Orchard Primary School - Progression of Knowledge & Skills in Scientific Enquiry

Skill	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Expected Standard			
Questioning and enquiring - planning	• With prompting, ask a few simple questions about the world around us.	• Ask simple questions about the world around them. • Begin to recognise that they can be answered in different ways (diifferent types of enquiry including - observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative tests, finding things out from secondary sources).	• Ask questions about the world around them. • Recognise that they can be answered in different ways (different types of enquiry including - observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative tests, finding things out from secondary sources).	• Ask some relevant questions and use different types of scientific enquiries to answer them. • Begin to explore everyday phenomena and the relationships between living things and familiar environments. • Begin to develop ideas about functions, relationships and interactions. • Begin to raise their own questions about the world around them. • Begin to make some decisions about which types of enquiry will be the best way of answering questions including observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative and fair tests, finding things out using secondary sources.	• Ask relevant questions and use different types of scientific enquiries to answer them. • Explore everyday phenomena and the relationships between living things and familiar environments. • Begin to develop ideas about functions, relationships and interactions. • Raise their own questions about the world around them. • Make some decisions about which types of enquiry will be the best way of answering questions including observing changes over time, noticing patterns, grouping and classifying, carrying out simple comparative and fair tests, finding things out using secondary sources.	• Begin to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Begin to explore and talk about ideas, ask their own questions about scientific phenomena, analyse functions, relationships and interactions more systematically. • Begin to recognise some more abstract ideas and begin to recognise how these ideas help them to understand how the world operates. • Begin to recognise scientific ideas change and develop over time. • Begin to select the most appropriate ways to answer science questions using different types of scientific enquiry (including observing changes over different periods of time, noticing patterns, grouping and classifying, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.)	• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Explore and talk about ideas, ask their own questions about scientific phenomena, analyse functions, relationships and interactions more systematically. • Begin to recognise more abstract ideas and begin to recognise how these ideas help them to understand how the world operates. • Begin to recognise scientific ideas change and develop over time. • Select the most appropriate ways to answer science questions using different types of scientific enquiry (including observing changes over different periods of time, noticing patterns, grouping and classifying, carrying out comparative and fair tests & finding things out using a wide range of secondary sources of info.)
Observing, measuring ad pattern seeking	• With support, begin to observe closely, using simple equipment.	• Begin to observe closely, using simple equipment. • Use simple observations and ideas to suggest answers to questions. • To observe simple changes over time and, with guidance, begin to notice patterns and relationships. • To say what they are looking for and what they are measuring. • To know how to use simple equipment safely. Use simple	• Observe closely, using simple equipment. • Use observations and ideas to suggest answers to questions. • Observe changes over time and, with guidance, begin to notice patterns and relationships. • Say what they are looking for and what they are measuring. • To know how to use	• Begin to make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.	• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.	• Begin to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. • Begin to identify patterns that might be found in the natural environment. • Begin to make their own decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them. Choose the most appropriate equipment and explain how to use it accurately.	• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. • Identify patterns that might be found in the natural environment. • Make their own decisions about what observations to make, what measurements to use and how long to make them for and whether to repeat them. • Choose the most appropriate equipment and explain how to use it accurately. • Can interpret data and find patterns.

