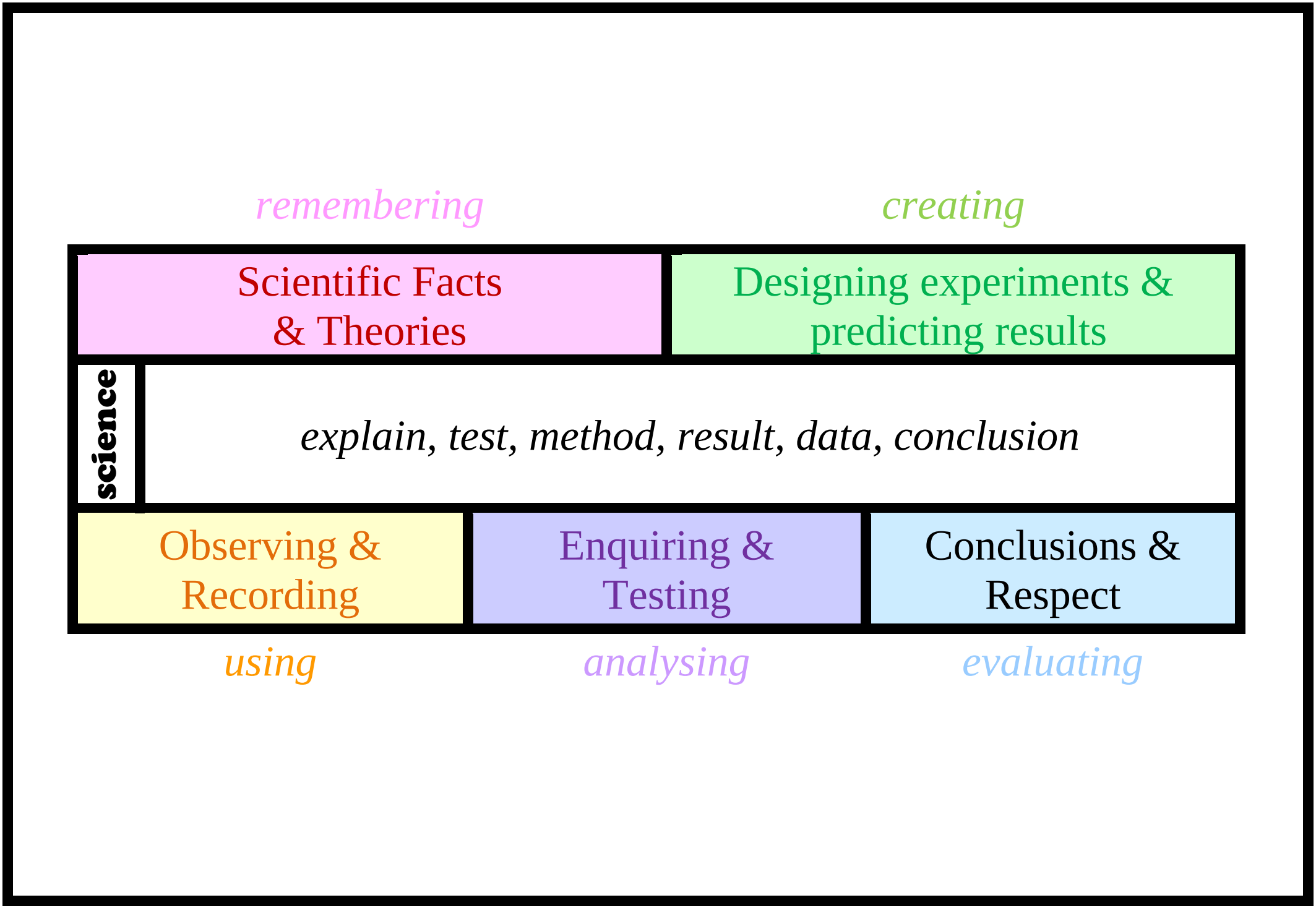

R•E•A•L Opportunities (How we will learn)

YEAR 1

Biology	Chemistry	Physics
PLANTS 1 Pupils should be taught to: ➢ identify and name a variety of common wild and garden plants, including deciduous and evergreen trees; ➢ identify and describe the basic structure of a variety of common flowering plants, including trees. **ANIMALS INCLUDING HUMANS** Pupils should be taught to: ➢ identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ➢ identify and name a variety of common animals that are carnivores, herbivores and omnivores Science – key stages 1 & 2 *P&S: Uses & Abuses*: initial discussion of healthy eating, diet and lifestyle surrounding meat, vegetables, sugar etc. Could link to school wide 'healthy eating' focus. ➢ describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) ➢ identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	**EVERYDAY MATERIALS** Pupils should be taught to: ➢ distinguish between an object and the material from which it is made ➢ identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock ➢ describe the simple physical properties of a variety of everyday materials ➢ compare and group together a variety of everyday materials on the basis of their simple physical properties.	**SEASONAL CHANGES** Pupils should be taught to: ➢ observe changes across the four seasons ➢ observe and describe weather associated with the seasons and how day length varies.

YEAR 2

Biology	Chemistry	Physics
LIVING THINGS AND THEIR HABITATS	**USES OF EVERYDAY MATERIALS**	
Pupils should be taught to: ➢ explore and compare the differences between things that are living, dead, and things that have never been alive ➢ 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 ➢ identify and name a variety of plants and animals in their habitats, including micro-habitats ➢ describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.	Pupils should be taught to: ➢ identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses, ➢ find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	
PLANTS 2		
Pupils should be taught to: ➢ observe and describe how seeds and bulbs grow into mature plants, ➢ find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.		
ANIMALS INCLUDING HUMANS 2		
Pupils should be taught to: ➢ notice that animals, including humans, have offspring which grow into adults, *P&S: Myself & Others* human reproduction. ➢ find out about and describe the basic **needs** of animals, including humans, for survival (water, food and air), *P&S Uses & Abuses* contrast with **wants** (sweets, cola, coffee tea) & effect of non-necessary diet. ➢ describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. *P&S Staying Safe* recapping P&S *Staying Safe* include basic medicine safety education, oral health and basic personal hygiene e.g. hand washing.		

YEAR 3

Biology	Chemistry	Physics
PLANTS 3	**ROCKS**	**LIGHT**
Pupils should be taught to: ➢ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers ➢ explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant *P&S Community Life* Light touch on consequences of crops nutrition, deforestation / oxygenation for humans. ➢ investigate the way in which water is transported within plants. ➢ explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. *P&S Community Life* Light touch on gardens / green spaces and the importance of encouraging pollinators (bees, etc.)	Pupils should be taught to: ➢ compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ➢ describe in simple terms how fossils are formed when things that have lived are trapped within rock, ➢ recognise that soils are made from rocks and organic matter.	Pupils should be taught to: ➢ recognise that they need light in order to see things and that dark is the absence of light ➢ notice that light is reflected from surfaces ➢ recognise that light from the sun can be dangerous and that there are ways to protect their eyes *P&S Staying Safe* hazards in the home, outdoors and toys ➢ recognise that shadows are formed when the light from a light source is blocked by a solid object ➢ find patterns in the way that the size of shadows change. *P&S Staying Safe* Road Safety, night-visibility, bike lights, reflectors in winter etc.
ANIMALS INCLUDING HUMANS 3		**FORCES AND MAGNETS**
Pupils should be taught to: ➢ 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. *P&S Uses & Abuses/Healthy Body Healthy Mind*: esp. looking at none- or poor-nutritious choices which may do more harm than good (sweets, energy drinks, coke etc.) ➢ identify that humans and some other animals have skeletons and muscles for support, protection and movement. *P&S Staying Safe* examine damage to bodies, breaks, healing risk etc.		Pupils should be taught to: ➢ compare how things move on different surfaces ➢ notice that some forces need contact between two objects, but magnetic forces can act at a distance ➢ observe how magnets attract or repel each other and attract some materials and not others ➢ compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ➢ describe magnets as having two poles ➢ predict whether two magnets will attract or repel each other, depending on which poles are facing.

