

What will a Morpeth Partnership Scientist look like?				
	At the end of EYFS they will have the following skills:	At the end of Year 2 they will have the following skills:	At the end of Year 4 they will have the following skills:	By the end of Year 6 they will have the following skills:
Being a Scientist	The principal focus of science teaching in Early Years is to enable pupils to develop emerging science skills required as precursors to the statutory requirements of Working Scientifically in Science for Key Stage One. Children should; • be encouraged to show curiosity about objects and people. • know how to take risks, engage in new experiences and learn by trial and error. • find ways to solve problems, find new ways to do things and test their ideas. • develop ideas of grouping, sequences, cause and effect • know about	The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and	The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things,	The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types

	similarities and differences in relation to objects, materials and living things - comment and ask questions about aspects of the natural world - observe and make links in their experiences - answer how and why questions about their experiences - make observations of animals and plants, explain why some things occur and talk about changes - build up scientific vocabulary that reflects the breadth of their experiences	communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word-reading and spelling knowledge at key stage 1. <u>Working scientifically:</u> During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: - asking simple questions and recognising that they can be answered in different ways - observing closely, using simple equipment - performing simple tests	carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word-reading and spelling knowledge. <u>Working scientifically:</u> During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: - asking relevant questions and using different types of scientific enquiries to answer them - setting up simple	of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings. Pupils should read, spell and pronounce scientific vocabulary correctly. <u>Working scientifically:</u> During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: planning different types of scientific enquiries to answer questions, including recognising
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		• identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	practical enquiries, comparative and fair tests • 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 • recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and	and controlling variables where necessary • 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 • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific
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			conclusions • using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • identifying differences, similarities or changes related to simple scientific ideas and processes • using straightforward scientific evidence to answer questions or to support their findings.	evidence that has been used to support or refute ideas or arguments
Knowledge		At Key Stage 1, pupils in the Morpeth Partnership are taught about: • Plants • Animals, including humans • Everyday materials (Y1) and their uses (Y2) • Seasonal changes • Living things and their habitats Please see the Primary National Curriculum document for Year 1 and 2 detail		
		At Lower Key Stage 2, pupils in the Morpeth Partnership are taught about: • Plants • Animals, including humans • Rocks		

		• Light • Forces and magnets • Living things and their habitats • States of matter • Sound • Electricity Please see the Primary National Curriculum document for Year 3 and 4 detail
	Key Stage Transition Document	At Upper Key Stage 2, pupils in the Morpeth Partnership are taught about: • Living things and their habitats • Animals, including humans • Properties and changes of materials • Earth and space • Forces • Evolution and inheritance • Light • Electricity Please see the Primary National Curriculum document for Year 5 and 6 detail
		At Key Stage 3, pupils in the Morpeth Partnership are taught about: • Cells, tissues, organs and systems • Sexual reproduction in animals • Muscles and bones • Ecosystems • Mixtures and separation • Acids and alkalis • Particle model • Atoms, elements and molecules

		• Energy • Current electricity • Forces • Sound • Food and nutrition • Plants and their reproduction • Breathing and respiration • Unicellular organisms • Combustion • Periodic table • Metals and their uses • Fluids • Light • Energy transfers • Earth and space
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Progression of key skills from EYFS - Y6

	Planning, communication and sources	Enquiring, testing, obtaining and presenting evidence	Observing and recording	Considering evidence and evaluating
End of EYFS	Raise their own simple questions Begin to recognise different ways in which they might answer scientific questions Ask people questions and	Experience different types of Science enquiries including practical activities Observe closely using simple equipment eg magnifying glasses. Observe changes over time	Make observations of animals and plants and explain why some things occur, and talk about changes Develop their own explanations by connecting	When reflecting, build up scientific vocabulary that reflects the breadth of their experience. Create simple representations of events and objects.

	use simple secondary sources to find answers	Develop ideas about grouping	ideas.	Make links and notice patterns in their experience.
End of Year 1	draw simple pictures talk about what they see and do use simple charts to communicate findings identify key features ask questions	test ideas suggested to them say what they think will happen use first hand experiences to answer questions begin to compare some living things	make observations using appropriate senses record observations Communicate observations orally, in drawing, labelling, simple writing and using information technology	make simple comparisons and groupings say what has happened say whether what has happened was what they expected
End of Year 2	describe their observations using some scientific vocabulary use a range of simple texts to find information suggest how to find things out identify key features ask questions	use simple equipment provided to aid observation compare objects, living things or events make observations relevant to their task begin to recognise when a test or comparison is unfair use first hand experiences to answer questions	respond to questions asked by the teacher ask questions collect and record data (supported by the teacher) suggest how they could collect data to answer questions begin to select equipment from a limited range	say what has happened say what their observations show and whether it was what they expected begin to draw simple conclusions and explain what they did begin to suggest improvements in their work
End of Year 3	use pictures, writing, diagrams and tables as directed by their teacher use simple texts, directed by the teacher, to find information	put forward own ideas about how to find the answers to questions recognise the need to collect data to answer questions carry out a fair test with	make relevant observations measure using given equipment select equipment from a limited range	begin to offer explanations for what they see and communicate in a scientific way what they have found out

	record their observations in written, pictorial and diagrammatic forms select the appropriate format to record their observations	support recognise and explain why it is a fair test with help, pupils begin to realise that scientific ideas are based on evidence		begin to identify patterns in recorded measurements suggest improvements in their work evaluate their findings
End of Year 4	record observations, comparisons and measurements using tables and bar charts begin to plot points to form a simple graph use graphs to point out and interpret patterns in their data select information from a range of sources provided for them	with help, pupils begin to realise that scientific ideas are based on evidence show in the way they perform their tasks how to vary one factor while keeping others the same decide on an appropriate approach in their own investigations to answer questions describe which factors they are varying and which will remain the same and say why	carry out measurement accurately make a series of observations, comparisons and measurements select and use suitable equipment make a series of observations and measurements adequate for the task	predict outcomes using previous experience and knowledge and compare with actual results begin to relate their conclusions to scientific knowledge and understanding suggest improvements in their work, giving reasons
End of Year 5	record observations systematically use appropriate scientific language and conventions to communicate quantitative and qualitative data select a range of	use previous knowledge and experience combined with experimental evidence to provide scientific explanations recognise the key factors to be considered in carrying out a fair	make a series of observations, comparisons and measurements with increasing precision select apparatus for a range of tasks plan to use apparatus	make predictions based on their scientific knowledge and understanding draw conclusions that are consistent with the evidence relate evidence to scientific

	appropriate sources of information including books and the internet	test	effectively begin to make repeat observations and measurements systematically	knowledge and understanding offer simple explanations for any differences in their results make practical suggestions about how their working methods could be improved
End of Year 6	choose scales for graphs which show data and features effectively identify measurements and observations which do not fit into the main pattern begin to explain anomalous data use appropriate ways to communicate quantitative data using scientific language	describe evidence for a scientific idea use scientific knowledge to identify an approach for an investigation explain how the interpretation leads to new ideas	measure quantities with precision using fine –scale divisions select and use information effectively make enough measurements or observations for the required task	make reasoned suggestions on how to improve working methods show how interpretation of evidence leads to new ideas explain conclusions, showing understanding of scientific ideas
	Scientific attitudes	Experimental skills and investigations	Analysis and evaluation	Measurement
End of KS3	Pay attention to objectivity and concern for accuracy,	Ask questions and develop a line of enquiry based on observations of the real world,	Apply mathematical concepts and calculate results (7A)(8I).	Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry)

	precision, repeatability and reproducibility. (8F) Understand that scientific methods and theories develop (8E) as earlier explanations are modified to take account of new evidence and ideas (7G), together with the importance of publishing results and peer review (8L). Evaluate risks (7E)(7F).	alongside prior knowledge and experience (7F)(8C). Make predictions using scientific knowledge and understanding (throughout). Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables (throughout). Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety (7E)(7F).	Present observations and data using appropriate methods, including tables and graphs (8E)(8L). Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions (throughout). Present reasoned explanations, including explaining data in relation to predictions and hypotheses (8F). Evaluate data, showing awareness of potential sources of random and	chemical nomenclature (7A)(8I). Use and derive simple equations and carry out appropriate calculations (7H)(8G). Undertake basic data analysis including simple statistical techniques (throughout).
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		Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements (throughout). Apply sampling techniques. (8D)	systematic error (throughout). Identify further questions arising from their results (7K).	
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Scientific concepts

At the end of Key Stage 1, the pupils will have developed an understanding of the following scientific concepts:	At the end of Key Stage 2, the pupils will have developed an understanding of the following scientific concepts:
Life processes - living, not living or never been alive, basic needs, survival Human body and senses Exercise, food and hygiene Variety of common animals e.g fish, mammals, amphibians	Life processes - reproduction in plants and animals, development to old age Skeleton and muscles Nutrition and the digestive system Food chains

Plants - deciduous and evergreen trees, what plants need to stay alive Structure of plants and trees Habitats and microhabitats Food chain and sources of food Materials - what are they, what are their properties and how are they used? Can they be changed? Seasons - why do they occur? Weather	Teeth and their simple functions Circulatory system - heart, blood vessels and blood Digestive system in humans Diet, exercise, drugs and lifestyle Functions of plants e.g roots, stem and what plants need for life and growth Life cycle of flowering plants and mammals, amphibians, insects, bird Classification of living things Materials - physical and chemical properties Solids, liquids and gases Changes of state Dissolving Chemical change Day and night Moon, Sun, Stars Solar system Erosion Igneous, metamorphic and sedimentary rocks Soil Weathering and its impact Sources of light How eyes function How light travels Rainbows Shadows Force Gravity
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	Friction Air and water resistance Application of forces Magnetic force Sound Loudness, pitch, echoes Ears and how they work Electricity Circuits, voltage, conductors, insulators, switches Resistance Static electricity (Upper KS2) Evolution and fossil record Natural selection Survival of the fittest Natural variation in living things Artificial variation in living things
At the end of Key Stage 3, the pupils will have developed an understanding of the following scientific concepts:	
7A Cells, Tissues, Organs and Organ Systems Understand the structure and function of cells. 7B Sexual Reproduction in Animals Describe the process of reproduction in animals. 7C Muscles and Bones Understand the role of muscles and bones within the body. 7D Ecosystems Explain how living things are adapted to their habitats and how they interact with one another. 7E Mixtures and Separation Carry out simple separation techniques e.g. filtration, evaporation, distillation and chromatography. 7F Acids and Alkalis Explore, classify and understand the uses of a range of common acids and alkalis.	

7G Particle Model Understand the arrangement and behaviour of particles in the solid, liquid and gaseous states.

7H Atoms, Elements and Molecules Identify elements, mixtures and compounds from descriptions and particle diagrams.

7I Energy Understand how energy is stored, released and transferred and know the key difference between renewable and non-renewable energy sources.

7J Current Electricity Explain the principles of current, potential difference and resistance in series and parallel electrical circuits.

7K Forces Describe, measure and represent a range of contact and non-contact forces.

7L Sound Describe the key features and principles of waves and understand waves as a mode of energy transfer.

8A Food and Nutrition Describe the biological process of digestion and understand the importance of a balanced diet.

8B Plants and their Reproduction Understand the process of reproduction in plants.

8C Breathing and Respiration Understand the process of gas exchange and how energy is released in the body.

8D Unicellular Organisms Explain the differences between unicellular and multicellular organisms.

8E Combustion Explain how hydrogen and hydrocarbons react with oxygen.

8F The Periodic Table Understand how to group elements based on their physical properties and chemical behaviour.

8G Metals and their Uses Describe the common properties of metals and explain how they react with acids, water and oxygen.

8H Rocks Describe the rock cycle in terms of the formation of igneous, sedimentary and metamorphic rocks.

8I Fluids Describe how the density of objects and the pressure within a fluid can be explained in terms of the particle model.

8J Light Be able to describe how light travels and interacts with different media.

8K Energy Transfers Understand how energy is stored and transferred.

8L Earth and Space Describe the Earth's position within the Solar System in relation to stars, constellations and galaxies.