		• measurements and equipment with support (eg hand lenses and egg timers) • Begin to progress from non-standard units, reading cm, m, cl, l, °C	• simple equipment safely. • Use simple measurements and equipment with increasing independence (eg hand lenses and egg timers) • Begin to progress from non-standard units, reading mm, cm, m, ml, l, °C	• Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. • Learn to use some new equipment appropriately (eg data loggers). • Begin to see a pattern in my results. • Begin to choose from a selection of equipment. • Begin to observe and measure accurately using standard units including time in minutes and seconds.	• Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. • Learn to use new equipment appropriately (eg data loggers). • Can spot a pattern in results • Can choose from a selection of equipment. • Can observe and measure accurately using standard units including time in minutes and seconds.	• Begin to interpret data and find patterns. • Select equipment on their own. • Can make a set of observations and say what the interval and range are. • Begin to take accurate and precise measurements – N, g, kg, mm, cm, mins, seconds, cm^2V, km/h, m per sec, m/ sec • Graphs – pie, line	• Select equipment on their own. • Can make a set of observations and say what the interval and range are. • Accurate and precise measurements e.g N, g, kg, mm, cm, mins, seconds, cm^2V, km/h, m per sec, m/ sec • Graphs – pie, line, bar
Investigating	• To begin to discuss my ideas about how to find things out.	• Perform simple tests with support. • Begin to discuss their ideas about how to find things out. • To begin to say what happened in their investigation.	• Perform simple tests. • To discuss theirideas about how to find things out. • To say what happened in their investigation.	• Set up some simple practical enquiries, comparative and fair tests. • Begin to recognise when a simple fair test is necessary and help to decide how to set it up. • Begin to think of more than one variable factor.	• Set up simple practical enquiries, comparative and fair tests. • Recognise when a simple fair test is necessary and help to decide how to set it up. • Can think of more than one variable factor.	• Begin to use test results to make predictions to set up further comparative and fair tests. • Begin to recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. • Begin to suggest improvements to their method and give reasons. • Begin to decide when it is appropriate to do a fair test.	• Use test results to make predictions to set up further comparative and fair tests. • Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. • Suggest improvements to their method and give reasons. • Decide when it is appropriate to do a fair test.
Recording and Reporting Findings	• Gather and record data with adult support, to help in answering questions.	• Gather and record data with some adult support, to help in answering questions. • Begin to record simple data. • Begin to record and communicate their findings in a range of ways. • Can show their results in a simple table that the teacher has provided.	• Gather and record data to help in answering questions. • Record simple data. • Record and communicate their findings in a range of ways. • Can show their results in a table that the teacher has provided.	• Gather, record, and begin to classify and present data in a variety of ways to help in answering questions. • Begin to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. • Begin to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Begin to use notes, simple tables and standard units and help to decide how to record and analyse their data. • Begin to record results in tables and bar charts.	• Gather, record, classify and present data in a variety of ways to help in answering questions. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use notes, simple tables and standard units and help to decide how to record and analyse their data. • Can record results in tables and bar charts.	• Begin to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. • Begin to report and present findings from enquiries. • Begin to decide how to record data from a choice of familiar approaches. • Begin to choose how best to present data.	• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar and line graphs. • Report and present findings from enquiries. • Decide how to record data from a choice of familiar approaches. • Can choose how best to present data.

Identifying, Grouping and Classifying	• Identify and classify with support.	• Identify and classify with some support. • To begin to observe and identify, compare and describe. • To begin to use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.	• Identify and classify. • Observe and identify, compare and describe. • Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them.	• Begin to identify differences, similarities or changes related to simple scientific ideas and processes. • Begin to talk about criteria for grouping, sorting and classifying and use simple keys. • Begin to compare and group according to behaviour or properties, based on testing.	• Identify differences, similarities or changes related to simple scientific ideas and processes. • Talk about criteria for grouping, sorting and classifying and use simple keys. • Compare and group according to behaviour or properties, based on testing.	• Begin to use and develop keys and other information records to identify, classify and describe living things and materials.	• Use and develop keys and other information records to identify, classify and describe living things and materials.
Research	• To begin to find information to help me from books and computers with help.	• To begin to use simple secondary sources to find answers. • To begin to find information from books and computers with help.	• Use simple secondary sources to find answers. • Can find information from books and computers with help.	• Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.	• Recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations.	• Begin to recognise which secondary sources will be most useful to research their ideas.	• Recognise which secondary sources will be most useful to research their ideas.
Conclusions	• Begin to talk about what they have found out and how they found it out.	• Begin to talk about what they have found out and how they found it out. • To begin to say what happened in an investigation. • To begin to say whether they were surprised at the results or not. • To begin to say what they would change about their investigation.	• Talk about what they have found out and how they found it out. • To say what happened in an investigation. • To say whether they were surprised at the results or not. • To say what they would change about their investigation.	• Begin to use results to draw simple conclusions , make predictions for new values, suggest improvements and raise further questions. • Begin to use straightforward scientific evidence to answer questions or to support their findings. • With help, are beginning to look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. • With support, are beginning to identify new questions arising from the data, make new predictions and find ways of improving what they have already done. • Begin to see a pattern in results. • Begin to say what was found out, linking cause and effect. • Begin to say how an experiment could be made better. • Begin to answer questions from what they have found out.	• Using results to draw simple conclusions , make predictions for new values, suggest improvements and raise further questions. • Use straightforward scientific evidence to answer questions or to support their findings. • With help, look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. • With support, identify new questions arising from the data, make new predictions and find ways of improving what they have already done. • Can see a pattern in results. • Can say what has been found out, linking cause and effect. • Can say how an experiment could be made better. • Can answer questions from what they have found out.	• Begin to report and present findings from enquiries , including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Begin to identify scientific evidence that has been used to support or refute ideas or arguments • Begin to draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings. • Begin to use test results to make predictions to set up further comparatives and fair tests. • Begin to look for different causal relationships in their data and identify evidence that refutes or supports their ideas. • Use their results to identify when further tests and observations are needed. • Begin to separate opinion from fact. • Begin to draw conclusions and identify scientific evidence. • Can use simple models. • Know which evidence proves a scientific point. • Begin to use test results to make predictions to set up further comparative and fair tests.	• Report and present findings from enquiries , including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments • Draw conclusions based on their data and observations, use evidence to justify their ideas, use scientific knowledge and understanding to explain their findings. • Use test results to make predictions to set up further comparatives and fair tests. • Look for different causal relationships in their data and identify evidence that refutes or supports their ideas. • Use their results to identify when further tests and observations are needed. • Separate opinion from fact. • Can draw conclusions and identify scientific evidence. • Can use simple models. • Know which evidence proves a scientific point. • Use test results to make predictions to set up further comparative and fair tests.

Vocabulary	• Begin to use some scientific words	• Use some simple scientific language • Begin to use some science words. • Use comparative language with support.	• Use simple scientific language and some science words. • Use comparative language – bigger, faster etc	• Begin to use some scientific language to talk and, later, write about what they have found out. • Begin to use relevant scientific language. • Begin to use comparative and superlative language.	• Use some scientific language to talk and, later, write about what they have found out. • Use relevant scientific language. • Use comparative and superlative language	• Begin to read, spell and pronounce scientific vocabulary correctly. • Begin to use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas. • Begin to confidently use a range of scientific vocabulary. • Begin to use conventions such as trend, rogue result, support prediction and -er word generalisation. • Begin to use scientific ideas when describing simple processes. • Begin to use the correct science vocabulary	• Read, spell and pronounce scientific vocabulary correctly. • Use relevant scientific language. And illustrations to discuss, communicate and justify scientific ideas. • Can confidently use a range of scientific vocabulary. • Can use conventions such as trend, rogue result, support prediction and er word generalisation. • Can use scientific ideas when describing simple processes. • Can use the correct science vocabulary
Vocabulary Map	• Science • Experiment • Test • Fair • Find out • Explain • Reason • Why • Record • Senses	• Animals including humans Fish, Reptiles, Mammals, Birds, Amphibians (+ examples of each) Herbivore, Omnivore, Carnivore, Leg, Arm, Elbow, Head, Ear, Nose, Back, Wings, Beak • Plants Deciduous, Evergreen trees, Leaves, Flowers (blossom), Petals, Fruit, Roots, Bulb, Seed, Trunk, Branches, Stem • Everyday Materials Wood, Plastic, Glass, Paper, Water, Metal, Rock, Hard, Soft, Bendy, Rough, Smooth • Seasonal Changes Summer, Spring, Autumn, Winter, Sun, Day, Moon, Night, Light, Dark	• Animals including humans Survival, Water, Air, Food, Adult, Baby, Offspring, Kitten, Calf, Puppy, Exercise, Hygiene • Plants Seeds, Bulbs, Water, Light, Temperature, Growth • Living things and their habitats Living, Dead, Habitat, Energy, Food chain, Predator, Prey, Woodland, Pond, Desert • Everyday materials and their uses Hard, Soft, Stretchy, Stiff, Shiny, Dull, Rough, Smooth, Bendy, Waterproof, Absorbent, Opaque, Transparent Brick, Paper, Fabrics, Squashing, Bending, Twisting, Stretching Elastic, Foil	• Animals including humans Movement, Muscles, Bones, Skull, Nutrition, Skeletons, • Plants Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower • Rocks Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent • Light Light, Shadows, Mirror, Reflective, Dark, Reflection • Forces and magnets Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull	• Animals including humans Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar • Living things and their habitats Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats • States of Matter Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating • Sound Volume, Vibration, Wave, Pitch, Tone, Speaker • Electricity Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators	• Animals including humans Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty • Living things and their habitats Mammal, Reproduction, Insect, Amphibian, Bird, Offspring • Properties and changes of materials Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing • Earth and Space Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation • Forces Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys	• Animals including humans Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration • Living things and their habitats Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects • Evolution and Inheritance Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics • Light Refraction, Reflection, Light, Spectrum, Rainbow, Colour, • Electricity Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell
understanding	• With support, can begin to talk about how science helps us in our daily lives eg. torches and lights help us see hen it is dark.	• Can begin to talk about how science helps us in our daily lives eg. torches and lights help us see hen it is dark. • Am beginning to understand science can sometimes be dangerous.	• Can talk about how science helps us in our daily lives eg. torches and lights help us see hen it is dark. • Am beginning to understand science can sometimes be dangerous.	• Begin to know which things in science have made our lives better. • Can begin to understand risk in science.	• Knows which things in science have made our lives better. • Can understand there is some risk in science. • Begin to talk about how scientific ideas have changed over time.	• Begin to explain the positive and negative effects of scientific development. • Begin to see how science is useful in everyday life. • Begin to say which parts of our lives rely on science.	• Can talk about how scientific ideas have changed over time. • Can explain the positive and negative effects of scientific development. • Can see how science is useful in everyday life. • Can say which parts of our lives rely on science.

Greater Depth Standard						
EYFS	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
• Can they find out by watching, listening, tasting, smelling and touching? • Can they give reasons for their answers? • Can they discuss similarities and differences? • Can they explain what they have found out using scientific vocabulary? • Can they compare measurements?	• Can they find out by watching, listening, tasting, smelling and touching? • Can they give reasons for their answers? • Can they discuss similarities and differences? • Can they explain what they have found out using scientific vocabulary? • Can they make accurate measurements using non-standard measurements i.e. unifix	• Can they suggest ways of finding out through listening, hearing, smelling, touching and tasting? • Can they say whether things happened as they expected and if not why not? • Can they suggest more than one way of grouping animals and plants and explain their reasons? • Can they use information from books and online information to find things out? • Can they begin to independently consider controlling variables to create a fair test?	• Can they record and present what they have found using scientific language, drawings, labelled diagrams, bar charts and tables? • Can they explain their findings in different ways (display, presentation, and writing)? • Can they use their findings to draw a simple conclusion? • Can they suggest improvements and predictions for further tests? • Can they suggest how to improve their work if they did it again?	• Can they plan and carry out an investigation by controlling variables fairly and accurately? • Can they use test results to make further predictions and set up further comparative tests? • Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models? • Can they report findings from investigations through written explanations and conclusions? • Can they use a graph or diagram to answer scientific questions? • Can they use a range of variables to investigate?	• Can they explore different ways to test an idea, choose the best way and give reasons? • Can they vary one factor whilst keeping the others the same in an experiment? • Can they use information to help make a prediction? • Can they explain, in simple terms, a scientific idea and what evidence supports it? • Can they decide which units of measurement they need to use? • Can they explain why a measurement needs to be repeated? • Can they find a pattern from their data and explain what it shows? • Can they link what they have found out to other science? • Can they suggest how to improve their work and say why they think this?	• Can they choose the best way to answer a question and use information from different sources to plan an investigation? • Can they make a prediction which links with other scientific knowledge? • Can they plan which equipment they will need and use it effectively? • Can they explain qualitative and quantitative data? • Can they identify scientific evidence that has been used to support or to refute ideas or arguments and link their conclusions to it? • Can they explain how they could improve their way of working? • Can they report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results,