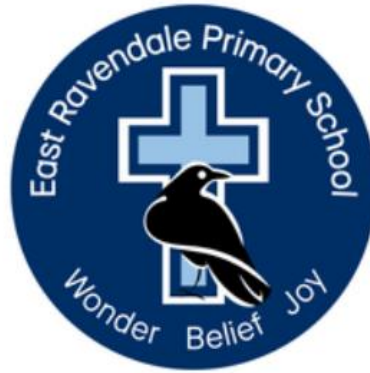




YEAR 5 AND 6 SCIENCE CURRICULUM CYCLE B

EAST RAVENDALE C OF E PRIMARY SCHOOL

At East Ravendale, we strive to develop independent, self-motivated and inquisitive learners of all ages. We celebrate our uniqueness and value all as God's children. We aim to give all members of our community opportunities to succeed, now and in the future, knowing they are safe and valued.

Our vision is underpinned by our core values of wonder, belief and joy.

"I can do all things through God who strengthens me." Philippians 4:13



Science at East Ravendale

At East Ravendale, our science curriculum reflects our vision to develop independent, self-motivated and inquisitive learners who feel valued, safe and inspired to succeed now and in the future. Rooted in our Christian ethos, we celebrate each child as unique and valued as God's creation. Guided by the belief that ***"I can do all things through God who strengthens me"*** (***Philippians 4:13***), we nurture confidence, curiosity and resilience. Through science, we bring our values of **wonder, belief and joy** to life while developing a strong understanding of the scientific world.

Wonder

We inspire a sense of wonder about the world God has created through engaging, hands-on experiences. Children are encouraged to question, explore and investigate through practical learning and outdoor opportunities. By building on prior knowledge across biology, chemistry and physics, pupils develop curiosity and become increasingly independent, inquisitive learners.

Belief

We foster belief by developing children's confidence in their ability to think scientifically and overcome challenges. Through carefully sequenced learning and working scientifically skills, pupils learn to trust in their abilities. By exploring science-related careers, children are encouraged to believe in their potential and aspire for the future.

Joy

We promote joy through exciting and engaging science experiences, including practical lessons, STEM events and cross-curricular learning. These opportunities create enthusiasm and help children retain knowledge. As a result, pupils develop a lasting love of science and a desire to continue exploring the world around them.



Year 5/6 Science Curriculum Cycle B

	<u>Autumn</u> <u>1</u>	<u>Autumn</u> <u>2</u>	<u>Spring</u> <u>1</u>	<u>Spring</u> <u>2</u>	<u>Summer</u> <u>1</u>	<u>Summer</u> <u>2</u>
Programme of Study	Properties and Changes of Materials	Living Things and their Habitats	Evolution and Inheritance	Forces		Animals including Humans and Evolution and Inheritance
Area of Science	Chemistry	Biology	Biology	Physics		Biology

“I can do all things through God who strengthens me.” Philippians 4:13



Why this, why now?

<u>Year 5/6</u> <u>Cycle B</u>	<u>Why this, why now?</u>
Autumn 1 – Properties and Changes of Materials	Pupils will be able to apply knowledge taught here about changes to materials and apply this within their wider curriculum lessons related to Coastal Erosion within the Golden Thread – Water. They will be able to consider how water changes materials.
Autumn 2 – Living Things and their Habitats	Now that children know about different species, they will learn how to classify different species and look at adaptations made for the habitats they live in, preparing themselves for deeper learning on evolution and for moving into the KS3 curriculum.
Spring 1 – Evolution and Inheritance	Pupils will pull their learning about animals and habitats together in this unit as they now focus on more complex content, in preparation for biology at KS3. They will use their understanding of adaptations learnt in the previous half term to support the learning of evolution.
Spring 2/Summer 1 - Forces	Pupils will be able to apply their knowledge from LKS2 to different aspects of forces. This is also spread across two terms to ensure full coverage due to Statutory Testing periods in these terms.
Summer 2 – Animals including Humans and Evolution and Inheritance	Pupils will be taught this aspect of Evolution and Inheritance to coincide with the relationships, sex and health education provision provided in the summer term by Big Talk.

Scientists

At East Ravendale, children learn about a diverse range of scientists alongside their National Curriculum science studies. By exploring **historical** and **contemporary** scientists from a variety of backgrounds, including **underrepresented** groups, pupils develop science capital, see the relevance of science in everyday life, and recognise that science is for everyone.

