Intent, Implementation & Impact

EYFS

Science

Vocabulary

National Curriculum Aims

Wider School Links

Trips & Visits

Ogden Trust



Progression Map

Significant Individuals

Wider School

All Subjects



Part 1



At Trenance Learning Academy our Science Curriculum follows the National Curriculum as we believe that this is a brilliant, tried and tested resource. The main aim is to enable pupils to observe, question and be curious about their surroundings and the world in which they live. Throughout their learning, pupils will be taught different types of scientific enquiry and guided how best to put them into practice.

The types of scientific enquiry are as follows:

Observing changes over time

Noticing patterns

Grouping and classifying

Carrying out simple tests

Using secondary sources

Science Overview <u>Next Page</u>



Part 2



Vocabulary underpins scientific understanding; at Trenance Learning Academy we equip our pupils with scientific terminology, allowing them to effectively communicate their findings and understanding. These skills not only help our pupils become scientists, it also enables them to use these skills and vocabulary to further access the rest of the curriculum. We enrich our science curriculum by varying the ways in which we reach our learning objectives through our exciting and engaging topics. By doing so, we can take a child's imagination and curiosity to the next level. Teaching different aspects of science through topic work as well as the National Curriculum, we believe, gives pupils the best of both structure and freedom in their learning, allowing them to apply their scientific knowledge to abstract contexts.

Outdoor learning is instilled in our ethos as a school and each year group are able to access different settings in their local community. We believe this builds a positive relationship between the children and their local environment which is of growing importance in today's current climate. Children learn through hands on investigation and memories which bring their learning to life. They are able to use skills they have acquired in the classroom and apply these to real world scenarios. Science Overview Next Page

Science

Part 3



We believe that by integrating these three different approaches we are able to give children a broad and balanced introduction to science: igniting their passion, encouraging curiosity, promoting a love of learning as well as the world and phenomena around them. In doing this we know that when children leave Trenance Learning Academy they are equipped to access and thrive in future scientific learning.



National Curriculum Aims/Early Foundation Stage Curriculum

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes

- <u>Early Years Foundation Stage</u>
- <u>Understanding: The Natural World</u>
- <u>Reception</u>
- Explore the natural world around them
- Describe what they see, hear and feel while they are outside
- Recognise some environments that are different to the one in which live
- Understand the effect of changing seasons on the natural world around them
- <u>Early Learning Goals</u>
- Explore the natural world around them, making observations and drawing pictures of animals and plants
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.

 Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.



National Curriculum Aims/Early Foundation Stage Curriculum

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes

Animals including Humans

Living Things and their Habitats

Year 1

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

Year 2

- Understand that animals including humans, have offspring which grow into adults.
- 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
- Explore and compare 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 animals and different plants, and how they depend on each other.
- 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.



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National Curriculum Aims

Plants Year 1

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

Year 2

- 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.

Everyday materials and their uses

Year 1

- 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.

Year 2

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



National Curriculum Aims

Seasonal changes

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

Working Scientifically

Year 1

- I can ask questions and know they can be answered in different ways
- I can look closely using equipment.
- Perform simple tests.
- Identify and classify.
- Uses his/her observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.

Year 2

- I can ask questions and know they can be answered in different ways.
- I can watch closely using equipment including changes over time.
- Perform simple comparative tests.
- Identify, group and classify.
- Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns.
- Gather and record data to help in answering questions including from secondary sources of information.





YF	Year 1	Year 2	
Ready Steady Go Superheroes Circle of Life	Deep in the woods Beach school	Beach school Great outdoors Discoveries	
 Sharing baby photos in the first part in the Autumn term Observing Tadpoles within Foundation Observing the life cycle of caterpillars Meet Banana Man linked to keeping healthy living 	 Grouping animals What animals do we find in the woods? What animals do we find at the beach (habitats) Senses and which body part they are linked to Parts of a knight and their armour Fish dissection and comparing to our body parts. 	 Grouping Naming animals and plants in their habitats. Classifying: Alive, dead, never been alive. Blubber gloves. Rock pools. Growing. 	
 Explore the natural world around them, making observations and drawing pictures of animals and plants. (ELG) Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. 	 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). Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	 Understand that animals including humans, have offspring which grow into adults. 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 Explore and compare 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 animals and different plants, and how they depend on each other. 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. 	