YEAR 4

Biology	Chemistry	Physics
LIVING THINGS AND THEIR HABITATS 3	**STATES OF MATTER**	**ELECTRICITY**
Pupils should be taught to: ➢ recognise that living things can be grouped in a variety of ways, ➢ explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment, ➢ recognise that environments can change and that this can sometimes pose dangers to living things. *P&S Community Life* in context Humankind's impact on animals habitats e.g. deforestation and children's own responsibilities as future local, national and global citizens.	Pupils should be taught to: ➢ compare and group materials together, according to whether they are solids, liquids or gases, ➢ 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), *P&S Staying Safe* (light touch) contextualise insulation briefly with concept of proper clothes, waterproofs, insulation of bodies etc. ➢ identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	Pupils should be taught to: ➢ identify common appliances that run on electricity ➢ construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers ➢ identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery ➢ recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit ➢ recognise some common conductors and insulators, and associate metals with being good conductors. *P&S Staying Safe* recapping to ensure children recognise the risks of electricity, electrical devices and hazards in the home.
ANIMALS INCLUDING HUMANS 4		**SOUND**
Pupils should be taught to: ➢ describe the simple functions of the basic parts of the digestive system in humans, *P&S Healthy Body, Healthy Mind* good diet and the effects of poor diet and the effects of non-required substances on the body (processed sugar, tea, coffee etc.) ➢ identify the different types of teeth in humans and their simple functions, *P&S Healthy Body, Healthy Mind* including dental health and hygiene; good diet and the effects of poor diet *P&S Uses & Abuses.* Examining the effect of sugar, coffee, energy drinks, etc. on teeth. ➢ construct and interpret a variety of food chains, identifying producers, predators and prey.		Pupils should be taught to: ➢ identify how sounds are made, associating some of them with something vibrating ➢ recognise that vibrations from sounds travel through a medium to the ear, ➢ find patterns between the pitch of a sound and features of the object that produced it, ➢ find patterns between the volume of a sound and the strength of the vibrations that produced it, ➢ recognise that sounds get fainter as the distance from the sound source increases.

YEAR 5

Biology	Chemistry	Physics
LIVING THINGS AND THEIR HABITATS 4	**PROPERTIES AND CHANGES OF MATERIALS**	**EARTH AND SPACE**
Pupils should be taught to: ➢ describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird *P&S Myself & Others* sexual reproduction relating mammal to human. ➢ describe the life process of reproduction in some plants and animals. *P&S Myself & Others* sexual reproduction contextualised to non-detailed human reproduction.	Pupils should be taught to: ➢ compare and group together everyday materials on the basis of their properties, including their 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.	Pupils should be taught to: ➢ describe the movement of the Earth, and other planets, relative to the Sun in the solar system ➢ describe the movement of the Moon relative to the Earth ➢ describe the Sun, Earth and Moon as approximately spherical bodies ➢ use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
ANIMALS INCLUDING HUMANS 4		**FORCES**
Pupils should be taught to: describe the changes as humans develop to old age. *P&S Myself & Others* including hormonal, emotional and mental changes (including hygiene, deodorant etc.) *P&S Healthy Body, Healthy Mind* including worries about change, the "normality" of change, weight gain, weight loss, body image, etc. changes in mood and maturity etc.		Pupils should be taught to: ➢ 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 a greater effect.

YEAR 6

Biology	Chemistry	Physics
LIVING THINGS AND THEIR HABITATS 5		**LIGHT 2**
Pupils should be taught to: ➢ 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.		Pupils should be taught to: ➢ recognise that light appears to travel in straight lines ➢ use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye ➢ explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes ➢ use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
ANIMALS, INCLUDING HUMANS		**ELECTRICITY 2**
pupils should be taught to: ➢ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood, *P&S Uses & Abuses; Healthy Body, Healthy Mind* recognise the impact of diet, exercise, drugs (incl. caffeine) and lifestyle choices (smoking, exercise) on the way their bodies function, incl. social aspect, peer pressure etc. ➢ describe the ways in which nutrients and water are transported within animals, including humans. *P&S Healthy Body, Healthy Mind*; Uses & Abuses including water content of "drinks": tea, coffee, fizzy drinks, alcohol, diuretic effects, dehydration and the effects of alcohol on the brain/liver etc.		Pupils should be taught to: ➢ associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit *P&S Community Life* contextualises the use of electricity with emissions, carbon footprint and effect on the environment, esp. in relation to brightness/wattage of bulbs. ➢ compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches ➢ use recognised symbols when representing a simple circuit in a diagram. *P&S Staying Safe* recapping to ensure children recognise the risks of electricity, electrical devices and hazards in the home.
EVOLUTION AND INHERITANCE		
Pupils should be taught to: ➢ recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago, ➢ recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents, *P&S Myself & Others* including more detail on human reproduction, puberty & *P&S Healthy Body, Healthy Mind* incl. social aspect, peer pressure etc. associated mental and emotional feelings, privacy, secrets, good touch/bad touch etc. ➢ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.		

Cross-Curricular Learning				
	ART & DESIGN: Scientific method ought to be applied to the mixing of paints and pigments and the exploration of new media. Scientific enquiry with for instance, charcoal might ask *how can I make the lightest/darkest possible marks with this medium?* Recording, analysing and evaluating the results.	**COMPUTING:** This is in itself a science but the widest possible use should be made of software, websites and apps to further the science knowledge and develop experimental skills. In particular, virtual models, data loggers and abstractions should be used to deepen children's understanding of science.	**DANCE:** Dance is an exploration both the art of movement, and the possibilities of the human body. Every chance should be taken to discuss fitness, flexibility, motion, anatomy and physiology during dance, relating it to studies of motion, forces, gravity, health, exercise and the human body.	**DESIGN & TECHNOLOGY:** The iterative nature of D&T means that designs should be researched, data gathered, findings analysed and products tested. Testing should be fair and thorough and lead to simplifications, streamlines and improvements. This is a perfect opportunity to develop scientific method and enquiry.
	GEOGRAPHY: Geography is the chance to take science into the environment and tests rocks, soils, the weather and naturally occurring materials and chemicals. There are ample opportunities to gather, compare, analyse and evaluate real data, drawing scientific conclusions.	**HISTORY:** A concept of change over time is key in science, e.g. geological time and the intervals between certain discoveries and beliefs. For how long have we believed the earth orbits the sun and how long is a nanosecond? The history of science and scientists will bring science into focus for children. What impact did certain world events have on science and scientists? E.g. the 2nd World War?	**LANGUAGES:** There is the opportunity to learn about German scientists, contextualised in the history of ideas, pronouncing, writing and spelling their names and discoveries to broaden the opportunities to experience the language and ideas of the culture.	**MATHEMATICS:** Maths underpins science and provides its foundation. Science at Stanley Road needs to build rigorous measurement, calculation and problem solving in the context of scientific enquiry with science lessons facilitating age-appropriate, challenging maths and it not being "good science" without "good maths" to support it.
	MUSIC: A great deal of learning in the music curriculum is about testing "what happens if I…" or analysis "what can I hear…?" both of which are scientific disciplines. Music is also a way into the world of sound, acoustics, the ear and the mystery of the mind.	**PHILOSOPHY:** Epistemology (how can we know or prove anything?) must underpin science's certainties and metaphysics (what is real? – what exists?) should contextualise science's hard facts. Time – space – life – death – all of sciences big answers are philosophy's big questions.	**PHYSICAL EDUCATION:** PE is concerned with what the human body is capable of. It should be well-structured with measuring performance, improvements to resting and active pulse, warm-ups, recovery time, personal bests, data spreads etc. "If this ball is twice as heavy will it on average only travel half as far?"	**SMSC:** The ethics and responsibilities of science need to be at the heart of the REAL science curriculum. Religious and beliefs which are challenged by science must be discussed sensitively, and the impact of science on the world (animal testing, atomic power, pollution etc.) needs to be addressed.

