

# Science in Year 2

# Working Scientifically

**Year 1/ 2**

## **Working Scientifically Skills**

### **OBJECTIVES**

- Explore the world around them and raise their own simple questions
- Experience different types of science enquiries, including practical activities (c) Begin to recognise and make suggestions of different ways in which they might answer scientific questions
- Use their senses and simple equipment to make observations, observing changes over time.
- Carry out simple tests
- Use simple features to compare objects, materials and living things and decide how to sort and group them
- Ask people questions and use simple secondary sources to find answers
- With guidance, they should begin to notice patterns and relationships and use their observations and ideas to suggest answers to further questions
- Use simple measurements and simple equipment (e.g. hand lenses, egg timers) to gather data
- Record simple data (using charts, tables, pictures, labels and captions).
- To explain and talk about what they have found out and how they found it out.
- Beginning to answer some scientific questions with a simple reason.
- Begin to say whether things happened as they expected and if not why not.
- With help, they should record and communicate their findings in a range of ways and begin to use simple scientific vocabulary (written, diagrams, charts, pictures, tables, ICT and verbally)

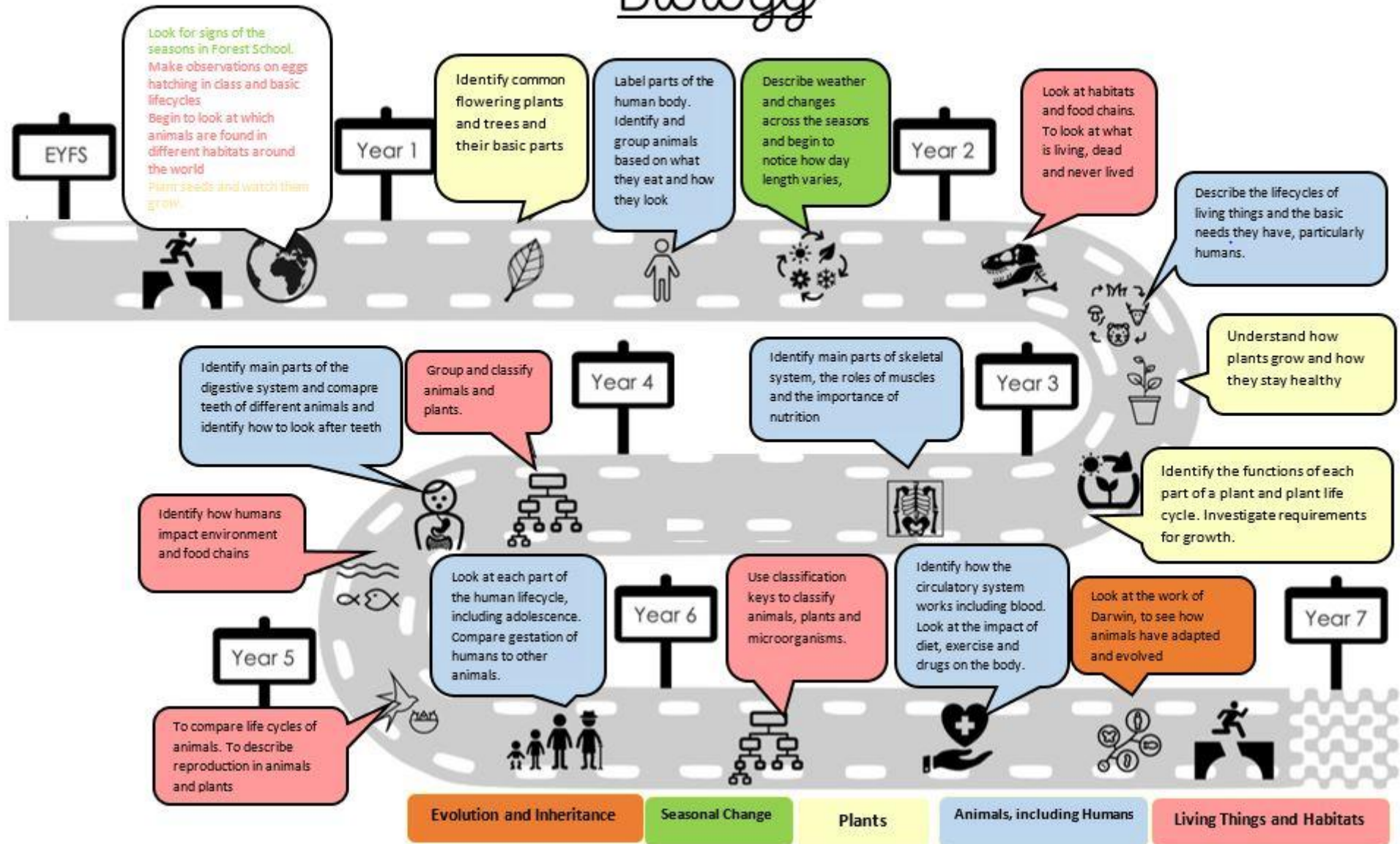
### **VOCABULARY**

Questions/Answers  
 Test / enquiries  
 Observe/observe over time Identify  
 compare /contrast  
 sort  
 group  
 equipment  
 Record  
 Gather Evidence  
 measure  
 patterns/relationships  
 Results /data  
 Pictograms  
 Simple chart and table describe  
 Similar/similarities different/differences  
 Reason  
 Predict  
 Tally chart bar chart Venn diagram  
 Secondary sources

Child friendly  
version to be put in  
the back of  
children's  
books/floor book



# Biology



<b>Year 2</b>	<b>Area of NC: Animals, including humans (Biology)</b>		
<b>Learning Objectives</b>  <i>(in suggested order of teaching sequence)</i>	<p><b>Prior Learning relevant to this topic:</b> In Year 1 children have learnt the differences between domestic and wild animals, grouped them in various ways including differences in what they eat, their bodies where they live etc. Children have also learnt the basic parts of the human body and know which senses relate to which body part.</p> <ul style="list-style-type: none"> <li>• Explain that animals, including humans, have offspring which grow into adults</li> <li>• Describe the life cycles of some living things, including humans</li> <li>• Identify and describe the basic needs of animals, including humans, for survival</li> <li>• Begin to understand and describe the importance of exercise for humans</li> <li>• Begin to understand and describe the importance of eating the right foods for humans</li> <li>• Begin to understand and describe the importance of hygiene for humans</li> </ul> <p><b><u>Pupils do not need to be taught the following content, which they will learn in later year groups:</u></b> InY3 children will learn in more detail about a healthy diet and its nutritious impact on the human body, they will introduce the name of the specific food groups when doing this. In Y5 children will look at how humans develop in more detail, looking at areas like puberty and how our body changes when we get to an elderly age. In Y5 children will also look at the difference between animal lifecycles and how they differ for mammals, birds etc and they will look at the process of reproduction in animals and plants. In Y6 children will look at exercise and the impact on the human body (in particular the heart)</p>		
<b>Working Scientifically Objectives that link to this topic:</b>	<ul style="list-style-type: none"> <li>• Explore the world around them and raise their own simple questions</li> <li>• Use their senses and simple equipment to make observations, observing changes over time.</li> <li>• Use simple features to compare objects, materials and living things and decide how to sort and group them</li> <li>• Ask people questions and use simple secondary sources to find answers</li> <li>• To explain and talk about what they have found out and how they found it out.</li> <li>• Beginning to answer some scientific questions with a simple reason.</li> <li>• With help, they should record and communicate their findings in a range of ways and begin to use simple scientific vocabulary (written, diagrams, charts, pictures, tables, ICT and verbally)</li> </ul> <p><b><i>Others could be relevant dependant on which practical enquiries you choose to plan</i></b></p>		
<b>Learning Objective</b>	<b>Objective Broken Down into Differentiation</b>		
	<b><i>Below</i></b>	<b><i>Expected</i></b>	<b><i>Above</i></b>
<b>Explain that animals, including humans, have offspring which grow into adults</b>	Pupil can match offspring to adult parents	Pupil recognises that humans are animals and all animals have young/offspring/babies which in time become adults	Pupil can independently explain and sort animals into different ways they are born (babies, eggs, frogspawn etc) as well as recognise that some young look similar to their adult form while others do not e.g. tadpoles and frogs.
<b>Describe the life cycles of some living things, including humans</b>	With support, pupil can sort the lifecycles of humans and another basic animal into the correct order.	Pupil can describe the life cycle of various common animals, including humans, and sequence them correctly using appropriate names for the stages. Pupil can describe the growth of the animal independently using the lifecycle.	Pupil compares the human lifecycle to that of another animal identifying any similarities and differences
<b>Identify and describe the basic needs of animals, including humans, for survival</b>	Pupil can state the basic needs that all animals have for survival (water, food, air)	Pupil describes the basic needs of all animals, including humans, for survival and begins to recognise the reasons for these needs	Pupil is beginning to research and compare the basic needs of different animals and show their understanding by explaining how to look after babies/animals (pets).

<b>Begin to understand and describe the importance of exercise for humans</b>	<b>Pupil is beginning to recognise why exercise is important to humans</b>	<b>Pupil understands that exercise is important to humans to keep their body healthy</b>	<b>Pupil can begin to explain what would happen if humans did not exercise</b>
<b>Begin to understand and describe the importance of eating the right foods for humans</b>	<b>Pupil can sort healthy and unhealthy food</b>	<b>Pupils recognise that humans need a balanced diet to stay healthy</b>	<b>Pupil can begin to explain what would happen if humans had too much unhealthy food in comparison to a balanced diet</b>
<b>Begin to understand and describe the importance of hygiene for humans</b>	<b>Pupil can give simple examples of humans having good hygiene e.g. brush teeth and wash hands</b>	<b>Pupil can understand and give simple reasons for humans having good hygiene e.g. germs and other diseases can be spread by poor hygiene</b>	<b>Pupil can begin to explain how health might be affected if we did not have good hygiene and pupil can give some preventive ways to stop the spread of germs</b>

#### Scientific Enquiry/Activity Ideas:

<u>Pattern Seeking</u>	<u>Observations Over Time</u>	<u>Identifying, classifying and grouping</u>	<u>Practical Tests</u>	<u>Research</u>
<ul style="list-style-type: none"> <li>Keep a diary of daily activities (sleep, food and drink, exercise). Do the children notice patterns amongst the class?</li> <li>Do all animals need the same things to survive?</li> </ul>	<ul style="list-style-type: none"> <li>How does my height change over the year?</li> <li>How much food and drink do I have over a week?</li> <li>How do humans change as they grow?</li> <li>Looking at photographs of children when they were a baby and comparing them with recent photographs up to this school year. Discuss how we change over time.</li> <li>How does a tadpole change over time?</li> <li>Get a caterpillar and observe the lifecycle into a butterfly. Or use pictures, time lapses etc.</li> <li>Observe how a chick grows from an egg, to a chick to an adult. Use pictures, time lapses etc.</li> <li>Stick insects are fairly easy to keep as class pets. Children can observe them as they hatch and grow to adulthood, shedding their skin several times.</li> <li>Put glitter on hands, shake everyone's hand - how many people have glitter on their hands?</li> </ul>	<ul style="list-style-type: none"> <li>Identify healthy and unhealthy food into a Venn diagram</li> <li>Give the children a variety of play/real food and ask them to classify it into healthy food groups, e.g. foods that give us energy (bread, pasta), food that helps us grow (fish, cheese), treats (ice cream, chocolate)</li> <li>Are you eating a healthy balanced diet? (How much/You are what you eat - <i>See the book 'A Creative Approach to Teaching Science'</i>)</li> <li>Match up pictures of animal offspring to their parents – what has stayed the same what has changed?</li> <li>Identify and order the parts of different animal life cycles</li> <li>Bring in a selection of foods – set up like a picnic at the front of class. Children to design their own picnic from their choices. Do they think they have a balanced meal? Do they think they have made a healthy choice? Children to interview the school cook about healthy eating and why she uses the ingredients she does for cooking. Children to redesign their meal choice so that is healthy.</li> </ul>	<ul style="list-style-type: none"> <li>Does hot or cold-water wash hands better? Or Which type of soap cleans hands the best? (Learning about hygiene, how does soap help to get rid of germs - <i>See the book 'A Creative Approach to Teaching Science'</i>)</li> <li>What happens when you eat without washing your hands? Bread and germs experiment <i>See the book 'A Creative Approach to Teaching Science'</i></li> </ul>	<ul style="list-style-type: none"> <li>What food do you need in a healthy diet and why?</li> <li>How do humans grow?</li> <li>How do germs spread?</li> <li>Why should I exercise?</li> <li>How long can a human survive without food, water or air? How many days can a crocodile survive without food?</li> <li>Why do camels have humps?</li> <li>Research a healthy meal and make it.</li> <li>Build perfect island for a given set of animal/s - e.g. water/food source – children to map out and label. Children explain their reasoning to their group.</li> <li>Write a scientifically correct version of the tiger who came for tea (Who is coming to tea? <i>See the book 'A Creative Approach to Teaching Science'</i>)</li> </ul>

**Non statutory NC ideas**

- Pupils might work scientifically by observing, through video or first-hand observation and measurement, how different animals, including humans, grow;

**Scientists to Consider**

James Lind

Bright Ideas Time Suggestions	Vocabulary to be Taught	Possible Trips/Experiences	Possible Cross-Curricular Links	Potential Books to use
<ul style="list-style-type: none"> <li>• PMI – What if chocolate was considered healthy like fruit?</li> <li>• PMI - What if chicken eggs hatched a dinosaur?</li> <li>• Odd one out – pasta, orange and chocolate cake</li> <li>• PMI – What if we didn't exercise?</li> <li>• PMI – What would it be like if we could always eat the snacks we wanted to?</li> </ul>	<p>Offspring Reproduce babies young grow/ growth change human Adults older/younger Baby, toddler, child, teenager, adult lifecycle (e.g. egg - caterpillar, pupa, butterfly -, egg - chick - chicken, spawn-tadpole – frog, lamb-sheep etc.) survival basic needs water, food, air/oxygen breathing exercise Food types (e.g. meat, fish, bread and rice) Hygiene, clean, Wash, germs Balanced diet Healthy /unhealthy</p>	<ul style="list-style-type: none"> <li>• Hands on Science Kitten Rescue workshop - <a href="https://hands-on-science.co.uk/workshop/ks1-ks2-practical-science-investigations/">https://hands-on-science.co.uk/workshop/ks1-ks2-practical-science-investigations/</a></li> <li>• Hands on Science Healthy Bodies Workshop <a href="https://hands-on-science.co.uk/workshop/healthy-bodies-primary-science-investigation/">https://hands-on-science.co.uk/workshop/healthy-bodies-primary-science-investigation/</a></li> <li>• Visitor to the classroom – animal charity about basic needs of animals or a trip to a farm.</li> <li>• Visit from Warburton's about healthy eating</li> </ul>	<p><b>English:</b></p> <ul style="list-style-type: none"> <li>• Write a descriptive text about the human body.</li> <li>• Create a leaflet about animal care.</li> <li>• Make an information poster on health and hygiene. Create a hand washing poster.</li> </ul> <p><b>Maths:</b></p> <ul style="list-style-type: none"> <li>• Use Venn diagrams to group and compare foods when investigating healthy diets.</li> </ul> <p><b>ICT/iPads:</b></p> <ul style="list-style-type: none"> <li>• Pic Collage</li> <li>• Book Creator</li> <li>• Explain Everything and upload to seesaw</li> <li>• Shadow Puppet app to record over an image an explanation</li> <li>• Padlet can be used to generate the questions the children want to investigate in each topic.</li> <li>• Kahoot can be used as an assessment tool in lessons or at the end of each unit.</li> </ul>	<ul style="list-style-type: none"> <li>• The Growing Story: - by Ruth Krauss - <i>To be able to explain that animals, including humans, have offspring which grow into adults</i></li> <li>• ONCE THERE WERE GIANTS - <i>To be able to explain that animals, including humans, have offspring which grow into adults</i></li> <li>• Lifecycle books (lots of different books in series) by Camilla de la Bedoyere - <i>To describe the life cycles of some living things including animals</i></li> <li>• Caterpillar Butterfly by Vivian French - <i>To describe the life cycles of some living things including animals</i></li> <li>• Look at books like The Tiger that came to Tea and The Very Hungry Caterpillar and pick up the inaccuracies – are the basic needs of these animals met? Particularly what is wrong with what they eat?</li> </ul>

**Year 2****Area of NC: Living Things and Habitats (Biology)**

<b>Learning Objectives</b>  <i>(in suggested order of teaching sequence)</i>	<p><b><u>Prior Learning relevant to this topic:</u></b> Children in Y1 have learnt the difference between wild and domestic animals and how to care for some. They have named and identified common animals and plants and know that animals can be omnivores, carnivores or herbivores.</p> <ul style="list-style-type: none"> <li>Sort and compare the differences between things that are living, dead, and things that have never been alive.</li> <li>Identify and name a range of habitats, including micro habitats, and name animals and plants found within them.</li> <li>Identify that most living things live in habitats to which they are suited and their basic needs met</li> <li>Describes how animals obtain their food from plants and other animals</li> </ul> <p><b><u>Pupils do not need to be taught the following content, which they will learn in later year groups:</u></b> Y4 will look at more complex food chains using the vocab of producer, prey and predator. as well as begin to classify and group animals and plants in the local and wider environment</p>		
<b>Working Scientifically Objectives that link to this topic:</b>	<ul style="list-style-type: none"> <li>Use simple features to compare objects, materials and living things and decide how to sort and group them</li> <li>Use their senses to make observations.</li> <li>Record simple data (using charts, tables, pictures, labels and captions).</li> <li>To explain and talk about what they have found out and how they found it out.</li> <li>With guidance they should begin to notice patterns and relationships and use their observations and ideas to suggest answers to further questions.</li> <li>To begin to use simple scientific vocabulary and give simple reasons.</li> </ul> <p><b><i>Others could be relevant dependant on which practical enquiries you choose to plan</i></b></p>		
<b>Learning Objective</b>	<b>Objective Broken Down into Differentiation</b>		
	<b><i>Below</i></b>	<b><i>Expected</i></b>	<b><i>Above</i></b>
<b>Sort and compare the differences between things that are living, dead, and things that have never been alive.</b>  <b>Forest school</b>	Pupil can identify things that are living and dead	Pupil can identify most things as living, dead and never been alive	Pupil begins to use key features to identify living, dead and never been alive – e.g. living things grow, reproduce, use their senses, feed, move (they do not need to use all but may notice similarities of those things that are living) <b><u>no need for full MRS GREN</u></b>
<b>Identify and name a range of habitats, including micro habitats, and name animals and plants found within them.</b> <b>Forest school</b>	Pupil can name some basic habitats and the names of some animals or plants found there	Pupil can name a wide range of habitats and some micro-habitats (local and globally) together with the names of animals/plants found here	Pupil can independently compare and contrast habitats and name a range of plants and animals found there
<b>Identify that most living things live in habitats to which they are suited and their basic needs met</b>	Pupil understands that a habitat is where an animal or plant lives when basic needs are met	Pupil can explain how a habitat provides the basic needs for an animal or plant and talk about how the features of these animals and plants make them suited or not suited to a habitat.	Pupil can provide multiple reasons, with scientific vocabulary, as to why animals or plants are suited to a habitat.

		Pupil begins to recognise that animals/plants may adapt to live in a habitat / micro-habitat	Pupil can begin to describe the impact upon animals/plants of changing a basic need in a habitat/micro-habitat
<b>Describes how animals obtain their food from plants and other animals</b>	Pupil can, with support, construct a simple 3 part food chain that starts with a plant and has the arrows pointing in the correct direction	<p>Pupil can independently construct a food chain that starts with a plant and has the arrows pointing in the correct direction and use it to explain what animals eat.</p> <p>Pupil begins to understand that plants make their own food and animals get their food by eating plants and/or other animals</p>	<p>Pupil can identify and/or create a range of food chains to show how animals obtain their food</p> <p>Pupil understands that plants make their own food and animals get their food by eating plants and/or other animals</p>

#### Scientific Enquiry/Activity Ideas:

<b><u>Pattern Seeking</u></b> <ul style="list-style-type: none"> <li>Where do we find the most snails/spider/worms/woodlice ? Take a walk what makes a thing living or non-living and finding the pattern in both.</li> </ul>	<b><u>Observations Over Time</u></b>	<b><u>Identifying, classifying and grouping</u></b> <ul style="list-style-type: none"> <li>How would you group these plants and animals based on what habitat you would find them in?</li> <li>How would you group things to show which are living, dead, or have never been alive? Can you find things around school to put in these groups?</li> <li>Identify what things a living person do that a doll cannot (<i>See the book 'A Creative Approach to Teaching Science'</i>)</li> <li>Group animals into their habitats. (<i>See Post box problem on pg 46 of the book 'A Creative Approach to Teaching Science' and make a habitat in a box pg 47</i>)</li> <li>Begin to identify basic food chains (<i>See the book 'A Creative Approach to Teaching Science' - Find it and Eat it pg 47</i>)</li> </ul>	<b><u>Practical Tests</u></b> <ul style="list-style-type: none"> <li>Can you build a habitat/micro habitat in the playground?</li> <li>Can you make a bird feeder from everyday objects? (Link to what birds need to survive)</li> </ul>	<b><u>Research</u></b> <ul style="list-style-type: none"> <li>How are the animals in Australia different to the ones that we find in Britain?</li> <li>How does the habitat of the Arctic compare with the habitat of the rainforest or desert?</li> <li>Which animals live in deserts, jungles, around town, where it is cold?</li> <li>Give each group an animal and ask them to research what food they need and habitat they require in order to stay alive and healthy</li> <li>Children create their own animal to live in a specific habitat</li> </ul>
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#### Non statutory NC ideas

- Could work scientifically by: describing conditions in different habitats and finding out how it changes the number of living things that are there.

#### Scientists to Consider

Liz Bonin, Rachel Carson

<b>Bright Ideas Time Suggestions</b>	<b>Vocabulary to be Taught</b>	<b>Possible Trips/Experiences</b>	<b>Possible Cross-Curricular Links</b>	<b>Potential Books to use</b>
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<ul style="list-style-type: none"> <li>• Odd one out – cat, controller and car</li> <li>• PMI – What if a polar bear lived in the desert?</li> <li>• Is a flame alive?</li> <li>• How do you know the person sitting next to you is alive?</li> <li>• Odd one out - <a href="https://explorify.wellcome.ac.uk/en/activities/odd-one-out/growing-in-hot-and-cold-places">https://explorify.wellcome.ac.uk/en/activities/odd-one-out/growing-in-hot-and-cold-places</a></li> </ul>	<p>Living, dead, never been alive, food, food chain, basic needs, water , shelter, depend, conditions, shade, compare , sort group Habitats - pond, woodland, meadow, ocean, rainforest, sea shore, desert micro-habitats - under log, under stones, under bushes damp/wet/ dry dark/light suited/suitable</p>	<ul style="list-style-type: none"> <li>• Rainton Meadows Nature Reserve - <a href="https://durhamwt.com/education/">https://durhamwt.com/education/</a></li> <li>• <i>Botanic Gardens in Durham</i> - <a href="https://www.dur.ac.uk/4schools/programme/ks1/science/">https://www.dur.ac.uk/4schools/programme/ks1/science/</a> - <i>Our bear has gone to sleep! And Marvellous minibeasts</i></li> <li>• Ouseburn Parks Education Programme Jesmond Dene - <a href="https://www.newcastle.gov.uk/sites/default/files/wwfileroot/leisure-libraries-and-tourism/parks-and-countryside/education_workshops_spring_2015_.pdf">https://www.newcastle.gov.uk/sites/default/files/wwfileroot/leisure-libraries-and-tourism/parks-and-countryside/education_workshops_spring_2015_.pdf</a> - Mad about minibeasts and habitat detectives workshop</li> <li>• Hands on Science - <a href="https://www.hands-on-science.co.uk/workshop/adaptation-and-camouflage/">https://www.hands-on-science.co.uk/workshop/adaptation-and-camouflage/</a> -</li> <li>• Washington Wildfowl and Wetlands Trust - <a href="https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-a-wetland/7/">https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-a-wetland/7/</a> -What lives in a wetland habitat? and What lives in a pond? - <a href="https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-a-pond/1/">https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-a-pond/1/</a> and What lives in a habitat? <a href="https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-this-habitat/9/">https://www.wwt.org.uk/learn/learn-at-washington/learning-sessions/details/what-lives-in-this-habitat/9/</a></li> <li>• Life Centre - <a href="https://education.life.org.uk/workshop/minibeasts-and-me">https://education.life.org.uk/workshop/minibeasts-and-me</a></li> <li>• Blue Reef Aquarium - Who lives Where Habitats and Rockpool Encounter - <a href="https://www.bluerreefaquarium.co.uk/tynemouth/education-and-group-visits/school-trip/">https://www.bluerreefaquarium.co.uk/tynemouth/education-and-group-visits/school-trip/</a></li> <li>• Sunderland Winter Gardens - Animal Quest - <a href="https://www.seeitdoitsunderland.co.uk/learning-sessions/295/natural-world">https://www.seeitdoitsunderland.co.uk/learning-sessions/295/natural-world</a></li> <li>• <a href="http://www.bugsnstuff.com/our-workshops/schools/">http://www.bugsnstuff.com/our-workshops/schools/</a> - Bugs N Stuff Workshops</li> <li>• <a href="https://mobilepettingzoo.co.uk">https://mobilepettingzoo.co.uk</a> - <i>Crazy Creatures</i></li> <li>• <i>Gibside</i> - <a href="https://nt.global.ssl.fastly.net/gibside/documents/gibside-information-packs-for-primary-schools.pdf">https://nt.global.ssl.fastly.net/gibside/documents/gibside-information-packs-for-primary-schools.pdf</a> - <i>Minibeast Safari</i></li> </ul>	<p><b>English:</b></p> <ul style="list-style-type: none"> <li>• Children to research different facts about different mini beasts to create their own non-chron report.</li> </ul> <p><b>Maths:</b></p> <ul style="list-style-type: none"> <li>• Bar charts, Pictograms and tally charts about animals/minibeasts found around school.</li> </ul> <p><b>ICT/iPads:</b></p> <ul style="list-style-type: none"> <li>• <i>Padlet can be used to generate the questions the children want to investigate in each topic.</i></li> <li>• <i>Kahoot can be used as an assessment tool in lessons or at the end of each unit.</i></li> <li>• <i>Post it app/pic collage sorting and grouping</i></li> <li>• <i>i movie simple food chain</i></li> </ul>	<ul style="list-style-type: none"> <li>• How Animals Build by Lonely Planet Kids - <i>To be able to identify and name a range of habits</i></li> <li>• Evelyn the Adventurous Entomologist: The True Story of a World-Traveling Bug Hunter by Christine Evans - <i>To be able to identify and name a range of habitats</i></li> <li>• Meerkat Mail by Emily Gravett - <i>To be able to identify that most living things live in habitats to which they are suited and their basic needs met</i></li> <li>• Hoot and Howl across the Desert: Life in the world's driest deserts (Extreme Environments) by Vassiliki Tzomaka - <i>To be able to identify that most living things live in habitats to which they are suited and their basic needs met</i></li> <li>• Dart and Dive across the Reef: Life in the world's busiest reefs (Extreme Environments) by Vassiliki Tzomaka - <i>To be able to identify that most living things live in habitats to which they are suited and their basic needs met</i></li> <li>• Through the Animal Kingdom: Discover Amazing Animals and Their Remarkable Homes - <i>To be able to identify and name a range of habitats, including micro habitats, and name animals and plants found within them.</i></li> <li>• Above and below by Hanako Clulow - <i>To be able to identify and name a range of habitats, including micro habitats, and name animals and plants found within them</i></li> <li>• Above and below sea and shore by Harriet Evans and Hannah Bailey - <i>To be able to identify and name a range of habitats, including micro habitats, and name animals and plants found within them</i></li> <li>• RSPB My First Book of Garden Birds and RSPB My First Book of Garden Wildlife, My First Book of Garden Bugs - <i>To be able to identify and name a range of habitats and animals and plants found within them</i></li> </ul>
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<b>Year 2</b>	<b>Area of NC: Plants (Biology)</b>		
<b>Learning Objectives</b>  <i>(in suggested order of teaching sequence)</i>	<p><b><i>Prior Learning relevant to this topic:</i></b> In Y1 children have learnt the basic parts of a plant and trees, they have identified and named common plants as well learnt the difference between deciduous and ever green trees.</p> <ul style="list-style-type: none"> <li>Identify, compare, sort and group a range of seeds and bulbs.</li> <li>Observe and describe how seeds and bulbs grow into mature plants over time</li> <li>Begin to understand that plants grow in different ways.</li> <li>Name some of the things plants need to grow and stay healthy</li> </ul> <p><b><i>Pupils do not need to be taught the following content, which they will learn in later year groups:</i></b> In Year 3 children will learn the functions of different parts of a plant, they will also look at further conditions needed for plants to survive and grow well (air, room to grow and nutrients in soil). Furthermore, in Y3 they will learn about the lifecycles of plants and how water is transported in plants.</p>		
<b>Working Scientifically Objectives that link to this topic:</b>	<ul style="list-style-type: none"> <li>Explore the world around them and raise their own simple questions</li> <li>Experience different types of science enquiries, including practical activities</li> <li>Begin to recognise and make suggestions of different ways in which they might answer scientific questions</li> <li>Use their senses and simple equipment to make observations, observing changes over time.</li> <li>Carry out simple tests</li> <li>With guidance, they should begin to notice patterns and relationships and use their observations and ideas to suggest answers to further questions</li> <li>Use simple measurements and simple equipment (e.g. hand lenses, egg timers) to gather data</li> <li>Record simple data (using charts, tables, pictures, labels and captions).</li> <li>Beginning to answer some scientific questions with a simple reason.</li> <li>Begin to say whether things happened as they expected and if not why not.</li> <li>Use simple features to compare objects, materials and living things and decide how to sort and group them</li> <li>To explain and talk about what they have found out and how they found it out.</li> <li>With help, they should record and communicate their findings in a range of ways and begin to use simple scientific vocabulary (written, diagrams, charts, pictures, tables, ICT and verbally)</li> </ul> <p><b><i>Others could be relevant dependant on which practical enquiries you choose to plan</i></b></p>		
Learning Objective	Objective Broken Down into Differentiation		
	<i>Below</i>	<i>Expected</i>	<i>Above</i>
<b>Identify, compare, sort and group a range of seeds and bulbs.</b>	Pupil, with support, can say what they notice about seeds and bulbs	Pupil can identify the difference between seeds and bulbs and sort them accordingly	Pupil can spot similarities and difference between bulbs and seeds and give a number of ways to sort them
<b>Observe and describe how seeds and bulbs grow into mature plants over time</b> <b>Forest school</b>	Pupil can identify that seeds or bulbs can grow into plants when conditions are suitable	Pupil can describe with appropriate vocabulary the different stages of plant growth from a seed/bulb to mature plant.  Pupils can use the word germinate correctly.	Pupil may be able to suggest how changing the conditions (water, light and temperature) may affect the growth of a plant

<b>Begin to understand that plants grow in different ways.</b>	Pupil recognises that plants can grow at different rates	Pupil can measure the rate of growth of a range of plants and notice patterns and relationships in different growth	Pupil can accurately measure the rate of growth of a range of plants and giving reasons for the differences in rate of growth they note
<b>Name some of the things plants need to grow and stay healthy</b>	<p>Pupil can identify one condition a plant needs to grow and be healthy</p> <p>Pupil understands a seed/bulb will not grow if growing conditions are not correct</p>	Pupil can identify most conditions needed for a plant to grow and be healthy (water, light and a suitable temperature) but may not name all.	Pupil can identify all conditions needed for a plant to grow and be healthy (water, light and a suitable temperature). They understand that seeds don't need the same conditions to grow as a seedling

**Scientific Enquiry/Activity Ideas:  
Ensure experiments/enquires are significantly different to Year 1 and Year 3**

<p><b><u>Pattern Seeking</u></b></p> <ul style="list-style-type: none"> <li>Do bigger seeds grow into bigger plants?</li> <li>What can we tell from the amount of daises I can count on the school yard? Does it change throughout the year?</li> </ul>	<p><b><u>Observations Over Time</u></b></p> <ul style="list-style-type: none"> <li>Children to investigate and observe over time. Taking measurements, labelled drawings, plant diary/producing growth charts/ graphs.</li> <li>How does a daffodil bulb change over the year?</li> <li>How does my sunflower change each week?</li> <li>What happens to my bean after I have planted it? <a href="https://www.youtube.com/watch?v=w77zPAAtVTuI">https://www.youtube.com/watch?v=w77zPAAtVTuI</a></li> <li>How do seeds change as they grow into plants?</li> <li>What happens to the leaves if they do not get sunlight? Two identical plants can have used in this experiment. One can be covered with a black paper bag and the other is not. All other conditions are kept same. Observe over a period of 2 weeks what changes happen.</li> <li>Observe plants from bulbs - cut the bulbs on half and use magnifying glasses to see the miniature plant inside - place bulb point end facing up in container and see growth of shoots (<b><i>See the book 'A Creative Approach to Teaching Science'</i></b>)</li> <li>Plant and observe garlic bulbs growing.</li> </ul>	<p><b><u>Identifying, classifying and grouping</u></b></p> <ul style="list-style-type: none"> <li>What do plants need to survive?</li> <li>Do all plants produce flowers and seeds?</li> <li>What do seeds need to germinate?</li> </ul>	<p><b><u>Practical Tests</u></b></p> <ul style="list-style-type: none"> <li>Show children a pre-grown plant – how do we keep plants healthy. Raise questions the children would live to investigate to explore how conditions affect growth.</li> <li>Do cress seeds grow quicker inside or outside?</li> <li>Can I have cress hair? Why is some hair lush, long and green and others not? (<b><i>See the book 'A Creative Approach to Teaching Science'</i></b>)</li> <li>Will a seed grow if it is planted upside down?</li> <li>Can I grow a plant in the shape of an initial, star, etc? (<b><i>See the book 'A Creative Approach to Teaching Science'</i></b>)</li> <li>How does temperature affect how quickly a plant grows?</li> <li>How does light level affect how quickly a plant grows?</li> <li>What is the best amount of water to give a plant?</li> </ul>	<p><b><u>Research</u></b></p> <ul style="list-style-type: none"> <li>Children to create a gardener's guide to taking care of a plant. This should include diagrams and where possible photographs of their own plants.</li> <li>How does a cactus survive in a desert with no water?</li> <li>What happens to a plant after it has produced seeds?</li> <li>What is a botanist?</li> <li></li> </ul>
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**Non statutory NC ideas**

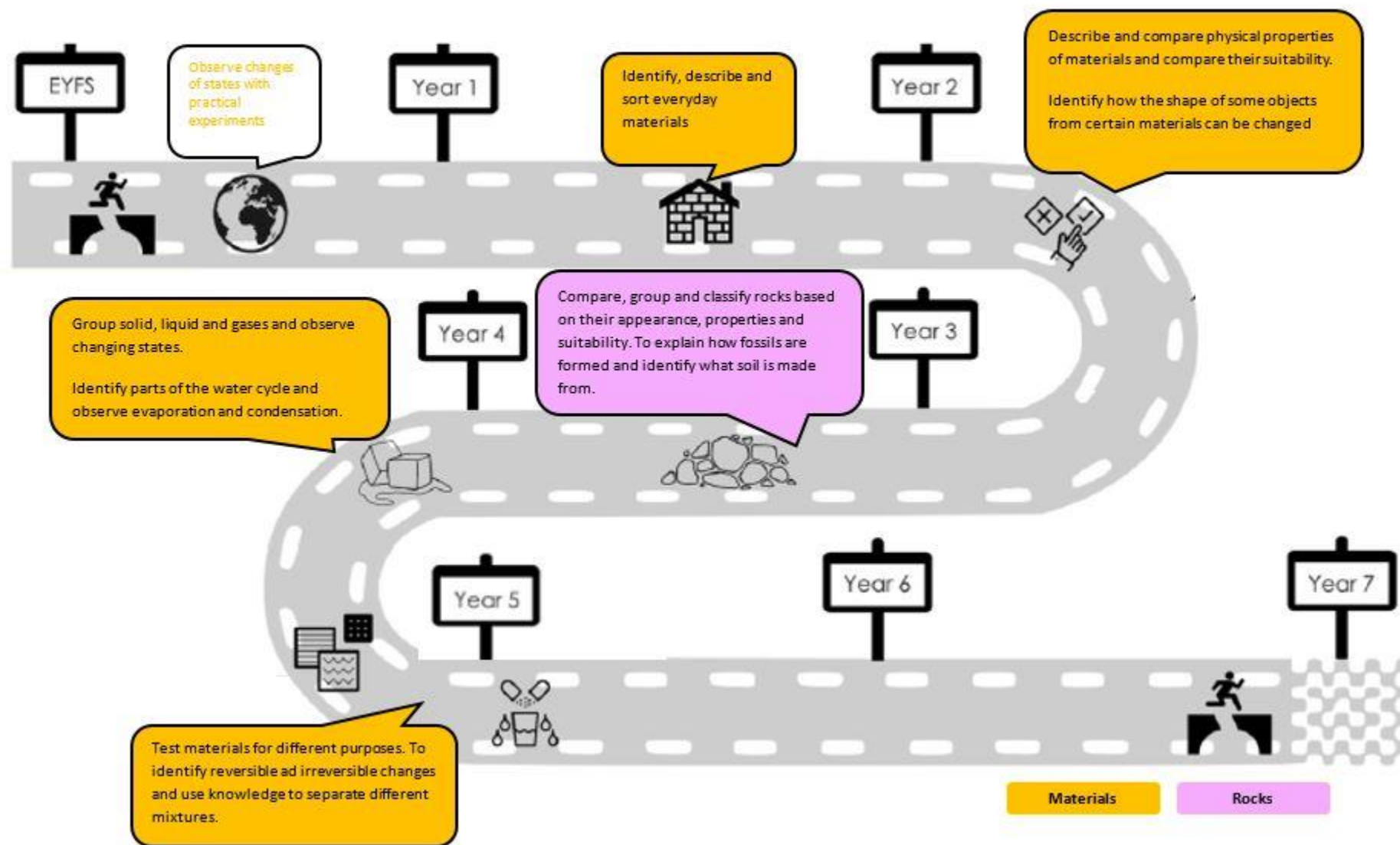
**Scientists to Consider**

Joseph Banks; George Washington Carver; Alan Titchmarsh

<b>Bright Ideas Time Suggestions</b>	<b>Vocabulary to be Taught</b>	<b>Possible Trips/Experiences</b>	<b>Possible Cross-Curricular Links</b>	<b>Potential Books to use</b>
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<ul style="list-style-type: none"> <li>• <a href="https://explorify.wellcome.ac.uk/en/activities/zoo-m-in-zoom-out/brown-and-sticky/classroom">https://explorify.wellcome.ac.uk/en/activities/zoo-m-in-zoom-out/brown-and-sticky/classroom</a></li> <li>• Odd one out – dandelions, leaves and daisies</li> <li>• Odd one out – grown plant, bulb, seed</li> <li>• PMI- What if plants could live without water?</li> <li>• Odd one out – root, stem, flower</li> <li>• Odd one out - Sunflower seed, sunflower seedlings and an amaryllis bulb</li> <li>• <a href="https://explorify.wellcome.ac.uk/en/activities/odd-one-out/seeds-of-life">https://explorify.wellcome.ac.uk/en/activities/odd-one-out/seeds-of-life</a></li> </ul>	<p>seedling; seed; bulb; seedling; mature plant; water; light/dark; temperature; grow(th); healthy; unhealthy; suitable conditions; germinate; live; living; non-living; shade, sun, cool, die/dying - limp, crispy, hot/warm/cool/cold, damp/wet/dry grow,</p>	<ul style="list-style-type: none"> <li>• <i>Visit a local allotment, florist or garden centre</i></li> <li>• <i>Botanic Gardens in Durham - <a href="https://www.dur.ac.uk/4schools/programme/ks1/science/">https://www.dur.ac.uk/4schools/programme/ks1/science/</a> - Jack and the Lost Beanstalk and Staying alive! What do plants need to survive?</i></li> <li>• Ouseburn Parks Education Programme Jesmond Dene - <a href="https://www.newcastle.gov.uk/sites/default/files/wwwfileroot/leisure-libraries-and-tourism/parks-and-countryside/education/workshops_spring_2015_.pdf">https://www.newcastle.gov.uk/sites/default/files/wwwfileroot/leisure-libraries-and-tourism/parks-and-countryside/education/workshops_spring_2015_.pdf</a> -Growing Plants</li> <li>• Life Centre - <a href="https://education.life.org.uk/workshop/plants">https://education.life.org.uk/workshop/plants</a></li> <li>• <i>Gibside - <a href="https://nt.global.ssl.fastly.net/gibside/documents/gibside-information-packs-for-primary-schools.pdf">https://nt.global.ssl.fastly.net/gibside/documents/gibside-information-packs-for-primary-schools.pdf</a> - Growing at Gibside</i></li> </ul>	<p><b>English:</b></p> <ul style="list-style-type: none"> <li>• Children to create a gardener's guide to taking care of a plant. This should include diagrams and where possible photographs of their own plants.</li> <li>• Write reports describing each of the fair tests carried out – include prediction, method, diagram, results and conclusion.</li> </ul> <p><b>Maths:</b></p> <ul style="list-style-type: none"> <li>• Plotting graphs of plant height against time – whole class sunflower growth monitoring.</li> <li>• Bar chart of height/number of leaves vs. amount of sunlight.</li> <li>• Bar chart of height/number of leaves vs. temperature.</li> <li>• Bar chart of height/number of leaves vs. amount of water.</li> </ul> <p><b>ICT/iPads:</b></p> <ul style="list-style-type: none"> <li>• Introduce time lapse – Stop motion, I can Animate videos Photographs to upload to seesaw of plants growing over time</li> <li>• Shadow Puppet app to record over an image with an explanation</li> <li>• Padlet can be used to generate the questions the children want to investigate in each topic.</li> <li>• Kahoot can be used as an assessment tool in lessons or at the end of each unit.</li> <li>• Excel document, collating data from plant growth</li> </ul>	<ul style="list-style-type: none"> <li>• Eddie's Garden: and How to Make Things Grow by Sarah Garland - <i>To be able to name some of the things plants need to grow and stay healthy</i></li> <li>• Ben Plants a Butterfly Garden by Kate Petty - <i>To be able to observe and describe how seeds and bulbs grow into mature plants over time</i></li> <li>• Grandmas Garden - <a href="https://clarefearon.files.wordpress.com/2021/03/grand-garden2.pdf">https://clarefearon.files.wordpress.com/2021/03/grand-garden2.pdf</a> - <i>To be able to name some of the things plants need to grow and stay healthy</i></li> <li>• It starts with a seed by Laura Knowles - <i>To be able to observe and describe how seeds and bulbs grow into mature plants over time</i></li> </ul>
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# Chemistry



<b>Year 2</b>	<b>Area of NC: Everyday Materials and their Suitability (Chemistry)</b>		
<b>Learning Objectives</b> <i>(in suggested order of teaching sequence)</i>	<p><b><u>Prior Learning relevant to this topic:</u></b> In Year 1 children will have learnt to identify a range of materials and their basic properties, sorting and classifying based on this. Children will also distinguish between an object and the material it is made from.</p> <ul style="list-style-type: none"> <li>Identify the difference between transparent, translucent and opaque</li> <li>Identify how the shape of solid objects made from some materials can be changed</li> <li>Describe and compare the physical properties of a variety of everyday materials</li> <li>Identify and compare the uses and suitability of a variety of everyday materials (including wood, metal, plastic, glass, brick, rock, paper and cardboard)</li> </ul> <p><b><u>Pupils do not need to be taught the following content, which they will learn in later year groups:</u></b> In Year 4 and Year 5 they will learn about changes in states of solids, liquids and gases and irreversible changes do not need to be looked at until Year 5.</p>		
<b>Working Scientifically Objectives that link to this topic:</b>	<ul style="list-style-type: none"> <li>Experience different types of science enquiries, including practical activities</li> <li>Begin to recognise and make suggestions of different ways in which they might answer scientific questions</li> <li>Carry out simple tests</li> <li>Use simple features to compare objects, materials and living things and decide how to sort and group them</li> <li>Beginning to answer some scientific questions with a simple reason.</li> <li>Begin to say whether things happened as they expected and if not why not.</li> <li>With help, they should record and communicate their findings in a range of ways and begin to use simple scientific vocabulary (written, diagrams, charts, pictures, tables, ICT and verbally)</li> </ul> <p><b><i>Others could be relevant dependant on which practical enquiries you choose to plan</i></b></p>		
<b>Learning Objective</b>	<b>Objective Broken Down into Differentiation</b>		
	<b><i>Below</i></b>	<b><i>Expected</i></b>	<b><i>Above</i></b>
<b>Identify the difference between transparent, translucent and opaque</b>	With support, pupil can explain what transparent, translucent and opaque is.	Pupil can independently use the three terms correctly and identify objects that are transparent, translucent and opaque	Pupil can begin to explain when an object that is transparent, translucent or opaque would be suitable or unsuitable.
<b>Identify how the shape of solid objects made from some materials can be changed</b>	Pupil recognises that the shape of some solid objects can be changed and can use the words flexible and/or stretchy to describe materials that can be changed in shape and stiff and/or rigid for those that cannot.	Pupil can use appropriate language about properties of materials to describe the change of shape of some solid objects when pressure is applied in different ways	Pupil can compare and contrast, using correct vocabulary, the materials that the shape can change as well as identify which materials cannot be changed back afterwards

Describe and compare the physical properties of a variety of everyday materials	Pupil can group objects made from similar materials based on their properties (may focus on recapping words/materials/properties from Y1)	<p>Pupil can use their knowledge of materials to suggest different ways they could be grouped e.g. hardness; flexibility (a wider range of materials and properties from Y1)</p> <p>Pupil can recognise that a material may come in different forms which have different properties E.g. plastic, paper etc.</p>	Pupil can describe why it is helpful to scientists to be able to classify and group materials according to their properties
Identify and compare the uses and suitability of a variety of everyday materials (including wood, metal, plastic, glass, brick, rock, paper and cardboard)	<p>Pupil understands that some materials can be used for a variety of purposes</p> <p>Pupils begin to suggest which material would be suitable and which would not for a given scenario based on its properties.</p> <p>Pupil can, with support, follow a method to test a material for its suitability</p>	<p>Pupil can explain, using the key properties, what a material may be used for.</p> <p>Pupil can explain, using the correct vocabulary, the properties of materials which make them suitable for a purpose</p> <p>Pupil can begin to choose an appropriate method for testing a material for a particular property</p> <p>Can use their test evidence to select appropriate material for a purpose e.g. Which material is the best for a rain hat?</p>	<p>Pupil can describe more than one use for a given material using accurate scientific vocabulary.</p> <p>Pupil can demonstrate how a wide range of materials are suitable for the same purpose and explain with reasoning which is the most suitable and why</p> <p>Pupil can use test evidence to suggest which material is the most suitable and which is the most unsuitable for an object, giving reasons for their conclusions</p>

**Scientific Enquiry/Activity Ideas:**

<u>Pattern Seeking</u>	<u>Observations Over Time</u>	<u>Identifying, classifying and grouping</u>	<u>Practical Tests</u>	<u>Research</u>
<ul style="list-style-type: none"> <li>Why can you stretch blu tac more than you can stretch clay?</li> <li>Do all balls bounce?</li> <li>How does amount of water affect the strength of a kitchen towel?</li> </ul>	<p>What happens to materials over time if we bury them in the ground?</p> <ul style="list-style-type: none"> <li>Would a paper boat float forever?</li> </ul>	<ul style="list-style-type: none"> <li>We need to choose a material to make an umbrella. Which materials are waterproof?</li> <li>Classify a range of real objects into different groups they belong based on observable material properties e.g., fabric, paper, glass, plastic, wood, metal, rock, cardboard, elastic, rubber, ceramic. Why would they be made from this? What objects definitely wouldn't go into those groups?</li> <li>Which <u>materials</u> are used to make particular objects? E.g. Which fabric would make the softest blanket?</li> <li>Identify the most ridiculous object you could make from a certain material. (<i>See the book 'A Creative Approach to Teaching Science'- pg 81</i>)</li> </ul>	<ul style="list-style-type: none"> <li>Which materials are the most absorbent? Which would make the best nappy or mop up a split drink quickly? (<i>See the book 'A Creative Approach to Teaching Science'- pg 82</i>)</li> <li>Which kitchen roll is the most absorbent?</li> <li>Which shapes make the strongest paper bridge?</li> <li>Which material would be best for the roof of three little pig's house (<i>See the book 'A Creative Approach to Teaching Science'- pg 82</i>)</li> <li>Investigate which fabric would be best to make a waterproof shelter or Get children to create animal homes from different natural items and test which would be the best in rain/wind etc.</li> <li>Which <u>materials</u> should we use to make mermaid's tail/ Santa's sleigh?</li> <li>Can materials change shape?</li> <li>Test shock absorbency - (<i>See the book 'A Creative Approach to Teaching Science'- pg 82</i>)</li> </ul>	<ul style="list-style-type: none"> <li>How have the materials we use changed over time?</li> <li>What do we know about the work of people like John Dunlop, Charles Macintosh and John McAdam?</li> </ul>

			<ul style="list-style-type: none"> <li>Can you beat the curly wurly stretching world record (<b>See the book 'A Creative Approach to Teaching Science'- pg 84</b>)?</li> <li>Which wrapping papers are strong enough to wrap and send a present?</li> <li>Which material could be used to make a waterproof hat for the teacher when she is on the playground at playtime?</li> <li>What could you paint on the runaway gingerbread man that would allow him to swim the river and get away from the fox and not turn to mush?</li> <li>Shelter building – what properties do materials need to have if you are building a shelter and why?</li> </ul>	
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#### **Non statutory NC ideas**

- Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials and recording their observations.
- Find out about people who developed useful new materials. (John Dunlop, Charles Macintosh, John McAdam)

#### **Scientists to Consider**

Charles Macintosh-Waterproof material, John MacAdam- Tarmac, William Addis - Toothbrush Inventor, John Dunlop - Tyres

Bright Ideas Time Suggestions	Vocabulary to be Taught	Possible Trips/Experiences	Possible Cross-Curricular Links	Potential Books to use
<ul style="list-style-type: none"> <li>Odd one out - Umbrella, jacket, hat</li> <li>Odd one out – card, glass window and brick</li> <li>PMI – What If all materials were waterproof?</li> <li>PMI – What if you could only build houses from glass?</li> <li>Odd one out – fluffy socks, paper clip and elastic band</li> <li>PMI – What if all beds were made from cotton wool?</li> <li>Odd one out - Plastic spoon, ball of wool and a wooden block</li> <li>PMI - An umbrella made of glass, A house made of steel, Windows made of wood</li> <li>PMI – What if humans were 100% waterproof?</li> <li>PMI – What if glass was as strong as steel?</li> </ul>	<p>Material (card/cardboard, clay) Properties of materials –opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, shape changed , push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending and stretch/stretching, Waterproof, absorbent , hard/soft , strong/weak, rough/smooth suitable/unsuitable, use/useful, fit for purpose strong/weak, rough/smooth</p>	<ul style="list-style-type: none"> <li><i>Greenshift Education</i> <a href="http://greenshifteducation.co.uk/workshops/">http://greenshifteducation.co.uk/workshops/</a></li> <li>Esh Group - A story time and questions session looking at the three pigs, exploring the different materials and qualities, what home are made from and different homes around the world <a href="mailto:clare.davison@esh.uk.com">clare.davison@esh.uk.com</a></li> </ul>	<p><b>English:</b></p> <ul style="list-style-type: none"> <li>Explanation text – why are materials used for particular jobs?</li> </ul> <p><b>Maths:</b></p> <ul style="list-style-type: none"> <li>Simple tables to record results of practical tests</li> </ul> <p>ICT/iPads:</p> <ul style="list-style-type: none"> <li>Padlet can be used to generate the questions the children want to investigate in each topic.</li> <li>Kahoot can be used as an assessment tool in lessons or at the end of each unit.</li> <li>Post it app/pic collage sorting and grouping</li> <li>Yakkit kids/green screen as well-known scientists</li> <li>Explain everything - Show the object before, during and after changing it - pictures and explanation - could it be changed back?</li> </ul>	<ul style="list-style-type: none"> <li>Iggy Peck Architect - <i>To be able to identify and compare the uses and suitability of materials</i></li> <li>Three little pigs - <i>To be able to identify and compare the uses and suitability of materials</i></li> </ul>

#### **Other Useful Websites / Resources**

### **For Bright Ideas Time**

- <https://explorify.wellcome.ac.uk>
- Curriculum Coverage Document with Bright Ideas examples on
- Concept Cartoons on the School Server

### **For Class Resources and Planning**

- <https://www.ogdentrust.com/resources-cpd/resources>
- <https://explorify.wellcome.ac.uk>
- <https://pstt.org.uk/resources>
- <https://www.primarysciencebee.com> – **example medium term plans**
- <https://ypste.org.uk/audiences/teachers>
- <https://www.stem.org.uk> (excellent resources for all topics and areas of science curriculum)
- <http://www.ciec.org.uk/interactive-planning-tool.html> (**good interactive planning tool**)
- <https://www.bbc.com/teach/terrific-scientific>
- <https://www.bbc.com/teach/ks1-science/zhsr2sg> (KS1)
- <https://www.bbc.com/teach/ks2-science/zf3kt39> (KS2)
- <http://www.ciec.org.uk/primary.html#resources>
- <https://wowscience.co.uk>
- <https://sites.google.com/view/primary-science-bee/home> - **Examples of medium term planning that could support planning**
- <http://www.rsc.org/learn-chemistry/resource/listing?searchtext=&filter=all&fLevel=LEV00000001&eMediaType=MED00000009&reference=primaryresource> - Good cross-curricular links to science and topic
- <https://endeavour.kew.org/app/os> - good real life contexts and challenges surrounding plants
- <https://nustem.uk/primarycareers/#tab-id-10> - **gives children a context for learning science by showing jobs related to the topic being taught.**
- <https://www.linnean.org/learning/teaching/primary/discovery-kits> - email for free resources to use of plants, life cycles, habitats, classification and evolution.
- <https://www.bbc.com/teach/terrific-scientific/amazing-people/zhy4hbk> - information on some influential scientists
- [https://www.youtube.com/watch?v=qEGYU-0AtaM&list=PLg7f-TkW11iU11yatk\\_TcbA2tGH\\_WLe8d](https://www.youtube.com/watch?v=qEGYU-0AtaM&list=PLg7f-TkW11iU11yatk_TcbA2tGH_WLe8d) - Brian Cox School Experiments videos - a range of ideas for experiments in schools.
- <https://nustem.uk/loans-boxes/> - free loan boxes of resources to have for 6 weeks
- A creative Approach to Teaching Science book - copy given to all teachers
- Concept Cartoons on the School Server
- Curriculum coverage document on the server
- Science cupboard resource list on the server
- Resources in subject > science > then individual year group folders - these have ideas for experiments or other useful resources when planning.

### **Science in the News**

- <https://www.reachoutreporter.com>
- <https://www.bbc.co.uk/newsround>
- [https://www.bbc.co.uk/news/science\\_and\\_environment](https://www.bbc.co.uk/news/science_and_environment)

### **For CPD**

- <https://www.reachoutcpd.com>
- <https://www.pstt.org.uk/resources/cpd-units>
- <http://primaryscienceonline.org.uk/glossary-of-terms/>
- Science Glossary on the server