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YF	Year 1	Year 2
Sparkle and Shine Circle of Life	Deep in the woods Castles and dragons Beach school	Beach school Great outdoors Space
 Growing plants in the school allotment Planting bulbs in the Autumn Science Experiment: Measuring different plants grown in school Explore the natural world around them, making observations and drawing pictures of animals and plants. (ELG) Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class. 	 Labelling parts of a plant What parts of a plant can we eat? Growing a beanstalk Harvesting a pumpkin Comparing seaweed and plants Spotter sheets Sycamore seeds experiment Identify and name a variety of common wild and garden plants, including deciduous and evergreen. Identify and describe the basic structure of a variety of common flowering plants, including trees. 	 Can plants survive on Mars? Beans and light experiment. 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.

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Everyday materials and their uses

Progression Maps

YF	Year 1	Year 2
Wild and Wonderful Weather Superheroes	Deep in the woods Castles and dragons Beach school	Titanic
 A series of lessons surrounding effects of weather. Meet Recycle Person, the children talk about different materials that can be recycled. Explore collections of materials with similar and/or different properties (3-4 year olds) 	 Shelter for a dragon What materials should we find at the beach? What materials should we not find at the beach? Recycling Grouping materials Three little pigs, what did they build their houses out of? 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. 	 Floating and sinking experiment. Looking at the properties of different materials. Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
		Next Page Science Overview

<u>Seasonal changes</u>	<u>Progression Maps</u>	
YF	Year 1	Year 2
Sparkle and Shine Wild and Wonderful Weather	Deep in the woods Castles and dragons Beach school	Titanic
 Autumn celebration in Sparkle and Shine Autumn and Spring Walks Trips to Harbour and Summer Walk to the Beach Seasons boards in every Classroom Daily weather chart and seasons songs Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter (ELG). 	 Seasons board Daily weather chart Trenance garden walk - signs of Autumn Tehidy woods trip - spotter sheets Signs of Spring Trenance garden walk - signs of Spring (when walking to swimming) Trenance garden walk - Signs of Summer. Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. 	 Weather chart. Growing cress. Shadow experiment.

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YF	Year 1	Year 2
Ready, Steady Go Circle of Life	Deep in the woods Castles and dragons Beach school	Titanic Space 1 & 2 The Great Outdoors
 Key Skills in Sorting/Classifying Key Experiment- Measuring things that are grown in classroom/allotment 	 Spinners - looking at seed dispersal Shelter for a dragon - materials Venn diagrams for Nocturnal and Diurnal animals, Carnivores, herbivores and omnivores. Sorting materials by properties. Classifying animals by features, Sorting animals into habitats. Observing parts of a plant and minibeasts using magnifying glasses. 	 Floating and sinking Research Blubber gloves - looking at habitats and adaption. Cress, changes over time and fair testing. Grouping and classifying - alive, dead, never been alive.
 Make comments about what they have heard and ask questions to clarify their understanding (ELG, listening, attention and understanding) Describe what they see, hear and feel while they are outside. Explore the natural world around them. Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class(ELG). Make comments about what they have heard and ask questions to clarify their understanding (ELG, listening, attention and understanding) Talks about why things happen and how things work. 	 I can ask questions and know they can be answered in different ways. I can look closely using equipment. Perform simple tests. Identify and classify Uses his/her observations and ideas to suggest answers to questions. Gather and record data to help in answering questions. 	 I can ask questions and know they can be answered in different ways - answer using scientific language from National Curriculum. I can watch closely using equipment - including changes over time. Perform simple comparative tests. Identify, group and classify Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns. Gather and record data to help in answering questions including from secondary sources of information.

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Vocabulary (Working scientifically)

Year 2

Biology, Chemistry, Physics

Identify, Classify, Diagram Contrast, Fair testing

Year 1

Identify, Classify, Diagram Contrast, Fair testing

Question, Answer, Observe, Observing, Equipment Sort, Group, Record, Map, Data, Compare, Describe, Fair

Foundation

Question, Answer, Observe, Observing, Equipment Sort, Group, Record, Map, Data, Compare, Describe, Fair Question, Answer, Observe, Observing, Equipment Sort, Group, Record, Map, Data, Compare, Describe, Fair

(Plants)

Vocabulary (Plants)

Foundation

Year 2

Suitable temperature, healthy, germination, reproduction, photosynthesis, oxygen

Common, wild plants, garden plants, deciduous, evergreen, trunk, branches, leaf root, leaves, bud, root hairs, flower, fruit, nutrients

Year 1

Common, wild plants, garden plants, deciduous, evergreen, trunk, branches, leaf root, leaves, bud, root hairs, flower, fruit, nutrients

Tree, plant, flower, Tree, plant, flower, Tree, plant, flower, grow, roots, soil grow, roots, soil grow, roots, soil

Science Overview (Animals including humans, living things)



Vocabulary (Animals including humans, living things)

Year 2

Offspring, reproduce, survival, hygiene, exercise,

baby-toddler-child-teenager-adult, living, dead, never alive, micro-habitats, food chain, leaf litter, shelter, seashore, rainforest, conditions, Hot/warm/cold Dry/damp/wet, Bright/shade/dark

Carnivores, herbivores, omnivores, amphibians, reptiles, mammals, nutrition, habitat, diet, ocean

Year 1

Carnivores, herbivores, omnivores, amphibians, reptiles, mammals, nutrition, habitat, diet, ocean

Legs, knees, face, ears, eyes, hair, mouth, teeth, fish, birds, pets, grow, exercise, animals, adults, lifecycle, body, human, child, woodland

Foundation

Legs, knees, face, ears, eyes, hair, mouth, teeth, fish, birds, pets, grow, exercise, animals, adults, lifecycle, body, human, child, woodland Legs, knees, face, ears, eyes, hair, mouth, teeth, fish, birds, pets, grow, exercise, animals, adults, lifecycle, body, human, child, woodland

Science Overview (Materials)



Year 2



Squashing, bending, twisting, stretching, Solids, liquid, gas Changing state, transparent

Material, wood, plastic, glass, metal, water, rock, Properties, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent/not absorbent, brick, fabrics, elastic, foil

Year 1

Vocabulary (Materials)

Foundation

Material, wood, plastic, glass, metal, water, rock, Properties, hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent/not absorbent, brick, fabrics, elastic, foil

Science Overview

Wood, metal, plastic, Wood, metal, plastic, Wood, metal, plastic, rock, water, hard, rock, water, hard, rock, water, hard, soft, paper soft, paper soft, paper





Wider School Links



2021

This year as a trust we collaborated to run a virtual science fair. During this science fair children were asked to record videos of them carrying out science investigations or sharing scientific information. Science Overview

Science club

We run a science club to increase the excitement and engagement in science.

