Year Group	Term 1 World Space Week	Term 2	Term 3	Term 4 British science week	Term 5	Term 6
Year 1 Owls	Everyday materials Seasonal changes		Animals including humans 1 Seasonal changes		Plants Seasonal changes	
Year 2/3 Eagles A (2025-2026)	Forces and Magnets		Uses of everyday materials		Plants (2 and 3)	
Year 2/3 Eagles B (2024-2025)	Living things and their habitats		Rocks	Light	Animals including humans (2 and 3)	
Year 4/5 Tigers A (2025-2026)	Living things and their habitats 4		States of matter	Electricity	Sound	Living things and their habitats 5
Year 4/5 Tigers B (2024-2025)	Animals including humans 4	Earth and Space	Properties of Change and Materials	Forces	Animals including humans 5	
Year 6 Lions	Evolution and Inheritance	Living things and their habitats	Electricity	Light	Animals Including Humans	

Year 1

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Everyday materials** **Seasonal Changes 1**		**Animals, including humans** **Seasonal changes 2**		**Plants** **Seasonal Changes 3**	
Planning and carrying out practical enquiries	Know that science is about asking questions. Ask and suggest answers to one key question: What properties does the material have? Ask a simple question: What material is best at absorbing water? Perform a simple test to find out which material is the most waterproof by comparing.		Carry out activities to identify which body part is used for each sense		Plant seeds and observe growth over time, drawing the different stages of growth that they see	
Observations	Make observations about living things in the local area in each season. Observe changes and link them to the seasons. Using observation of the different materials, suggest answers for their uses. Use observations to suggest what material is best at absorbing water?		Learn how scientists find answers by observing. Pupils use magnifying glasses to make closer observations using pictures of animals, looking for detail.		Know that by observing living things over time, we can monitor changes. Identify and describe the roots of a plant and the detail of leaves by observing closely using simple equipment – magnifying glasses/hand lenses. Identify similarities and differences. Use an identification chart to name plants we see in the local area.	
Sorting, grouping, identifying, classifying	Know how to sort objects according to the material they are made from.		Identify what is the same between animal groups and use this to sort mammals, reptiles, amphibians and birds, carnivores, herbivores and omnivores into the correct groups based on their common features		Classify plants as garden plants, wild plants, trees or weeds. Identify and classify common trees according to their physical features: leaves, bark, branches, trunk. Choose ways to sort leaves.	
Using equipment and taking measurements	Use simple equipment for measurement – a teaspoon to measure water.				Use magnifying glasses/hand lenses to observe and describe features of plants. Use string to measure trunks and then order them according to size.	
Collecting, recording, presenting data	*Measure the water gathered from each material and present this in a pictogram.*				Gather data about the thickness of tree trunks and compare and contrast to understand variation.	
Analysing and drawing conclusions	Draw conclusions about the characteristics of each season.		Draw up concluding statements based on investigations e.g. we use our ears to hear.			

	Collectively draw a conclusion about which material is best for keeping us dry.	Identify similarities and differences between animals and groups.	
Creating models			
Secondary sources		Pupils use books to identify whether animals have 5 senses.	
Learning from scientists	Know that scientists ask questions.	Scientists compare things such as the human body to find out what is different and what are common characteristics of living things Know that scientists understand the world by carrying out tests to see if things are true or find out answers e.g. which body part is required for each sense Know that scientists classify animals into different groups to understand how they are related to each other and to understand them e.g. into mammals, fish, birds. Scientists think about what is the same and what is different between different things. Scientists group living things according to their characteristics.	

