Kingston St Mary C of E Primary School Subject Map

Science

"Science is when we learn to investigate the world around us."

Curriculum Intent:

At Kingston, our vision is for everyone to achieve their emotional, physical and academic potential with an understanding of how to be good citizens of the wider world. Development in science changes lives and is vital to the world's future prosperity and an important part of developing pupils to become good citizens of the world. We intend to enthuse pupils to be curious about the world around them and develop their disciplinary and substantive knowledge through engaging units of work that explore the key elements of biology, chemistry and physics. Within these elements they will learn from the National Curriculum Programmes of Study covering: Plants; Animals, including Human; Materials; Seasonal Changes; Living Things and their Habitats; Rocks; States of Matter; Light; Forces & Magnets; Sound and Electricity.

All pupils will develop an understanding of what it means to be a scientist as they develop their disciplinary knowledge (questioning, predicting, testing, observing, measuring, recording data, interpreting, communicating, and evaluating). These strands of disciplinary knowledge will be weaved through our units of work detailing the substantive knowledge taken from National Curriculum Programmes of Study.

We will develop their scientific language, enabling them to talk about what they know, explain their findings and thoughts, and ask and answer questions.

WORKING SCIENTIFICALLY *(headings taken from Primary Science Teaching Trust, statements include the National Curriculum Working Scientifically statutory requirements)*

	EYFS	YEARS 1 AND 2 (by the end of Year 2)	YEARS 3 AND 4 (by the end of Year 4)	YEARS 5 AND 6 (by the end of Year 6)
Ask Questions	• Ask simple questions	• Ask simple questions. • Recognise that questions can be answered in different ways.	• Ask relevant questions. • Recognise that questions can be answered using the different types of scientific enquiry.	• Plan different types of scientific enquiry to answer questions. • Recognise and control variables where necessary
Make Predictions	• Guess what might happen	• Begin to make simple predictions.	• Make predictions based on my own ideas. • Use results from investigations to identify new questions and make new predictions based on my results.	• Use test results to make predictions to set up further comparatives and fair tests. And look for different causal relationships in my data
Set up Tests	• Choose resources to help.	• Perform simple tests.	• Set up simple practical enquiries, comparative and fair tests. • Perform the enquiries and tests I have set up.	• Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. • Suggest improvements to my method and give reasons.
Observe & Measure	• Make observations	• Observe closely and use observations and ideas to suggest answers to simple equipment. • Identifying and classifying - compare and sort objects (materials & living things) by their simple features.	• Make systematic and careful observations. • Take accurate measurements using standard units and a range of equipment.	• Take measurements, using a range of scientific equipment, with accuracy and precision. • Make decisions on which observations or measurements to take. • Take repeat measurements when appropriate.
Record Data	• Show ideas in drawings	• Gather and record data to help answer questions.	• Gather, record, classify and present data in a variety of ways to answer questions. • Record findings using simple scientific language, I a variety of ways (drawings, diagrams, keys, bar charts and tables).	• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs.
Interpret & Communicate Results	• Draw pictures • Talk about what they see	• Begin to communicate findings (with help) in a variety of ways – pictures and tables.	• Report on findings from enquiries in a variety of ways, including orally and written. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Use scientific evidence from my enquiry to answer questions or support my findings.	• Report and present findings from enquiries, including conclusions, causal relationships and explanations of results, choosing how best to present data.
Evaluate		• Begin to discuss my results using scientific language.	• Use results to draw simple conclusions and raise further questions. •	• Identify scientific evidence that has been used to report or refute ideas and arguments. • Use my results to identify when further tests and observations are needed.

KINGSTON ST MARY SCIENCE CURRICULUM KNOWLEDGE PROGRESSION

KINGSTON ST MARY CURRICULUM KNOWLEDGE

YEARS 1 & 2

YEAR A

MATERIALS UNIT 1.3 EVERYDAY MATERIALS

- Know the meaning of material – material is what an object is made from.
- Know that objects are made from different materials.
- Know the basic properties of everyday materials:
  - Materials: wood, plastic, glass, metal, water, rock.
  - Basic Properties: soft, stretchy, stiff, shiny, hard, rough, smooth, bendy, waterproof, adsorbent, transparent, opaque.
- Know what materials some common objects are made from.

ANIMALS INCLUDING HUMANS UNIT 1.2 (A)

- Know that human bodies have different parts (hair, head, ears, eyebrows, eyes, nose, mouth, chin, neck, shoulder, chest, elbow, arm, wrist, hand, tummy, knee, leg, ankle, foot) and where they are.
- Know that eyes allow us to see, ears allow us to hear, our tongue allows us to taste, our nose allows us to smell and our skin allows us to touch.

ANIMALS INCLUDING HUMANS UNIT 2.3 (A)

- Know what humans (and animals) need to survive (water, food, air, shelter).
- Know what humans need to keep healthy (exercise, a balanced diet and good hygiene).

LIVING THUNGS AND THEIR HABITATS UNIT Y2.1

- Know that some things are alive, some things are dead and some things have never been alive.
- Know that a habitat is the area an animal or plant lives in (woodland, rainforest, desert…).
- Know that the habitat animals and plants live in is suited to their needs.
- Know different types of habitat and some animals and plants that live in them (hot, cold, wet, dry).

YEAR B

MATERIALS UNIT Y2.4 USE OF EVERYDAY MATERIALS

- Know that different materials are suitable for different purposes and be able to select materials for different purposes: wood, plastic, glass, metal, water, rock, paper, card.
- Know that some materials allow some objects to change shapes (squashing, bending, twisting and stretching).

ANIMALS INCLUDING HUMANS UNIT 1.2 (A)

- Know that there are different types of animals with different features and structures (fish, amphibians, reptiles, birds, mammals).
- Know that carnivores eat meat, omnivores eat both meat and plants and herbivores eat plants only – name some animals in each category.

ANIMALS INCLUDING HUMANS UNIT 2.3 (B)

- Know that animals and humans produce offspring which grow into adults over time.

LIVING THUNGS AND THEIR HABITATS UNIT Y2.1

- Know that some things are alive, some things are dead and some things have never been alive.
- Know that a habitat is the area an animal or plant lives in (woodland, rainforest, desert…).
- Know that the habitat animals and plants live in is suited to their needs.
- Know different types of habitat and some animals and plants that live in them (hot, cold, wet, dry).
- Know that animals get food from plants and other animals (know a simple food chain).
- Know that a microhabitat is a very small area an animal lives in (under a rock, a clump of grass.

PLANTS UNIT 1.1

- Know that a plant is a living thing.
- Know some common plants and trees in our surroundings.
- Know that plants have stems, roots, leaves and flowers.
- Know that deciduous trees shed their leaves annually and evergreen trees keep their leaves all year round.
- Know that trees have trunks and branches.

PLANTS UNIT 2.2

YEARS 3 & 4

YEAR A

ANIMALS INCLUDING HUMANS UNIT Y3.2

- Know that animals and humans cannot make their own food, they get nutrition from what they eat.
- Know that different animals, including humans, need different diets (types and amounts of nutrients).
- Know that humans and some other animals have a skeletal system that supports and protects and a muscular system supports and enables movement.
- Know some parts of the human skeleton.
- Know some of the human muscles.

ANIMALS INCLUDING HUMANS UNIT Y4.2

- Know that our mouths break our food up and our stomach stores and churns food.
- Know that our small intestine release nutrients into our blood and our large intestine absorbs any water.
- Know that incisors are used for biting and cutting food, canines are used for tearing and grasping food, premolars are used for crushing and grinding food, molars are used for chewing and grinding food.
- Know the parts of food chains (producers, predators, prey) and be able to construct and interpret them.

MATERIALS UNIT Y4.3 STATES OF MATTER

- Know that solids hold their shape, liquids flow and pour and gases spread when not contained (they are often invisible).
- Know that some materials change state when heated or cooled – solid to liquid, liquid to solid, liquid to gas, gas to liquid.
- Know that condensation is the change from a vapour to a condensed state (solid or liquid) and evaporation is the change of a liquid to a gas.
- Know the part condensation and evaporation play in the water cycle.

FORCES AND MAGNETS UNIT Y3.5

- Know that a force is either a push or a pull.
- Know that different surfaces can change how objects move – speed up/slow down.
- Know that most forces need contact between two objects
- Know the magnetic forces can act at a distance - without direct contact (unlike other forces).
- Know magnets have two poles and these can attract or repel each other, depending which way they are facing.
- Know some everyday magnetic materials.

