

Scientific Knowledge and Conceptual Understanding

		Nursery 30-50 months	Reception	Phase 1 Key Stage 1 Year 1 & 2	Phase 2 Lower Key Stage 2 Year 3 & 4	Phase 3 Upper Key Stage 2 Year 5 & 6
National Curriculum Subject Content	Plants	<ul style="list-style-type: none"> ❖ Relating to real life experiences: what plants need to stay healthy, names of plants and simple parts. ❖ <i>Comment and ask questions about aspects of their familiar world such as the place where they live or the natural world</i> ❖ <i>Children can talk about some of the things they have observed such as plants or animals</i> ❖ <i>Develop an understanding of growth, decay and changes over time</i> 	<ul style="list-style-type: none"> ❖ <i>Talk about features of their own immediate environment and how environments might vary from one another</i> ❖ <i>Children make observations of animals and plants and explain why some things occur and talk about changes</i> ❖ Children start to use names of plants and their parts in context 	<ul style="list-style-type: none"> ❖ 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 ❖ 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. 	<ul style="list-style-type: none"> ✚ 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 ✚ 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 	
	Animals, Including Humans	<ul style="list-style-type: none"> ✚ <i>Observe the effects of activity on their body eg feel for heart after running around</i> ✚ <i>Can tell an adult when they are hungry or tired.</i> ✚ <i>What we/animals need to stay healthy</i> ✚ <i>Comment and ask questions about aspects of their familiar world such as the place where they live or the natural world</i> ✚ <i>Children can talk about some of the things they have observed such as plants or animal, natural and found objects</i> ✚ <i>Naming simple body parts of insects eg wings, legs</i> ✚ <i>Singing songs to develop awareness of body parts</i> 	<ul style="list-style-type: none"> ✚ <i>They show sensitivity to others needs and feelings.</i> ✚ <i>Children know about the importance for good health, physical exercise and a healthy diet. Children can talk about ways to keep healthy and safe.</i> ✚ <i>Children manage their own personal hygiene and basic successfully.</i> ✚ <i>Children make observations of animals and plants and explain why some things occur and talk about changes</i> ✚ <i>Children know about similarities and differences between themselves and others</i> 	<ul style="list-style-type: none"> ✚ 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 ✚ 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 ✚ notice that animals, including humans, have offspring which grow into adults ✚ find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ✚ describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene 	<ul style="list-style-type: none"> ✚ 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 ✚ identify that humans and some other animals have skeletons and muscles for support, protection and movement ✚ describe the simple functions of the basic parts of the digestive system in humans ✚ identify the different types of teeth in humans and their simple functions ✚ construct and interpret a variety of food chains, identifying producers, predators and prey 	<ul style="list-style-type: none"> ✚ describe the changes as humans develop to old age ✚ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood ✚ recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function ✚ describe the ways in which nutrients and water are transported within animals, including humans

National Curriculum Subject Content	Living Things and Their Habitats	<ul style="list-style-type: none"> Comment and ask questions about aspects of their familiar world such as the place where they live or the natural world Develop an understanding of growth, decay and changes over time Show care and concern for living things and their environment Creating temporary habitats for living creatures Explore how things grow and the speed at which they grow Opportunities to observe caterpillars grow into butterflies Talking about and observe eggs hatching 	<ul style="list-style-type: none"> Children know that some behaviour is unacceptable eg looking after animals Children know about similarities and differences in relation to living things Opportunities to observe caterpillars grow into butterflies, use vocabulary linked to the life cycle to explain changes Name simple animals that hatch from eggs Explore woodland animals and their homes 	<ul style="list-style-type: none"> Explore and compare the difference 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 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 microhabitats 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird describe the life process of reproduction in some plants and animals describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals give reasons for classifying plants and animals based on specific characteristics.
		<ul style="list-style-type: none"> Talk about why things happen and how things work Explore colours and how colours can be changed Dark den to experience dark spaces 	<ul style="list-style-type: none"> Opportunities to explore darkness, light and shadows using different sources of light 		<ul style="list-style-type: none"> 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 recognise that shadows are formed when the light from a light source is blocked by an opaque object find patterns in the way that the size of shadows change 	<ul style="list-style-type: none"> 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