Year 2

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Living things and their habitats**		**Uses of everyday materials**	**Animals, including humans**	**Plants**	
Planning and carrying out practical enquiries			Gather and record data in a simple test to help answer questions – finding out which material makes a ball bounce higher. Independently identify why it needs to be a fair test and how to ensure this. Use their observations and experimentation to suggest answers to questions – can solid objects change shape? Pupils make a prediction about which fabric they think will be stretchiest and collectively plan how to test this.	Pupils begin to suggest ways we could find out about how humans grow, using their observations. Pupils identify activities to carry out to help us find out which make us 'puff most'	Begin to develop the idea that we should keep some things the same when planning an experiment. Begin to make predictions. Observe seed germination closely; set up a simple test/ investigation following a model. Discuss the method together and have it scaffolded to enable them to plan.	
Observations	Use simple equipment (magnifying glasses) to observe closely the animals we find in local microhabitats. Observe the light, plants and dryness of the soil in different habitats.			Use observation to identify change and growth and order life cycles in response. Use knowledge of what animals need to survive and explore the school grounds, using observation to identify where animals could access food, water and shelter	Use observations and ideas (about seeds and bulbs) to suggest answers to questions. Take weekly photos to monitor change over time. See teachers modelling using observations to ask questions about what we see. Based on observations over time, predict what might happen to the plants in the future.	
Sorting, grouping, identifying, classifying	Identify and classify living and non-living things according to whether they are alive or dead or have never been alive.		Identify and classify the variety of uses of different materials	Using knowledge learnt about food, pupils sort healthy and		

	Sort animals and plants into food chains.	based on their properties. Identifying and classifying, using observations and ideas to suggest answers to questions – use knowledge of materials to select the correct one for a given purpose.	unhealthy food intake based on the impact on our bodies	
Using equipment and taking measurements	Use simple equipment (magnifying glasses) to observe closely the animals we find in local microhabitats.	Use tape or wool on the wall to measure the height of bounces. Use a metre stick to measure the stretchiness of fabric. Use weights to test them.	Accurately use rulers and tape measures to measure the lengths of arms and legs in cm Use stop watches to count the number of breaths in a minute	
Carrying out practical enquiries		Compare the suitability of a range of everyday materials.	Pupils carry out exercise for one minute, use a stopwatch and calculate puffs on a piece of paper for one minute to identify which makes us breathe harder.	Perform a simple comparative test to see whether seeds need water to grow. Carry out a simple comparative test to show that plants need water and light to stay healthy.
Collecting, recording, presenting data		Record results in a table and present them in a bar chart. Record data from observations in a table to help answer questions.	Record the length of arms and legs in a table using correct units of measure Pupils use time to record in a table the number of breaths taken in the minute after different physical activities	Keep a seed diary to track changes.
Analysing, explaining relationships and drawing conclusions	Observe the conditions in different microhabitats and draw conclusions about what minibeast need to survive	Draw conclusions against the initial question – which material is best for a bouncy ball?	Identify whether arms and legs get longer as we get older by comparing measurements	Suggest answers to questions (What does a seed need to grow?).

	Draw conclusions about what different plants need to survive.	In pairs draw a conclusion about whether a solid can change shape.	Looking at the number of breaths taken, pupils to identify which exercise made them work hardest	
Creating models	Create food chain diagrams			
Secondary sources	Use books and the internet to learn about different, unfamiliar habitats around the world and the animals that live there. Gather information from a range of sources and record the most useful and appropriate information for future reference.		Enq 1: Learn about life cycles of animals from videos and books chosen by the teacher	Enq 5: Ask simple questions and know that information can be found from secondary sources such as books. Use these to find out about plant life.
Learning from scientists	Scientists explore the world around them	Know that when scientists plan experiments, they try to keep some things the same.	Enq 2: Scientists might carry out tests using measurements to see how things change and grow Enq 5: Scientists have helped us learn what we should eat by sorting foods into groups with common benefits or negative impacts Enq 5: Know that scientists investigate food so that they can educate people about healthy choices.	Enq 1: Scientists record progress

By the end of Key Stage 1 pupils at Littlebourne will be curious, practical young scientists who can observe the world around them, ask simple scientific questions and use a range of enquiry methods to find answers. They will retain key substantive knowledge from the programme (everyday materials, plants, animals including humans, seasonal changes, habitats and simple uses of everyday materials) and be able to use the disciplinary skills of working scientifically (observing, measuring with simple equipment, sorting/classifying, carrying out simple comparative tests, recording and communicating findings). Knowledge will be taught through first-hand practical activities, linked to local contexts (Littlebourne, school grounds) and vocabulary explicitly taught for long-term retrieval.

A. Substantive knowledge (what pupils will know and remember)

1. Plants and habitats
    - Know the basic structure of common plants (roots, stem, leaves, flowers) and their simple needs for growth (water, light, suitable temperature).
    - Recognise that plants and animals are found in different habitats and know a few local examples (school grounds, field, beach at Reculver) and contrasting habitats (rainforest, polar) introduced earlier.
2. Animals including humans
    - Know common animal groups (mammals, birds, fish, amphibians, reptiles—age-appropriate names) and basic needs for survival (food, water, shelter).
    - Know basic human life-processes relevant to KS1: growth from baby to adult, simple hygiene and healthy eating vocabulary.
3. Everyday materials and their uses
    - Identify and name everyday materials (wood, metal, plastic, glass, fabric, rock) and describe simple properties (hard/soft, waterproof/absorbent, flexible/rigid).
    - Know appropriate uses of materials (e.g. waterproof for umbrellas) and recognise that some materials are chosen for specific properties.
4. Seasonal changes and weather

- Recognise and describe seasonal changes across the year in the local area (temperature, daylight, clothing, plant life, animal behaviour).
- Record simple weather observations and explain how seasons affect daily life.

5. Forces and simple physical phenomena (introductory)
    - (Where taught in Year 2/3 mixed classes) Know simple effects of push and pull and that magnets attract some materials.

B. Disciplinary knowledge (working scientifically — skills and ways of thinking)

Pupils will routinely practise and be assessed on these disciplinary skills across units:

1. Asking simple questions
    - Pose questions such as “Which soil helps beans grow best?” or “Which material keeps my house dry?” and suggest how they might be answered.
2. Observing and measuring
    - Observe carefully using simple equipment (hand lens, ruler, thermometer where appropriate), and take repeated measurements (growth, temperature, count of animals) over time.
3. Comparative and fair testing
    - Plan and carry out basic comparative tests with support (change one variable, keep others similar), e.g. which material is most absorbent.
4. Identifying, grouping and classifying
    - Sort plants/animals/materials by observable features and explain the basis for grouping.
5. Recording and presenting

- Record findings using simple labelled drawings, tallies, tables, pictograms and block charts; use these to answer the original question.

6. Using evidence to suggest answers
    - Use data and observations to make simple conclusions and say whether the evidence supports their idea.

Year 3

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Forces and magnets**		**Light**	**Rocks**	**Plants**	**Animals, including humans**
Planning and carrying out practical enquiries	Understand why tests should be fair and control all but one variable (the surface the car travels on). Predict whether two magnets will attract or repel each other, depending on which poles are facing. Independently set up an investigation when the method has been discussed collectively. Carry out a simple investigation and record results (bringing a range of materials near a magnet to test magnetism)		Set up a simple comparative test to see which materials can be seen in low light. Collectively set up a simple comparative and fair test to see how shadows change over the course of the day.	With support, carry out a comparative test to find out which rocks are permeable (absorb water) and which rocks are impermeable (do not absorb water).	Set up simple practical enquiries, comparative and fair tests to find out how quickly the roots of a seed grow. Set up a simple practical enquiry to explore the different requirements of plants to live and grow. Set up simple practical inquiries to show water transport through a stem, marking the changes on a jar. Set up a comparative test to see how plants in different situations grow.	Make predictions about whether doing more exercise makes our muscles stronger Carry out a pattern seeking investigation to find out if the amount of physical activity we do makes us stronger Ensure that a test is fair by ensuring the same activities are carried out by each person
Observations	Use observation to identify forces being used and to identify the effect these forces have on objects. Make systematic observations, testing the strength of magnetism from different distances.		Make systematic and careful observations to identify which objects can be seen in different lighting conditions. Make careful observations when using mirrors, to learn how light behaves when it is reflected .	Make careful observations about permeability Use observation and touch to identify types of soil.	Make systematic and careful observations of seeds to look for properties that will help us to understand how they are dispersed. Make systematic and careful observations and, where appropriate, use a	Watch videos to observe similarities and differences in the movement of animals with skeletons and animals without

		Use observation (how does the height of light change shadows), tables of data (how does distance affect shadow size) and comparison (which objects create darker shadows) to answer questions.		range of equipment (e.g. microscope). Make systematic and careful observations of the plants each week for changes in condition. Make systematic and careful observations of flowers, recording colours in a table.	
Sorting, grouping, identifying, classifying	Sort into groups objects that are attracted to magnets and those that are not.		Classify rocks according to whether they have grains, crystals or layers	Sort seeds into groups according to dispersal method.	Organise foods into their food groups and use this knowledge to model a balanced diet
Using equipment and taking measurements	Use measuring tape to measure the distance the cars travel. Measure the strength of a magnet by working out how many sheets of paper need to be in the way before a paperclip is no longer attracted.	Take systematic and accurate measurements of length in cm, to measure how shadows change in size. Make careful observations of how position and size of shadows changes and take accurate measurements using standard units of the length.	Make careful observations of rocks using a hand lens or magnifying glass. Use a stopwatch or second hand on a clock to time the length the rocks are in the water	Use a ruler and measure in mm how much the root of a seed grows over time. Use measurements on a jar to calculate the growth rate. Measure different changes e.g. height and number of leaves over time.	
Collecting, recording, presenting data	Record results in a table and use this data to draw conclusions about which surface slowed down the moving object the most. Carry out a simple investigation, record results in a table and use these to present data in a bar chart.	Record findings in a table. Write a written explanation of the learning about light and reflection.	Record findings based on a model and using the scientific language.	Report on their findings and draw simple conclusions. Gather, record and presenting data in a graph that shows the	Present data in a scattergram to show the relationship between strength and the amount of physical activity pupils do

		Use a simple diagram to show how shadows are formed. Use an appropriate graph/chart to show how shadows change across a day. Identify and explain differences, similarities or changes related to simple scientific ideas and processes (how and why shadows change)		frequency of different colours in the plants.	
Analysing, explaining relationships and drawing conclusions	Record results in a table and use this data to draw conclusions about which surface slowed down the moving object the most. Discuss the factors that might influence magnet strength, such as the size, shape, and material of the magnet.	Report on findings and draw a conclusion about which materials are more visible in low light. Use results to draw simple conclusions about why distance and height changes the size of shadows.		Use results to draw simple conclusions and make predictions e.g. whyich colours are most common and why might that be?	Look for patterns in a scattergram to draw a conclusion about whether activity levels impacts muscle strength Monitor the effect of different liquids on teeth
Creating models			Create a model of a fossil to help understand the process of fossilisation		Create a model of the muscles in the arm to show how they contract and retract Create a model of teeth in different liquids to test the impact and draw conclusions
Secondary sources		Report findings about keeping eyes safe in the sun.	Use video to learn how rocks were formed. Record findings using simple scientific language,		Know that secondary sources can be used to find out information when we cannot carry out an experiment –

			drawings and labelled diagrams. Use pictures to understand a process e.g. different types of soil.		research the diets of animals
Learning from scientists		Over time, processes modernise and change e.g. from Thomas Edison's lightbulb to Isamu Akasaki's LEDs	There is a body of scientists who share work as Mary Anning did. Female scientists have not always been respected.		Scientists sort and group living things to identify common characteristics. This helps us to understand them and identify new species that are found

Year 4

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Sound**		**States of Matter**	**Electricity**	**Animals, including humans**	**Living things and their habitats**
Planning and carrying out enquiries	Set up a comparative test to identify how the strength of vibrations affect the volume of a sound. Independently choose control variables. Carry out an experiment three times to increase reliability.		explore the effect of temperature on some substances by investigating the temperature at which a range of solids change state and become liquids. Set up a simple practical enquiry, ensuring it is a fair test, to find out the answer to whether all liquids can change state to become a solid. Increasingly give pupils opportunities to answer, 'How can we find this. Set up comparative and fair tests to determine the effect of temperature on rates of evaporation. out?'	Pupils record the method and table they are going to use. Know how to be safe around electricity. Set up a simple, practical investigation – using all the components to light a bulb. Investigate questions e.g. does the order of components matter? Set up a comparative test to identify which materials make good electrical conductors and which make good electrical insulators.	Set up an experiment over time to compare the impact of different liquids on teeth, making regular observations Ensure fair tests by putting egg shells in the same place Make predictions about how our activity level affects our muscle strength	
Observations	Make careful observations about how we see, hear and feel sound (vibrations).			Make systematic and careful observations about how appliances convert electrical energy.	Over the course of a week, observe egg shell in different liquids to see the impact of drinks on our teeth Observe the teeth of animals to make	Use classification diagrams and careful observation to group living things according to their characteristics. Identify from observation and reading how

