Science

Intent

At Chew Stoke Church School the teaching and learning of science enables all pupils to develop a sense of curiosity about the natural world. All pupils develop the skills of scientific enquiry, questioning and investigating in a variety of contexts. This helps them to build a good understanding of the world around them. They learn to appreciate the work of famous scientists, and to question and often lead the line of scientific enquiry. Learning is an active process facilitated by teachers and enabling all pupils to deepen their scientific understanding

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. Our whole school approach to the teaching and learning of science involves the following;

Early Years Foundation Stage

In the Foundation Stage, children are taught Science through the key areas of learning set out within the EYFS Statutory Framework. Through a broad range of teacher-led, child-initiated and continuous learning opportunities, children will be taught to:

- Use their senses to investigate a range of objects and materials
- Find out about, identify and observe the different features of living things, objects and worldly events
- Look closely at similarities, differences, patterns and change
- Ask questions about why things happen and why things work
- Develop their communication and co-operation skills
- Talk about their findings, sometimes recording them
- Identify and find out about features of the place they live and in the natural world around them

Key Stage 1 and 2

In Key Stage 1 and 2, Science will be taught in planned and arranged blocks by the class teacher, these are, where appropriate linked to the overall Topic theme of the class. This ensures that all topics are covered and enables progression through the year groups. Children have weekly Science lessons, with teachers following the scheme of work, but adapting lessons where necessary to suit the needs of their class.

Impact

Most children will achieve age related expectations in Science at the end of their cohort year.

Children will retain knowledge that is pertinent to Science with a real life context.

Children will be able to question ideas and reflect on knowledge.

Children will work collaboratively and practically to investigate and experiment.

Children will be able to explain the process they have taken and be able to reason scientifically.

Progression of skills within Science

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Skills	Planning a scientific investigation	With support, identify whole-class questions thatcan be tested. Perform simple tests. Observe changes over time.	Identify questions that can be tested. Identify that questions can be answered in a variety of ways. Perform simple tests. Observe changes over time, noticing the patterns and relationships.	Identify variables: independent, dependent and controlled. Choose a question to answer in a scientific enquiry based on the above. Conduct a range of scientific enquiries with scaffolded support/investigation frames. Make predictions.	Identify and suggest variables:independent, dependent and controlled. Suggest a question to answer in a scientific enquiry based on theabove. Conduct a range of scientific enquiries with some support by listing a teacher-led method and equipment. Make predictions and give a reason.	Identify and list multiple variables: independent, dependent and controlled. Suggest and refine a question toanswer in a scientific enquiry based on the above. Conduct a range of scientific enquiries by suggesting a method and equipment. Make and fully justify Predictions.	Identify and decide variables: independent, dependent and controlled. Choose the most appropriate type ofscientific enquiry based on these. Design a range of scientific enquiries:fair tests, pattern seeking, observations over time, identifying and classifying and research. Make and fully justify predictions. Suggest risks and safety advice.
	Working with data (create, collect, analyse)	Discuss method and findings. Use senses and simple equipment to gather data. Present data in templates Provided.	Identify relevant things to measureto answer the question. Use appropriate non-standard measurements (i.e. cubes) and a greater range of equipment to gather data. Record simple data in a variety of ways: drawings, photographs, labelled diagrams, orally or in simple	Take measurements using a range of scientific equipment. Collect and present scientific data with diagrams and labels,tables and bar charts. Use this to answer scientificenquiry questions. Make a simple conclusion aboutwhat the test shows.	Take measurements using a range of scientific equipmentusing increasing accuracy. Identify patterns. Collect and accurately/ neatly present scientific data with diagrams and labels, tables andbar charts. Compare conclusion toprediction. Identify anomalies.	Take accurate and more complexmeasurements using a range of scientific equipment. Identify patterns and suggest a reason why it may have occurred. Collect and accurately/neatly present scientific data in a range of ways: scientific diagrams and labels, tables, bar charts and line	Choose the most appropriate format to accurately collect and present data, with increasing complexity: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Identify and fully explain patterns. Draw conclusions to: refute or

			prepared tables or charts. Suggest answers to scientific questions.			graphs. Draw conclusions to prove ideas. Identify and explain anomalies.	prove ideas. Identify and explain anomalies.
	Evaluation of a scientific investigation	Give ideas about whether or not the scientific question has been answered.	State one good thing about an investigation and one bad thing about the investigation.	Identify things that help to make scientific data valid.	Explain what helps to make scientific data valid Understand how/why accuracy is important in collecting data (i.e. reduction in the chance of an anomaly).	Evaluate why or why not a test has been fair, accurate or reliable by discussing what could be done differently/better.	Increase validity of results and prevent anomalies through: • Justifying the choice of the equipment to support datacollection • Repeating observations Suggesting alternative investigations to yield similar results.

