Science Plans

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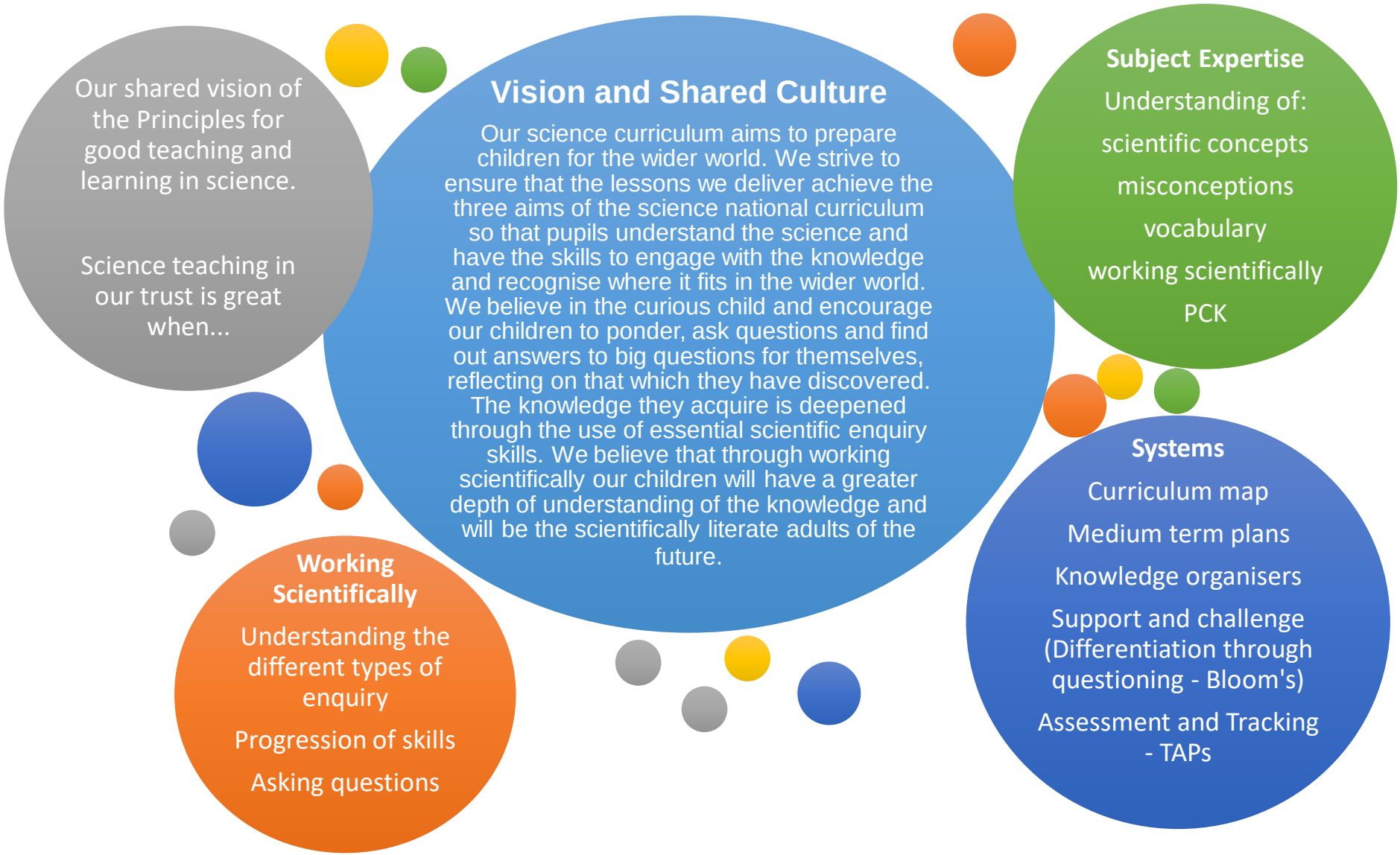

Curriculum Map Overview

Year	Autumn Term		Spring Term		Summer Term	
	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year A Y1 objectives	**Animals incl. humans** -Human sense organs -Identifying the 5 vertebrate groups -Identifying herbivores, carnivores and omnivores		**Everyday materials** -Properties of wood, plastics, glass, metal, water and rock		**Plants** -naming plants and trees -structure of plants / trees	**Seasonal changes** -The 4 Seasons -Seasonal weather -Seasonal day length
	Seasonal changes (to run over the year and culminate in full coverage in Summer Term 6)					
Year B Y2 objectives	**Animals incl. humans** • Animal offspring • The basic needs of animals • Human health – diet, exercise and hygiene		**Uses of everyday materials** • Properties and uses of materials. • Changing the shape of solid objects		**Plants** • Seeds and bulbs. • The need for water, light and warmth	**Living things & Habitat** • Living, dead & non-living • Habitats • Simple food chains
Year A Y3 objectives	**Animals incl. humans** • Human nutrition • Skeletons & muscles	**Light** • Seeing things • Eye protection • Reflections • Shadows	**Rocks** • Types of rock • Fossils • The soil	**Forces & Magnets** • Friction • Magnets & magnetic forces	**Plants** • Structure & function • Plant growth & reproduction • Water transport	
Year B Y 4 objectives	**Sound** • Vibrations and sources of sound • Pitch patterns • Volume patterns	**Electricity** • Appliances • Insulators & conductors • Single loop (series) circuits • Switches, lights, buzzers	**States of Matter** • Solids, Liquids & Gases • Changing state with temperature • The Water Cycle		**Animals incl. humans** • The digestive system • Teeth • Food chains	**Living things & Habitat** • Grouping living things • Classification keys • Changing environments
Year A Y5/6 objectives	**Evolution** • Fossils • Offspring and variation • Adaptation and evolution	**Light** • How we see • Reflections • Shadows	**Forces** • Gravity • Friction • Levers, gears and pulleys		**Living things & habitat** • Life cycles • Reproduction in plants and animals	**Animals incl. humans** • Changes in humans
Year B Y5/6 objectives	**Animals incl. humans** • The circulatory system • Transportation of nutrients in the body • Healthy bodies	**Earth in Space** • Heliocentric model • Moon's orbit • Day and night	**Properties and Changes of materials** • Dissolving, separating, filtering, evaporating • Reversible / irreversible changes • Properties of materials		**Electricity** • Voltage • Symbols • switches	**Living things & habitat** • Classification system

KS1 Lesson Plans

Year 1

Animals Including Humans	Year 1 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	**Pupil learning activity**	**Resources**	**Assessment**
Humans Lesson 1: What parts of the body can I name?	Humans have key parts in common, but these vary from person to person. WS focus: **Use observations and ideas to suggest answers to questions**	Introduction – Sing head shoulders knees and toes. What other parts of the body do we know? Use TAPS lesson plan Y1 Body parts https://pstt.org.uk/resources/curriculum-materials/assessment Children create models Finish with game Simon says.	Children to individually create a model (e.g. play dough or clay) of the human body and label the parts (head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth). Label/match body names / parts. Compare two children similarities / differences. In maths Measure heights of children using non-standard measures. Create class graphs.		Children meeting the objective will be able to: Can explain features of their body part and link to senses, *e.g., I can feel things with my legs.* Children will be able to label parts of their body on pictures and diagrams *and make measurements of their bodies using non-standard measurements e.g. straws.*
Lesson 2: What can I	Humans (and other animals) find out about the world	Draw around a child and as a class label. Focus on eyes/nose etc.	Children draw a picture of themselves and the body parts related to the		Children able to identify a sense to

hear/touch / smell/taste/ see?	using their senses. Humans have five senses – sight, touch, taste, hearing and smelling. Know senses link to particular parts of the body.	Discuss the senses and explain how we use each sense. Carousel of activities for children to explore all the different senses. Children to record their ideas.	senses. Complete concept sentences: provide vocab to make sentences. I taste with I touch with I smell with I hear with I see with And draw pictures of what they saw, heard felt etc.		explore different things.
Animals Lesson 3: What animals will we see around our school? What other animals do I know?	Animals vary in many ways having different structures e.g. wings, tails, ears etc. They also have different skin coverings e.g. scales, feathers, hair. Children know key features identify them.	Assessment for learning (AfL) lesson – finding out what animals they know. Plenary - Look at pictures children have drawn and add any group that is perhaps missing e.g. amphibians if necessary. Start identifying the animals to their groups.	A4 paper divided into two: Children draw pictures of animals in the two groups those around the school – others that they know.		

<table>
<tr>
<td>Lesson 4: How are these animals similar / different?</td>
<td></td>
<td>Provide pictures of the range of animals that the children drew in the previous lesson Make sure that there are examples of fish, amphibians, reptiles, birds and mammals.
Activity children choose two and describe similarities and differences of animals focussing on features of animals
Plenary – draw out features
A bird has feathers.
A fish has…
A snake has… (Children might not know that it is a reptile)
Plenary – Explorify Tip the scales Odd one out
https://explorify.wellcome.ac.uk/en/activities/odd-one-out/tip-the-scales</td>
<td>Children choose two animals and say how they are similar / or how they are different.
<table>
<tr><td></td><td></td></tr>
<tr><td>This animal has:</td><td>This animal has:</td></tr>
<tr><td colspan="2">They both have:</td></tr>
</table>
</td>
<td></td>
<td>Children should be able to name a range of animals including animals from the different vertebrate groups.
They should be able to describe the key features of these named animals.</td>
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<tr>
<td>Lesson 5/6 : What do animals eat?</td>
<td>Animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals.</td>
<td>Visit to a zoo/animal park etc. to increase the range of animals and to focus on what food they eat or have visitors to the school with their pets. Focus on examples the children give of the animals they observed and what it ate based on their evidence of the visit / visitor. Discuss whether the animal ate plants, meat or both. Discuss other examples they know of e.g. their pets. You do not need to use the correct terms omnivore etc.</td>
<td>What animals did you see? What did they eat?

