Science at Ashleigh– Curriculum Map

At Ashleigh, we believe in the importance of children building their scientific knowledge and skills towards our 'Big Ideas of Science at Ashleigh'. It is hoped that even in an ever changing world these 'big ideas' will enable both children and teachers to feel they are working together to build their smaller ideas of learning towards these broader underlying ideas that have a wide application.

What are the 'Big Ideas of Science' at Ashleigh?

Biology:

- *Living things are special collections of matter that make copies of themselves, use energy and grow.*
- *Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.*
- *The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.*

Chemistry:

- *All matter (stuff) in the universe is made up of tiny building blocks.*
- *The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).*
- *Matter can change if the arrangement of these building blocks changes.*

Physics:

- *The universe follows unbreakable rules that are all about forces, matter and energy.*
- *Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.*
- *Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.*

Earth Science:

- *The Earth is one of eight planets that orbit the sun.*
- *The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.*
- *The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)*

To help children and teachers build towards the 'Ashleigh Big Ideas' science leaders have mapped the National Curriculum units to a progressive series of questions, which gradually will help to generate curiosity as well as show progress. This curriculum map will also prompt opportunities for teachers to revisit previous areas of learning to ensure prior knowledge is secure.

What is taught where?

Year Group	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
EYFS	Science, within EYFS, is covered within the Understanding the World aspect of the EYFS Curriculum. We teach specific science knowledge and skills through topics mapped across the year, relating to the children's interests. Children also have the opportunity within EYFS to explore and embed scientific skills and knowledge through enhancements and continuous provision. By the end of EYFS, children will have been exposed to, explored and developed knowledge and skills, which cover the following areas: Our Bodies, Seasons, Animals, Growing, Farming, Space, Light and Dark.					
Year 1	What are bodies and what do they do?	What are things made from?		What are the different types of weather?	What is alive?	What other types of things are alive?
NC unit	Animals including humans (parts of the body only) TOPIC: 'Here come the Aliens'	Seasonal changes Everyday materials Topic: 'Light and Dark'	Everyday materials Topic: 'Toys'	Seasonal changes	Plants Topic: 'How does your garden grow?'	Animals including humans. (remaining parts of unit) Topic: 'We're going to the Zoo.'

Year 2	Stand Alone unit – not on National Curriculum.	How do we choose materials?	How can we change the shape of some materials?	What is alive, dead or was never alive?	Can living things stay healthy and live forever?	What do living things need to survive?
NC unit	Engagement in Science	Uses of everyday materials	Uses of everyday materials	Plants	Living things and their habitats	Animals including humans
Year 3	Are all rocks the same?	What can magnets do?	What is the dark?	How do living things work?		Do living things need different things to survive?
NC unit	Rocks	Forces & Magnets	Light	Animals including humans		Plants
Year 4	Is water always wet?	What do our bodies do with the food we eat?	How do we hear different sounds?	Can we control electricity?	Living things: What's the same and what's different? Are living things in danger?	
NC unit	States of matter	Animals including humans	Sound	Electricity	Living things and their habitats	

Year 5	Do all life cycles look the same?	How do things move?	Sun, Earth and Moon: what is moving?	How do bodies change, as we get older?		What are things made from and can we change them?
NC unit	Living things and their habitats	Forces	Earth & Space	Animals including humans		Properties and changes of materials
Year 6	How do our choices affect how our bodies work?	Living things: what's the same and what's different?	How do living things change over time and place?		How do we see?	How can we vary the effects of electricity?
NC unit	Animals including humans	Living things in their habitats	Evolution & Inheritance		Light	Electricity

What are the 'Ashleigh Big Ideas of Science' that our bank of scientific knowledge and mastery of scientific skills build towards?

<table>
<tr>
<td>Biology</td>
<td>
B1: Living things are special collections of matter that make copies of themselves, use energy and grow.
B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.
B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Progression in Biology units towards 'Ashleigh Big Ideas':
<table>
<tr><td>What are bodies and what do they do? (Y1)</td></tr>
<tr><td>What is alive? (Y1)</td></tr>
<tr><td>What other types of things are alive? (Y1)</td></tr>
<tr><td>What is alive, dead or was never alive? (Y2)</td></tr>
<tr><td>Can living things stay healthy and live forever? (Y2)</td></tr>
<tr><td>What do living things need to survive? (Y2)</td></tr>
<tr><td>How do living things work? (Y3)</td></tr>
<tr><td>Do living things need different things to survive? (Y3)</td></tr>
<tr><td>What do our bodies do with the food we eat? (Y4)</td></tr>
<tr><td>Living things: What is the same and what's different? Are living things in danger? (Y4)</td></tr>
<tr><td>Do all life cycles look the same? (Y5)</td></tr>
<tr><td>How do bodies change, as we get older? (Y5)</td></tr>
<tr><td>How do our choices affect how our bodies work? (Y6)</td></tr>
<tr><td>Living things: what is the same and what's different? (Y6)</td></tr>
<tr><td>How do living things change over time and place? (Y6)</td></tr>
</table>
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<td>Chemistry</td>
<td>C1: All matter (stuff) in the universe is made up of tiny building blocks.</td>
</tr>
</table>