National Curriculum Subject Content	Forces and Magnets	<ul style="list-style-type: none"> Talk about why things happen and how things work Explore magnets and materials Games that use magnets eg fishing with magnets Vocabulary: Magnets that like each other and magnets that don't Use of magnetic numbers and letters 	<ul style="list-style-type: none"> Talking about materials that are magnetic and starting to name things that are or aren't magnetic Opportunities to explore magnets in different contexts, games, outside, real life (fridge magnets) 		<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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
	Seasonal Change	<ul style="list-style-type: none"> <i>Talk about why things happen and how things work</i> Daily weather song Garden clothing rule and the changing weather Weathers effect on the garden – windy day so what can we have out? Encouraging observations of weather changes Watch seasonal videos Outdoor learning whatever the weather and change clothing appropriately 	<ul style="list-style-type: none"> Daily talk about the weather and seasons Explore seasons through books and song Role play opportunities for different weather/seasons Learning about what happens during each season through hands on experiences 	<ul style="list-style-type: none"> observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies 		

National Curriculum Subject Content					
Materials					
	<ul style="list-style-type: none"> Talk about indoor and outdoor toys and how what they are made of affects where they are used Using felt tip pens, water and filter paper to investigate what happens with those materials and different colours Adult let talk about objects that are made of different materials Sensory experiences with different materials ICT game sorting rubbish into different categories Recycling and rubbish bin, support to use correct one Shape of materials while constructions, talking about which ones work in different places Adult let talk about strengths of materials during creative activity Experiences of changing shapes of malleable materials, squashed, bent, stood on 	<ul style="list-style-type: none"> <i>Children know about similarities and differences in relation to materials</i> <i>They safely use and explore a variety of materials</i> <i>experimenting with colour, design, texture, form and function.</i> Children will use basic vocabulary about the properties of materials, hard, soft, smooth, sharp. Children will talk about malleable materials using some language like squash, stretch, bend 	<p>Uses of Everyday Materials</p> <ul style="list-style-type: none"> 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. 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. 	<p>Rocks</p> <ul style="list-style-type: none"> 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 	<p>Properties and Changes of Materials</p> <ul style="list-style-type: none"> 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.

National Curriculum Subject Content	Sound	<ul style="list-style-type: none"> Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound. Exposure to sound through talk around outdoor and indoor voices Vocabulary modelled: loud, quiet, volume, mute Adult modelled and suggested activities using musical instruments 	<ul style="list-style-type: none"> Children will identify that they can hear with their ears Opportunities to explore musical instruments Children begin to use vocabulary such as loud, quiet, noisy, silent, louder, quieter 	<ul style="list-style-type: none"> Observe and name a variety of sources of sound, noticing that we hear with our ears Recognise that sounds get fainter as the distance from the sound source increases 	<ul style="list-style-type: none"> identify how sounds are made, associating some of them with something vibrating 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 	
	Evolution and Inheritance					<ul style="list-style-type: none"> 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 identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
	States of Matter				<ul style="list-style-type: none"> 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) identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature 	

Cedars Primary School Breadth of Study in Science

National Curriculum Subject Content	Earth and Space	<ul style="list-style-type: none"> Use of a globe to look at the Earth Flying saucer songs to explore space Lots of talk about moon, stars and the sun 	<ul style="list-style-type: none"> Use of a globe to look at the Earth, children begin to use the terms Earth and space Look at the sky and talk about the moon, stars and the sun 			<ul style="list-style-type: none"> 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
	Electricity	<ul style="list-style-type: none"> Talk about why things happen and how things work Talk about equipment Questions: How do we turn it on? Etc Making children aware of electricity 	<ul style="list-style-type: none"> Linking electricity to real life, charging iPad, using kettles and toasters in role play 		<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit 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

Nature, Processes and Methods of Science Through Scientific Enquiry

		Nursery	Reception	Phase 1 Key Stage 1 Year 1 & 2	Phase 2 Lower Key Stage 2 Year 3 & 4	Phase 3 Upper Key Stage 2 Year 5 & 6
Working Scientifically	Strand: Asking Questions	❖ Asking simple questions after hearing an adult role model	❖ Asking simple questions	❖ asking simple questions and recognising that they can be answered in different ways	❖ asking relevant questions and using different types of scientific enquiries to answer them ❖ setting up simple practical enquiries, comparative and fair tests	❖ Plan different types of Scientific enquiries to answer questions including recognising and controlling variables where necessary.
	Classification	Thumbs up/thumbs down for answering simple questions	Answer a yes/no question to aid sorting	Ask a yes/no question to aid sorting Identify the headings for 2 groups	Ask a yes/no question to aid sorting Be able to put appropriate headings onto intersecting Venn and Carroll diagrams	Ask a range of yes/no questions to aid sorting and decide which ways of sorting will give useful information Identify specific clear questions that will help to sort without ambiguity
	Research	After being exposed to role modelling, children begin to form questions and find out the answer with an adult	Ask a simple question related to the topic	Ask one or two simple questions linked to a topic	Ask a range of questions linked to a topic Choose a source from a range provided	To ask a range of questions recognising that some can be answered through research and others may not Choose suitable sources to use
	Comparative or Fair Test	Practical opportunities in context, car races, pancake races etc. Start at the same point to make it fair.	Begin to use equipment in the environment to investigate an idea or question	Identify a question to investigate from a scenario or choose a question from a range provided Choose equipment to use, decide what to do and what to observe or measure in order to answer the question	Ask a range of relevant questions linked to a topic Decide what to change or what to measure or observe Use results from an investigation to make a prediction about a further result	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results Recognise and control variables where necessary Use test results to make predictions for further investigations
	Observation over time	Adult led experiments to watch what happens over time eg plant growing Role modelling of predicting what might happen.	Observe changes over time with adult support	Ask a question about what might happen in the future based on observation Choose equipment to use, decide what to do and what to observe or measure in order to answer the question	Ask a range of relevant questions linked to a topic Decide what to measure or observe Decide how often to take a measurement Use results from an investigation to make a prediction about a further result	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results Recognise and control variables where necessary Use test results to make predictions for further investigations
	Pattern Seeking	With the adult, exploring the environment to look for patterns eg sunflower heads and apple cores	Explore the environment and begin to notice patterns	Ask a question that is looking for a pattern based on observations Choose equipment to use, decide what to do and what to observe or measure in order to answer the question	Ask a range of relevant questions linked to a topic Decide what to measure or observe Use results from an investigation to make a prediction about a further result	Ask a range of questions and identify the type of enquiry that will help to answer the questions. Ask further questions based on results Recognise and control variables where necessary Use test results to make predictions for further investigations

		Nursery	Reception	Phase 1 Key Stage 1 Year 1 & 2	Phase 2 Lower Key Stage 2 Year 3 & 4	Phase 3 Upper Key Stage 2 Year 5 & 6
Working Scientifically	Strand: Measuring and Recording	<ul style="list-style-type: none"> ❖ Use simple equipment with support such as magnifying glasses ❖ Adult led to support with observations 	<ul style="list-style-type: none"> ❖ Use simple equipment such as magnifying glasses ❖ Observing closely 	<ul style="list-style-type: none"> ❖ observing closely, using simple equipment ❖ performing simple tests ❖ gathering and recording data to help in answering questions 	<ul style="list-style-type: none"> ❖ making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers gathering, recording, classifying and presenting data in a variety of ways to help in answering questions ❖ gathering, recording, classifying and presenting data in a variety of ways to help in answering questions ❖ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables 	<ul style="list-style-type: none"> ❖ taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate ❖ recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
	Scientific Enquiry Skills					
	Classification	Alongside an adult role model, beginning to classify everyday animals or objects into type, size, colour etc	Beginning to sort objects/animals into simple groups eg colour, shape, size	Compare objects based on obvious, observable features e.g. size, shape, colour and texture	Be able to compare objects based on more sophisticated, observable features. Present observations in labelled diagrams.	To be able to compare not only based on physical properties but also on knowledge gained through previous enquiry
	Research					
	Comparative or Fair Test	Role model asking and answering questions from simple scientific experiments Adult led mark making to record observations	Recording data using simple sorting charts and tables designed by adults Child led mark making such as labelling where an object stopped	Make observations linked to answering the question When appropriate measure using standard units where all the numbers are marked on the scale Record data in simple prepared tables pictorially or by taking photographs	Make observations linked to answering the question Measure using standard units where not all the numbers are marked on the scale, take repeat readings where necessary Prepare own tables to record data	Make observations linked to answering the question Measure using standard units using equipment that has scales involving decimals Prepare own tables to record data, including columns for taking repeat readings

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		Observation over time	Visual representations of changes Photos, drawings etc.	Children to begin to draw pictures of changes	Record data in simple prepared tables pictorially or by taking photographs Making observations linked to answering questions. When appropriate measure using standard units where all the numbers are marked on the scale Record data in simple prepared tables pictorially or by taking photographs	Make a range of relevant observations Measure using standard units where not all numbers are marked on the scale Use data loggers to measure over time Prepare own tables to record data	Make observations linked to answering the question Measure using standard units using equipment that has scales involving decimals
		Pattern Seeking	Adult to create patterns with chalks etc for children to copy	Children to begin to draw observations that have been noticed	Make observations linked to answering questions. When appropriate measure using standard units where all the numbers are marked on the scale Record data in simple, prepared tables and tally charts	Make a range of relevant observations Measure using standard units where not all numbers are marked on the scale Prepare own tables to record data	Make observations linked to answering the question Measure using standard units using equipment that has scales involving decimals