Provide a Venn diagram and children sort animals according to what they know they eat.</td>
<td></td>
<td>The children should be able to describe what a range of animals eat using information learned from secondary sources e.g. zookeeper, pet owner.</td>
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Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Lesson 7: What have I learned? Can I sort the animals into different groups?	Use TAPS lesson plan Y1 Animal classification Focus assess WS: **sorting and classifying** https://pstt.org.uk/resources/curriculum-materials/assessment	Give children a small selection of pictures or plastic toys of different creatures from all of the different animal groups. Children to identify and classify into fish, amphibian, reptile, bird and mammal and explain why they belong to that group. Prompt children to name animals and discuss their choices. Using a prepared chart, children sort under the headings fish, amphibian, reptile, bird and mammal. Using mammals only, identify one example that is a carnivore, a herbivore and an omnivore. Either take photo of classifying or stick pictures onto template	Children sort toys into different groups based on the learning from the unit.		Children meeting the objective will be able to name a variety of common animals. Uses observations to classify into given scientific groupings and can explain how they are similar.

Everyday Materials	Year 1 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	**Pupil learning activity**	**Resources**	**Assessment**
Lesson 1: What can you tell me about these objects?	**AfL Elicitation task** All objects are made of one or more materials. Children know objects are made from different materials e.g. plastic, metal or wood. Some children may think: - Only fabrics are materials - Only building materials are materials - Solid is another word for hard	Selection of items on carpet (wood, plastic, glass, metal, water and rock) make sure there is also a glass filled with water. Children could describe the glass and water.	Children choose an object and describe, encourage a range of vocabulary without providing the specific words.	Spoons of different materials, cups of different materials. Also rocks, paper, wool etc.	Can the child name a variety of objects? Children can name each material and each object and the material it is made of? Do they use any words to describe the properties? You are looking to assess any gaps and then focus on them.
Lesson 2: What materials can we find around our school?		Go on a materials treasure hunt around the school. Walk around the school (inside and/or outside) on a 'Materials Hunt'. Play game can you find something made of… metal? Wood? Rock? If they have not identified a range of things.	Children use a digital camera to take pictures of objects. Children record the names of the objects and materials they are made of. Possibility of making a class materials scrap book. Consider materials the school is made from. Create a page of metal objects, a	Cameras	

		Name that object: Point to something the child names as the child says the name of the material for each object.	page of plastic etc. filled with the children's drawings / photos.		
Lesson 3: To explore materials that have been washed up on the beach? How could you describe the objects in the bag? How could you sort the objects?	Describe materials by their properties e.g. shiny, stretchy, rough etc. Some materials e.g. plastic can be in different forms with very different properties	Show a picture of objects washed up the beach. Discuss. Share items that you found on the beach that are in your bag of things you collected. Listen to how the children describe the materials and show corresponding flash cards. Introduce new vocabulary if needed, bendy, stretchy etc. Encourage the children to sort the materials in a way of their choosing. How did they sort them? Based on ASE idea: https://www.ase.org.uk/resources/floating-ducks	Children name objects and find corresponding flash card. Children name the material for each object. Children find the corresponding flash card. Children to identify and sort collection of materials. Can others guess how they sorted the objects? Record their sorting photos, drawings etc. Capture their learning by writing concept sentences using new vocabulary. Use flash cards etc. The … is bendy. The … is rough etc.	Carrier bag of suitable objects that may have been found on the beach: sunglasses, rubber duck, pebbles, pencil, paper, lollypop stick etc.	Children should be able to describe the properties of different materials.
Lesson 4: Which of the materials found at the beach will float / sink?	This is the TAPS WS assessment task Children will need to explore and test different materials to determine their properties. **WS focus to assess: Perform simple tests to compare and group**	**TAPS** Floating & Sinking https://pstt.org.uk/resources/curriculum-materials/assessment Use the materials washed up on the beach and set the children the task of discovering which of the materials they have looked at would float / sink. How will they find out? Children can carry out a simple test and describe what they find out through grouping the materials according to whether they float or sink. WS Perform simple tests and sort -	Children could use a prepared template to record findings or make up one of their own. Children to choose an object and describe its properties, then make a prediction about whether it will float or sink. Children to test the object and record findings.	Fish tank of water – variety of materials as above.	Children meeting the objective will be able to: Carry out a simple test and describe what they find out through grouping the materials according to

		Identifying and classifying Assess the children's ability to achieve this objective.			whether they float or sink.
Lesson 5: How would you describe this material?		**I**ntroduction - Which is the odd one out? Why? https://explorify.wellcome.ac.uk/en/activities/odd-one-out/unusual-houses/classroom Main activity- Hot seating activity, where the class teacher (and then the children) pretend to be a material and the children have to ask questions about its properties in order to identify and name the material. Children record their ideas. Plenary – What if every material was stretchy / rigid? What if all your clothes were shiny? https://explorify.wellcome.ac.uk/en/activities/what-if/every-material-was-stretchy	Children can describe e.g. wood and then a material of their choice using scientific vocabulary.		Can the child name a variety of objects? Children say what material the objects are made of? Do they use any words to describe their properties?
Lesson 6: What is the best materials for lining a dog basket/ making a party hat? or any similar question for them to test.	Children will need to explore and test different materials to determine their properties. WS focus to assess: **Ask simple questions and recognising that they can be answered in different ways**	**What is the best material for an umbrella?** TAPS Y2 Waterproof materials Umbrella planning https://pstt.org.uk/resources/curriculum-materials/assessment Provide a collection of different types of materials. Discuss which could be the 'best' material – draw out that need to know best for what. Today we want to know the 'best' for waterproof coat/umbrella/cover for summer fair cakes etc. – choose appropriate context. Pupils discuss how to compare how waterproof the different materials are, for example: • Drip water onto the material	Children to plan and carry out a simple test to measure the waterproofness of different materials – groups can try different ways to answer the question.	Variety of materials: tin foil, fabric etc., beakers, pipettes	Children will be able to use their test evidence to answer a question about the properties of the material. Children will know the best material for an umbrella based on their test.

		• Pour water onto the material • Wrap up a cotton ball in the material & put into water Alternatively, Save the dinosaur waterproofing investigation. https://www.science-sparks.com/save-the-dinosaur-waterproofing-investigation/			
Lesson 7: What have I learned in this topic?		**Quiz to assess their learning.** Teacher reads question child says/writes/draws answer/or selects most appropriate flash card e.g. 1. Name/tell me three materials. 2. Name/select a material that is shiny etc.			

Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Plants	Year 1 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What plants do I know?			Children to draw pictures of plants they know? Children to say the names of any plants that they know – list them.		Children's responses will provide teachers with gaps in their knowledge to extend.
Lesson 2a: What trees and plants are around our school? Lesson 2b: What do you notice about these trees / plants?	Growing locally, there will be a vast array of plants, which all have specific names. These can be identified by looking at the key characteristics of the plant WS: **Observing closely using simple equipment**	Outside - Go on a treasure hunt around the school and spot the variety of different plants/trees. Collect the leaves from different trees/plants and take them back to the classroom. Inside - Describe the leaves, talk about the shape and features of the leaves**.** **Use TAPS lesson plan Y1 Leaf looking**. https://pstt.org.uk/resources/curriculum-materials/assessment Identify similarities and differences between leaves. How are these leaves the same/different? Plenary Read book: 'Leaf Man' by Lois Ehlert.. or Explorify - odd, one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/types-of-leaves	Outside - Welly walk – noticing observing, taking photos, collecting leaves. Inside - Make observational drawings of the leaves. Children sort leaves based on different characteristics of the leaves. Make leaf rubbings and specify from what tree their leaf has come from. Can also make a class picture/collage using the leaves children have collected	Magnifying glasses	Children meeting the objective will be able to observe closely and can draw a leaf outline accurately and show hairs/veins when present.
Lesson 3: Can you spot that plant?		Based on activity 2 of the Great Plant Hunt file:///C:/Users/Allie%20Beaumont/Downloads/Lookouts-Activity2.pdf	Children to make observational drawings and describe the plants they have found for a class book.	Identikit photos/cards of named plants in the local	They should be able to find and name the plants they find using a

Being able to identify a specific tree / plant using a picture / clues.		http://www.greatplanthunt.org/yeargroup-1 Possibility of using identikit cards from GPH and children find the plant that they have been given. Alternatively, the teacher takes photos of some plants in the surrounding environment. The teacher names these plants and the children have to find the plant. Choose plants for the children to find that they do not know so expanding their knowledge. Plenary – Explorify - odd one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/winter-scenes		environment. This can include trees.	simple chart. Children should be able to name at least 3 plants and trees in their surroundings that they see regularly. They should be able to describe these plants/trees identifying key features e.g. shape of leaves, colour of flower.
Lesson 4: How does this tree change through the year?	Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring	Children/class to adopt a tree and keep an eye on it throughout the seasons. What changes can they observe? Take a photograph of the children and the tree at various times of the year. The children should say what they notice. Then compare to previous photos. What is similar/different? At end of unit use Explorify video What's going on https://explorify.wellcome.ac.uk/en/activities/whats-going-on/seasons	Photographs/drawings Noticing similarities and differences – making drawings/rubbings - identifying the differences – key features. This tree has… This tree has... Discussion	cameras	Children should be able to point out trees that lose their leaves during the year and those that kept them the whole year. They should be able to use photographs to talk about how plants/tress change over time.
Lesson 5:		One way of investigating this is:-:	Children order string/leaves.	String	

Does the tree with largest trunk have the largest leaves?		Children use string to measure around different trees in their surroundings. (Three trees) Cut the string to size. Order which tree has the largest trunk? Look at the leaves from these different trees. Order them according to size. Again, can use string or simply place on top of each other. Is the biggest leaf from the tree with the biggest trunk?	Talk about what they notice. Can they order the sizes? Can they determine a relationship? This is a challenging question.		
Lesson 6: What are the different parts of a plant?	This is the WS focussed assessment task WS LO **Observing closely using simple equipment** TAPS PLAN Plant structure TAPS Activity: Plant structure https://pstt.org.uk/resources/curriculum-materials/assessment Plants have common parts, but they vary between the different types of plants.	Bring in a plant from home (dig a weed up) and observe the different parts. Identify the different parts and show flash cards flowers, stem, leaves and roots. Look at two different plants: e.g. Dandelion, daisy, Shepherd's purse What is the same/different? Plenary: Sing: Flowers, stem, leaves and roots (heads, shoulders, knees and toes tune)	Children talk about, point and name the different parts of their plant. They can draw pictures of their plant and label it for evidence of achieving objective		Can describe and point to the basic structure of a plant and a tree using scientific language, *e.g. leaves, flowers, petals, fruit, roots, bulb, seed, trunk, branch, stem.* May begin to explain what the different parts of the plant are needed for.
Lesson 7: Is a tree a plant?		Refresh the parts of a plant. Think about a tree. Teacher to quickly draw a plant and label the parts now ask children to draw a tree. Discuss similarities. Roots stem/trunk leaves. Look at flowers. Does a tree have flowers? Show pictures of trees in flower. Therefore, trees are very similar to flowering plants. They are plants. Children can	Children create junk pictures of plants either tree or plant.		

		use junk materials to create a plant or tree P.14-15 Parts of a plant and their functions booklet https://www.saps.org.uk/attachments/article/1373/SAPS%20book%201%20-%20Parts%20of%20a%20Plant%20-%202016.pdf Plenary – look at a variety of seeds. What are they? Where do they come from?			
Lesson 8: What happens to the seed when I plant it?	Use either Sunflower seeds or beans.	Use Eric Carle's book the tiny seed.	Children observe their seed growing over time and take photos. Give the children a sequence of photos to order.		Can they order them and talk about the changes in the plant as it grows referring to the different parts of the plant?
Lesson 9 What have I learned?			Allow children to look back at the pictures of the plants that they drew at the beginning of the topic. Can they add to their list of plants that they can name in the surrounding areas? Encourage them to annotate their pictures with words that they have learnt. Leaves, stem roots, etc.		

Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Seasonal Changes	Year 1 Term (Topic to be implemented as a longitudinal study – over the course of the year.)

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do you know about the seasons?	WS focus for the unit – **gather and record data to help in answering questions.**	Use TAPS lesson plan – Y1 seasonal change. https://pstt.org.uk/resources/curriculum-materials/assessment	Initial assessment – children to make drawings of each of season independent activity– adult to scribe.		
Lesson 2: What is the weather like today? **September**	In the UK, the day length is longest at mid-summer (about 16 hours) and gets shorter each day until mid-winter (about 8 hours) before getting longer again. The weather also changes with the seasons. In the UK, it is usually colder and rainier in winter, and hotter and dryer in the summer.	**Collect the weather for a week** Throughout the year the children should take the weather for one week in each season, choosing an appropriate symbol to represent the weather. The teacher should keep this record. Once the weather data has been collected for the four seasons, the children can look at the differences. Setting the scene. Go on a 'welly walk' to the same place, observe some trees - ensure that on your walk you observe a deciduous and an evergreen tree. Look at the signs of the season, make collections, and take photos. Identify and take photos of each tree and the signs of the season. Record the temperature on your walk. Adult scribe comments from children. Links to plants unit of work lesson 4	The child could make drawings; take photos of things they notice.		

Lesson 3: What do you notice about these leaves? **October**	Note: Lesson has the same focus as lesson 2 plants. Draw out Autumnal features: falling leaves, seeds, fruits, changing colours, dew on grass, temperature, mini beasts, temperature, clothing WS **observing closely**	Link to lesson 2 plants unit – focus on leaves. Outside - Go on a treasure hunt around the school and spot the variety of different plants/trees. Collect the leaves from different trees/plants and take them back to the classroom. Inside - Describe the leaves, talk about the shape and features of the leaves**.** **Use TAPS lesson plan Y1 Leaf looking**. https://pstt.org.uk/resources/curriculum-materials/assessment Identify similarities and differences between leaves. How are these leaves the same/different?	Focus on leaves – identifying similarities and differences.		
Lesson 4: What is the weather like today? **November**	The change in weather causes many other changes. Some examples are numbers of minibeasts found outside; seed and plant growth; leaves on trees; and type of clothes worn by people.	Children to collect more detailed data and record the weather over a week. In this week they should/could make a rain gauge and collect rainfall to see which was the wettest day and/or a bubble wind investigation – how long does it take a bubble to travel across the playground.	Create a class diary monitoring the weather for a week.		
Lesson 5: What was the weather like last week? **November**	WS focus gather and record data to help in answering questions.	Look at the data collected for the week (Last week) and make into class pictograms. Use the data to draw conclusions.			

Lesson 6: How is the weather different from when we started school? Is it cold outside what should I wear? **December**		**Collect the weather for a week.** Go on a 'welly walk' to the same place, observe some trees - ensure that on your walk you observe a deciduous and an evergreen tree. Look at the signs of the season, make collections, and take photos. Identify and take photos of each tree and the signs of the season. Record the temperature on your walk. Adult scribe comments from children. Draw out features of winter: bare trees, hard ground, lack of plants, temperature, and clothing.	Children write winter acrostic poems. Using a body template and templates of clothing the children can select the most appropriate clothing to wear at this time of year.		
Lesson 7: What animals will I see around the school? How do the animals adapt to the changing seasons? **January**	Link to lesson 3 Animals unit.	Do we see as many animals in this season? Discuss hibernating animals and migrating birds. Use books as stimulus to support.			
Lesson 8: What is the weather like today? How have the trees changed? **March**		**Collect the weather for a week** Look for signs of spring: buds on trees, new growth, blossom, bird song, grass, warmth, temperature, and clothing. Go on a 'welly walk' to the same place, observe some trees - ensure that on your walk you observe a deciduous and an evergreen tree. Look at the signs of each season and make collections and take photos. Identify and take photos of each tree and the signs of the season.			

		Record the temperature on your walk. Adult scribe comments from children.			
Lesson 9: What plants are there around our school? What are the signs of summer? **Summer**	Link to plants unit of work	**Collect the weather for a week.** Look for signs of summer: full trees, colours, mini beasts, wild flowers, temperature, clothing Go on a 'welly walk' to the same place, observe some trees - ensure that on your walk you observe a deciduous and an evergreen tree. Look at the signs of teach season and make collections and take photos. Identify and take photos of each tree and the signs of the season. Record the temperature on your walk. Adult scribe comments from children.			
Lesson 10:	WS focus for the unit – **gather and record data to help in answering questions**	Look at the 4 charts of weather collected in the different seasons. Talk about the differences. What are the features of the different seasons? **Assessment of knowledge** (July) Children to use a photocopy of the elicitation to add new knowledge, include comparisons and descriptions. Share with a partner. Compare the weekly weather charts and discuss the changes and how it made you feel and how it affects the seasons.			Children meeting the objective will be able to: Observe record and describe changes in plants, temperature and the weather across the four seasons.

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Year 1/ Year A Science Progression in Skills and Knowledge

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Autumn 1 and 2: Animals including humans • identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • identify and name a variety of common animals that are carnivores, herbivores and omnivores • describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense		
Spring 1 and 2: Everyday materials • distinguish between an object and the material from which it is made • identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • describe the simple physical properties of a variety of everyday materials • compare and group together a variety of everyday materials on the basis of their simple physical properties. •		
Summer 1: Plants • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees. •		
Summer 2: Seasonal changes • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies.		

Year 1/ Year A Science Progression in Skills and Knowledge

Y1/2 Working Scientifically:	Pupils not securing learning	Pupils achieving depth in learning
• asking simple questions and recognising that they can be answered in different ways		
• observing closely, using simple equipment		
• performing simple tests		
• identifying and classifying		
• using their observations and ideas to suggest answers to questions		
• gathering and recording data to help in answering questions		

KS1 Lesson Plans

Year 2

Animals Including Humans	Year 2 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know?			KWL grid: What do I know about 'Growing up healthily?' What do I want to find out about …?		
Lesson 2: Growing up. Are you my mummy? Do all babies look like their parents?	Animals, including humans, have offspring, which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens that grow into adults.	Use the book Monkey Puzzle by Julia Donaldson as a starter for this lesson. Plenary: Also, use photos of a baby, child, teenager, adult to discuss similarities and differences.	Children match the animal with their offspring. Research one animal of their choice, draw, and annotate pictures to show the stages of growth using key vocabulary offspring, young, old etc. Use this for the plenary discussion. Do all babies look like their parents?	Pictures of animals and their offspring to match	Children should be able to describe how animals, including humans have offspring which grow into adults, using the appropriate names for the stages.
Lesson 3: Can you describe the lifecycle of an animal?	In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages, which then grow, to adults. The young of some animals do not look	Use book: Who am I? By Judith Nicholls Lifecycle of a frog. It would be great if the class had tadpoles and watched their lifecycle. Use be safe book to know protocol of animals in the classroom and draw / make a comic strip annotating the different stages. Observation over time enquiry.	Make a comic strip to show stages of growth of a caterpillar / frog.	Frogspawn Pupae of caterpillar pupa	They should be able to describe the lifecycles of some animals.

	like their parents e.g. tadpoles.				
Lesson 4: What does a puppy / baby need to survive?	All animals, including humans, have the basic needs of feeding; drinking and breathing that must be satisfied in order to survive.	Invite a pet owner / new mum into the school to talk about looking after the baby / puppy etc. Prior to this teacher has given time for the children to come up with questions to ask the pet owner / new mum. Invite children who have a pet to say what their pets need. Develop common understanding that all animals have basic needs of water, food, air, shelter.	Children ask questions to find out about the basic needs of the baby / puppy etc. Children create a pet owner's guide detailing what they have learnt.	Visitor	They should be able to show what they know about looking after a baby animal.
Lesson 5: How can I stay healthy?	Good hygiene is important in preventing infections and illnesses.	Link to PSHE Healthy Me. Healthy Living Week. \record this learning in their science books. How do germs spread?	How do germs spread? Use glitter glue on children's hands and see how it spreads. Then get them to wash their hands properly. Write instructions for washing hands and explain why important.		They should be able to explain why it is important to be clean.
Lesson 6: What is a healthy meal?	To grow into healthy adults, they also need the right amounts and types of food and exercise.	Look at different foods and how the children have sorted them. Discuss a healthy diet based on government NHS Eatwell guide. Is my school lunch healthy? Explorify Fuel up odd one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/fuel-up	Pictures of different foods that the children can sort in different ways. Provide a plate and ask children to draw a healthy meal based on Eatwell guide.	Pictures of different foods	They should be able to name foods in each section of the NHS Eatwell guide.
Lesson 7: What exercise do I do?		Carry out a class survey of exercise that the children enjoy doing at the weekend / after school e.g. cycling,	Each child should draw a picture of an activity that they regularly participate in on a post it. Make a class		They should be able to explain why it is

		swimming, ball games, running, horse riding! Create a class pictogram and then children can draw bar charts of results. Discuss why we carry out these activities. Children should answer questions about the graph. Plenary: What happens to our body when we exercise?	pictogram. Draw their own bar charts in their books and draw conclusions from the data.		important for humans to exercise.
Lesson 8: What do I know about growing up healthily?			Complete KWL grids.		

Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Uses of Everyday Materials	Year 2 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What is in the bag? How can I find out the answer to my question?	WS focus assessment **Ask questions. Teachers' respond to questions about materials in different ways.**	Use a feely bag with a variety of objects in. Children have to describe the object thinking about its properties. Once revealed the children describe what it is and what is it made of. Revision of Y1. All feedback will be oral. Provide children with spinners: **Spinner one** - picture of different materials: fabric, water, plastic, wood, sand, brick **Spinner two** - question stems: What happens when, do, does, are, what, how can etc. Children take turns and make up questions about the object.	Children play the spinners game and make different questions, recording one question of their choice. On a post it children write down one question. In groups, children sort the questions according to how they think they will be able to answer the question. i.e. look - book – test On a post-it, the children should record how their question e.g., I can find out the answer to my question by….	Feely bag with a variety of objects in. Spinners Post-its	Assess achievement of Y1 objectives. Assess ability of children to ask questions (using question stems). Children understand each question can have a different answer.
Lesson 2: What materials have been used to build a … car/bike	Children went on a materials hunt around their school in Y1; therefore, you may not want to choose the school.	Bring in a bike and discuss the different parts of the bike: mirrors, wheels, bell, frame, seat, etc. Teacher to explain how the materials are made. Teachers' draw out why? Explain the properties of each material. Explain how the materials are suited to their use.	Child has picture of bike / car in book and then selects different parts of the car to consider. Pupil can record findings in a prepared table: Object |		Bike	Children should be able to name an object. Children able to say what material the

etc. and why?	Explain all objects are made of one or more materials specifically chosen because they are suitable for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water.	Plenary – safety when bike riding. Show a picture of a cyclist wearing a reflective jacket. Describe the picture. Leads into the next lesson reflective materials.	<table><tr><td>Material</td><td></td></tr><tr><td>Properties</td><td></td></tr><tr><td>Why it is used?</td><td></td></tr></table>		objects are made from. Children able to identify the properties of the material and state why it is used.
Lesson 3: What material would make the best reflective jacket?	When choosing what to make an object from, compare the properties needed with the properties of the materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Assess WS skill: **Performing simple tests sorting and classifying**	Show image of cyclist wearing a reflective jacket. Why are they wearing this jacket? Provide a variety of materials to test and sort based on their reflective properties e.g. Tin foil, black paper/cling film, water, windows, etc. TAPS example Y1 Ways to test reflectiveness https://pstt.org.uk/resources/curriculum-materials/assessment	Children consider how to test the materials to find out which are the most reflective and would make the best reflective jacket. Children carry out the test and record the results: Some sorting into most reflective least reflective. Others sorting into reflective, not reflective. A simple conclusion to be written to suggest a reason why it is reflective or not.	Variety of materials to test, torches	Children meeting the objective will be able to carry out a simple test to determine reflectiveness of material and sort or order the materials from most to the least reflective and explain how the test helped them decide on this sequence. May suggest what property of the material causes the reflectiveness.

<table>
<tr>
<td>Lesson 4: Who is John Dunlop / Charles Macintosh or John McAdam? How did Charles Macintosh create a waterproof coat?</td>
<td></td>
<td>Create waterproof material – investigate painting on jam, glue, paint etc. on Jay cloth.
https://pstt.org.uk/resources/curriculum-materials/sotsog</td>
<td>Children perform a simple test to assess children's ability to plan an investigation into which material would make the best waterproof coat.

Macintosh Test.

Children carry out the investigation and answer the question. How did Charles Macintosh create a waterproof coat?</td>
<td>Jam, glue, paint etc. on Jay cloths. Water beakers pipettes</td>
<td>Assess whether the children can ask a question and know how to go about answering it.</td>
</tr>
<tr>
<td>Lesson 5: Is this a good choice?</td>
<td></td>
<td>Good choices activity based on paperclip spinners. Made you look, made you think, and made you talk. Gaynor Weavers.
Children have two spinners – One has different materials on (wood, plastic, metal etc.). The other spinner has objects on (kettle, umbrella, jumper etc.) Child spins the spinner and then says whether it is sensible or not sensible.</td>
<td>Recoding of game:
<table><tr><td>Object</td><td></td></tr><tr><td>Material</td><td></td></tr><tr><td>Properties</td><td></td></tr><tr><td>Good choice? Why?</td><td></td></tr></table></td>
<td>Spinners</td>
<td>Good assessment activity to determine whether the children Identify and compare the suitability of everyday materials including wood, metal etc…for particular uses.</td>
</tr>
</table>

Lesson 6: Can you make a playdough duck?		Start with an explorify activity looking at for example squashy materials. https://explorify.wellcome.ac.uk/en/activities/mystery-bag/changing-shape Then use the Book: Made you look. Made you think. Made you talk. P.89 Make me a duck. Use a dice to determine force used e.g. push and pull. Roll the dice corresponding number is an action push, pull twist etc. Children use this action on the playdough and take it in turns to make a duck.	The children should draw their creation/take a photo and annotate it with the vocabulary they used. How did you mould and shape the playdough?	Bags with squashy bendy materials Playdough and dice. 1 set for each group.	Whilst changing the shape of an object the children should be able to describe the action used.
Lesson 7: How far can you stretch a curly wurly?		World Record Curly wurly stretching! https://world-records.org/longest-curly-wurly-stretching/	Provide children with 26g of playdough / Blu Tac and challenge them to match the world record. Link with maths and focus on accurate measuring.	Curly wurly , Blu Tac	
Lesson 8; Final assessment Can you make a …. What materials would you choose to make a kite and why?		Set a problem-solving activity that will draw together all the children's knowledge form this unit based on explorify: https://explorify.wellcome.ac.uk/en/activities/problem-solvers/at-home-on-mars or DfE example (Making a kite): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763062/2018_key_stage_1_teacher_assessment_exemplification_science.pdf	Children make the construction and label the materials they have used and why.	Junk Materials/ fabrics etc.	Final assessment of children's knowledge of the content objectives.

Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Plants	Year 2 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do we know about plants?	AfL Elicitation task		KWL grid. What do I know, What do I want to know, What have I learnt about seeds, bulbs and plants? Finish the sentence: What do seeds need to start growing?		
Lesson 2: How are seeds and bulbs similar/ different? What is inside a bulb / seed?	It would be good if the collection of seeds / bulbs the children observed included the seed that they planted in Y1. Can they spot this seed?	Provide the children with a collection of seeds and bulbs to observe using magnifying glasses. Notice similarities and differences. Use the great plant hunt teacher's booklet resource: http://www.greatplanthunt.org/yeargroup-2 sorting and sprouting P.10 Sorting Plenary. What is inside a seed/bulb? Collect children's ideas. Then using a visualizer show them a seed/bulb you have cut in half to find the 'baby' plant inside the seed/bulb.	Children make observational drawings of their seeds and sort the collection.	Variety of seeds and bulbs, e.g. sunflower bean sycamore daffodil onion tulip and, magnifying glasses.	Children should be able to spot similarities and differences between bulbs and seeds.
Lesson 3: What will this seed / bulb grow into? How long will it take to grow?	Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings, which then continue to grow into mature plants. These mature plants may have flowers, which then develop into seeds, berries, fruits etc.	Introduction: Refer back to Y1 where children planted a seed (Sunflower / Bean) and watched it grow. Can they remember and pick out the seed / adult plant from the pictures they have? Main part – Plant a seed / bulb and children make a diary observing its growth over time. E.g. Amaryllis bulb. Mung beans (seed)	Children match the picture or actual seed / bulb to the adult plant. Record the growth of the plant over time. Compare and contrast the bulb and the seed. Create cartoon comic strips.	sunflower, bean, sycamore daffodil onion tulip Amaryllis bulb Mung beans	Use graphic organiser to collate similarities and differences.

	Seeds and bulbs are planted outside at particular times of year. Seeds and bulbs will germinate and grow at different rates.	Plenary – watch time-lapse plant growth video clip and discuss. Explorify shooting sprouts https://explorify.wellcome.ac.uk/en/activities/whats-going-on/shooting-sprouts			
Lesson 4/5: What do plants need to grow healthily? Investigate: - light temperature water	This is the focussed assessment task for this term: Observe closely, using simple equipment Keep it simple – allow different groups to investigate different things but basically water/no water, light/no light warmth/ cold Amalgamate results.	TAPS activity: Show children pre-grown plants, discuss what children think these plants could need to keep healthy. Use TAPS lesson PLAN Y2 Growth https://pstt.org.uk/resources/curriculum-materials/assessment Also great plant hunt teacher's booklet resource: http://www.greatplanthunt.org/yeargroup-2 Sprouting P.10 Sorting	Observe and record the appearance of the plants (drawing or annotated photo) and compare the heights of the plants.	Pre grown plants Basil.	Children achieving the objective will observe and record the appearance of the plants (drawing or annotated photo) and compare the heights of the plants. Use findings to suggest how healthy plants are and suggest reasons.
Lesson 6: What happens if I plant seeds / bulbs upside down? Will they grow?	Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy	Planting different seeds / bulbs and making observations. Use concept cartoon Upside down seeds:	Children plant a range of seeds and observe growth.		Children should be able to describe how plants they have grown from seeds or bulbs have developed over time. They should be aware of the different

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td>requirements of plants for growth.</td></tr>
<tr><td>Lesson 7: Do bigger seeds grow into a bigger plant?</td><td>This is an opportunity to carry out a pattern-seeking enquiry.