	C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc). *C3: Matter can change if the arrangement of these building blocks changes.* Progression in Chemistry units towards 'Ashleigh Big Ideas': What are things made from? (Y1) How do we choose materials? (Y2) How can we change the shape of some materials? (Y2) Are all rocks the same? (Y3) Is water always wet? (Y4) What are things made from and can we change them? (Y5) 
Physics	*P1: The universe follows unbreakable rules that are all about forces, matter and energy.* *P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.* *P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.* Progression in Physics units towards 'Ashleigh Big Ideas': What can magnets do? (Y3) What is the dark? (Y3) How do we hear different sounds? (Y4) Can we control electricity? (Y4) How do things move? (Y5) How do we see? (Y6) How can we vary the effects of electricity? (Y6) 
Earth Science	*Earth science* *E1: The Earth is one of eight planets that orbit the sun.*

	E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate. *E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)* Progression in Earth Science units towards 'Ashleigh Big Ideas': What are the different types of weather? Sun, Earth and Moon: what is moving? 

How does 'Working Scientifically' progress?

Year 1 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc1/1.1 asking simple questions and recognising that they can be answered in different ways • Sc1/1.2 observing closely, using simple equipment • Sc1/1.3 performing simple tests • Sc1/1.4 identifying and classifying • Sc1/1.5 using their observations and ideas to suggest answers to questions • Sc1/1.6 gathering and recording data to help in answering questions	<u>New learning and vocabulary</u> **properties,** observe, test, magnifying glass, object, record, equipment Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into groups based on their observable properties Know that we can write down numbers and words or draw pictures to record what we find

Year 2 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc2/1.1 asking simple questions and recognising that they can be answered in different ways • Sc2/1.2 observing closely, using simple equipment • Sc2/1.3 performing simple tests • Sc2/1.4 identifying and classifying • Sc2/1.5 using their observations and ideas to suggest answers to questions • Sc2/1.6 gathering and recording data to help in answering questions	<u>Learning and vocabulary – continuing from year 1</u> **properties,** observe, test, magnifying glass, object, record, equipment Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into groups based on their observable properties Know that we can write down numbers and words or draw pictures to record what we find

Year 3 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc4/1.1 asking relevant questions and using different types of scientific enquiries to answer them • Sc4/1.2 setting up simple practical enquiries, comparative and fair tests • Sc4/1.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Sc4/1.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Sc4/1.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Sc4/1.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Sc4/1.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Sc4/1.8 identifying differences, similarities or changes related to simple scientific ideas and processes • Sc4/1.9 using straightforward scientific evidence to answer questions or to support their findings.	<u>Revision</u> **properties,** observe, test, magnifying glass, object, record, equipment Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into groups based on their observable properties Know that we can write down numbers and words or draw pictures to record what we find <u>New learning and vocabulary</u> prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to summarise a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) Know that they can draw conclusions from the findings of other scientists Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry

Year 4 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc4/1.1 asking relevant questions and using different types of scientific enquiries to answer them • Sc4/1.2 setting up simple practical enquiries, comparative and fair tests • Sc4/1.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Sc4/1.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Sc4/1.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Sc4/1.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Sc4/1.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Sc4/1.8 identifying differences, similarities or changes related to simple scientific ideas and processes • Sc4/1.9 using straightforward scientific evidence to answer questions or to support their findings.	<u>Revision</u> **properties,** observe, test, magnifying glass, object, record, equipment Know that we can ask questions about the world and that when we observe the world to answer these questions, this is science Know that we can use magnifying glasses to observe objects closely Know that we can test our questions to see if they are true Know that objects can be identified or sorted into groups based on their observable properties Know that we can write down numbers and words or draw pictures to record what we find <u>New learning and vocabulary – ongoing from year 3</u> prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table Know how – with structured guidance - to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) Know that they can draw conclusions from the findings of other scientists Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry

Year 5 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision • Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • Sc5/1.4 using test results to make predictions to set up further comparative and fair tests • Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations • Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.	<u>Revision</u> prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) Know that they can draw conclusions from the findings of other scientists Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry <u>New learning and vocabulary</u> line graph, relationship, outlier Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth) Know how to identify conditions that were imperfectly controlled and can explain how these might affect results Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection)

Year 6 – Ongoing throughout year – Working scientifically	
NC objectives	Key knowledge and vocabulary
• Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision • Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs • Sc5/1.4 using test results to make predictions to set up further comparative and fair tests • Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations • Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.	<u>Revision</u> prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis Know that we can ask questions and answer them by setting up scientific enquiries Know how to make relevant predictions that will be tested in a scientific enquiry Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry Know that scientific enquiries can suggest relationships, but that they do <u>not</u> prove whether a prediction is true Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc) Know that they can draw conclusions from the findings of other scientists Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry <u>New learning and vocabulary</u> line graph, relationship, outlier Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth) Know how to identify conditions that were imperfectly controlled and can explain how these might affect results Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection)