SCIENCE – Long Term Overview

School Vision: To be best prepared to live life in all its fullness.
Subject Intent: To be best prepared for the next stage in their science journey

The Gospel offers forgiveness of the past, new life in the present and hope for the future.

Past = *To be at peace and ready to learn:* Our curriculum is progressive - it is built on previous skills and meaningful experiences. Reading is a priority so it is not a barrier to learning. Targeted support is provided and early intervention is identified to ensure the needs of each pupil are met.
Present = T*o be inspired in the present:* The curriculum mapped out with substantive knowledge (facts) and disciplinary knowledge (how we gain knowledge, skills enquiry). We will ensure pupils will receive quality lessons and that they are accessible for all through scaffolding and modelling. There will be opportunities beyond the curriculum for those who are enthused or show a talent in this subject. Pupils will ask questions, be inquisitive and develop their understanding of the different enquiry types.
Future = *Hope for the future*: Children will leave Reepham equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. They will be confident and the opportunities provided will open doors for future careers or interest in science. They are ready for Secondary school science lessons.

Types of scientific enquiry:

- Observation over time
- Pattern Seeking
- Research using Secondary sources
- Identifying, grouping and classifying
- Comparative / fair testing

All of these enquiry types should be covered in a year to ensure all pupils can explore different ways of investigating and recording investigations.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	BIOLOGY: **HUMANS** Identify and name the basic parts of the human body, identify the different layers within the body, which body parts are associated with each sense. **Enquiry Opportunities:** **Identifying, Grouping and Classifying** - using a feely bag, children try to guess what the object is. Children close their eyes and identify what food they have tasted. Children use their sense of smell to identify what is in the cup.	CHEMISTRY: **MATERIALS** Identify a variety of common materials, distinguish between objects and the materials they are made from, identify and name everyday materials including wood, plastic, glass, metal, water and rock and their properties **Enquiry Opportunities:** **Identifying Grouping and Classifying** - Ask children to look around the classroom to see if they can see any objects that are made from metal, fabric, plastic, stone or Provide children with Sorting Cards. Match a variety of objects to the materials they are made from. **Comparative / Fair Testing** - What material would be best for an umbrella? Children test different materials to see if they are waterproof or not. *Key Scientist - Materials Scientist: Charles Macintosh*	BIOLOGY: **ANIMALS** Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals, identify if animals are carnivores, herbivores or omnivores, describe the structure of common animals (fish, amphibians, reptiles, birds and mammals including pets, collect data on animals using tally charts and graphs **Enquiry Opportunities:** **Pattern Seeking** - children to ask each other what their favourite animal is and collect data. **Research using Secondary Sources** - Research who Steve Irwin is and why he is important. *Key Scientist – Zoologist: Steve Irwin*		PHYSICS: **SEASONAL CHANGES** Observe changes across the four seasons, observe how the four seasons are different, identify how animals and humans are affected by the seasons, observe and describe weather associated with the seasons and how day length can vary **Enquiry Opportunities:** **Observation Over Time** - record weather (temperature and rain gauge) over the term. **Pattern Seeking** - investigate weather during a season e.g. what was the most common weather? **Research using Secondary Sources** - Who is Joanne Simpson and why are they important? *Key Scientist – Meteorologist: Joanne Simpson*	BIOLOGY: **PLANTS** Identify what a plant is, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees, identify and describe the basic structure of a variety of common flowering plants including trees, observe the growth of plants **Enquiry Opportunities:** **Observation Over Time** - observation of plants - looking at how they have changed since planting. **Identifying, Grouping and Classifying** - Identify garden plants, wild plants and trees. E.g. children use a classification key to identify the six plants. **Research using Secondary Sources** - Who's is Joseph Banks and why are they important? *Key Scientist – Biologist: Joseph Banks*