Entitlements

Children will have the most practical science experience possible. In the REAL curriculum we will prize primary sources (feeling, touching, experimenting, testing) over secondary sources, (pictures, text, research, yet combine the two to ensure a deep and broad understanding of science.

We stand by the maxim:

"Don't tell me if you can show me, don't show me if I can discover for myself!"

Children will be given the opportunity to explore science in a cross curricular way and will engage in field work to observe science in the wider world and gather real data to inform their studies.

R•E•A•L Objectives (What we will learn to do)

Children should learn:

To record	To select	To research	To enquire	To classify
using	using	using	analysis	analysis
Children will develop accurate methods of recording their learning, their findings and expressing data.	Children will learn to use and apply a growing range of scientific equipment, aiming at increasing accuracy and efficiency.	Children will develop scientific knowledge, skills and understanding using primary and secondary sources for information retrieval.	Children will develop their sense of curiosity into an organised mode of enquiry, asking and answering questions about the world.	Children will look for patterns, trends and anomalies in scientific data, using a growing range of models to group, sort and taxonomise.

To test	To respect	To draw conclusions	To troubleshoot	To design
analysis	evaluating	evaluating	evaluating	creating
Children will develop the skills to test hypotheses and assumptions, identifying and controlling variables with increasing efficiency and working methodically.	Children will develop an awareness of the hazards of scientific enquiry, assessing risks whilst respecting the safety and dignity of themselves and their peers.	Children will make judgements on the success of scientific method, interpreting results and suggesting improvements to their own and others' work.	Children will identify problems, limitations and anomalies, seeking solutions and fixing weak logic, inaccurate use of equipment and poor scientific method.	Children use vision and imagination to develop their own tests, experiments and lines of enquiry, discussing, planning and writing creatively.

R•E•A•L Outcomes (What will learning look like in science?)

The Depth & Breadth Assessment Model: Points System

Phase 1						Phase 2						Phase 3					
Year 1			Year 2			Year 3			Year 4			Year 5			Year 6		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Surface Learning		Enhanced Learning		Deep Learning		Surface Learning		Enhanced Learning		Deep Learning		Surface Learning		Enhanced Learning		Deep Learning	

We are assessing not just the amount that children learn, but the **depth** and **breadth** of their learning. We want to monitor how well a child understands a concept and how useful that learning becomes. Progress in the D&B model should be a widening cone shape, from shallow, surface-level learning, to an enhanced understanding then beyond, into deep, useful, thoughtful ownership.

We chart children's understanding on this continuum, giving them a numerical score, based on averages. This is their attainment. The difference in *attainment* from one assessment to the next is their *progress.* The combination of both in a broad picture is their *achievement.*

With support and modelling	With modelling	Independently
Children attempt and complete learning after concepts and skills are clearly demonstrated. They make mistakes, are assisted and use consistent and continuing feedback to improve during the process.	Children attempt and complete learning after concepts and skills are clearly demonstrated. They work collaboratively or unaided, needing formative feedback, demonstrating maturing skills and concepts.	Children attempt and complete work confidently and independently, in collaboration or alone. They are largely unaided with minimum scaffolding and are demonstrating embedded skills and concepts.