				judgements about the diet Explore the local area, looking for plants and wildlife that may form a food chain	environments change over time.
Sorting, grouping, identifying, classifying		Group and classify a variety of different materials according to whether they are a solid, liquid or gas.	Sort devices according to whether they use mains or battery electricity	Group animals with or without skeletons Sort living things according to whether they are producers or consumers in a food chain Categorise changes according to whether they happen to males or females during puberty	Reflect on why classification is a process followed in the world of science. Use dichotomous keys to identify living things and draw conclusions about what they are.
Using equipment and taking measurements	Use data loggers with teacher support to measure the sound. Use a ranking system to compare and measure e.g. rank the volume from quietest to loudest.	Make systematic and careful observations and take accurate measurements using standard units, using a range of equipment: thermometers or data loggers to measure the temperature of melting points. Make systematic and careful observations and take accurate measurements using standard units by measuring the amount of water in ml or the space taken up by the water in cm.	Use scientific language and knowledge of circuits to design diagrams and create functional objects.		Use observation and tools such as magnifying glasses to identify living things. Ensure to leave habitats as they were found.

Collecting, recording, presenting data	Independently respond to lesson question with lengthier responses.	Gather and record data in a table, using the correct unit of measure. Begin to choose an appropriate way to gather and record data to help in answering questions and draw simple conclusions Add diagrams to written explanations to explain processes e.g. whether all liquids can become solids. Gather and record data in a table and line graph to show changes in evaporation rates over time. Present results to the class.		Enq 5: Use process diagrams to show the transfer of energy in a food chain	Produce a guidebook to inform people about the local area and threats it faces.
Analysing, explaining relationships and drawing conclusions	Investigate how the strength of vibrations affect the volume of a sound. Use these results to draw simple conclusions, make links between vibrations and sounds and identify patterns, Use scientific language about pitch and sound waves to explain how to change the pitch of a sound. Draw conclusions about what affects the pitch of a sound. Find patterns between the pitch of a sound and features of the object that produced it.	Present simple scientific definitions for a solid, liquid and gas. Report on findings from enquiries in the form of a written conclusion. Use results to draw simple conclusions and raise further question e.g. What further experiments could be done to	Enq 3: Use scientific evidence to answer questions e.g. how do switches work? Enq 4: Use results from comparative tests to draw simple conclusions, make links and identify patterns		Explore the local area, using knowledge of pollution and urbanisation to identify issues that need resolving. Devise a plan of action to protect living things in the local area.

		explore the changing state of these items?			
Creating models	Create models of headphones to identify materials which act as the best insulators for sound. Scientists may create prototypes like these before creating a final product.	Create a model of the water cycle to understand how condensation forms.		Enq 3: Create a model of the stomach to identify the properties that a stomach needs to carry out its role Enq 4: Create a model of the digestive system to explain and describe a process – digestive system	
Secondary sources	Understand that there are science museums around the world which provide us with valuable learning opportunities. These museums conduct research but also share with us existing findings.				Identify from observation and reading how environments change over time. Use research and findings from the scientific community to understand how humans are negatively impacting the planet.
Learning from scientists			Enq 1: Identify scientific evidence that has been used to support or refute ideas or arguments (Erik Bystrup). Enq 1: Identify how science helps engineers improve the world. Enq 2: Scientists use their knowledge and experience to form hypotheses which they then test out.	Enq 4: Know that scientists often create models to show or explore how something works Scientists make predictions about what they think will happen based on their experiences, knowledge or observations Enq 6: Scientists think about the impact environmental	Scientists are often committed to protecting the planet from the danger posed by human behaviour.

			Enq 4: Learn how scientists have explored, sought proof and used electricity (Benjamin Franklin) and how this has helped people (attracting lightning).	changes will have on living things	

Year 5

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Animals including humans**	**Earth and space**	**Forces**		**Properties and changes of materials**	**Living things and their habitats**
Planning and carrying out enquiries	Pupils to devise a comparative enquiry question to find out how people change as they get older Pupils to plan their own experiment about how people change as they get older – write the method and design a table for recording Carry out a pattern seeking investigation to identify relationships between mass of animals and their gestation period	Plan a pattern-seeking investigation to identify how shadows change throughout the day.	Plan a scientific enquiry to answer a question about friction. Decide the variables to be controlled. Plan a scientific enquiry, making choices about the variables to be changed to test the impact of air resistance. Make independent decisions about repeat readings. Use knowledge of water resistance to make predictions. Plan a scientific enquiry to test the effects of shape and surface area on water resistance.		Decide how to measure which cup is the best thermal insulator – how will it be measured? What will be used? What method will be followed? Use previous test results (from enquiry 1) to make a prediction to set up further fair tests. Plan an enquiry (fair test) answer a question to find thermal conductors and insulators, including recognising and controlling variables.	Ask questions about the local area and plan different types of scientific enquiries to answer them, including recognising and controlling variables where necessary Plan an enquiry to monitor and observe which plants flower at different times of the year. Plan a scientific enquiry to answer questions about which parts of a plant will lead to asexual reproduction. Form a hypothesis and then try to grow new plants from different parts of the parent plant, using knowledge of how plants grow and reproduce. Control variables e.g. amount of water and location of pots.
Using equipment and		Take accurate measurements and record results in a table of their own design.	Take accurate measurements using a force-meter. Calculate speed of a fall using a stopwatch. Pupils take readings from newton-meters.		take measurements using a thermometer with increasing accuracy.	

taking measurements					
Collecting, recording, presenting data	Carry out an interview and record and summarise answers about how we change as we grow Take measurements to show how people grow as they age. Present this in a line graph, identify patterns and draw conclusions about how we change as we grow	Present data in a line graph and identify the pattern.	Use scientific diagrams to show the direction of forces.	Report and present findings from enquiries, including conclusions, in oral and written forms. Report using first-hand observations and findings from demonstrations in written forms.	Label diagrams using a range of scientific language related to reproduction in plants. Choose how to record findings – this does not need to be in a table and could be photos, diagrams, measurements.
Analysing, explaining relationships and drawing conclusions	Use venn diagrams to show how some changes in puberty are the same and some are different for males and females Experiments can be used to create a general rule e.g. bigger animals have a longer gestation period Pupils to think about how the evidence that has been collected might be useful to scientists – what can they find out from this data? Pupils will come up with rules based on questions about their data e.g. can you estimate the gestation period of these animals, is there a	Draw conclusions from this pattern and link this to historic views of the movement of the Earth and sun.	Measure speed and identify relationships between water resistance and shape. Explain causal relationships in the components of levers, gears and pulleys.	Read an existing graph that shows cooling speeds and interpret.	Compare and contrast life cycles of different animals to identify similarities and differences. Devise a conclusion about asexual reproduction in plants.

	relationship between the size of the animal and the number of offspring it has?				
Creating models		Create a model to understand the movement of Earth in relation to the sun and moon. Create a to-scale model of the Solar System to understand distances and sizes. Use a model to understand the movement of the Earth			Build a classification diagram
Secondary sources	Interview people at different stages of life to find out about changes that we experience as we grow Enq 6: Pupils take more ownership of their research into animal gestation period	Use secondary sources to find out information about planets in the solar system.			
Learning from scientists	Enq 1: Know that scientists might use interviews to find out information from people who have experienced it Enq 3: Know that scientists ask questions to prove hypotheses Enq 4: Know that scientists classify to help them understand	Identify scientific evidence that has been used to support or refute ideas or arguments e.g. heliocentric universe.	Identify the scientific evidence that has been used to support or refute ideas about gravity (*Galileo Galilei and Isaac Newton* *Identify the scientific evidence that has been used to support or refute ideas (Elon Musk)*		Understand the considerations when working as a naturalist, e.g. taking care of the area whilst researching.

	how living things work and so knowledge can be applied to unknowns Enq 5: Scientists try to come up with rules or generalisations based on finding patterns from lots of examples. This helps them to make estimations and assumptions about unknowns				

Year 6

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
UNIT	**Living things and their habitats**	**Evolution and inheritance**	**Electricity**	**Light**	**Animals, including humans**	
Planning and carrying out enquiries	Use prior knowledge to select three locations where they think mould will spread fastest. Set up an experiment to prove this.		Recognise which variable to control in a fair test and carry out a fair test to see how the number of cells in a circuit affects the brightness. Devise a question based on their own experience e.g. what else impacts the brightness of a bulb? Plan their own fair test to answer the question. Come up with their own questions. Make predictions about what will happen in a range of circuit set-ups and test the accuracy of these. Plan a specific scientific enquiry, which recognises and controls variables, to make a working device.	Plan a scientific enquiry to answer the question: Is a shadow always the same shape as the object that casts it? Prove hypotheses with evidence.	Plan a pattern-seeking experiment to explore the relationship between the types of exercise we can do and heart rate Identify the variables that need to be controlled Write a hypothesis Plan a method independently for how they will keep this a fair test, how they will measure and record	
Observations	Use classification charts in the school grounds/local area to look for living things.	Observe closely to identify inherited characteristics in a range of living things.				

	Observe the habitat of living things, making notes. Observe adaptations to different conditions.	Observe and raise questions about how local plants are adapted to their environment; if possible, use microscopes to look at roots.			
Sorting, grouping, identifying, classifying	Use classification keys. Use prior knowledge from all previous year groups to classify animals in ways of their choosing. Create own classification charts. Use and compare different systems e.g. classification chart vs dichotomous key				
Using equipment and taking measurements		Use microscopes to look at roots.	Use a data logger to measure the brightness of a bulb. Create a scale to compare light according to brightness. Reflect on accuracy of measuring methods. Be confident in the reliability of results and explain why.	Take measurements of angles of incidence and reflection, using a protractor, with increasing accuracy and precision, taking repeat readings when appropriate	Use a heart monitor/pulse meter to take measurements Monitor sleep over time in a diary.
Carrying out practical enquiries					

Collecting, recording, presenting data			Record and represent findings, including drawing conclusions. Record with increasing complexity using scientific diagrams and labels the different ways to affect the function of a component in a circuit. Plan and design own table for results.	Record results of light model using scientific diagrams and labels. Report findings and share conclusions. Report and present findings about the refraction of light (as per pencil and glass demonstration) being an example of scientific phenomenon.	Use scientific diagrams and annotate them to explain a process – the circulatory system Create and annotate the process of the human circulatory system Present findings in a graph that pupils consider appropriate to show the relationship between exercise and heart rate
Analysing, explaining relationships and drawing conclusions		Analyse how cross/selective breeding has led to animals with certain inherited characteristics. Consider the advantages and disadvantages of selective breeding. Analyse how different circumstances may lead to natural selection and evolution. Use and apply knowledge of climate change to consider what this means for the adaptation of living things. Compare the adaptations of animals in different habitats.	Ensure results are accurate and reliable. Report findings and provide clear explanations.	Report and present findings from enquiries, including conclusions about the angles of incidence and reflection	Draw conclusions and suggest further investigations Investigate nutritional values on packaging and draw conclusions about the health benefits of different foods Draw conclusions about the impact of sleep on our lives

Creating models			Create circuits of increasing complexity and represent them using diagrams, annotated with scientific diagrams and labels.		Build on prior understanding of how scientists use models by creating a model of blood to show the proportions of component parts
Learning from scientists	Scientists classify living things to help explain their relationships to each other and to help us learn things about newly discovered organisms by noting their similarities to known organisms. Know that Carl Linnaeus' taxonomy was significant and has an impact today. Botanists study plants. There is a body of work taking place now around how plants across the world are responding to climate change. Discuss how people consider whether the work of scientists is significant e.g. Joseph Lister – what are the criteria for significance?	Understand how scientists examine fossils to find out about the evolution of different species. Know how Charles Darwin conducted scientific studies to inform his theory of evolution. Use a range of fossils and/or images of fossils over time and both identify changes and observe changes identified by scientists.	Know how scientists have developed ideas over time and improved efficiency (Nikolas Tesla). Understand why scientists use symbols i.e. international understanding, efficiency Identify how scientists build on the work of other scientists (M. Stanley Whittingham designing lithium-ion batteries).	Identify scientific evidence that has been used to support or refute ideas or arguments – Isaac Newton's discovery about the colours of light.	Know that scientists can challenge discoveries from other scientists and can prove these in a variety of ways (William Harvey) Know some ways in which scientists experimented on living things before technology developed (William Harvey) Learn about scientific evidence that has been used to refute ideas (William Harvey's work on the circulatory system)