Enrichment



Foundation Stage

Year One





<u>Intent</u>	<u>Implementation</u>	<u>Impact</u>
curriculum design coverage & appropriateness)	(curriculum delivery, teaching & assessment)	(Attainment & progress)
 The aim of the Science curriculum is to ensure all children: Develop an understanding of the world around them. Develop an investigative approach which can be applied across the curriculum. Understand different areas of scientific enquiry and their uses. To develop basic scientific language. Become confident, curious and passionate learners. Progress from EYFS to Year Two and form a solid base to enter into KS2. Cover the key aspects of the science national curriculum in engaging, immersive topics. Receive high quality science lessons, taught by confident teachers. Access a range of scientific equipment and understand how it is used. Establish links within the trust to share resources, competitions and CPD. 	 Germly topics have been designed to incorporate the science curriculum and ensure coverage. Children are made aware when they are learning aspects of science and how it is in everything we do. Teachers have access to CPD to improve their confidence and ability to teach science effectively. Children will be assessed termly to ensure gaps are being filed. Progesion and coverage is monitored closely to ensure sontinuation from EYFS to Year Two. Gurriculum leaders work alongside teachers from each year group to ensure the quality of teaching throughout the science. Resources are checked to ensure they are suitable, appropriate and useful. Begular talks within the curriculum team will ensure coverage and progression is monitored. 	 Enthusiastic, excited and curious children. Children will become more inquisitive, have a greater understanding of the world around them and will have the vocabulary to begin to communicate this. Children are able to use different methods of scientific enquiry. Children's progress is tracked using OTracker and areas of development will have been identified. Internal moderation of books provides evidence of consistent teaching and opportunities where all pupils have access to science and scientific enquiry. Children are able to apply reasoning, enquiry and communication skills to all aspects of their life. Children are equipped with the scientific knowledge which will enable them to understand the uses of science today and how vital it is to the world's future prosperity.



Ogden Trust



Established by Sir Peter Ogden in 1999, we are a charitable trust that exists to promote the teaching and learning of physics. We do this by enabling innovative physics teaching to take place in, and collaboratively between, schools, often forging links to universities and other organisations. We address the shortage of physics teachers in the UK by funding programmes that encourage young graduates to go into teaching and by supporting teacher professional development in an effort to enhance retention.

Physics as a subject has a huge importance in the world today and we must ensure that access to good quality physics education is about the ability to learn and not the ability to pay.

Cameron Ogden, Chair of The Ogden Trust



making physics matter



Significant Individuals



Year 1	Ye	Year 2	
David Attenborough	Katherine Johnson	Tim Peake	
Evelyn Cheesman	Neil Armstrong	The Wright Brothers	
Agnes Aber	Mae C Jemison		
Sir Tim Smit	Mary Anning		
Eugenie Clark	David Attenborough		
Greta Thunberg	1296		
	Year 1 David Attenborough Evelyn Cheesman Agnes Aber Sir Tim Smit Eugenie Clark Greta Thunberg	Year 1 David Attenborough Evelyn Cheesman Agnes Aber Sir Tim Smit Eugenie Clark Greta Thunberg	



Evelyn Cheesman - Year One Deep in the woods

- Lucy Evelyn Cheesman (1881-1969), OBE, was an English entomologist best known for her extensive solo expeditions in the South West Pacific.
- Over the course of her trips, she collected around 70,000 specimens of insects, plants and other animals for the Natural History Museum.
- More than 40 years after her death, scientists are still identifying new species and making discoveries among the specimens she collected.
- A pressed flower found in the Museum's collection was found in 2013 to be a new species of orchid. The blue colour of its flowers makes it unique among the approximately 26,000 known species of orchids.



Entomology is the study of insects and their relationship to humans, the environment, and other organisms.



Eugenie Clark - Year One Beach School

- Ichthyology is the branch of zoology devoted to the study of fish.
- She conducted 72 submersible dives and countless more using Scuba gear, where she studied marine life, including sharks.
 She was one of the only ichthyologists, or fish biologists, of her time to study living specimens in this way.
 - She discovered several fish species, including one that releases a natural shark repellent when threatened. Known as the Moses sole, the fish makes hungry sharks not only stop in their tracks,







Sir Tim Smit







Science Overview

Agnes Arber

- Agnes Robertson Arber (23 February 1879 22 March 1960) was a British plant morphologist and anatomist, historian of botany and philosopher of biology.
- She was the first woman botanist to be elected as a Fellow of the Royal Society (21 March 1946, at the age of 67) and the third woman overall.
- She was the first woman to receive the Gold Medal of the Linnean Society of London (24 May 1948, at the age of 69) for her contributions to botanical science.
- Phytomorphology is the study of the physical form and external structure of plants.
- Plant anatomy, is the study of the internal structure of plants.
- Plant morphology is useful in the visual identification of plants.





Sir David Attenborough

Key Facts

- David Frederick Attenborough was born on May 8, 1926 in England. Attenborough spent much of his childhood growing up on the campus of University College in Leicester. His father, Frederick, was the school's principal at the time. In recent years, Attenborough has become very vocally concerned about the state of the planet. In 2018, he even attended a climate summit in Poland and delivered a powerful speech urging world leaders to take immediate action against climate change.
 Did you know?
 - There's only one animal David Attenborough doesn't like- rats
 - He doesn't own a car as he's never passed his driving test.
 - He was in the Royal Navy for 2 years.
 - He has had more than 10 plants and animals named after him.
 - The first television programme he made was in black and white and was about prehistoric fish.
 - In 1985 he received a knighthood for services to television and conservation.
 - Sir David Attenborough quotes: "Surely we all have a responsibility to care for our Blue Planet. The future of humanity and indeed, all life on earth, now depends on us."



Science Overview

Greta Thunberg

Key Facts

• Greta Thunberg is an environmental activist. She was born in Stockholm, Sweden, in 2003. When she was eight, she started learning about climate change. The more she learned, the more baffled she became as to why so little was being done about it.

Did you know?

- At the age of 11, Greta became so sad about climate change that she temporarily stopped speaking!
- Greta has Asperger syndrome, a condition that affects how people socialise. But Greta views her condition as a positive, calling it her "superpower"! She says it helps her see the world in black and white, and that there are "no grey areas when it comes to climate change."
- In August 2018, Greta decided to take action. Instead of going to school, she made a large sign that read 'SCHOOL STRIKE FOR CLIMATE', and calmly sat down outside the Swedish parliament. Her aim was to make politicians take notice and act to stop global warming.
- Soon enough, tens of thousands of students from around the world joined her #FridaysforFuture strikes skipping school on Fridays to protest against climate change.
- Greta's greatest inspiration is the civil rights activist Rosa Parks.



Mary Anning - Year 2 Dinosaurs

- Mary Anning (1799–1847) was a famous English fossil hunter and collector.
- Despite her poor background and limited education, she was the first to discover and identify many important pre-historic fossils.
- She lived at a time when women were rarely taken seriously in science.
- During her lifetime she received little recognition for her work, despite helping to change our understanding of ancient creatures and evolution.



The Wright Brothers - Year 2 Space

- The Wright brothers, Orville and Wilbur, were two American brothers, inventors and aviation pioneers who invented and built the world's first successful airplane and made the first controlled, powered and sustained heavier-than-air human flight, on December 17, 1903.
- They had been experimenting for many years with gliders and other vehicles before their first powered flight.
- They are also known for making the first way to steer an airplane.
- They designed the aircraft in Dayton, Ohio, and their first test flight was in Kitty Hawk, North Carolina.







Katherine Johnson - Year 2 Space

- Katherine Johnson was an African American physicist and mathematician.
- She was the first African-American woman to attend graduate school at West Virginia University and is known for her work on the United States' aeronautics and space programs.
- Katherine was one of the NASA "human computers". These were women mathematicians who performed calculations that allowed NASA firstly, to put astronauts safely into orbit then onto the Moon!
- Katherine calculated the trajectory for the 1961 space flight of Alan Shepherd and when computers were first used it was Katherine who checked their calculations were correct!!
- Katherine also worked on the space shuttle program and in the later part of her career spent time inspiring students to follow a STEM Career.
- Katherine worked for NASA for over 30 years and retired in 1986. She passed away in February 2020 at the age of 101.