PHASE 1

Depth of Learning		Stage of Teaching		To record using	To select using	To research using	To enquire analysing	To classify analysing
1	Surface Learning	Aut	Year 1	**To record:** With support and modelling children communicate their observations using simple labelled drawings and sorting hoops.	**To select:** With support and modelling I can use non-standard units to measure.	**To research:** With support and modelling I can use a range of simple written and visual sources to retrieve basic scientific information. *[Phonic-based reference books, KS1 appropriate websites and early primary apps]*	**To enquire:** With support and modelling I develop and articulate *why?* and *how?* questions.	**To classify:** With support and modelling I identify simple patterns in the natural world and built environment. **To classify:** With support and modelling I can sort objects and materials by a single criterion.["These are the heavy items, these the light"]
2	Surface Learning	Spr	Year 1	**To record:** With modelling children communicate their observations using simple labelled and captioned drawings. **To record:** With support and modelling I can show change over time (before and after) in my recording.	**To select:** With support and modelling I use equipment from a narrow range suggested by my teacher. (ruler, pooter, magnifying glass, hoops, **To select:** With modelling I can use and suggest non-standard units to measure.	**To research:** With modelling I can use a range of simple written and visual sources to retrieve basic scientific information, accessing simple contents pages, indices, glossaries and insets.	**To enquire:** With modelling I develop and articulate and answer *why?* and *how?* Questions, verbally and in writing.	**To classify:** With modelling I identify and discuss simple patterns in the natural world and built environment. **To classify:** With modelling I can sort objects and materials by a single criterion, suggesting other possible criteria. ["These are the red leaves, these are the green. We could have done big and small leaves, or holey and not holey!"]
3	Enhanced Learning	Sum	Year 1	**To record:** I can confidently record what I have observed or discovered in and sorting hoops, simple labelled and captioned drawings and written work. **To record:** I can independently record simple changes in pictures and writing.	**To select:** I independently can use non-standard units to measure with growing accuracy. **To select:** With support I can explore new equipment and suggest a use for it.	**To research:** I independently use a range of supervised simple written and visual sources to retrieve basic scientific information, accessing simple contents pages, indices, glossaries and insets.	**To enquire:** I begin to develop my own independent *why?* and *how?* questions, giving verbal and written answers.	**To classify:** I independently identify and discuss simple patterns in the natural world and built environment ["Look, the beehive is built out of hexagons!"] **To classify:** I can suggest a single criterion to sort groups of objects.
4	Enhanced Learning	Aut	Year 2	**To record:** With support and modelling I can populate a table, graph or chart which has been supplied to me. **To record:** With support and modelling I can label a diagram to accompany my writing or learning, using simple but appropriate scientific vocabulary. [A Fox diagram labelled brush, fangs, fur.] **To record:** With support and modelling I can begin to record change over time as a sequence of events (e.g. a bean diary).	**To select:** With support and modelling I begin to suggest suitable non-standard equipment. **To record:** With support and modelling I can select the correct measuring equipment (scales, balances, ruler, stopwatch) for the right job.	**To research:** With support and modelling I can use age-appropriate reference books to answer my own scientific questions, orienting myself with the glossary, contents, index and page layout.	**To enquire:** With support and modelling I explore *"what if?"* questions. ["What if we watered it but only a bit of water, every day!"] **To enquire:** With support and modelling I notice links between cause and effect.	**To classify:** With support and modelling I can sort objects and materials by two criteria. ["These are the big heavy items, these small heavy, these are the big, light, these are the small light"] **To classify:** I independently identify and discuss more complex patterns in the natural world and built environment.
5	Deep Learning	Spr	Year 2	**To record:** With modelling I can populate a table, graph or chart which has been supplied to me, using my own data. **To record:** With modelling I can label a diagram to accompany my writing or learning, using simple but appropriate scientific vocabulary. **To record:** With modelling I can record observed change over time as a sequence of events (e.g. a bean diary), as illustrated writing.	**To select:** With support and modelling I begin to suggest suitable non-standard equipment. **To select:** With modelling I can suggest non-standard units to measure with growing accuracy and explore measuring in cm/m, g/kg and ml/l secs/mins, with developing efficiency. **To select:** With modelling I can select the correct measuring equipment (scales, balances, ruler, stopwatch) for the right job.	**To research:** With modelling I can use age-appropriate reference books to answer my own and others' questions, orienting myself with the glossary, contents, index and page layout.	**To enquire:** With modelling I explore *"what if?"* questions. ["What if I put two batteries on instead on one – wow! That's bright. Do three!"] **To enquire:** With modelling I notice and describe links between cause and effect. ["I think double the battery means double the energy, so that gave double the light."]	**To classify:** With modelling I can sort objects and materials by two criteria. **To classify:** With modelling I identify and discuss more complex patterns in the natural world and built environment ["When we listened to the birds singing we found lots of them repeated themselves!"]
6	Deep Learning	Sum	Year 2	**To record:** I can independently populate a table, graph or chart which has been supplied for me. **To record:** I can independently draw and label a diagram to accompany my writing or learning, using simple but appropriate scientific vocabulary. **To record:** I can confidently record observed change over time as a sequence of events (e.g. changing shadows) in illustrated, structured writing.	**To select:** I can select and use a range of simple scientific tools (beakers, pooter, camera, magnifying glass, ruler etc.) independently, effectively and accurately. **To record:** I can select the correct simple measuring equipment (scales, balances, ruler, stopwatch) for the right job.	**To research:** I confidently use age-appropriate reference books to answer my own and others' questions, orienting myself with the glossary, contents, index and page layout.	**To enquire:** I begin to suggest and develop explore *"what if?"* questions. **To enquire:** I notice and describe (verbally and in writing) links between cause and effect.	**To classify:** I confidently sort objects and materials by two criteria. ["These are the big heavy items, these small heavy, these are the big, light, these are the small light"] **To classify:** I independently identify and discuss more complex patterns in the natural world and built environment.

Breadth of Learning

PHASE 1

Breadth of Learning →

Depth of Learning ↓

Depth of Learning		Stage of Teaching		To test (analysing)	To respect (analysing / evaluating)	To draw conclusions (evaluating)	To troubleshoot (evaluating)	To design (creating)
1	Surface Learning	Aut	Year 1	**To test:** With support and modelling I investigate simple variables to change and measure their effect.	**To respect:** with support and modelling I am aware of basic hygiene, washing hands after handling equipment and substance and keeping such items out of my mouth. **To respect:** With support and modelling I follow basic safety guidelines when using sharp or fragile equipment.	**To draw conclusions:** With support and modelling I can describe what happened in the results of experiments. **To draw conclusions:** With support and modelling I begin to give an opinion about the results of experiments or new scientific knowledge.	**To troubleshoot:** With support and modelling I can discuss on a basic level my own basic practical errors during scientific processes.["I spilled some as it went in"]	**To design:** With support and modelling I can decide what to observe in an experiment and predict a result.
2	Surface Learning	Spr	Year 1	**To test:** With modelling I investigate simple variables to change and measure their effect.	**To respect:** with modelling I am aware of basic hygiene, washing hands after handling equipment and substance and keeping such items out of my mouth. **To respect:** With modelling I follow basic safety guidelines when using sharp or fragile equipment.	**To draw conclusions:** With modelling I can describe what happened in the results of experiments. **To draw conclusions:** With modelling I can give an opinion about the results of experiments or new scientific knowledge.	**To troubleshoot:** With support and modelling I can discuss on a basic level my own errors during scientific processes, and suggest basic improvements. ["My hand wobbled. I'm going to poor the next one more carefully."]	**To design:** I can decide what to observe in an experiment and predict a result.
3	Enhanced Learning	Sum	Year 1	**To test:** I can begin to independently discuss changes to simple variables to change and measure their effect. ["e.g. let's put one in the dark and one in the light to see what happens."]	**To respect:** I am aware of basic hygiene, independently washing hands after handling equipment and substance and voluntarily keeping such items out of my mouth. **To respect:** With modelling I follow basic safety guidelines when using sharp or fragile equipment and report accidents independently.	**To draw conclusions:** I can describe what happened in the results of experiments using simple scientific language (names of equipment etc.) **To draw conclusions:** I can give an opinion about the results of experiments or new scientific knowledge. ["It looks like the dye went inside the plant and came out in the petals!"]	**To troubleshoot:** I can discuss on a basic level my own errors during scientific processes, and suggest basic improvements, describing if these were effective. ["I kept my eye on the spout and didn't spill any this time!"]	**To design:** With modelling I can decide what to observe in an experiment and predict a result.
4	Enhanced Learning	Aut	Year 2	**To test:** With support and modelling I begin to suggest and identify simple variables to change and measure.	**To respect:** With support and modelling I can give basic hygiene and safety advice, working safely and scientifically with a partner. ["Can you cut there? Watch your fingers"] **To respect:** With support and modelling I relate my science learning to risks in the wider world, including e-safety.	**To draw conclusions:** With support and modelling I talk about whether an information source was useful. **To draw conclusions:** With support and modelling I give an opinion about my own results and findings.	**To troubleshoot:** With support and modelling I can discuss my own and others' practical errors during scientific processes, suggesting an improvement. **To troubleshoot:** With support and modelling I can identify wrong or inaccurate facts and data in my own recording.	**To design:** With support and modelling I can suggest which variables to change and measure, predicting the results. **To design: With support and modelling I can design a very basic test or experiment in words and pictures.**
5	Deep Learning	Spr	Year 2	**To test:** With modelling I begin to suggest and identify simple variables to change and measure.	**To respect:** With modelling I can give basic hygiene and safety advice, working safely and scientifically with a partner. **To respect:** With modelling I relate my science learning to risks in the wider world, including e-safety. ["This bulb won't burn but the one in my bedroom will, so I'll practice handling it carefully."]	**To draw conclusions:** With support and modelling I talk about whether an information source was useful. ["I looked in this book "mini-bugs" but it was just about gardens, not house insects!"] **To draw conclusions:** With support and modelling I give an opinion about my own results and findings.	**To troubleshoot:** With modelling I can discuss my own and others' practical errors during scientific processes, suggesting an improvement. **To troubleshoot:** With modelling I can identify wrong or inaccurate facts and data in my own recording. ["that should be 30, not 13!"]	**To design:** With modelling I can suggest which variables to change and measure, predicting the results. **To design:** With modelling I can design a very basic test or experiment in words and pictures.
6	Deep Learning	Sum	Year 2	**To test:** I begin to suggest and identify simple variables to change and measure. ["We could give it light, but what about red light, miss?"]	**To respect:** Independently and in collaboration I use basic sharp and fragile equipment safely, offering advice and support. ["Pour carefully, mate, you'll spill it. Miss, can we have a paper towel, there's a drip of ink."] **To respect:** I describe the risks of scientific concepts in the wider world, including e-safety. [e.g. "Mrs B – have you asked your mum if you can use the internet – is the safe thingy on?"]	**To draw conclusions:** With support and modelling I talk about whether an information source was useful. **To draw conclusions:** With support and modelling I give an opinion about my own results and findings. ["Well, we found that hot water melts (*sic*) sugar faster than cold water, so maybe it's the temperature doing it?"]	**To troubleshoot:** I reflect on my practical technique, identifying strengths and weaknesses and describing improvements. ["I find sucking in through the pooter hard – I'm scared of eating a centipede. Faizaan told me to suck gently and I'm better at it now.] **To troubleshoot:** I revise my recording spotting and correcting basic scientific mistakes.	**To design:** I can suggest which variables to change and measure, predicting the results. **To design:** I can design a very basic test or experiment in words and pictures.

PHASE 2

Depth of Learning

Stage of Teaching

Breadth of Learning

	To record	To select	To research	To enquire	To classify
	using	using	using	analysing	analysing
7 Aut (Year 3, Surface Learning)	**To record:** With support and modelling I draw and label charts and diagrams (incl. tables, bar charts branching keys/databases, Carroll and Venn diagrams and scientific illustrations, using a ruler and correct scientific vocabulary. [e.g. a picture of a fox saying: thick fur, strong jaws] **To record:** With support and modelling I can record simply my predictions and findings in an experiment or observation.	**To select:** With support and modelling I can suggest an appropriate way to present provided data. **To select:** With support and modelling I can begin to assemble equipment or components to perform scientific tasks from a bank of resources. [e.g. the components for a simple circuit or the tools necessary to find and examine minibeasts]	**To research:** With support and modelling I can retrieve information from a range of more sophisticated texts, (longer non-fiction books, websites and other sources) and my own notes and results. **To research:** With support and modelling I can develop my growing scientific vocabulary by using glossaries, word banks and junior dictionaries.	**To enquire:** With support and modelling I use data and results to generate what, why, how and what if questions. ["How did the tissue paper not soak the most up? I'm really surprised."] **To enquire:** With support and modelling I generate and log my own questions about science.	**To classify:** With support and modelling I begin to classify objects or materials according to their properties or behaviour, using these words. ["The scratches wash away and weighs more than a kg, so ..."] **To classify:** With support and modelling I use simple keys and branching diagrams to aid my sorting and classification.
8 Spr (Year 3, Surface Learning)	**To record:** With modelling I draw and label charts and diagrams (incl. tables, bar charts branching keys/databases, Carroll and Venn diagrams and scientific illustration, using a ruler and correct scientific vocabulary. **To record:** With modelling I can record simply my predictions and findings in an experiment or observation.	**To select:** With modelling I can suggest an appropriate way to present my own data. **To select:** With modelling I can begin to assemble equipment or components to perform scientific tasks from a bank of resources. [e.g. the components for a simple circuit or the tools necessary to find and examine minibeasts]	**To research:** With modelling I can retrieve information from a range of more sophisticated texts, (longer non-fiction books, websites and other sources) and my own notes and results. **To research:** With modelling I can develop my growing scientific vocabulary by using glossaries, word banks and junior dictionaries.	**To enquire:** With modelling I use data and results to generate what, why, how and what if questions. ["How did the tissue paper not soak the most up? I'm really surprised."] **To enquire:** With modelling I generate and log my own questions about science.	**To classify:** With modelling I begin to classify objects or materials according to their properties or behaviour, using these words. ["The scratches wash away and weighs more than a kg, so ..."] **To classify:** With modelling I use simple keys and branching diagrams to aid my sorting and classification.
9 Sum (Year 3, Enhanced Learning)	**To record:** I can independently respond to simple data, expressing it as a clear and accurate headed chart. ["Cooling Liquids"] **To record:** I can draw and label a simple diagram using a ruler scientific vocabulary, labelling key parts to demonstrate understanding. **To record:** I independently record predictions and findings in a simple experiment or observation.	**To select:** Based on my experience of data handling I can suggest an appropriate way to present my own and others' data. **To select:** With support and modelling I can begin to assemble equipment or components to perform scientific tasks from a bank of resources. [e.g. the components for a simple circuit]	**To research:** I can independently retrieve information from a range of more sophisticated texts, (longer non-fiction books, websites and other sources) **To research:** With modelling I can develop my growing scientific vocabulary by using glossaries, word banks and junior dictionaries.	**To enquire:** I use data and results to generate simple *what*, *why*, *how* and *what if* questions. ["How did the tissue paper not soak the most up? I'm really surprised."]. **To enquire:** With modelling I generate and log my own questions about science.	**To classify:** I classify objects or materials in simple terms, according to their properties or behaviour, using these words. ["The scratches wash away and weighs more than a kg, so ..."] **To classify:** I independently use simple keys and branching diagrams to aid my sorting and classification.
10 Aut (Year 4, Enhanced Learning)	**To record:** With support and modelling I can draw a variety of charts, labelling headings, axes, columns rows, and units of measurement. [see range, above] **To record:** With support and modelling I can label diagrams with detailed and accurate phrases or sentences [*canine teeth, for crunching bones*] **To record:** With support and modelling I can begin to record change using cause, effect and comparative vocabulary.	**To select:** With support and modelling I can suggest appropriate ways to present data. **To select:** With support and modelling I can read measuring equipment to the nearest standard whole **To select:** With support and modelling I can confidently assemble equipment or components to perform scientific tasks from a bank of resources (incl. data loggers.)	**To research:** With support and modelling, I cross-reference my research, using parallel sources gathering and checking facts. **To research:** With support and modelling I continue to check and refine my understanding of emerging scientific vocabulary.	**To enquire:** With support and modelling I talk about how things are and the way they work and decide when questions can be answered by research using secondary sources or when they need a test. **To enquire:** With support and modelling I can develop my own fair test questions relevant to the scientific enquiry.	**To classify:** With support and modelling I use keys and branching diagrams as part of the sorting/classification process. **To classify:** With support and modelling I use the properties and behaviour of objects to talk in terms of sets and sub-sets. ["A hobby is in the set of raptors but in the sub-set or hawks!"]
11 Spr (Year 4, Deep Learning)	**To record:** With modelling I can draw and label a chart, indicating headings, axes, columns rows, and units of measurement. **To record:** With modelling I can label diagrams with detailed and accurate phrases or sentences **To record:** With modelling I can begin to record change using cause, effect and comparative vocabulary. [When it gets hotter/colder/higher/lower, the liquid...]	**To select:** With modelling I can suggest appropriate ways to present data. **To select:** With modelling I read measuring equipment to the nearest standard whole unit. (e.g. /cm/10ml/g/°C) **To select:** With modelling I can confidently assemble equipment or components to perform scientific tasks from a bank of resources.	**To research:** With modelling, I cross-reference my research, using parallel sources gathering and checking facts **To research:** With modelling I continue to check and refine my understanding of emerging scientific vocabulary.	**To enquire:** With modelling I talk about how things are and the way they work sorting between research questions and experimental questions. To **enquire:** With modelling I can develop my own fair test questions relevant to the scientific enquiry.	**To classify:** With modelling I use keys and branching diagrams as part of the sorting/classification process. **To classify:** With modelling I use the properties and behaviour of objects to talk in terms of sets and sub-sets. ["This is the set of volcanic rocks, and within that we have subsets of porous and non-porous.]
12 Sum (Year 4, Deep Learning)	**To record:** I can draw and fully label (see above) a bar chart or table. **To record:** With modelling I can label diagrams with detailed and accurate phrases or sentences. **To record:** With modelling I can begin to record change using cause, effect and	**To select:** I can suggest appropriate ways to present data. **To select:** I accurately read measuring equipment to the nearest standard whole unit. **To select:** I confidently assemble equipment or components to perform	**To research:** I confidently cross-reference my research, building a consensus of knowledge. **To research:** With modelling I continue to check and refine my understanding of emerging scientific vocabulary.	**To enquire:** I confidently discuss how things are and the way they work sorting between research questions and experimental questions. To **enquire:** I develop my own relevant scientific fair test questions.	**To classify:** I confidently use keys and branching diagrams as part of the sorting/classification process. **To classify:** I use the properties and behaviour of objects to talk in terms of sets and sub-sets.