		Nursery 30-50 Months	Reception 40-60 Months	Phase 1 Key Stage 1 Year 1 & 2	Phase 2 Lower Key Stage 2 Year 3 & 4	Phase 3 Upper Key Stage 2 Year 5 & 6
Working Scientific Skills	Scientific Enquiry Skills	❖ Begin to identify and classify with adult support	❖ Begin to identify and classify	❖ identifying and classifying ❖ using their observations and ideas to suggest answers to questions	❖ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ❖ using straightforward scientific evidence to answer questions or to support their findings ❖ identifying differences, similarities or changes related to simple scientific ideas and processes	❖ reporting and presenting 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 ❖ identifying scientific evidence that has been used to support or refute ideas or arguments
		<div>Strand: Evaluating</div>				

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		Classification	Adults to encourage and model a summing up of the sorting in a practical or verbal way	With an adult sort objects and living things into 2 groups using a simple table Talk about the number of objects in each group i.e. which has more or less with adult support	To sort objects and living things into 2 groups using a basic Venn diagram or simple table. Talk about the number of objects in each group i.e. which has more or less	Sort objects and living things into groups using intersecting Venn and Carroll diagrams Spot patterns in data particularly two criteria with no examples e.g. there are no living things with wings and no legs. Draw simple conclusions when appropriate for patterns e.g. a flying insect with no legs might always crash land	Create branching databases (tree diagrams), and keys to enable others to name living things and objects To be able to talk about the features that objects and living things share and do not share based on information in the key etc. Be able to use data to show that living things and materials that are grouped together have more things in common than with things in other groups
		Research			Present what they have learnt verbally or using pictures Be able to answer their questions using simple sentences	Present what they learnt verbally or using labelled diagrams Be able to answer their questions using simple scientific language	Present what they learnt in a range of ways e.g. different graphic organisers Be able to answer their questions using scientific evidence gained from a range of sources
		Comparative or Fair Test	Adult will model telling a friend or another adult who won, very simplistic language and children will begin to use independently	Children will begin to notice and comment on observations starting to use pictures to support their findings	Present what they learnt verbally using pictures or block diagrams Answer their question in simple sentences using their observations or measurements	Present data in bar charts Refer directly to the evidence when answering their question Where appropriate provide oral or written explanations for their findings	Choose an appropriate form of presentation including line graphs Be able to answer their question describing causal relationships Provide oral or written explanations for their findings
		Observation over time	Verbal feedback about observations with adult support	Verbal feedback about observations	Present what they learnt verbally or using pictures Answer their own questions in simple sentences using observations or measurements	Present data in time graphs Refer directly to the evidence when answering their question Where appropriate provide oral or written explanations for their findings	Choose an appropriate form of presentation including line graphs Be able to answer their question describing causal relationships Provide oral or written explanations for their findings
		Pattern Seeking	Adult to model verbally what has been learnt	Present what they learnt verbally with support from an adult if needed	Present what they learnt verbally Answer their own questions in simple sentences using observations or measurements	Use IT package to present data as a scatter gram Refer directly to the evidence when answering their question Where appropriate provide oral or written explanations for their findings	Choose an appropriate form of presentation including scatter graphs Be able to answer their question describing causal relationships Provide oral or written explanations for their findings

				Phase 1 Key Stage 1 Year 1 & 2	Phase 2 Lower Key Stage 2 Year 3 & 4	Phase 3 Upper Key Stage 2 Year 5 & 6
Working Scientifically : Measuring and Recording	Scientific Enquiry Skills	Strand: Concluding			❖ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	❖ using test results to make predictions to set up further comparative and fair tests
		Classification			<i>Suggest improvement e.g. a wider range of objects – only looked at British trees. Suggest new questions arising from the investigation.</i>	<i>Be able to explain using evidence that the branching database or classification key will only work for the living things or materials it was created for</i>
		Research			<i>Suggest limitations e.g. only had one book. Suggest new questions arising from the investigation.</i>	<i>Be able to talk their degree of trust in the sources they have used</i>
		Comparative or Fair Test			<i>Suggest improvements e.g. the method of taking measurements. Suggest new questions arising from the investigation.</i>	<i>Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results</i>
		Observation over time			<i>Suggest improvements e.g. need to make observations more regularly. Suggest new questions arising from the investigation.</i>	<i>Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results</i>
		Pattern Seeking			<i>Explain their degree of trust in their results e.g. precision in taking measurement, variables that may not have been controlled and accuracy of results.</i>	<i>Explain their degree of trust in their results e.g. precision in taking measurements, variables that may not have been controlled and accuracy of results</i>