Science - Class Knowledge Map

The majority of classes at Chew Stoke Church School are mixed age (will have a mix of 2 Year groups), as a result, the curriculum that has been developed runs over a two year cycle. This ensures that learning is never repeated and that knowledge builds on previous knowledge.

	Cycle	Autumn	Spring	Summer
Hedgehog Class		This is me – See detailed plan on the website	Plants – See detailed plan on the website	Mini Beasts – See detailed plan on the website
Owl Class	A	**Animals including humans** -Human sense organs -Identifying the 5 vertebrate groups -Identifying herbivores, carnivores and omnivores *Senses* What senses do we use at school and how do we use them? Play a listening game, talking game, using our body to communicate (hands up, sitting quietly, being excited). Discuss linked with controlling our own behavior. *Humans* What parts of the body can I name? I can	**Materials** Everyday materials - properties of wood, plastics, glass, metal, water and rock. *Naming Materials:* To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock by matching a material to its name. *What are these materials?* *Objects and Materials:* To distinguish between an object and the material from which it is made by naming objects and identifying the material which they are made from. What is an object and what is a material?	**Seasonal Changes** *(Children to observe and discuss seasonal changes across the 4 seasons)* The 4 Seasons, seasonal weather, seasonal day length. *Wonderful Weather.* What is the weather like today? *Shadow fun* Does my shadow always look like that? What was it like first thing in the morning? Is it better to play shadow tag at lunchtime or after school?

		label parts of my body on pictures and diagrams and make measurements of bodies using non-standard measurement s e.g. straws. *Senses Say* Which part of the body is associated with each sens?. To perform simple tests. • To name the five senses and to perform simple tests to find out more about them. Carousel of activities for children to explore all the different senses. Children to record their ideas *Animals* What animals will we see around our school? What other animals do I know? I can draw and identify some animals that I know. I can draw animals around the school and other animals that I know. Animals – animal classification. How do we classify animals? What are examples of mammals, reptiles, birds, fish and amphibians. How do we classify animals by diet? What animals fall into the categories of carnivors, herbivores and ombivores? *School Visit from Animal Science with a variety of animals for the children to interact with.* How are animals similar and different? How can we group them? Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets).	*Properties of materials:* To distinguish between an object and the material from which it is made by looking and touching different materials. What is an object and what is a material? What are the properties of materials? Why are objects made of certain materials? *Testing properties* To describe the simple physical properties of a variety of everyday materials by testing different objects. Which materials have certain properties? *Umbrella Investigation:* To observe closely by watching what happens to teddy. To perform simple tests: Which material would be suitable to make and umbrella from? *I can test different materials*. Design an umbrella with the materials most suitable after testing. Design and build a house out of different materials and test it's strength against the big, bad wolf. Build a house out of different materials and test it's strength agains the big bad wolf: Write up the results Show and tell – children bring in different objects from home and we discuss the materials they are made of. Children ask questions about the objects, how the feel, their properties and best guesses at the material used.	Understand that the day length changes each day and varies from season to season. Investigate shadows and their shapes. *Winter to Spring* What changes occur between seasons? What things happen during Spring and Summer? What changes will I see between the seasons? *Spring to Summer* What comparisons can be made between the seasons? How can you describe the weather? How do you stay safe in the sun? *Spring walk:* What are the different types of weather? What are some seasonal plants? Can you use simple equipment to observe seasonal changes in nature? What are the seasonal changes you can see in your local area? *Weather Station – rainfall* How can we observe rainfall? What patterns do we see over time. *Weather station – wind* How can we find out which way the wind is blowing? *Weather station – temperature* How can we find out the temperature inside the classroom and outide? ***School trip* – Walk through the village to *Chew Magna Community Farm* – what changes can you observe since the Spring walk? Predict what we will see at the farm. What seasonal plants will we find at the farm? What wildlife will we see on the way? How do the seasons effect wildlife and farms?**