PHASE 3

Depth of Learning

Stage of Teaching

Breadth of Learning

Depth of Learning		Stage of Teaching		To test	To respect	To draw conclusions	To troubleshoot	To design
				analysing	analysing / evaluating	evaluating	evaluating	creating
7	Surface Learning	Aut	Year 3	**To test:** With support and modelling I develop the language of fair testing enough to pose a fair test question. **To test:** With support and modelling I carry out a simple test to sort objects and materials.	**To respect:** With support and modelling I can begin to use more hazardous equipment, (scalpel, glass beaker etc.) following a basic risk assessment to keep myself and my collaborators safe.	**To draw conclusions:** With support and modelling I begin to interpret scientific data, giving my opinion about what is might mean. **To draw conclusions:** With support and modelling I can say if the results of my test/research was expected or unexpected.	**To troubleshoot:** With support and modelling I can discuss an aspect of my scientific method which could be improved, using scientific language. *(planning, equipment use, fair testing, recording, drawing conclusions.)* **To troubleshoot:** With support and modelling I can apply mathematics when checking data and statistics.	**To design:** With support and modelling I can collaborate to co-design a simple experiment to answer a general scientific question or test a theory. **To design:** With support and modelling I can come up with my own simple layout to record data *(a table or bar graph, key or branching diagram).*
8	Surface Learning	Spr	Year 3	**To enquire** With modelling I develop the language of fair testing (enough to pose a fair test question.) **To enquire:** With modelling I carry out a simple test to sort objects and materials.	**To respect:** With modelling I can begin to use more hazardous equipment, (scalpel, glass beaker etc.) following a basic risk assessment to keep myself and my collaborators safe.	**To draw conclusions:** With modelling I begin to interpret scientific data, giving my opinion about what is might mean. **To draw conclusions:** With modelling I can say if the results of my test/research was expected or unexpected, giving reasons why.	**To troubleshoot:** With modelling I can discuss an aspect of my scientific method which could be improved, using scientific language. **To troubleshoot:** With modelling I can apply mathematics when checking data and statistics.	**To design:** With modelling I can collaborate to co-design a simple experiment to answer a general scientific question or test a theory. **To design:** With modelling I can come up with my own simple layout to record data *(a table or bar graph, key or branching diagram).*
9	Enhanced Learning	Sum	Year 3	**To enquire:** I develop the language of fair testing ["Which of these fabrics is the least absorbent?"] **To enquire:** I can independently carry out a simple test to sort objects and materials.	**To respect:** I can begin to use more hazardous equipment, (scalpel, glass beaker etc.) following a basic risk assessment to keep myself and my collaborators safe.	**To draw conclusions:** I begin to interpret scientific data unaided, giving my opinion about what is might mean. **To draw conclusions:** With support and modelling I can say if the results of my test / research was expected or unexpected.	**To troubleshoot:** I can independently select an aspect of my scientific method which could be improved, using scientific language. **To troubleshoot:** I can apply mathematics when checking data and statistics.	**To design:** I design a simple experiment to answer a general scientific question or test a theory. *(the experiment is recognisably a test but may not be practical or feasible).* **To design:** I can come up with my own layout to record data *(a table or bar graph, key or branching diagram).*
10	Enhanced Learning	Aut	Year 4	**To test:** With support and modelling I am consistent in fair testing (measurements, recording and processes). **To test: With support and modelling I can say what I am testing and what I expect the outcome to be.**	**To respect:** With support and modelling I verbalise the risks of scientific processes, incl. e-safety, contributing to a shared risk assessment. **To respect:** With support and modelling I am aware of the sensitivity of some scientific topics (reproduction, death, creation, evolution) and attempt to separate learning the theories (what has been proven) from my own beliefs.	**To draw conclusions:** With support and modelling I discuss interpretations of scientific data, giving my opinion about what is might mean. **To draw conclusions:** With support and modelling I use the language of cause and effect to explain scientific outcomes.	**To troubleshoot:** With support and modelling I can predict what might go wrong in an experiment, activity or test. **To troubleshoot:** With support and modelling I can account for muddled or failed results in experiments or theories.["I thought it wouldn't matter that one fizzer was broken, but in the results it looks like it did matter"]	**To design:** With support and modelling I can design a simple experiment to answer a general scientific question or test a theory, predicting the possible results. **To design: With support and modelling** I can present my method and results creatively, using graphics, charts and blocks of text.
11	Deep Learning	Spr	Year 4	**To test:** With modelling I am consistent in fair testing (measurements, recording and processes). **To test:** With modelling I can say what I am testing and what I expect the outcome to be.	**To respect:** With modelling I verbalise the risks of scientific processes, incl. e-safety, contributing to a shared risk assessment. **To respect:** With modelling I am aware of the sensitivity of some scientific topics and can separate learning the theories (what has been proven) from my own beliefs, respecting the beliefs of others.	**To draw conclusions:** With support and modelling I discuss interpretations of scientific data, giving and sometimes changing my opinion about what is might mean. **To draw conclusions:** With modelling I use the language of cause and effect to explain scientific outcomes.	**To troubleshoot:** With support and modelling I can predict what might go wrong in an experiment, activity or test. ["If I put different amounts of ink in, then one plant will be redder because of the ink, not because of its xylem, so that's one to watch..."] **To troubleshoot:** With support and modelling I can account for muddled or failed results in experiments or theories.	**To design:** With modelling I can design a simple experiment to answer a general scientific question or test a theory, predicting the possible results. **To design:** With modelling I can present my method and results creatively, using graphics, charts and blocks of text.
12	Deep Learning	Sum	Year 4	**To test:** I am reliably consistent in fair testing (measurements, recording and processes) and can discuss why this is important. **To test:** I confidently explain what I am testing, how, and what I expect the outcome to be.	**To respect:** I can verbalise the risks of scientific processes, incl. e-safety, contributing to a shared risk assessment. **To respect:** I am aware of the sensitivity of some scientific topics and can separate learning the theories from my own beliefs, respecting the beliefs of others and reserving some discussions for philosophy.	**To draw conclusions:** I confidently discuss interpretations of scientific data, giving and sometimes changing my opinion about what is might mean. **To draw conclusions:** I use the language of cause and effect to justify my opinions of scientific outcomes.	**To troubleshoot:** With support and modelling I can predict what might go wrong in an experiment, activity or test. **To troubleshoot:** With support and modelling I can account for muddled or failed results in experiments or theories.	**To design:** I can design a simple experiment to answer a general scientific question or test a theory, predicting the possible results. **To design:** I can present my method and results creatively, using graphics, charts and blocks of text.

PHASE 3

Depth of Learning

Stage of Teaching

Breadth of Learning

				To record	To select	To research	To enquire	To classify
				using	using	using	analysing	Analysing
13	Surface Learning	Aut	Year 5	**To record:** With support and modelling I can write structured accounts of experiments using technical vocabulary. **To record:** With support and modelling I can show change or explain processes with structured or sequential diagrams [e.g. a water cycle flow chart or a before and after bread mould experiment] incl. branching diagrams. **To record:** With support and modelling I can explore and attempt to plot line graphs using simple data.	**To select:** With support and modelling I can suggest and select appropriate equipment for a planned process or experiment, including modelling software and data-logging equipment. **To select:** With support and modelling I can reset and calibrate measuring equipment to ensure reliable results.	**To research:** With support and modelling I can make judgements about the trustworthiness of sources and the up-to-date nature or information in books and online. **To research:** With support and modelling I can sort between relevant and irrelevant scientific information.	**To enquire:** With support and modelling I can begin to recognise when variables cannot be controlled and look for patterns in results instead. **To enquire:** With support and modelling I decide which source of information (observation, testing, data, secondary source) might best answer my question.	**To classify:** With support and modelling I use a series of tests to classify objects. **To classify:** With support and modelling I use keys and branching diagrams to identify and classify unknown quantities. [e.g. sorting between various species of similar organisms or a range of rocks of similar properties]
14	Surface Learning	Spr	Year 5	**To record:** With modelling I can write structured accounts of experiments using technical vocabulary. **To record:** With modelling I can show change or explain processes with structured or sequential diagrams, incl. branching diagrams. **To record:** With modelling I can explore and attempt to plot line graphs using simple data.	**To select:** With modelling I can suggest and select a range of appropriate equipment for a planned process or experiment including modelling software and data-logging equipment. **To select:** With modelling I can reset and calibrate measuring equipment to ensure reliable results.	**To research:** With modelling I can make judgements about the trustworthiness of sources and the up-to-date nature or information in books and online. **To research:** With modelling I can sort between relevant and irrelevant scientific information.	**To enquire:** With modelling I can begin to recognise when variables cannot be controlled and look for patterns in results instead. **To enquire:** With modelling I decide which source of might best answer my question.	**To classify**: With modelling I use a series of tests to sort objects, making notes and labelling to assist me. **To classify:** With modelling I use simple keys and branching diagrams to identify and classify unknown quantities, correcting my mistakes.
15	Enhanced Learning	Sum	Year 5	**To record:** I can write extended structured accounts of experiments using high level technical vocabulary. **To record:** I can show change or explain processes with structured or sequential diagrams, incl. branching diagrams. **To record:** I can independently explore and attempt to plot line graphs using simple data.	**To select:** I can confidently suggest and select a range of appropriate equipment for a planned process or experiment including modelling software and data-logging equipment. **To select:** I can independently reset and calibrate measuring equipment to ensure reliable results.	**To research:** I can make judgements about the trustworthiness of sources and the up-to-date nature or information in books and online. **To research:** I can sort between relevant and irrelevant scientific information.	**To enquire:** I independently decide which source of might best answer my question.	**To classify**: I independently classify objects by sorting systematically, making notes, building sets and use a series of tests to sort objects and materials. **To classify:** I independently use simple keys and branching diagrams to identify and classify unknown quantities, using trial and error to correct my mistakes.
16	Enhanced Learning	Aut	Year 6	**To record:** With support and modelling I can express data in range of ways taught so far, including detailed explanatory diagrams keys (with 4+ categories) and plotting line and scatter graphs using my own data. **To record:** With support and modelling I can formally record structured accounts of scientific experiments, including, justifications, evaluations and balanced arguments.	**To select:** With support and modelling I can read measuring equipment to decimal places (e.g. mm, ml, digital thermometer readings, milisecs on stopwatches and mg.) **To select:** With support and modelling I can plan an equipment list for my own experiments and collaborations, correctly selecting the appropriate scientific instruments.	**To research:** With support and modelling I use research to back up my opinions, citing evidence from secondary sources. **To research:** With support and modelling I can sort reliably between various (a least three) levels of relevance in information and data, noting, storing, archiving and rejecting against criteria.	**To enquire**: With support and modelling I can suggest causal relationships using scientific language. **To enquire:** With support and modelling I recognise when variables cannot be controlled and look for patterns in results instead.	**To classify:** With support and modelling I apply sorting and classification amongst other processes to reach valid results. **To classify:** With support and modelling I can work with various sets and sub sets, reading and making sorting diagrams to several levels. . ["This is the set of birds, these are meat-eaters, these are seed eaters, within meat eaters these are raptors, these are fish catchers etc..."]
17	Deep Learning	Spr	Year 6	**To record:** With modelling I can express data in range of ways taught so far, including detailed explanatory diagrams keys (with 4+ categories) and plotting line and scatter graphs using my own data. **To record:** With modelling I can formally record structured accounts of scientific experiments, including, justifications, evaluations and balanced arguments.	**To select:** With modelling I can read measuring equipment to decimal places. **To select:** With modelling I can plan an equipment list for my own experiments and collaborations, correctly selecting the appropriate scientific instruments, explaining and justifying my choices.	**To research:** With modelling I use research to back up my opinions, citing evidence from secondary sources. **To research:** With modelling I can sort reliably between various (a least three) levels of relevance in information and data, noting, storing, archiving and rejecting against criteria.	**To enquire**: With modelling I can suggest causal relationships using scientific language. **To enquire:** With modelling I recognise when variables cannot be controlled and look for patterns in results instead.	**To classify:** With modelling I apply sorting and classification amongst other processes to reach valid results. **To classify:** With modelling I can work with various sets and sub sets, reading and making sorting diagrams (Venn, Carroll) to several levels.
18	Deep Learning	Sum	Year 6	**To record:** I can express data in range of ways taught so far, including detailed explanatory diagrams keys (with 4+ categories) and plotting line and scatter graphs using my own data. **To record:** I formally record structured accounts of scientific experiments, including, justifications, evaluations and	**To select:** I can independently and accurately read measuring equipment to decimal places. **To select:** I independently plan an equipment list for my own experiments and collaborations, correctly selecting the appropriate scientific instruments, explaining and justifying my choices	**To research:** I independently use research to back up my opinions, citing evidence from secondary sources. **To research:** I reliably can sort reliably between various (a least three) levels of relevance in information and data, noting, storing, archiving and rejecting against criteria	**To enquire**: In my independent enquiry can suggest causal relationships using scientific language. **To enquire:** I recognise when variables cannot be controlled and look for patterns in results instead.	**To classify:** I confidently apply sorting and classification amongst other processes to reach valid results. **To classify:** I can independently work with various sets and sub sets, reading and making sorting diagrams to several levels.