Year 2	CHEMISTRY: **MATERIALS** Identify and compare the suitability of everyday materials including wood, metal, plastic, glass, brick, rock, paper and cardboard including their uses, find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **Enquiry Opportunities:** **Observation Over Time** **Comparative / Fair Testing** - How long does it take for a material to absorb an amount of water? **Identifying, Grouping and Classifying** - How can materials be grouped based on their properties? **Research using Secondary Sources** - How is paper made? Who is John Boyd Dunlop and why is he important? **Key Scientist** - Materials Scientist: John Boyd Dunlop		BIOLOGY: **ANIMALS** Notice and identify that all animals including humans have offspring which grow into adults, identify the basic needs of animals including humans for survival (water, food and air), describe the importance of exercise for humans, including eating the right amounts of different types of foods, identifying the importance of hygiene **Enquiry Opportunities:** **Identifying, Grouping and Classifying** - How do different animals have babies?	BIOLOGY: **LIVING THINGS & HABITATS** Identify that more living things live in habitats to which they are suited, describe how different habitats provide for the basic needs of different animals and plants and how they depend on each other, identify how animals obtain their food from plants and other animals using the idea of a simple food chain **Enquiry Opportunities:** **Observation Over Time** - How long do caterpillars take to grow into butterflies? (summer term) **Identifying, Grouping and Classifying** - How would you group things to show	BIOLOGY: **PLANTS** Observe and describe how seeds and bulbs grow into mature plants, identify and describe how plants need water, light and a suitable temperature to grow and stay healthy, identify the ways in which seeds are dispersed **Enquiry Opportunities:** **Observation Over Time** - How long does a seed take to grow? **Pattern Seeking** - Do larger seeds grow into bigger plants than smaller seeds? **Research using Secondary Sources** - Who is Jane Colden and why is she important? **Key Scientist** – Botanist: Jane Colden	

			Research using Secondary Sources - Who is Howard Nelson and why is he important? **Key Scientist** – Zoologist: Howard Nelson	which are living, dead or never been alive? **Research using Secondary Sources** - Who is Rachel Carson and why is she important? **Key Scientist** – Ecologist: Rachel Carson		
Year 3	**PHYSICS:** **ROCKS** Compare and group different kinds of rocks based on their appearance and simply physical properties, describe in simple terms how fossils are formed when things that have lived are trapped within rock, recognise that soils are made from rocks and organic matter **Enquiry Opportunities:** **Comparative / Fair Testing** - Devise a test to investigate the permeability of different rocks **Identifying, Grouping and Classifying** - Classify rocks in a range of ways **Research using Secondary Sources** - Research using secondary sources how fossils are formed. **Key Scientist** - Geologist: Johan Herman Lie Vogt		**BIOLOGY:** **ANIMALS INCLUDING HUMANS** Identify that animals including humans need the right types and amount of nutrition and that they cannot make their own food – they get nutrition from what they eat, identify the importance of a healthy balanced diet, identify humans and some other animals have skeletons and muscles for support, protection and movement **Enquiry Opportunities:** **Identifying, Grouping and Classifying** - How do the skeletons of different animals compare? How can we group the food that we eat? Use food labels to explore the nutritional content of a range of food items (this is done in enrichment not science) **Research using Secondary Sources** - Who is Jane Goodall and why is she important? **Observation Over Time** **How do humans change as they grow?