By the end of Key Stage 2 pupils at Littlebourne will be scientifically literate: they will retain connected substantive knowledge across biology, chemistry and physics; be confident using the full range of "working scientifically" enquiries (observing over time, pattern seeking, comparative/fair tests, classification and use of secondary sources); and be able to select and carry out an appropriate enquiry to answer a question, record and analyse data and give evidence-based explanations. Knowledge and skills will be rooted in classroom practical work and local fieldwork (Littlebourne grounds, Reculver, Canterbury) and deliberately sequenced so pupils can apply what they remember to new problems (e.g. local flood risk, biodiversity, energy use).

A. Substantive knowledge (what pupils will know and remember)

Organised by broad National Curriculum topic coverage taught in KS2 units at Littlebourne.

1. Living things and their habitats
    - Describe life cycles and reproduction for a range of organisms (plants, insects, amphibians where taught) and explain the basic needs for survival and growth.
    - Know key concepts of classification: grouping organisms by observable characteristics and using simple keys.
    - Understand interdependence in ecosystems and the causes and consequences of biodiversity loss locally and globally (habitat change, land use, pollution).
2. Animals including humans
    - Know the main stages of human development (including basic puberty awareness where appropriate in upper KS2), the components of a healthy diet and the function of the major organ systems (digestive, circulatory and respiratory at an age-appropriate level).
    - Explain how nutrients and water are transported in plants and animals.
3. Plants
    - Explain photosynthesis at a simple conceptual level (plants use light to make food), describe how water and nutrients move through plants and link structure to function (roots, stems, leaves, flowers).

- Understand factors that affect plant growth (light, water, temperature, nutrients) and apply this in investigations.

4. Rocks, soils and Earth science (including Earth & Space where taught)
    - Know types of rocks and soils, their formation and uses; explain fossils as evidence of past life.
    - Explain Earth–Sun relationships that produce day/night and seasons; know basic planetary order and simple ideas about gravity and orbits.
5. Forces and magnets; electricity; light and sound
    - Explain how forces (push/pull, friction, gravity) affect motion; describe balanced/unbalanced forces and their effects.
    - Understand magnetism: poles, attraction/repulsion and everyday uses.
    - Explain simple electrical circuits (components, conductors/insulators) and relate to safety.
    - Describe how light travels, how we see (shadows, reflection) and how sounds are produced and travel.
6. Properties and changes of materials
    - Describe solids, liquids and gases and reversible/irreversible changes (melting, dissolving, burning, chemical reactions in age-appropriate terms).
    - Relate material properties to their uses and simple separation techniques.

B. Disciplinary knowledge (working scientifically — skills and ways of thinking)

Pupils will be able to routinely demonstrate and be assessed on the following:

1. Questioning and planning

- Formulate precise scientific questions and select an enquiry type (pattern seeking, comparative/fair test, observation over time, classification, secondary-source investigation) appropriate to the question.

2. Practical competence and measurement
    - Use a wider range of apparatus accurately (thermometer, data logger/stopwatch where available, metre ruler, force meters, simple circuit components) and record units and uncertainties.
    - Take repeated measures, use appropriate sampling and begin to control variables in fair tests.
3. Data handling, presentation and interpretation
    - Present data in appropriate forms: tables, bar/line/scatter graphs, labelled diagrams, and simple statistical ideas (range, average where appropriate).
    - Analyse data to identify patterns, anomalies and causal links; use evidence to support or refute hypotheses.
4. Source evaluation and modelling
    - Use secondary sources (texts, maps, web resources) critically and combine with practical results to build explanations; construct simple models to explain phenomena.
5. Explanation and argument
    - Construct reasoned, evidence-based explanations (cause → effect) using scientific vocabulary and link explanations across scales (cell/organism/environment where relevant).