PHASE 3

Depth of Learning

Stage of Teaching

Breadth of Learning

				To test	To respect	To draw conclusions	To troubleshoot	To design
				analysing	analysing / evaluating	evaluating	evaluating	creating
13	Surface Learning	Aut	Year 5	**To test:** With support and modelling I can combine tests to get results, strengthen data or classify objects. **To test:** With support and modelling I test my theories about causal relationships.	**To respect:** With support and modelling I can deal with intimate aspects of human biology or issues such as drugs, alcohol and reproduction sensibly, respecting the feelings and beliefs of others. **To respect:** With support and modelling I can predict risks from the equipment provided.	**To draw conclusions:** With support and modelling I give valid interpretations of data and observed phenomena, which can be demonstrated to be convincing. **To draw conclusions:** I use the language of cause and effect to justify my opinions of scientific outcomes.	**To troubleshoot:** With support and modelling I evaluate the quality of my own data and results, checking my scientific method for weaknesses.	**To design:** With support and modelling I can verbally, electronically and on paper, design tests of two or more parts. **To design:** With support and modelling I express my scientific learning in creative ways including statistical diagrams and illustrated text.
14	Surface Learning	Spr	Year 5	**To test:** With modelling I can combine tests to get results, strengthen data or classify objects. **To test:** With modelling I test my theories about causal relationships.	**To respect:** With modelling I can deal with intimate aspects of human biology or issues such as drugs, alcohol and reproduction sensibly, respecting the feelings and beliefs of others. **To respect:** With modelling I can predict risks from the equipment provided, verbally suggesting risk assessments.	**To draw conclusions:** With support and modelling I give valid interpretations of data and observed phenomena, which can be demonstrated to be convincing. **To draw conclusions:** I use the language of cause and effect to justify my opinions of scientific outcomes.	**To troubleshoot:** With modelling I evaluate the quality of my own data and results, checking my scientific method for weaknesses and explaining them in scientific language.	**To design:** With modelling I can verbally, electronically and on paper, design tests of two or more parts. **To design:** With modelling I express my scientific learning in creative ways including statistical diagrams and illustrated text.
15	Enhanced Learning	Sum	Year 5	**To test:** I independently apply more than one test to a scientific process to tests to get more reliable results, strengthen my data or classify objects. **To test:** I confidently and independently test my theories about causal relationships.	**To respect:** I can deal with sensitive or intimate details in learning sensibly respecting the feelings and beliefs of others. **To respect:** I can assess the risk of an activity based on my experience and my evaluation of the equipment, and can contribute to risk assessment.	**To draw conclusions:** With support and modelling I give valid interpretations of data and observed phenomena, which can be demonstrated to be convincing. **To draw conclusions:** I use the language of cause and effect to justify my opinions of scientific outcomes.	**To troubleshoot:** I confidently evaluate the quality of my own data and results, checking my scientific method for weaknesses and explaining them in scientific language.	**To design:** I independently design tests of two or more parts, verbally, electronically on paper. **To design:** I independently express my scientific learning in creative ways including statistical diagrams and illustrated text.
16	Enhanced Learning	Aut	Year 6	**To test:** With support and modelling I recognise questions and problems which need a test and those which don't.	**To respect:** With support and modelling I can use hazardous equipment and materials safety, discussing the risks beforehand. **To respect:** With support and modelling I can maturely discuss and ask questions about sensitive scientific issues such as reproduction, drugs, alcohol, belief etc. respecting the feelings and beliefs of others.	**To draw conclusions:** With support and modelling my valid verbal and written conclusions are rooted in data, citing process and results as evidence. **To draw conclusions:** With support and modelling I look for patterns in results over multiple tests.	**To troubleshoot:** With support and modelling I evaluate the quality of my own and others' data drawing conclusions about the quality of my preparation, method, recording and results. ["Hmm, if this column has all half the numbers than the last column then maybe it wasn't measured right."] **To draw conclusions:** With support and modelling based on my analysis of results I evaluate the fairness of a test and the trustworthiness of the data.	**To design:** With support and modelling I can plan and develop experiments as a series of tests, involving varied scientific processes. **To design:** With support and modelling I express my scientific learning in a variety of creative ways including flow-charts, statistical diagrams or illustrated text.
17	Deep Learning	Spr	Year 6	**To test:** With support and modelling I recognise questions and problems which need a test and those which don't, giving reasons why.	**To respect:** With modelling I can use hazardous equipment and materials safety, discussing the risks then drafting and referring to a risk assessment. **To respect:** With modelling I can maturely discuss and ask questions about sensitive scientific issues such as reproduction, drugs, alcohol, belief etc. respecting the feelings and beliefs of others.	**To draw conclusions:** With modelling my valid verbal and written conclusions are rooted in data, citing process and results as evidence. **To draw conclusions:** With modelling I look for patterns in results over multiple tests, drawing conclusion from data spreads and discussing trends and anomalies.	**To troubleshoot:** With modelling I evaluate the quality of my own and others' data drawing conclusions about the quality of my preparation, method, recording and results. **To draw conclusions:** With modelling based on my analysis of results I evaluate the fairness of a test and the trustworthiness of the data.	**To design:** With modelling I can plan and develop experiments as a series of tests, involving varied processes ["We will sort these materials, then we'll fair tests the porous ones"]. **To design:** With modelling I express my scientific learning in a variety of creative ways including detailed, labelled flow-charts, statistical diagrams or extended illustrated text.
18	Deep Learning	Sum	Year 6	**To test:** I recognise questions and problems which need a test and those which don't, giving reasons why.	**To respect:** I can use hazardous equipment and materials safety, discussing the risks beforehand, drafting and referring to a risk assessment. **To respect:** I can maturely discuss and ask questions about sensitive scientific issues such as reproduction, drugs, alcohol, belief etc. respecting the feelings and beliefs of others.	**To draw conclusions:** My valid independent verbal and written conclusions are rooted in data, citing process and results as evidence **To draw conclusions:** I independently and reliably look for patterns in results over multiple tests, drawing conclusion from data spreads and discussing trends and anomalies.	**To troubleshoot** I independently and reliably evaluate the quality of my own and others' data drawing conclusions about the quality of my preparation, method, recording and results. **To draw conclusions:** Based on my independent analysis of results I evaluate the fairness of a test and the trustworthiness of the data.	**To design:** I plan and develop experiments creatively as a series of tests, adapting as I go and using varied processes. **To design:** I express my scientific learning in a variety of creative ways including detailed, labelled flow-charts, statistical diagrams or extended illustrated text.