“I can do all things through God who strengthens me.” Philippians 4:13



Autumn 1 – Properties and Changes of Materials

Prior Knowledge	➤ Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for uses. (Y2 - Uses of everyday materials) ➤ 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) ➤ Compare and group together a variety of everyday materials based on whether they are attracted to a magnet and identify some magnetic materials. (Y3 - Forces and magnets) ➤ Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter) ➤ Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). (Y4 - States of matter) ➤ Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)
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Objectives to be taught	<u>Y5 Objectives</u> • Compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. • Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Demonstrate that dissolving, mixing and changes of state are reversible changes • Explain that some changes result in the formation of new materials and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda
Core Knowledge	▪ To know different materials properties ▪ To know which materials are thermal and electrical conductors and insulators ▪ To know which materials are magnetic ▪ To know which materials are soluble or insoluble ▪ To know that some materials can dissolve ▪ To know how to determine if changes are reversible or irreversible ▪ To know that some changes to materials create new materials ▪ To know the difference between a solid, liquid and gas ▪ To know how you can separate different mixtures through filtering, sieving and evaporation ▪ To know how to conduct a comparative and fair test



Working Scientifically Statements	○ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ○ Identifying scientific evidence that has been used to support or refute ideas or arguments ○ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where necessary ○ Using test results to make predictions to set up further comparative and fair tests ○ Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs ○ Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ○ Use scientific vocabulary correctly and accurately
Vocabulary	conductor, insulator, thermal, magnetism, transparent, resistant, dissolve, substance, soluble., insoluble, reversible, irreversible, chemical change, burning, new material, product, sieving, filtering, attraction, melting, freeze, evaporate, condensate, separate, solid, liquid, gas
TAPS Assessment	Nappy Absorbency – click here
Scientists	Spencer Silver & Arthur Fry - Chemical Engineer & Chemist respectively who invented the post it notes Ruth Benerito - Chemist who developed wrinkle-free cotton fabric Andre Geim & Konstantin Novoselov - Physicists who discovered graphene Jamie Garcia - Chemist who discovered a fully recyclable plastic Raquel Prado - Chemist who develops a sustainable fabric that looks like leather but comes from pineapple leaves that would otherwise be burnt



Suggested Resources

CLEAPSS

[Does it dissolve?](#)

[Making a salt solution and recovering the salt](#)

[Growing crystals with table salt](#)

[Investigating heating and melting](#)

[Investigating burning](#)

[Rusty nails](#)

[Vinegar and bicarbonate balloons](#)

[Double bubble](#)

[Making bath bombs](#)

[Dissolving jelly](#)

[Vinegar and bicarbonate fire extinguisher demonstration](#)



Autumn 2 – Living Things and their Habitats

Prior Knowledge	➤ Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats) ➤ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats) ➤ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats) ➤ Describe the life process of reproduction in some plants and animals. (Y5 -Living things and their habitats)
Objectives to be taught	<u>Y6 Objectives</u> • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. • Give reasons for classifying plants and animals based on specific characteristics
Core Knowledge	▪ To know how to identify characteristics of different living things ▪ To know how to group and sort living things based on characteristics and features ▪ To know different types of harmful and helpful microorganisms ▪ To know how to identify different types of microorganisms



Working Scientifically Statements	○ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ○ Identifying scientific evidence that has been used to support or refute ideas or arguments ○ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where necessary ○ Using test results to make predictions to set up further comparative and fair tests ○ Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs ○ Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ○ Use scientific vocabulary correctly and accurately
Vocabulary	microorganisms, bacteria, microscopic, virus, fungi, fungus, mould, antibiotic, yeast, ferment, microscope, decompose, microbes, variation, flowering plants, non-flowering plants
TAPS Assessment	Outdoor Keys – click here
Scientists	Carl Linnaeus - Botanist & Zoologist who developed a taxonomy for classifying organisms Agnes Arber - Botanist and first woman to become a fellow of the Royal Society who studied aquatic flowering plants and monocots, a group of flowering plants Hu Xiansu - Botanist and founder of plant taxonomy in China Beatrix Potter - Mycologist, study of fungi and Scientific Illustrator
Suggested Resources	



Spring 1 – Evolution and Inheritance

Prior Knowledge	➤ 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 kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats) ➤ Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) ➤ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) ➤ Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) ➤ Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) ➤ Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)
Objectives to be taught	<u>Y6 Objectives</u> • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
Core Knowledge	▪ To know who Charles Darwin is and be able to explain his theory ▪ To know the definition and be able to explain adaptation, evolution and natural selection ▪ To know what genes and DNA are ▪ To know that living things have adapted over time to live in their environments ▪ To know how living things evolve due to natural selection ▪ To know how fossils support the theory of evolution ▪ To know ethical issues of natural selection



Working Scientifically Statements	○ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ○ Identifying scientific evidence that has been used to support or refute ideas or arguments ○ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where necessary ○ Using test results to make predictions to set up further comparative and fair tests ○ Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs ○ Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ○ Use scientific vocabulary correctly and accurately
Vocabulary	evolve, adaptation, inherit, natural selection, adaptive traits, inherited traits, mutations, theory of evolution, ancestors, biological parent, chromosomes, genes, Charles Darwin, selective breeding, artificial selection, cloning, DNA, genetically modified, variations, fossil, sedimentary rocks
TAPS Assessment	Egg Strength – click here
Scientists	Mary Anning - Fossil hunter who developed the theory that dinosaurs had become extinct a long time ago Charles Darwin - Natural Historian who developed the theory of evolution by natural selection Alfred Wallace - Natural Historian who developed the theory of evolution by natural selection Emma Dunne - Palaeobiologist who investigates how ancient climate change affected the evolution of different species Telma Laurentino - Evolutionary Biologist who measures differences in the colour of lizards that live in white desert sands to find differences in their genes which might have allowed them to survive in such an extreme environment



Suggested Resources

CLEAPSS

[Fantasy animal adaptation models](#)

[Investigating camouflage](#)



Spring 2 & Summer 1 - Forces

Prior Knowledge	➤ Compare how things move on different surfaces. (Y3 - Forces and magnets) ➤ Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets) ➤ Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets) ➤ Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials. (Y3 - Forces and magnets) ➤ Describe magnets as having two poles. (Y3 - Forces and magnets) ➤ Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)
Objectives to be taught	<u>Y5 Objectives</u> • Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • Identify the effects of air resistance, water resistance and friction that act between moving surfaces • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have greater effect
Core Knowledge	▪ To know who Isaac Newton is ▪ To know the different forces which are acting upon objects ▪ To know the effects of friction on moving objects, including air and water resistance ▪ To know how to identify different mechanisms ▪ To know how mechanisms influence the force produced



Working Scientifically Statements	○ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ○ Identifying scientific evidence that has been used to support or refute ideas or arguments ○ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where necessary ○ Using test results to make predictions to set up further comparative and fair tests ○ Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs ○ Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ○ Use scientific vocabulary correctly and accurately
Vocabulary	air resistance, water resistance, buoyancy, upthrust, gravitational pull, gravity, force, levers, pulleys, gears, cogs, weight, mass, kilograms (kg), Newtons (N), scales, speed, fast, slow, effect
TAPS Assessment	Aqua Dynamics – click here Spinners – click here
Scientists	Archimedes - Mathematician who developed theories about how levers and pulleys can lift and move heavy objects Galileo Galilei - Astronomer, Mathematician & Physicist who was the first person to use the scientific method to test theories about gravity and the Solar System Isaac Newton - Mathematician & Physicist who developed theories about gravity George Cayley - Aeronautical Engineer who designed the first successful glider to carry a human being Brahmagupta - Mathematician & Astronomer who was the first scientist to talk about gravity



Suggested Resources

CLEAPSS

[How does the size of a cupcake parachute affect drop time?](#)

[Measuring friction on different surfaces](#)

[Inseparable books](#)

[Water resistance](#)

[Exploring levers](#)

[Measuring how pulleys affect lifting a load/ Observing how pulleys affect lifting a load](#)

[Turning a figure with and without gears](#)

[Using a bicycle to demonstrate why we use gears](#)



Summer 2 – Animals including Humans & Evolution and Inheritance

Prior Knowledge	➤ Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) ➤ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) ➤ Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5) ➤ Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - 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. (Y3 - Animals, including humans) ➤ Describe the simple functions of the basic parts of the digestive system in humans. (Y4 - Animals, including humans) ➤ Identify the different types of teeth in humans and their simple functions. Y4 - Animals, including humans)
Objectives to be taught	<u>Y6 Evolution and Inheritance Objectives</u> • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (<i>to be taught alongside Big Talk</i>) <u>Y6 Animals including Humans Objectives</u> • Describe the ways in which nutrients and water are transported within animals, including humans. • Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function



Core Knowledge	▪ To know and give examples of selective and cross breeding ▪ To know what genes and DNA are ▪ To know what adaptation and evolution is ▪ To know the three main parts of the circulatory system ▪ To know and be able to describe the jobs of the heart ▪ To know the jobs of blood vessels and blood ▪ To know how heart rate can be affected ▪ To know why regular exercise is important for the body ▪ To know the effect exercise and diet has on the body ▪ To know the impact of drugs and lifestyle on the way our body's function
Working Scientifically Statements	○ Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary ○ Identifying scientific evidence that has been used to support or refute ideas or arguments ○ Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where necessary ○ Using test results to make predictions to set up further comparative and fair tests ○ Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs ○ Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations ○ Use scientific vocabulary correctly and accurate
Vocabulary	circulation, heart, pulse, heartbeat, heart rate, lungs, breathing, blood vessels, blood, pump, transported, oxygenated, deoxygenated, arteries, veins, capillaries, chambers, plasma, platelets, white blood cells, red blood cells, drugs, alcohol, smoking, disease, calories, energy, transportation, waste, diet, side effect, evolve, adaptation, inherit, adaptive traits, inherited traits, biological parent, genes, DNA, breed, selective breeding, chromosomes



TAPS Assessment	Heart rate Poses – click here
Scientists	William Harvey - Doctor who discovered the nature of blood circulation and the function of the heart as a pump Santorio Santorio - Doctor who invented an instrument to measure pulse accurately using a pendulum and did the first scientific study of the metabolism Richard Doll - Doctor who proved the link between lung cancer and smoking Nettie Stevens - Geneticist who concluded that sex is inherited as a chromosomal factor and that males determine the gender of offspring Ruth Ella Moore - Bacteriologist who researched immunology, blood groups and tuberculosis) James Miranda Steuart Barry - Doctor - born Margaret Bulkley, who went to medical school by presenting as male and lived the rest of his life as a man – who became Inspector General of military hospitals and improved conditions for wounded soldiers, native inhabitants, and performed the first caesarean section in Africa
Suggested Resources	<u>CLEAPSS</u> How to dissect a heart How does my body change when I exercise?