** **Key Scientist** – Zoologist: Jane Goodal	**PHYSICS:** **FORCES & MAGNETS** Identify forces acting on objects – push or pull, compare how things move on different surfaces, notice that some forces need contact between two objects but that magnetic forces can act at a distance, observe how magnets attract or repel each other and attract some materials and not others, compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, identify some magnetic materials, describe magnets as having two poles, predict whether two magnets will attract or repel each other depending on which poles are facing **Enquiry Approach:** **Comparative / Fair Testing** - Which magnet is the strongest? Which surface produces the most friction? Explore the ways that magnets behave in relation to each other. **Identifying, Grouping and Classifying** - Which materials are magnetic? **Pattern Seeking** - Does the size and shape of a magnet affect how strong it is? **Research using Secondary Sources** - who is William Gilbert and why are they important? **Key Scientist** - Physicist: William Gilbert	**PHYSICS:** **LIGHT** Recognise that we need light to see things and that dark is the absence of light, notice that light is reflected from surfaces, recognise that light from the sun can be dangerous and the ways to protect from this **Enquiry Opportunities:** **Observation Over Time** - Investigate how the size of shadows change throughout the day **Comparative / Fair Testing** - Explore how shadows vary as the distance between a light source and an object is changed. **Identifying, Grouping and Classifying** - How could you organise these light sources into natural and artificial light sources. Classifying materials as opaque, transparent and translucent **Research using Secondary Sources** - Who is Thomas Young and why are they important? **Key Scientist** – Optical Scientist: Thomas Young	**BIOLOGY:** **PLANTS** Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers, explore the requirements of plants for life and growth (air, light, water, nutrients from the soil, room to grow) and how they vary from plant to plant, investigate the way in which water is transported within plants, explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal **Enquiry Opportunities:** **Observation Over Time** - What happens to celery/flower when it is left in a glass of coloured water? **Research using Secondary Sources** - What are all the ways that seeds disperse? **Key Scientist** – Botanist: George Washington Carver
Year 4	**CHEMISTRY:** **STATES OF MATTER** Compare and group materials together according to whether they are solids, liquids or gases, identify and explore the properties of gases, observe that some materials change state when they are heated or cooled, measure/research the temperature at which this happens in degrees Celsius, identify the part played by evaporation and condensation in the water cycle **Enquiry Opportunities:** **Observation Over Time** - Does the temperature affect how quickly towels dry? How does the mass of an ice cube change over time? **Comparative / Fait Testing** - Does the temperature affect how quickly towels dry? **Identifying, Grouping and Classifying** - Can you group these materials and objects into solids, liquids and gases?	**PHYSICS:** **ELECTRICITY** Learn how and why electricity occurs, identify electrical appliances and the types of electricity they use, learn how to construct simple circuits, identify and name basic parts of a circuit, identify complete and incomplete circuits, Design, investigate and construct a simple circuit with a switch **Enquiry Opportunities:** **Observation Over Time** - How long does a battery light a torch for? **Comparative / Fait Testing** - Predict what will happen in a circuit. Create circuits to test the predictions. **Identifying, Grouping and Classifying** - Sort appliances – electrical or non-electrical; mains or battery **Pattern Seeking** - Test a range of materials in circuits. Which room has the most electrical sockets in a house? **Research using Secondary Sources** - How has electricity changed the way we live?	**PHYSICS:** **SOUND** Identify how sounds are made, associating sone of them with something vibrating, recognise that vibrations from sounds travel through a medium to the ear, find patterns between the pitch of a sound and features of the object that produced it, find patterns between the volume of a sound and the strength of the vibrations that produced it, recognise that sounds get fainter as the distance from the sound source increases, investigate ways to absorb sound **Enquiry Opportunities:** **Comparative / Fait Testing** - Which material is best to use for muffling sound in ear defenders **Identifying, Grouping and Classifying** - **Pattern Seeking** - Is there a link between how loud it is in school and the time of the day? Is there a pattern, is it the same in every area of school? **Research using Secondary Sources** -	**BIOLOGY:** **ANIMALS INCLUDING HUMANS** Describe the simple functions of the basic parts of the digestive system in humans, identify the different types of teeth in humans and their simple functions, compare the similarities between the teeth of herbivores, carnivores and omnivores. Investigate food chain. **Enquiry Opportunities:** **Observation Over Time** - Tooth decay investigation using boiled eggs and different drinks **Comparative / Fait Testing** - Tooth decay investigation using boiled eggs and different drinks **Identifying, Grouping and Classifying** - What are the names for all the organs involved in the digestive system? How can we organise teeth into groups. Compare similarities and differences between herbivores, carnivores and omnivores.	**BIOLOGY:** **LIVING THINGS & HABITATS** Identify and classify plants (and animals) into different groups, identify living things that can be grouped into a variety of ways, explore the use of classification key., Group, identify and name a variety of living things in local and wider environment, recognise that environments can change and the dangers this can pose to living things, identify changes and dangers in the local habitat, identify potential environmental dangers and endangered species **Enquiry Opportunities:** **Observation Over Time** - How does the variety of invertebrates on the school field change over the year? **Identifying, Grouping and Classifying** - Create classification keys by sorting characteristics of animals. **Research using Secondary Sources** - Do all animals have the same hearing range. Draw and write about the animal and the dangers it faces. Suggest how it could be saved from extinction. **Key Scientist** – Ecologist: Wangari Maathai	

	Pattern Seeking -Is there a pattern in how long it takes chocolate to melt using different temperatures of water? **Research using Secondary Sources** -	**Key Scientist** – Physicist: André-Marie Ampère	**Key Scientist** – Acoustician Scientist: Dorte Hammershøi	**Research using Secondary Sources** - How do dentists fix broken teeth? **Key Scientist** – Zoologist: Evelyn Cheesman	
Year 5	**BIOLOGY:** **ANIMALS (INCLUDING HUMANS)** Recognise the stages of growth and development in humans, identify the gestational stages of humans and animals, recognise the stages of development during childhood, understand the initial changes during puberty, identify how puberty differs for boys and girls, understand how the body changes during adulthood and old age **Enquiry Opportunities:** **Observation Over Time** - How have I changed over time? self-observation of human development over time. **Comparative / Fair Testing** - What similarities and differences are there in puberty between girls and boy? How do gestational periods differ between mammals? **Identifying, Grouping and Classifying** - What developmental stages happen in humans? How do humans develop eg: what a baby can do? **Pattern Seeking** - What patterns can we see in human development - same or different- in male & females? What patterns can we see when comparing the size of mammals and the length of gestational periods?	**PHYSICS:** **FORCES & GRAVITY** Explain the force of gravity, identify the effects of friction, identify and explain effects of air resistance, identify and explain effects of water resistance, identify use of levers & pulleys allowing smaller forces to give greater effect, identify use of gears on a mechanism exerting greater & smaller force **Enquiry Opportunities:** **Comparative / Fair Testing** - How can you slow down your parachute? How can you speed up your car? **Identifying, Grouping and Classifying** - Can you group and classify forces as pushes or pulls? **Pattern Seeking** - What patterns do you notice in the way forces are exerted - levers and gears? **Research using Secondary Sources** - **Key Scientist** - Physicist: Galileo Galilea.	**PHYSICS:** **EARTH, SUN & MOON** Study shape of Sun, Earth & Moon as approximately spherical; Earth's rotation of Sun; Moon's orbit of Earth; structure of Solar System (heliocentric & geocentric theories); how position of Sun influences seasonal changes in sunrise etc. **Enquiry Opportunities:** **Observation Over Time** - Why do we have 24 hour days? Why don't all months have the same number of days? Why do we have seasons? **Identifying, Grouping and Classifying** - How can we identify, classify and group the planets within our Solar System? eg: terrestrial planets, gas giants and ice giants. **Pattern Seeking** - Is there a pattern between the size of the planets and length of their orbits? **Research using Secondary Sources** - chn research self-selected planet to create fact file. **Key Scientist** - Astronaut: Mae C Jemison	**BIOLOGY:** **LIVING THINGS & HABITATS** Asexual & sexual reproduction in plants; sexual reproduction in animals; comparing animal adaptation to habitats; compare life cycles of animals; study of work of famous naturalists. **Enquiry Opportunities:** **Comparative / Fair Testing** - How do the the processes of asexual and sexual reproduction of plants differ? **Identifying, Grouping and Classifying** - Why do certain types of animals use external gestation? **Research using Secondary Sources** - How do the physical features of animals help them survive in their habitats? eg: size and shape of a bird's beak. **Research using Secondary Sources How has the work of this person contributed to our understanding of the natural world?