of those with different skills and abilities/disabilities
Equality- Developing awareness of those with hearing impairments
Independence- Children to work independently to create their own sound

Year 3 & 4 Science	**Physics- Sound**	Spring Term Year A

Working Scientifically:
- "Which milk bottle makes the highest pitch sound?" **(pattern seeking)**
- "Which material makes the best ear-muffs?" **(comparative test)**

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)
- - Understand how particles are arranged in a solid, liquid and gas (Y3/4 - States of Matter. This unit should always be taught after the States of Matter unit)

Key Essential Skills and sticky knowledge:
- Sound is a thing that can be heard. The object that makes the sound is called a source.

- When objects vibrate, a sound is made. The vibration makes the air around the object vibrate and the air vibrations enter your ear. These are called sound waves.
- Sound waves travel to the ear and make the ear drum vibrate. Messages are sent to the brain which recognises the vibrations as sound.
- Name parts of the ear: middle ear, inner ear, cochlea, hammer, auditory nerve
- High pitched sounds are created by short sound waves (fast vibrations)
- Low pitched sounds are created by long sound waves (slow vibrations)
- The stronger the vibration the louder the sound
- The weaker the vibration the quieter the sound
- The closer you are to the source, the louder the volume will be.
- The further away you are from the source, the quieter the sound will be.

Topic Vocabulary:
source, pitch, volume, vibration, frequency, outer, middle and inner ear, cochlea, hammer, auditory nerve, insulation, increase, decrease, fainter, medium, loud, quiet

Sequence:
What is sound energy? How do we hear sound energy? What changes the pitch of a sound energy?
What changes the volume of a sound energy? How can we protect our ears from loud sound energy?
What would life be like without sound energy?

Thinking Deeper:
How do dolphins use sound to hunt?
- - Echolocation.
- - Use the idea of an ultrasound scan to demonstrate how this might look for a dolphin.
- - Why are loud sounds dangerous? Look at why people in many careers need to use ear defenders to protect their hearing.

Possible books/resources:
- The Pied Piper – Emma Chicester Clark
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- Peter and the Wolf - Sergei Prokofiev

Links:
Subject Specific links – Music – how to create sounds of different pitches and volumes
Personal development – working cooperatively in a team
SMSC/outdoor learning –
Cultural Capital – Appreciate different types of music made by different instruments
Careers/ community– musicians, doctors, local people and families
British Values – Developing mutual respect for and understanding of those with different skills and abilities/disabilities
Equality- Developing awareness of those with hearing impairments
Independence- Children to work independently to create their own sound

Year 2 Science **Biology- Plants** Summer Term Year A
Working Scientifically: • Observing and recording the growth of a plant over time **(observation over time)** • What conditions do plants need to grow? (**comparative test** of plants growing in different locations- dry, wet, light, dark.
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)
Key Essential Skills and sticky knowledge: • Plants may grow from either seeds or bulbs. • Plants need water, light and a suitable temperature to grow and stay healthy

- Seeds germinate and grow into seedlings which then continue to grow into mature plants.
- Mature plants may have flowers which then develop into seeds, berries, and fruits.
- Seeds and bulbs need to be planted outside at particular times of the year. Some plants are better suited to growing in full sun and some grow better in shade.
- Plants need different amounts of water and space to grow well and stay healthy.

Topic Vocabulary:
seed, bulb, roots, stem, petal, leaves, oxygen, habitat, growth, shade , temperature, germinate, seedlings, mature

Sequence:
Plants are living things and require things to grow. Which plants do we eat?
What are the parts of common trees and plants? How do plants grow?

Thinking Deeper:
Can plants eat humans? Research carnivorous plants and how they can eat creatures and insects.

Possible books/resources:
- Little Evie in the Wild Wood - Jackie Morris
- A Seed is Sleepy - Dianna Aston
- The Little Fir Tree - Christopher Corr
- Miss Maple's Seeds - Eliza Wheeler

Links:
Subject Specific links – English: new vocabulary, explaining their work, describing images and processes. Maths- sorting activities and comparative language. Measuring using cm
Personal development – learning how to look after plants and the link to environmental changes.
SMSC/outdoor learning – learning how to look after plants and to respect nature.
Cultural Capital – show an appreciation of where in the world some plants come from and different cultures eat different plants
Careers/ community– farming, florist, tree surgeon, scientist, biologist,
British Values – developing self-esteem and pride in growing something
Equality- Promotion of both men and women as scientists.
Independence- taking care of their plants, looking after their needs

Year 3 & 4 Science **Biology- Plants** Summer Term Year A

Working Scientifically:
- "How is water transported in plants?" Putting cut up flowers/ lettuce into coloured water and observing transportation of water (**observation**)
- "Do bigger plants grow from bigger seeds?" (**pattern seeking**)
- *What colour flowers do pollinating insects prefer?* (**pattern seeking**)

Enrichment:
Malton Secondary School- Science bus

Prior Learning:
- - Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants)
- - Find out and describe how plants need water, light, and a suitable temperature to grow and stay healthy. (Y2 - Plants)

Key Essential Skills and sticky knowledge:

- Plants need air, water, sunlight, nutrients from the soil, room to grow, sustainable temperature. The amount of each of these may vary depending on the type of plant.
- The functions of the parts of a flower are: roots – anchor the plant and take up nutrients and water; stem/trunk – carries water and nutrients to different parts of a plant; leaves - make food for the plant; flowers – create seeds so new plants can grow
- During transportation water is absorbed from the soil by the roots. It is then transported from the roots to the stem and then to the rest of the plant. Leaves use this water to make food.
- There are 3 main ways that plants reproduce: pollination, fertilisation and seed dispersal.
- During pollination pollen is carried by insects or blown by the wind from one flower to another.
- During fertilisation pollen sticks to the flower and then travels to the ovary where it fertilises egg cells
  (ovules) to make seeds.
- During seed dispersal the seeds are scattered by animals or the wind.

Topic Vocabulary:
flower, leaves, stem, trunk, petals, roots, nutrients, pollination, seed formation, seed dispersal, reproduction, transportation

Sequence:
What is the function of the parts of a flowering plant? What do plants need to grow well?
How is water transported in plants? How do plants reproduce? What part do flowers play in the life cycle of plants? How did the different species of plants get to the UK?

Thinking Deeper:
Children split a flower stem in half lengthways and putting each half in a different colour of water. They predict what they think will happen to the flower.

Possible books/resources:
- The Animals of Farthing Wood - Colin Dann
- The Night Gardener - Terry Fan
- Tom's Midnight Garden - Philiipa Pearce
- The Last Tree - Emily Haworth Boot

Links:
Subject Specific links – Recording – explanation texts, non-chronological reports, analysis of data, classifying into Carroll diagrams or Venn diagrams
Personal development – Mental wellbeing promoted by spending time in nature.
SMSC/outdoor learning – learning how to look after plants and to respect nature.
Cultural Capital – To appreciate plants from other countries and how they are now in the UK
Careers/ community– Gardening, Horticulture, Farming
British Values – to understand that some plants are protected by law such as bluebells
Equality- equality within class/groupwork, everyone having opportunities to participate
Independence- taking care of their plants, looking after their needs