It is not a fair test because we cannot control all the variables.</td><td>Using their knowledge of growing plants the children should each have a seed to plant and nurture, making sure they give it the right conditions for growth. Look at the seeds and decide which are the biggest. Sort them according to small / medium / large seeds. Plant the seeds – after a period of time measure the plant growth. Sort again according to growth. Smallest / medium / tallest. Create a class scatter gram to see if there is a pattern.
Class scattergram example
<table>
<tr><td>Biggest seed</td><td></td><td></td><td>x</td></tr>
<tr><td>Medium sized seed</td><td></td><td>x</td><td></td></tr>
<tr><td>Smallest seed</td><td>x</td><td></td><td></td></tr>
<tr><td></td><td>5 – 10 cm growth small</td><td>11 – 15 cm growth</td><td>16-20cm growth tall</td></tr>
</table></td><td>Children to make observations of their seeds and a general conclusion about plants.</td><td></td><td>Some children might just compare their plant to another child’s, some may be able to understand the bigger picture of the class scattergram and decide whether there is a pattern.</td></tr>
<tr><td>Lesson 8: What have I learned?</td><td></td><td></td><td>Go back to KWL grid children fill in what they have learnt about plants. Provide question - What do seeds need to start growing?</td><td></td><td>Children complete the question given. Is their answer different to the beginning of the unit?</td></tr>
</table>

Living Things and Their Habitats	Year 2 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	**Pupil learning activity**	**Resources**	**Assessment**
Lesson 1: Outside, what plants and animals might I find? What is a habitat?	Animals and plants live in a habitat, to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water	AfL - Class discussion prior to going outside to gather initial ideas of what they might find and where. Allow the children to find things that interest them outside. In class, share their findings. Introduce the word habitat explaining that this is where an animal/plant lives. Plenary: What is essential in a habitat? Shelter, food and warmth. What would happen if we did not have these things?	Initial exploration of a habitat. Have a class discussion about what was found and the habitat it was found in.		
Lesson 2: What habitats are around our school grounds? What plants and animals live in these habitats?	Identify 3 different habitats around the school for children to explore. E.g. flower bed/corner of the playground/under a log	What habitats are around our school? Collate these. Children then carry out a survey of the different habitats – collating findings. Gather and record findings in a table according to what they can see, hear, smell feel. Recapping senses learnt in KS1. Based on Smart Hunt lesson. https://www.pstt-cpd.org.uk/ext/cpd/smarter-schools/documents/Smarter%20Schools%20-%20Smart%20Hunt.pdf	Children collate findings in a table of their own making or the prepared table from Smart Hunt. Discuss the children's findings. Why do the creatures live there?		Can the children recognise the different habitats and name some plants/animals that might live there?
Lesson 3:	This is the WS assessment	TAPS woodlice habitat lesson plan or			Children meeting the objective will

Where do woodlice like to live? Why do woodlice live under logs?	**Gather and record data to help in answering questions.** Within a habitat there are different microhabitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These microhabitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. Plants and animals in a habitat depend on each other for food and shelter.	Use a choice chamber to explore what conditions woodlice like to live in. Damp/Dark Damp/Light Dry/Dark Dry/Light Children can predict and then record what they found out.			be able to draw a tally chart (model to them) and explain why woodlice are found in a particular habitat, *e.g. I found 3 here and 3 there because it is dark.* They should be able to give features of the habitat that mean the plant or animal is suited to its microhabitat.
Lesson 4: What is a food chain?	Plants and animals in a habitat depend on each other for food and shelter. The way that animals obtain their food from plants and other animals can be shown in a food chain	Look at a woodland habitat and discuss what plants / animals we might find there: foxes, rabbits, hedgehogs, trees, grass, dandelions etc. Look at the food chain cards form this website https://www.stem.org.uk/resources/elibrary/resource/34119/education-pack-food-chains Play foxes and rabbits game. Play game to model food chain. Playground/bean bags/hoops. Divide children into mostly rabbits and a few foxes. The beanbags are carrots. The rabbits have to get their food to survive. They are safe within the hoop, but they must come out to eat and take back	Children play game foxes and rabbits. Make further food chains using the food chain cards.	Pictures, bean bags, hoops bibs of different colours	Children will be able to draw a simple food chain and explain what animals eat.

		their food to the rabbit hole. Foxes try to catch them. Show this as a food chain. What other food chains can they make from the woodland habitat picture cards? Plenary: Explorify – A muddy meal https://explorify.wellcome.ac.uk/en/activities/whats-going-on/muddy-meal			
Lesson 5: Can I sort objects into living/non-living?	All objects are living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals, plants, and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is 'classed' as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). This is the WS assessment TAPS lesson plan Y2 Sorting living and non-living **Use their observations and**	Treasure Hunt Give each group of children an egg box with 12 compartments. Children, whilst outside exploring they find the treasure to put into the box. http://www.saps.org.uk/attachments/article/560/SAPS%20Grouping%20&%20classification%20-%20PartB.pdf Back in class – can they sort the items? Also TAPS lesson plan Y2 Sorting living and non-living https://pstt.org.uk/resources/curriculum-materials/assessment Can they sort a given set of pictures/objects using the criteria: alive, once alive, never been alive? Can they add their own examples to the list?	The children can work in groups of three or four. Give each group a bag or tray and a list of the objects they are going to hunt for in the chosen area. Time the activity to limit the time spent on the 'hunt'. When time is up, the children can bring the objects back to the classroom. Sort them using TAPS lesson plan ideas.	a piece of paper; a stone; a fallen leaf; a piece of plastic; something made of metal; a twig; a fruit or seed; an artificial flower; something that the child can choose	Children meeting the objective would be able to explain why they had sorted in this way. For example, they might say, *"because it moves on its legs and it would probably go and get something to eat and drink if it was hungry", "it's living because it can be pregnant and it can get a husband or wife", "the rock doesn't grow, eat, move or have babies".*

	ideas to suggest answers to questions.				
Lesson 6 What have I learned? Can I make an annotated drawing of a habitat showing the plants and animals that live there?		With the teacher, the children should write the success criteria. E.g. - The habitat must show 3 different named plants / animals - One food chain in that habitat - Label an object that is living, dead, and something that has never been alive.	Children to choose a habitat and draw a picture to represent that habitat labelling the plants and animals that they might find there. They should explain why we might find these plants /animals in that habitat and show a simple food chain in that habitat.		Children should be able to name a range of animals and plants that live in a habitat and microhabitat that they have studied. They should be able to describe how these plants /animals are suited to that habitat.

Based on materials from PLAN knowledge matrices: https://www.planassessment.com/plan-knowledge-matrices

Year 2/ Year B Science Progression in Skills and Knowledge

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Autumn 1 and 2: Animals including humans • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene		
Spring 1 and 2: Uses of Everyday materials • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.		
Summer 1: Plants • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.		
Summer 2: Living thigs and habitats • explore and compare the differences between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including microhabitats • describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.		

Year 2/ Year B Science Progression in Skills and Knowledge

Y1/2 Working Scientifically:	Pupils not securing learning	Pupils achieving depth in learning
• asking simple questions and recognising that they can be answered in different ways		
• observing closely, using simple equipment		
• performing simple tests		
• identifying and classifying		
• using their observations and ideas to suggest answers to questions		
• gathering and recording data to help in answering questions		

KS2 Lesson Plans

Year 3

Animals including humans	Year 3 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I already know?			Using the key vocabulary: food, water, exercise, survive, healthy, rest. What can the children remember about being healthy? Make a mind map to show what they already know. Then give them some new vocabulary: skeleton, bones, muscles, food groups, carbohydrates, proteins. Ask them to add to the mind map anything they know or think of questions they would like to ask to find out more about animals including humans and these words.		
Lesson 2: What are the different food groups?	Animals, unlike plants, which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre, which the body needs to stay healthy. A piece of food will often	Start with an odd, one out to start the discussion about the different food groups. Explorify Fuel up. https://explorify.wellcome.ac.uk/en/activities/odd-one-out/fuel-up Introduce the different food groups – allow the children to research the different groups. They need to be able to record their findings in terms of: Food group - where this can be found e.g. carbohydrates – pasta Using this information can they state what food groups a meal contains. Use photographs of different meals. Children can label/draw the pictures stating what			Children should be able to name the nutrients found in food.

	provide a range of nutrients.	the food is and what food group is and whether it would be a healthy meal. Sort the pictures into yes healthy/not healthy and state why?			
Lesson 3: How nutritional are different foods?		Provide the children with different food labels / packaging for them to explore the fat content, protein, carbohydrate value etc. Show them how they can compare the foods e.g. by 100g. Record findings in a table. From this information draw out conclusions: Sort a range of packaging into low / high fat content / sugar content etc.		Packaging labels: Pizza Coco pops Ready meals	Children will be able to answer questions about nutrients in food based on their gathered evidence. They will be able to sort foods according to high / low nutrient value.
Lesson 4: What is in a day? Planning my own healthy diet.		Could use Which breakfast is best. Exporify Can they plan a daily diet, which contains a good balance of nutrients? Explain ideas will be based on research from food packaging and knowledge of the food groups.			Assess whether children do understand that animals need the right amount of nutrition and that they get this nutrition form what they eat. They will be able to talk about the nutrient content of their daily plan.
Lesson 5:	Humans, and some other animals, have	Children can research the human body and find out the name of some bones.			Children will be able to

What bones are in my body?	skeletons and muscles, which help them, move and provide protection and support.	Can they label a diagram of a human skeleton using ideas found form research? Using straws make models of a skeleton. Plenary: Could also use Funny bones book as a stimulus. Shows skeletons of other animals. How are the skeletons similar / different? Leads into next lesson.			name some bones that make up their skeleton,
Lesson 6: What job does the skeleton do? What would happen if animals/humans did not have skeletons?		Looking at the book Funnybones or real pictures of skeletons of different animals- discuss how the skeletons are similar / different. List the ways. What is the job of the skeleton? Use concept cartoon with statements: 'I would not be damaged as easily without any bones to break.' 'Your heart and brain might be damaged.' 'You would not be able to stand up or move – you would just fall in a heap.' 'You would move better because your muscles could bend you in any direction.' Children can research and answer the statements posed. Plenary: What statements can they confidently answer? Might not be sure about movement.			They will be able to give examples of bones that support, help them move, and provide protection.
Lesson 7: How do our bones help with movement ?		How do our bones help with movement? Look at an x-ray of an elbow. Make a model of an elbow joint using card, elastic bands and split pins. Explain what is happening. Reinforce muscles are attached to the bones and that muscles pull the bones to make movement.			Children will be able to describe how muscles and joints help them to move.

		Plenary odd one out. Pictures of giraffe, ladybird, octopus. Also display words, protect, support and movement can they consider which one is the odd one out and why?			
Lesson 8: Am I a square? Investigating the human skeleton.	This is a WS focussed assessment task. WS **Ask relevant questions and use different types of scientific enquiries to answer them.** TAPS Plan Investigating the human skeleton. Y3 Skeleton Are you a square. Pattern seeking.	Ask children to suggest ideas about differences between human skeletons. Help children turn ideas into a question that they can investigate e.g. Am I/Are you a square? (look at arm span versus height) Who has the longest arms? (Y3 or Y6?)			Children meeting the objective will be able to **ask** questions, and turn the questions into questions that they can investigate. Can say whether the outcome of the survey is what they expected, e.g., *I thought that Y6 children have bigger heads than Y4 children do and they do.*
Lesson 9 What have I learned?			Children should go back to their original mind maps and in a different colour add any additional learning or answer any questions.		

Light	Year 3 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do we know about light?		Provide the children with the key vocabulary for the topic and read each of the words. Invite the children to look at the words and select two. Teach how these words can be connected together in order to form concept sentences. Children to write concept sentences in their books. More able can try to connect these in a concept map. The teacher will model this idea should first. Plenary: list some sources of light as a class then use https://explorify.wellcome.ac.uk/en/activities/odd-one-out/sources-of-light	Children create concept sentences/concept map - making connections between key scientific vocabularies.	Key vocab as flash cards: Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, eyes	Teachers analyse the sentences/maps to determine what the children already know about the key vocabulary. Any misconceptions? Any words they do not know.
Lesson 2: Why do we need light?	We see objects because our eyes can sense light. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light	Introduction or plenary – use back paper tubes to exemplify that darkness is the absence of light and that we need light to see. Children should explore how different objects are more or less visible in different levels of lighting. Use: 'Can't you sleep little bear, by Martin Waddell' as a stimulus. Use Ogden trust lesson ideas to explore the phenomenon. https://www.ogdentrust.com/resources/phizzi-practical-bear-cave	Children explore the bear cave and make predictions as to which objects they will be able to see. Recording their predictions and results in a table. Children should try to write a conclusion based on this evidence - describing patterns in visibility of different objects in different lighting conditions and predict which will be more or less visible as conditions change.	Black buckets, light sources LED candle, torches, stickers, printed pictures, 3 different curtain materials – transparent, translucent, opaque.	They should be able to clearly explain, giving examples, that objects are not visible in complete darkness

Lesson 3: What is darkness?	Dark is the absence of light. We cannot see anything in complete darkness.	Use concept cartoon as a starter Seeing in the dark. Ask the children what they think. Discuss. For cartoon image simply google: seeing in the dark concept cartoon Then use Explorify to set the children this problem solving challenge to create a cave /den to find out the answer to the cartoon.https://explorify.wellcome.ac.uk/en/activities/problem-solvers/lightproof-your-secret-den Plenary – can the children think of any time it might be completely dark or we might need it as dark as possible? Talk about use of blackout curtains in a child's bedroom during the war.	Children create dens and evaluate how effective they are at being light proof. They can draw diagrams of their den's and annotate explain features and why used.	A mix of building materials (garden canes, cardboard boxes, paper, net curtain, clear plastic, old sheets, foil, tape, glue, elastic bands, packaging and other bits of recycling	Assess whether the children are using any of the information that they learnt in lesson 2 when creating their dens. When drawing and notating their ideas do, they use any key vocabulary?
Lesson 4: Which objects reflect light the best?	Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective.	Provide children with a selection of different materials and a torch and allow them to explore and record for themselves how reflective the materials are. Teacher to look at how they children have recorded their results. Model how to draw a table if needed and the use of the vocabulary reflective. Teacher to then model the writing of a class conclusion …"Using the evidence in the table we can say that..."	Children to independently explore and record their findings.	Selection of materials: tin foil, CD, black paper, etc. torches.	Children need to make the connection between the shininess of the material and the amount of light reflected. Can they make this connection?
Lesson 5: How do we know that light from the sun is dangerous ? How can we protect our eyes	The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light	Intro - Class discussion on question posed. How do we know that light from the sun is dangerous? What do the children say? What evidence do they use? Main activity: Show pictures of people observing an eclipse. Discuss. Set children the task of testing some materials to see which would be the	Children test materials and choose an appropriate material to make their own sunglasses. They should then make a poster to persuade people to use their sunglasses to protect their eyes because they are the best.		Children will be able to state that It is dangerous to view the sun directly and state precautions used to view the sun.

from the sun?		best materials to make a pair of sunglasses. Children make their sunglasses. Teacher demo - test sun cream using a UV light by putting it on cling film over a cup of tonic water and seeing how much light penetrates. Use high factor suntan cream, low factor and no suntan cream. Make a conclusion based on the evidence.			
Lesson 6a: How are shadows form when light is blocked?		Intro activity – assess their current understanding. Go outside and make different shadows with their bodies. Introduce the words opaque and blocked. Define how shadows form when light is blocked.	Draw a picture of themselves in the sun with their shadow. Amend their original pictures if necessary. Children can describe how to form a shadow.		Children describe shadows are formed when light is blocked. Children are able to demonstrate this by blocking light.
Lesson 6b: Can everything make a shadow?	This is a WS focussed assessment ask; WS **Use results to draw simple conclusions**. Use Taps lesson plan Y3 Make shadows	Children explore a variety of objects and sort them into transparent, translucent and opaque. They should then make a prediction about the shadow the object will form and test. Use Taps lesson plan Y3 Make shadows. Using their test results can they consider (predict) the shadow of two overlapping transparent objects? Based on concept carton 12.8 two trees. https://pstt.org.uk/resources/curriculum-materials/assessment	Explore a variety of objects and the shadows made by the objects. Children record their findings in a way that communicates meaning. The children will be able to communicate which objects make the strongest shadows.	Variety of objects, torches.	Can make observations and use results to draw conclusions about the materials and the shadows that they might make.
Lesson 7 Can shadows change shape / size?	Assess WS skill: gather record and present data to help in answering questions.	Use Kipper's Monster by Mick Inkpen to set the scene of the lesson. Challenge the children to find out how you change the size of the shadow. Plenary Read poem **Shadow by Michael Rosen** Across my bedroom wall	Children can make a simple shadow puppet e.g. snail and explore how to show that the shadow changes – measure it, trace the shadow etc. Look at the evidence to answer the question		Can the children present data to help in answering the question?

		Flapping its giant grey wings A monster Across my bedroom lamp Fluttering its small brown winds: A moth Challenge the children to explain what is happening based on their scientific reasoning. *www.educationguru.co.uk/downloadfile.php?df=images/upload/files/...* · PDF file Google Shadow poem by Michael Rosen Great ideas for use.	posed. Challenge the children to draw conclusions. Support less able by saying To make the shadow bigger you …… To make the shadow smaller you……..		
Lesson 8 What have I learned?			Children return to their concept sentences and concept map - making connections between the key vocabularies and add/amend any information.		

Rocks	Year 3 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I already know about rocks, soils and fossils?	AfL elicitation task.		Children complete mind maps of what they know about rocks, soils and fossils.		
Lesson 2: What different types of rocks are there around our school?	Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders).	Carry out a rock detective walk so that children can begin to recognise the different types of rocks, think about their physical properties and their uses. They should begin to describe the rocks. Collect the vocabulary the children use to describe their observations. Plenary: Explorify discussion activity Do rocks stay the same forever. https://explorify.wellcome.ac.uk/en/activities/the-big-question/do-rocks-stay-the-same-forever Link their conclusions of this to their rock detective walk. What evidence did they find?	What can you find that is made from rock around our school? Draw and write. Think about why rock as a material has been used in different parts of the school and why this choice has been made.		
Lesson 3: What is this rock? How can I describe it?	Children naturally look but do not look in detail. This activity will heighten observational skills.	Introduction: Why is it all rocks do not look the same? https://explorify.wellcome.ac.uk/en/activities/the-big-question/why-don-t-all-rocks-look-the-same To help the children understand how different rocks form over time make chocolate rocks.	Draw a chocolate cookie observing the detail closely. Place their cookie back in the pile can they find it? Can they use the skill of observing closely to draw a rock? What is the rock? Choose two rocks, compare, and contrast the two rocks.	Chocolate cookies Samples of rocks	Children will be able to name some rocks and give physical features of each.

			Use a graphic organiser to collate their responses. Make chocolate rocks.		
Lesson 4: Choose an investigation from: We need to choose a hard rock for a kitchen worktop that will resist scratching. Which rock would be best? We need to choose a waterproof rock for the roof of a new building. Which rock would be best? Which rock would be the best material for a new	This is a focussed WS assessment task. Use the TAPS lesson plan for support. Children either carry out a rocks scratch testing investigation or a porous investigation and report findings from their enquiry. **WS focus: Reporting on findings from enquiries**	TAPS PLAN – Y3 Rocks report. https://pstt.org.uk/resources/curriculum-materials/assessment Provide a purpose for the investigation – e.g. to find the best material for a new paved area in school. Suggest that you would like to find out which rock would last the longest/be the least wearing/the strongest and that a rub test is one way to do this. Children to rub rocks on sandpaper and collect scrapings onto white paper. Ask children to order the rocks and justify their selection of strongest rock. How will you report your findings (to persuade), e.g. draw, write, power point?	Carry out investigation in groups.	Rocks, sandpaper, paper Pipettes Beakers	The children will be able to report their findings and can use the 'rub' test to order the rocks and can say (orally or with diagrams/writing) which rock is strongest/harder wearing.

paved area in school?					
Lesson 5: What is a fossil? How do fossils form?	Some rocks contain fossils. Fossils formed millions of years ago. When plants and animals died, they fell to the seabed and were covered and squashed by other material. Over time, the dissolving animal and plant minerals in the water replaced matter.	Modelling how fossils form. The children can flatten plasticene in a small plastic pot to make the seabed. They then imagine that a sea creature, represented by a dog biscuit (bone shaped) has died and fallen onto the seabed. Then they can add the sea (salty, diluted food colouring) and shredded up kitchen roll to represent the sediment. Imagining they are an archaeologist some thousands of years later, pupils can unearth their fossils using a pick (toothpick). They should identify imprint fossils, using a visualizer to help to identify the shape of the fossil imprint and notice the fossilised bones of the dead sea creature itself that has taken on some of the food colouring of the sea.	Children can create a comic strip to explain how fossilisation occurs recounting what they have done or in English write a chronological report.	Beakers, Plasticene, Bonio biscuits, (salty, diluted food colouring) shredded kitchen roll.	Children will be able to explain how a fossil forms and present this information in different forms.
Lesson 6: What can you find out about fossils? Who is Mary Anning?		Allow pupils to independently research using books/computer and report on what they have found out. They should be able to answer one of the two questions you posed. Pupil research lesson. https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-mary-anning/z7wvjhv	Children should report findings in a way of their choosing: PowerPoint, poster, annotated diagrams etc. They can work in groups and do a group presentation.	Books/ internet	
Lesson 7: What is soil?	Soils contain small pieces of ground down rock, plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter	Children to carry out an observation over time enquiry Plenary - explorify	Add water to a sample of soil – around one-third soil to two-thirds water in a pop bottle. Make careful observations over time. Draw the layers and label.		Children able to explain that soils are formed from rocks that contain living/dead matter.

	affect the property of the soil.	https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/tiny-bits-and-pieces			
Lesson 8: What have I learned?			Children go back to their original mind maps and in a different colour now add new information that they have learned about rocks, soils and fossils. Answer: What did they find most interesting?		

Forces and Magnets	Year 3 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know about forces and magnets?		Teacher to provide key questions for the children to consider in making their mind maps. Questions to include:- What is a force? How do things move? What make things speed up or slow down? Teach magnets are used for… Which materials are magnetic? What are some different types of magnets?	Children create a mind map detailing what they already know about forces and magnets.		
Lesson 2: How can I get an object to move?	Before the children investigate, the effect of movement on different surfaces they need to understand that pushes and pulls make things move. That a force is in fact a push or a pull. WS objective: gather and record data to help in answering a question.	Introduction: Children explore a variety of objects: ball, spinning top, yo-yo, car etc. and consider how they can get them to move. Use the term push / pull and that his is a force. Main activity: Children to explore pushes and pulls around them and record their findings in tables, charts, Venn diagrams their choice Plenary – Discuss the different ways of recording results particularly Venn diagram / tables and what these look like. Allow children to reflect on their recording. Is it clear? Video clip of pushes and pulls in real life: https://www.bbc.co.uk/bitesize/clips/zkw8g6f	Children identify pushes and pulls around them and record in way of their choosing.	ball, spinning top, yo-yo, car	Children are able to give examples of forces in everyday life e.g. pull - opening a drawer, push – close a door
Lesson 3: Which surface is best for an	When an object moves on a surface, the texture of the surface and the object	Show pictures and discuss the purpose of an escape lane and the kind of surfaces, which could slow down vehicles: wood chippings, grass, gravel,	Children carry out the investigation in groups and independently record the results in a table		Children meeting the objective will be able to take and record

escape lane? Why?	affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. This is a WS focussed assessment task: WS: **Makes systematic and accurate measurements and record these in a table and bar chart.** TAPS lesson plan Y3 Forces – car ramps. https://pstt.org.uk/resources/curriculum-materials/assessment	sand. Explore how far cars go after a hill (down a ramp). In small groups, discuss how they will measure how far the car goes on different surfaces and how they can record this. Emphasise that we are testing the surface, so everything else must stay the same to be fair – as a class list the control variables. Groups investigate with each drawing their own 'results table'. Plenary: Ask children to explain how the surface makes a difference. As a class, can they rank the surfaces?	(Modelled in previous lesson.) In the plenary, they can draw conclusions from their investigations – describing how an object can move on different surfaces. (Comparing the different surfaces)		accurate measurements using standard units and presents findings in a table (or bar chart). Can compare how things move, e.g., *it goes quicker on wood and slower on grass.*
Lesson 4: How do magnets behave? When do, magnets attract / repel?	The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, will push away from each other – repel. If two unlike poles, e.g. a north and south will pull together – attract.	Introduction – AfL Provide children with a variety of magnets and a bag of treasure. Allow them to explore the materials and find out for themselves. Main activity – Discuss children's post its, collating these on a white board grouping similar ideas. Introduce the terms attract and repel - if the children have not used these terms and demonstrate on an OHP with magnets the effects. Draw out the fact that when magnets repel – they are pushing. When attracted, they are pulling. Use arrows to show direction of force. Look at the different poles N and S using simple red/blue magnets. Emphasise that magnets use a	Children given a post it note each and after a period to write down one thing, they have noticed or found out about the magnets and treasure. Provide children with bar magnets and get them to explore the effects of the poles and record their findings using annotated diagrams and key vocabulary. Extension/challenge – can they determine where the north south poles are of	Selection of magnets and treasure bag of different materials. Bar magnets.	Children will be able to show how magnets attract, repel, and can use arrows to show the attraction and repulsion between the poles of magnets.

		magnetic force and they can act at a distance the magnets do not need to be touching. Plenary – can they determine where the north south poles are of magnets that are not the simple bar magnets?	magnets that are not the simple bar magnets.		Children will be able to name unmarked poles
Lesson 5: What materials are magnetic?	A magnet attracts magnetic material. Iron, nickel, and other materials containing these, e.g. stainless steel, are magnetic.	Use the children's post its from the previous lesson where it might say that metals are attracted to a magnet? Pose the question 'Are all metals magnetic? Or use concept cartoon Allow the children to carry out a classification activity to determine whether materials are magnetic and which are not magnetic? Plenary – Discuss - What is the difference between a magnet and a magnetic material? Look at the maze game. Can this game be played using attract /repel? I.e. magnets using the force of pushing to move a car around a course. Need two magnets. Attract is simple, Reinforce contact and not contact forces. Also explorify magnets What's going on: https://explorify.wellcome.ac.uk/en/activities/whats-going-on/magnets	Children carry out a classification activity to determine which materials are magnetic / non-magnetic. Draw conclusions based on their evidence. State what a magnet is and what a magnetic material is. Extension - Make a simple magnetic game e.g. maze/fishing game and explain how it works using key vocabulary: magnet, attract magnetic material.	Various objects: paperclips feather, balloon. Coins both magnetic non-magnetic, screws, bolts, scissors etc.	Children will be able to use their classification evidence to determine that some metals, but not all, are magnetic.
Lesson 6: Which is the strongest magnet?	This is the WS focussed assessment task. TAPS lesson plan Y3 forces – which is the strongest magnet? https://pstt.org.uk/resources/curriculum-materials/assessment	Use a concept cartoon as a starter: the bar magnet is the strongest, the biggest magnet is the strongest, you cannot tell which is the strongest magnet by looking at them. What do you think? Provide the children with a collection of magnets and other materials (e.g. card, fabric, tissue, thin wood, aluminium foil, paperclips) to explore. Ask them to find	Carry out an investigation in small groups and understand how to make the test fair to be able to compare the magnets.	Work through etc.	Children meeting the objective will be able to decide on an approach to answer the question, and what observations, measurements

	Set up simple practical enquiries, comparative and fair tests	out whether the magnets are all equally strong (see below for differentiated approach). As a class, discuss the different ways of testing the same thing, and talk about the advantages and disadvantages of each approach. Discuss why it is a good idea to try different ways of answering a question (-to get a more reliable answer). Carry out the investigations and ask the children to report their findings verbally. Rank the magnets based on evidence from their investigations.			are needed *e.g. place a paperclip at the end of a ruler and the magnet at the other. Move the magnet towards the paperclip and record the distance when it is attracted, or count number of layers of tissue paper the magnet works though.*
Lesson 7 What have I learned?			Go back to the mind maps and add information in a different colour. Reflect on previous thoughts and amend as appropriate.		

Plants	Year 3 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do we know about plants?	AfL Elicitation task.		Circus of activities KWL Grid What do you already know about plants? What you want to know? What you have learned in the unit (at end of unit)? Annotated diagrams -Draw a diagram of a flowering plant and label all the parts you know. Explain what these parts do. Children to complete a question stem with a question about plants that interest them and would like to find out. Teachers to sort questions and select appropriate questions that link with the objectives of the unit.	Provide lots of pictures of flowering plants. Share question stems: why, how, will, when, I wonder, what happens if …	
Lesson 2: What are the parts of a flower or plant and what are the functions of	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem	Introduction: Brown tubes Explorify https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/brown-tubes. Main activity: Notice similarities and differences between plants. Research the different functions of the plant. Use books / computer. http://www.saps.org.uk/attachments/arti	Class discussion – using evidence to suggest answers to zoom in, zoom out explorify Draw annotated diagrams through close observation of the plants they have brought	Children to have brought in a plant from home that they have dug up. (This can be a weed!)	Children achieving will be able to explain the different functions of the parts of a plant.