** **Key Scientist** – Reproduction Scientist: Miriam Menkin	**CHEMISTRY:** **PROPERTIES OF MATERIALS** Reversible & irreversible changes to materials using mixing, dissolving (forming a solution using a solvent & solute); heating, cooling & burning. **Enquiry Opportunities:** **Observation Over Time** - Observation over time: How does saltwater change over time? Observation over time: What happens to a sugar cube in a glass of water? **Identifying, Grouping and Classifying** - Can you group these materials depending on whether they are irreversibly changed by heating or not? Identifying and classifying materials in terms of their properties. **Research using Secondary Sources** - **Key Scientist** – Materials Scientist: Catherine Rae
Year 6	**BIOLOGY:** **ANIMALS (INCLUDING HUMANS)** **KEEPING HEALTHY** Scientific ideas on diet in the past (scurvy) compared to modern balanced diet; study digestive system; heart & lungs (circulatory); muscles in relation to skeletal movement & blood flow; **Enquiry Opportunities:** **Observation over time** - How long does it take my pulse rate to return to my resting pulse rate after exercise? **Fair test** – How do different activities affect my pulse rate? **Identifying, Grouping and Classifying**- Which organs of the body make up the circulatory system and where are they found? **Pattern seeking** – Which groups of people may have higher or lower resting pulse rates What is the recovery rate for different groups of people? (Boys / girls) **Research using Secondary sources** What are the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise?	**PHYSICS:** **LIGHT (HOW WE SEE THINGS)** Review light (how it moves) & shadows; study & label eye in relation to light & sight; reflections & how to change light direction (periscopes); experiment on shadow behaviour & difference between reflection & shadow. **Enquiry Opportunities:** **Comparative / Fair Testing** - Can you change the size and shape of shadows? How does the position of an object change a shadow? **Research using Secondary Sources** - Who was James Clerk Maxwell? **Key Scientist** – Physicist: James Clerk Maxwell	**BIOLOGY:** **LIVING THINGS - CLASSIFICATION** Study grouping of organisms based on shared & differing characteristics; classify plants by characteristics; Carl Linnaeus & classification system; identify, classify & group micro-organisms by characteristics in local study. **Enquiry Opportunities:** **Comparative / Fair Testing** - What food does yeast like the best? **Identifying, Grouping and Classifying**- How do you classify animals? **Pattern Seeking** - Do all flowers have the same number of petals? **Research using Secondary Sources**- What is the formal classification system devised by Carl Linnaeus and why it is important? **Key Scientist** - Taxonomist: Carl Linnaeus	**BIOLOGY:** **EVOLUTION & INHERITANCE** Study inherited traits in offspring; adaptation to environment may lead to evolution; Linnaeus & Darwin; human intervention in evolution (selective & cross breeding) **Enquiry Opportunities:** **Observation Over Time** - How have humans evolved over time? **Identifying, Grouping and Classifying**- Compare the skeletons of apes, humans and Neanderthals - how are they similar and how are they different?.**Research using Secondary Sources** - How did the population of peppered moths change during the industrial revolution? What was Darwin's research into the finches on the Galapagos Islands? What are the differences between Charles Darwin and Alfred Wallace ideas on Natural selection? **Key Scientist** - Biologist: Charles Darwin	**PHYSICS:** **ELECTRICITY** Major electrical discoveries (Volta, Edison etc); recap simple circuits; adapt circuits re bulbs & motor power; circuit symbols; investigate effect of wire length on circuits. **Enquiry Opportunities:** **Comparative / Fait Testing** - How does the length of a wire affect the components of a circuit? Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers, and the on/off position of switches. **Pattern Seeking**- Does the temperature of a lightbulb go up the longer it is on? **Research using Secondary Sources** - Who was Hertha Ayrton? **Key Scientist** – Physicist: Hertha Ayrton