	B	**Seasonal changes** (Children to observe and discuss seasonal changes across the 4 seasons) *What do you know about the seasons?* – find out what the children already know. *What is the weather like today?* Collect the weather for a week. Go for a walk around the school to see what they notice. Make observations using drawings, notes or photographs. *What do you notice about these leaves?* Draw out Autumnal features: falling leaves, seeds, fruits, changing colours, dew on grass, temperature, mini beasts, temperature, clothing *What is the weather like today?* The change in weather causes many other changes. Some examples are numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people. Children to collect more detailed data and record the weather over a week. In this week they should/could make a rain gauge and collect rainfall to see which was the wettest day and/or a bubble wind investigation – how long does it take a bubble to travel across the playground. *What was the weather like last week?* Look at the data collected for the week (Last week) and make into class pictograms. Use the data to draw conclusions. *How is the weather different from when we started school?* Is it cold outside what should I wear? Collect the weather for a week. Go on a 'welly walk' to the same place, observe some trees - ensure that on your walk you observe a deciduous and an evergreen tree. Look at the signs of the season, make collections, and take photos.	**Materials matter** What is a material? To be able to identify a variety of common materials. Children will learn what materials are, identify some common materials, and describe some of their uses. Can children identify a variety of common materials? Do children know where some materials come from? What is the difference between an object and the material from which it is made? Children will look at a variety of objects and identify some of the materials they are made from. To show what they have understood, children may write lists, match objects to labels or sort objects and materials. Can children identify a variety of common materials? Can children distinguish between an object and the material from which it is made? an children identify which material a variety of common objects are made from? Can you use a variety of words to describe what materials are like according to their properties? Children will use words such as 'soft', 'smooth', 'hard', or 'bendy' to describe and/or sort a variety of materials and objects. Can children match materials to various properties? Can children group objects and materials according to their properties? Why do some materials suit certain objects better than others? Children will consider why the properties of materials make them suitable for certain uses. They will then select appropriate materials for use in a range of objects. Can children identify and describe a variety of materials? Can children suggest why a material has been chosen for a particular purpose? Can children identify materials that are inappropriate for certain uses and offer alternatives?	**Plants & growing** What plants do I know? Draw pictures of any plants they know. *What trees and plants are around our school?* What do you notice about these trees or plants? Take the children in groups around the outside area to identify some common plants using spotter guides and app. Activity: cut and stick matching the images to their names. Look at a range of common flowering plants. Give the children time to dissect and discuss in small groups the different parts of their plant. Children ask a question about the plants (written or scribed). Discuss the parts of the plants and their uses. *Can you label the parts of a flowering plant?* Look together at the image of a flowering plant and label. Remind the children of the roles of these parts. Children choose to make a collage, model (out of pipe cleaners) or draw a plant of their choice (images as prompts) and label. Year 2 children write a sentence for each of the uses. *What is the difference between deciduous and evergreen trees?* Children make their own information video in pairs. Must include what it means for trees to be deciduous and evergreen. Should include some different types of trees. Challenge: could include some interesting facts about trees. Can I identify common trees? Go outside and collect a range of fallen leaves from the tress. Bring back to the classroom to identify and sort. Take rubbings and label with the name of the tree that it comes from. Were there any common trees that were missing? Do we know