YEAR B

ROCKS UNIT Y3.3

- Know that rocks have different appearances and physical properties (sedimentary, metamorphic, igneous).
- Know that fossils are formed when things that have lived are trapped within rock.
- Know that soil is made from rocks and organic matter.

ELECTRICITY UNIT Y4.5

- Know that we use electricity to run a variety of everyday appliances (fridges, TVs, washing machines…).
- Know the basic parts of a simple series circuit (cells, wires, bulbs, switches, buzzers).
- Know that a bulb will only light if it is in a complete loop with a battery (power source).
- Know that a switch connects and disconnects a circuit, controlling a bulb.
- Know some common conductors of electricity and that metals are generally good conductors of electricity (silver, gold, aluminium).
- Know some common insulators of electricity (plastic, glass, rubber, wood).

LIGHT UNIT Y3.4

- Know that we need light (from a light source) to see and that dark is the absence of light.
- Know that light is reflected from some surfaces – shiny surfaces reflect light well.
- Know that light from the sun can be dangerous and we must protect our eyes.
- Know that shadows form when light is blocked by an object.
- Know that shadows change size when we change light sources, objects and distance.

SOUND UNIT Y4.4

- Know that sounds are made by vibrations.
- Know that we hear sounds when vibration makes the air around the object vibrate and the air vibrations enter our ears.
- Know that the pitch of a sound is affected by the features of the object that produced it (a tight drum skin gives a higher pitched sound than a loose drum skin).
- Know that the volume of a sound is determined by the strength of the vibration that produced it.
- Know the impact on a sound as the distance from the sound source increases (fainter)

PLANTS UNIT Y3.1

- Know the functions of different parts of a flowering plant:

YEARS 5 & 6

YEAR A

ELECTRICITY UNIT Y6.5

- Know that increasing cells or voltage increases the brightness of a lamp or volume of a buzzer.
- Know that we can give reasons for and explain why components function in different ways (brightness of bulbs, loudness of buzzers and the on/off switch).
- Know that circuits can be drawn using recognised symbols to represent the different components.
- Know the symbols for cell, bulb and switch.

LIGHT UNIT Y6.4

- Know that light travels in straight lines.
- Know that objects are seen because they give out or reflect light into the eye.
- Know that we see things because light travels from light sources to our eyes or from light sources to objects and then our eyes.
- Know that shadows keep the shape of the object because light travels in straight lines.

FORCES AND MAGNETS UNIT Y5.5

- Know that objects fall towards Earth because of gravity acting between the Earth and the falling objects.
- Know that air resistance acts in the opposite direction to an object moving through the air, slowing objects down.
- Know that water resistance acts in the opposite direction to an object moving through or across water , slowing objects down.
- Know that friction acts between two surfaces that are sliding, or trying to slide, across each other, slowing objects down.
- Know that mechanisms (levers, pulleys, gears) allow a smaller force to have a greater effect.
- Know how to measure the size of a force as part of an enquiry.

EARTH AND SPACE UNIT Y5.4

- Know that the Sun is a star at the centre of our solar system.
- Know that the Earth and other 8 planets (of our solar system) all rotate around the Sun and that the Earth rotates around the sun roughly once every 365 days.
- Know that the Moon orbits the Earth – one orbit takes approximately 28 days.
- Know that the Sun, Earth, and Moon are all roughly spherical.
- Know that Earth's rotation causes night and day and makes the sun appear to move across the sky.

LIVING THUNGS AND THEIR HABITATS UNIT Y5.1

YEAR B

MATERIALS UNIT Y5.3 PROPERTIES & CHANGES OF MATERIAL

- Know that we can classify materials based on their properties. (hardness, solubility, transparency, electrical & thermal conductivity, magnetism).
- Know that some materials dissolve in a liquid to form a solution and how to recover a substance from a solution.
- Know some methods of separating mixtures (filtering, sieving, evaporating) and how methods can be used for different substances.
- Know that dissolving, mixing, and changes of state are reversible changes.
- Know that some changes create new materials and that these changes are usually not reversible.

EVOLUTION AND INHERITANCE UNIT Y6.3

- Know that living things have changed over time.
- Know that fossils tell us about how living things have changed over time.
- Know that plants and animals are adapted to their environment and that these adaptations may lead to evolution.
- Recognise that the offspring of humans and living things are not identical to their parents.

ANIMALS INCLUDING HUMANS UNIT Y5.2

- Know that puberty is the process of the body moving from childhood to adulthood.

ANIMALS INCLUDING HUMANS UNIT Y6.2

- Know the main parts of the circulatory system and their function - heart, blood vessels, blood.
- Know the blood carries oxygen and nutrients around the body.
- Know that diet, exercise, drugs and lifestyle have an effect on the way bodies function, both positively and negatively.

○ Know that animals get food from plants and other animals (know a simple food chain). ○ Know that a microhabitat is a very small area an animal lives in (under a rock, a clump of grass.	○ Know that plants need water, light and a suitable temperature to grow. ○ Know that plants grow from seeds and bulbs. **SEASONAL CHANGES UNIT Y1.4** ○ Know that the year is split into four parts known as seasons. ○ Know that the seasons are autumn, winter, spring and summer. ○ Know that the weather changes through the seasons. (colder in the winter, warmer in the summer). ○ Know that days are longer in the summer and shorter in the winter. ○ Know that looking directly into the sun isn't safe, even with sunglasses.		○ Roots take up nutrients and water from the soil whilst also anchoring the plant. ○ Stem/trunk transport nutrients and water from the roots whilst also providing support. ○ Leaves make food for the plant. ○ Flowers allow plants to reproduce. ○ Know that plants need water, nutrients, sunlight, temperature, space and time to grow and that different plants need different amounts of these things. **LIVING THUNGS AND THEIR HABITATS UNIT Y4.1** ○ Know the main groupings for plants (flowering and non-flowering) and animals (vertebrates including fish amphibians, reptiles, birds and mammals, and invertebrates including slugs, worms, spiders and insects)and be able sort living things into them. ○ Know how to use a classification key and be able to group living things using one. ○ Know that environments can change and that this can impact living things positively and negatively.	○ Know that different animals have different life cycles. ○ Know the stages of different life cycles: mammal (embryo, baby adult, gestation), amphibian (egg, embryo, young, adult), insect (egg, larva, pupa, adult) and bird (egg, hatchling, young, adult). ○ Know that reproduction is when living things create other living things. ○ Know the general processes of reproduction in plants, both asexual and sexual (pollination, fertilisation, dispersal). ○ Know the general processes of sexual reproduction in animals (fertilisation, gestation/incubation, birth). **LIVING THUNGS AND THEIR HABITATS UNIT Y6.1** ○ Know that living things can be classified into broad groups based on their characteristics – similarities and differences (micro-organisms, plants and animals). ○ Know that we can explain why and how things are classified, using specific characteristics to help us. **ANIMALS INCLUDING HUMANS UNIT Y5.2** ○ Know the stages of growth and development from young to old age in humans (infancy, toddler, childhood, adolescence (puberty), adulthood).	

EYFS - RECEPTION

PLANTS	ANIMALS INCLUDING HUMANS	LIVING THINGS AND THEIR HABITATS	SEASONS	MATERIALS	LIGHT
○ Know that plants have stems, roots, leaves and flowers. ○ Know that plants need water and light to grow. ○ Know how some plants and trees change in the seasons (see seasonal changes).	○ Know how they have changed from baby to now. ○ Know about their senses – see, hear and touch. ○ Know about the life cycle of a butterfly – caterpillar (chrysalis) butterfly.	○ Know some animals that live in our school environment Know some animals that live on a farm. ○ Know some animals that live in woodland areas. ○ Know some animals that live in cold places. ○ Know some animals that live in hot places. ○ Know some animals that live by and in the sea.	○ Know that there are four seasons – summer, autumn, winter and spring. ○ Know how the weather can change with seasons - from autumn to winter, winter to summer. ○ Know that some trees change with the seasons - their leaves fall off in the autumn and they grow new ones in spring	○ Know some objects that float and some objects that sink. ○ I know that water becomes ice when it freezes and ice melt to water.	○ Know how to make a shadow with a torch and an object.