		Identify and take photos of each tree and the signs of the season. Record the temperature on your walk. Draw out features of winter: bare trees, hard ground, lack of plants, temperature, and clothing. Write winter acrostic poem. *What animals will I see around the school? How* do *the animals adapt to the changing seasons?* (winter) Do we see as many animals in this season? Discuss hibernating animals and migrating birds. Use books as stimulus to support. ***What is the weather like today?*** **How have the trees changed? Collect the weather for a week Look for signs of winter on trees, temperature, nature, and clothing.**	How can I find out which materials are waterproof? Carry out an experiment to find out which materials are waterproof. Children will devise methods for testing materials to determine whether or not they are waterproof. They may then either test materials, or produce a model of a waterproof product. Can children make suggestions for how to test which materials are waterproof and which aren't? Can children test a variety of materials to see which are waterproof and which aren't? Can children draw conclusions from their experiment? **What have we learned about every day materials? Children will recap prior learning and show what they have understood by making models or matching objects to labels and descriptions. Can children identify a variety of everyday materials and describe their properties? Can children distinguish an object from the material from which it is made? Can children identify materials that are suitable for a particular purpose?**	what trees a selection of seeds come from e.g. acorns, conkers, helicopters, holly berries and ash keys. *What are the different parts of a plant?* Plants have common parts, but they vary between the different types of plants. Bring in a plant from home (dig a weed up) and observe the different parts. Identify the different parts and show flash cards flowers, stem, leaves and roots. Look at two different plants: e.g. Dandelion, daisy, Shepherd's purse What is the same/different? *What happens to the seed when I plant it?* - Use Eric Carle's book the tiny seed. Children observe their seed growing over time and take photos. Give the children a sequence of photos to order.
Kingfisher Class	A	**Rocks - Do rocks matter?** Recognise that there are different kinds of rocks with different appearances and physical properties. Recognise that fossils are the remains of things (animals, plants, and other organisms) that once lived on Earth and became preserved in rocks. Recognise that soil is a mixture of tiny particles of rocks, organic matter from animals and plants, and air and water.	**Animals including humans - What's the difference between animals and me?** Know about the basic needs of animals, including humans, for survival. Describe the importance of exercise, balanced diet and hygiene for humans. Describe the main changes as young animals, including humans, grow into adults. **Hamilton trust year 3 – Keeping healthy** Recognise that animals, including humans, cannot survive without eating because food provides them with energy for survival and growth in the form of nutrients. Recognise that animals need a balanced diet of nutrients and therefore of foods containing those nutrients.	**Plants – structure & classification** Identify the different parts of flowering plants. Predict what will happen in an investigation. Make observations. Identify the main stages of the life cycle of flowering plants. Explain the functions of the different parts of plants. Set up an investigation and make predictions. Make observations and conclusions. Identify different parts of a flower. Identify and describe the stages of the life cycle of flowering plants. Be able to answer questions based on their learning.

			Recognise that some animals have skeletons and muscles and understand that these are used for movement, support and protection. **Recognise that different types of animals may have different types of skeleton or no skeleton at all.**	
	B	**Forces** Understand that forces act in particular directions and can make an object start moving, stop moving, change shape or change direction. • The greater the force, the greater the movement or change in shape. • Know that pushes and pulls are examples of forces. Understand that forces do not always require contact between two objects – for example, magnetic forces can act without direct contact. Recognise that magnets attract or repel each other, and attract some materials and not others. **Recognise that magnets have two ends (poles) and understand how the poles of two magnets behave towards each other.**	**Living things and their habitats** Recognize whether things are alive, dead or have never lived. Identify different plants and animals and recognize that they are suited to their different habitats, including micro-habitats. Recognise how different habitats provide for the basic needs of animals and plants. Understand that animals get their food from other animals and/or from plants. **Recognise that a food chain is made of a series of plants and animals that eat each other and shows how energy is transferred from one organism to another via food.**	**Plants – function and survival** Understand and describe the main changes as seeds and bulbs grow into mature plants. Understand and describe the basic needs of plants for water, light and a suitable temperature to grow and stay healthy. **Twinkl Y2 plants unit** **Children will learn what plants need to stay healthy. They will have the opportunity to carry out their own investigations into what plants need to grow well. Children will also closely observe the inside of a seed and learn about the life cycle of a plant. They will also learn how plants look when they don't get the things they need. In their final lesson, children will learn how plants have adapted to live in different environments around the world.**
Woodpecker Class	A	**Sound** Can you investigate how different sounds are made? How do sounds travel before they reach the ear? Can you find patterns between the pitch of a sound and features of the object that produced it? Can you find patterns between the volume of a sound and the strength of the vibrations that produced it? What happens (to the sound) when the distance from the sound source increases?	**Materials** Can you compare and group materials together, according to whether they are solids, liquids or gases? What happens to materials when they are heated or cooled? Can you measure the temperatures at which these changes occur in degrees Celcius? What happens in the Water Cycle? Can you explain evaporation and condensation in the Water Cycle? How does temperature affect the rate of evaporation?	**Electricity** Can you identify appliances that run on electricity? Can you make a simple series electrical circuit and identify/name its basic parts? Can you use recognized symbols to draw and label your circuit? Will a lamp light in a simple series circuit if it is not part of a complete loop with a battery? What does a switch do to a circuit? What materials make good conductors and insulators? Which metals are good conductors?

	B	**Light** What is dark? Do we need light in order to see things? How is light reflected from surfaces? Why is it dangerous to look at the sun? How could you protect your eyes? How are shadows formed? What does opaque, translucent and transparent mean? How can you change the size of a shadow? Does your shadow length change throughout the day/why?	**Forces and Magnets** Can you compare how things move on different surfaces? Do some forces need contact between two objects? Can you describe the different ways magnets attract or repel each other? Why do they (magnets) attract some materials and not others? Can you compare and sort everyday materials as to whether they are magnetic? What do we mean by having two poles? Can you predict whether two magnets will attract or repel each other, depending on which poles are facing?	**Green plants – photosynthesis** Can you identify and name parts of a flower? Can you describe the life cycle of flowering plants? Do you know the names and functions of the parts within a flower? What role do insects play in pollination? What is fertilization? How do fruits and seeds develop? Can you classify fruits into groups? (according to structure and type) What is seed dispersal? Can you investigate wind dispersal by creating a fair test (size/weight/shape/material) on the flight of a paper spinner?
Fox Class	A	**Properties and changes of materials** What are the properties of materials? What test will find the properties of various materials? What are the best thermal conductors and insulators? Can I carry out an investigation into thermal conductors and insulators? Can I evaluate the results of my investigation? What are electrical insulators and which is the best conductors? What materials are soluble or insoluble? What process is best to separate mixtures or materials? What are irreversible changes?	**Living things and their habitats** How do plants reproduce? How do mammals reproduce? What is metamorphosis? Are all life cycles the same? Can I Understand the characteristics of living things? Can I observe living things in their habitat? How are living things classified? What is a classification key? Can I record living things through drawing? Can I create a branching database of living things?	**Scientists and Inventors** Who is David Attenborough? How is evidence used to solve crimes? What did Margaret Hamilton achieve? Who is Eva Crane and what is her impact on Bees? Who is Stephanie Kwolek and what did she do? Can I identify evidence that supports or refutes scientific theories about Stonehenge? **Space links (so current yr 5 don't miss out)** Famous scientists linked to space through enquiry How has our understanding of space changed?
	B	**Earth and Space** - What is a spherical body? What planets are in our solar system? What is the difference between Geocentric vs heliocentric? Can I explain night vs day?	**Forces** - What is a force? Why do we need Gravity? What is Air resistance? What is Water resistance? What is Friction? Can I investigate real world problems?	**Animals including humans** What is the Human timeline? What stages of development do babies undertake? What is Puberty and what will happen to me?

Badger Class	A	**Electricity** Explain the importance of the major discoveries in electricity. Observe and explain the effects of differing volts in a circuit. Understand variations in how components function. Plan and conduct an investigation. Record data and report findings.	**Living things and their habitats** Give reasons for classifying animals based on their similarities and differences. Explore the Linnaean system. Classify creatures based on its characteristics. Describe and investigate helpful and harmful microorganisms.	**Scientists and Inventors** Understand Stephen Hawking's theories. Understand Libbie Hyman's work on classification. Explain how diet affects the body functions (Marie Maynard Daly). Record and interpret data on the effects of penicillin (Alexander Fleming). Understand the life of Mary Leaker and her work on fossils. **Evolution and Inheritance** Explain the scientific concept of inheritance. Demonstrate understanding on adaptation. Identify key ideas of the theory of evolution. Identify evidence for evolution from fossil records. Understand how human beings have evolved. Explain how adaptations can result in advantages and disadvantages. Explain how human intervention affects evolution.
	B	**Light** Explain how light travels in straight lines from light sources to our eyes, and from light sources to objects and then to our eyes. Understand how mirrors reflect light, and how they can help us see objects. Investigate how refraction changes the direction in which light travels. Investigate how prism changes a ray of light. Investigate how light enables us to see colours. Explain why shadows have the same shape as the object that casts them.	**Evolution and Inheritance** Explain the scientific concept of inheritance. Demonstrate understanding on adaptation. Identify key ideas of the theory of evolution. Identify evidence for evolution from fossil records. Understand how human beings have evolved. Explain how adaptations can result in advantages and disadvantages. Explain how human intervention affects evolution.	**Animals including humans** Know the 3 main parts of the circulatory system and describe the job of the heart. Describe the important jobs of the blood vessels and blood. Describe the importance of exercise and how it affects the heart. Plan a scientific enquiry. Record, report and present results. Understand that regular exercise is important for a healthy body. Explain how diet and exercise affect the body. Recognise the impact of drugs and alcohol on the way bodies function.