these parts?	transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers, which enable the plant to reproduce. Note that children can get confused with terms like nutrients and food. Plant 'food' that might be bought and given to plants is dissolved minerals, not food. Plants use the energy of the sun to make their own food (sugars).	cle/1373/SAPS%20book%201%20-%20Parts%20of%20a%20Plant%20-%202016.pdf a useful resource with games to support less abled children in learning the functions of a plant. Are all roots of plants the same? Plenary: **Consider what will happen when the leaves or roots are removed from a plant?** Discuss how they might find out this question. Allow the children to set up a comparative test as a class and consider how they will collect the evidence. As a class, create a table to record their results. In the next lesson, we will focus on drawing conclusions form their investigation using the evidence they have collected to support their findings. Modelling an investigation using planning boards. https://content.connect.collins.co.uk/Content/ES/Primary/sample/snap_science/Lesson%20plans/897938_SnapSci_pln_3.pdf	in. Label and research the function of the different parts. Focus on the roots and describe similarities and differences between two of the plants in their group. Using evidence. Investigate – set up a comparative test as a class. Invite children to record findings of the class test during the week. Therefore, one table collected as a whole class.	Books related to plants Two geranium plants or similar.	Those who need more support could:https://www.youtube.com/watch?v=ql6OL7_qFgU Children can act out the different parts of the plant.
Lesson 3: Do all plants need exactly the same things to be healthy?	Different plants require different conditions for	Introduction – Look at the class investigation into removal of leaves from a plant. Use their class table of results and discuss what it shows. Write a conclusion. Model a good answer. Main activity; Children to plan their own simple comparative investigation to find	Discussion – whiteboards. Children in pairs to write a conclusion. Provide a sentence starter for them to complete. Use a writing frame to record the evidence collected and to support the writing of a conclusion that this is the case because… Children receive a cactus and parsley plant from the school and set up their own	Cactus and parsley plant.	Children should be able to explain observations made during investigations.

	germination and growth.	out whether all plants need the same things. Plenary: Recap the functions of parts of the plants by playing plant taboo, loop games P.21-24 Saps booklet https://www.saps.org.uk/attachments/article/1374/SAPS%20book%202%20-%20Reproduction%20and%20life%20cycles%20-%20Pt%201%20-%202016.pdf	comparative test, collecting results over a two-week period. Children to describe how they are going to ensure that the test is fair by making sure that the plants have the same conditions. Water, light etc., and draw the two plants in their books. The plants will receive minimal water.	One of each, for each group.	
Lesson 4: How is water transported within a plant?	This is a WS focussed assessment task. Use the TAPS lesson plan for support.WS Focus: **Use straightforward scientific evidence to answer questions or to support their findings** The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal.	**Introduction – To set the scene Use explorify** https://explorify.wellcome.ac.uk/en/activities/whats-going-on/water-colours Main Activity - **TAPS activity: The function of a plant stem** https://pstt.org.uk/resources/curriculum-materials/assessment **Key Question:** **How is water transported within plants?** Knowledge: Investigate the way in which water is transported in plants. Working Scientifically: Use straightforward scientific evidence to answer questions or to support their findings. Plenary – Discuss What happens if a plant does not have a stem? Can the children answer what is the function of the stem? Are there any plants without stems? (Algae and fungi)	Investigate – set up an observation over time enquiry and observe celery and carnations in coloured water over an agreed period. Children to predict what they would see inside the celery and write a conclusion as modelled in a previous lesson. This information can be used to assess the children's WS skills.	Celery Carnations dye, beakers of water	Assess children's skills of WS. Can they use straightforward scientific evidence to answer questions or to support their findings and write a simple conclusion? See TAPS for assessment indicators.
Lesson 5:	Different plants require different	Introduction: Recap - Do all plants need exactly the same things to be healthy?	Children to look at the two plants they have been caring		

Follow up to lesson 3.	conditions for germination and growth.	Main activity – drawing conclusions from their investigations. Plants requirements might differ depending on the plant or its habitat. Plenary: Use explorify looking at plants growing in hot and cold places recap of KS1. https://explorify.wellcome.ac.uk/en/activities/odd-one-out/growing-in-hot-and-cold-placesDiscuss similarities and differences between the 3 plants:	for: cactus / parsley and draw pictures of the plants after the two weeks. How has the plant changed from their initial drawing? Describe any changes they notice and how the plants differ. What do these finding suggest? If time children can research different plants and find out where they grow naturally		
Lesson 6: What are the different parts of a flower?		Introduction – play group memory game to introduce the different parts of the flower. Main activity - Dissect a flower to identify the different parts. http://www.saps.org.uk/attachments/article/1374/SAPS%20book%202%20-%20Reproduction%20and%20life%20cycles%20-%20Pt%201%20-%202016.pdf **p.6** Plenary - take the children outside and look at the flowers around the school grounds. Can they find the parts of the plants they had identified in the classroom? Use magnifying glasses outside etc.	Groups try to describe a flower to a child who has to draw what they have been told. Dissect a flower. Identify and label the different parts. Research what the different parts do.	Flowers to dissect. Lilies are good as are perennial geraniums, fuchsias.	The children should be able to explain the function of the parts of the flowering plant.
Lesson 7: What part do flowers play in the lifecycle of a flowering plant?	The male part of the flower produces pollen, which is transferred by insects to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits.	Introduction. Model through drama how flowers are pollinated by insects. Children then draw an annotated diagram to show the lifecycle. In English, they could write a diary entry of this explaining pollination from the perspective of the bee.	Use 3 children. One holds a drinks carton and the two Velcro balls, another child just has a drinks carton and child 3 has nothing. This child is a bee. The two with drinks cartons are flowers. The juice being nectar, the balls pollen. As the bee comes in for the nectar, the child can stick the	Some sticky balls made with Velcro, three woolly jumpers and two cartons of fruit juice with straws.	Children should be able to draw a labelled diagram of a flowering plant to show its parts, their role and the

	Seeds are then dispersed in different ways. Pollination is the transmission of pollen from the anther to the stigma of flowers after which fertilisation can take place.	Plenary - Use the vocab germinate, pollen, flowers, pollination, seed formation, seed dispersal. Play bingo. Children choose 3 words. Teacher reads out a definition child crosses it off if they have this word.	pollen to the jumper. The bee then visits another flower where the pollen then sticks to this flower. Drawing annotated diagrams. Retrieval of important vocabulary		method of pollination.
Lesson 8 How are seeds dispersed? Does this vary from plant to plant?	Seeds are dispersed in different ways: wind (parachute or rotor) animals(caught on fur or ingested) water, gravity, explosion. The seeds have particular design features to aid its dispersal.	Introduction. Explorify Bonkers conkers Provide children with a selection of seeds pictures - preferably the real thing. Can they sort the seeds? Can they discuss how the seeds might be dispersed? Think of other seeds and research how they are dispersed. Explorify odd one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/sightseeing-seeds	Research, sort and classify seeds based on how they are dispersed. Extension activity. Design/ make a seed of their choice using junk materials playdough etc. and state how it can be dispersed. What features does it have that ensure it can be dispersed in that way?	Seeds: Dandelion, sycamore, silver birch, acorn, conker, coconut. Tomato, strawberry, cleavers, poppy	Children should be able to look at the features of seeds to decide on their method of dispersal.
Lesson 9 What have I learnt in this topic? Can I design the perfect plant?		**Children should complete the KWL grid with what they have learnt.** Graphic organiser of parts of the plant and functions. http://www.saps.org.uk/attachments/article/1374/SAPS%20book%202%20-%20Reproduction%20and%20life%20cycles%20-%20Pt%201%20-%202016.pdf P.11 **Children could draw on what they have learned to design a plant. Am I the perfect plant?** Design / create a new flowering plant. Draw/label and annotate regarding how seeds are dispersed based on research. They			

		should name it, and present it as a picture or collage with labels and annotations. What would the plant look like that will grow form the seed they designed? What does it need to grow healthily? Where does it live?			

Year 3/ Year A Science Progression in Skills and Knowledge

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Autumn 1: Animals including Humans • identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • identify that humans and some other animals have skeletons and muscles for support, protection and movement.		
Autumn 2: Light • recognise that they need light in order to see things and that dark is the absence of light • notice that light is reflected from surfaces • recognise that light from the sun can be dangerous and that there are ways to protect their eyes • recognise that shadows are formed when the light from a light source is blocked by an opaque object • find patterns in the way that the size of shadows change.		
Spring 1: Rocks • compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • describe in simple terms how fossils are formed when things that have lived are trapped within rock • recognise that soils are made from rocks and organic matter		
Spring 2: Forces and Magnets • compare how things move on different surfaces • notice that some forces need contact between two objects, but magnetic forces can act at a distance • observe how magnets attract or repel each other and attract some materials and not others • compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials • describe magnets as having two poles		

• predict whether two magnets will attract or repel each other, depending on which poles are facing.		
Summer 1 and 2: Plants		
• identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal		

Y3/4 Working Scientifically to run throughout all units of learning:	**Pupils not securing learning**	**Pupils achieving depth in learning**
• asking relevant questions and using different types of scientific enquiries to answer them		
• setting up simple 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		

Y3/4 Working Scientifically to run throughout all units of learning:	Pupils not securing learning	Pupils achieving depth in learning
• 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 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.		

KS2 Lesson Plans

Year 4

Sound	Year 4 Term

What are we learning:	What do teachers need to know? Key Learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know about sound?		Circus of activities for the children to explore with key questions to support their thinking and show their understanding. Possible Activities: Rice on drum, Ruler twang Rubber band guitar Tuning fork Plenary: Draw out the knowledge that sounds are created by a wobble - vibration. What is happening? Use explorify what's going on Rice and rhythm https://explorify.wellcome.ac.uk/en/activities/whats-going-on/rice-and-rhythm	Recording sheet could be used or allow children to simply record annotated diagrams/notes of their findings. What did you see? What did you hear? What did you feel?		Can children associate a sound with something vibrating? Do they understand pitch/ loudness?
Lesson 2: How are sounds made? What is that sound?	A sound produces vibrations, which travel through a medium from the source to our ears.	Refer back to circus of activities and comment on what they saw. Reinforce that a vibration creates the sound. Can they demonstrate this with some objects in in front of them – explaining what is going on? Activity-problem solving name that sound. Name the sound source and consider how the sound is made.- use Explorify https://explorify.wellcome.ac.uk/en/activities/problem-solvers/what-s-that-sound Excellent activity	Children work together to produce different sounds.		Child can explain how they made the sounds and what happened e.g. when you strike a drum or pluck a string and uses a diagram to show how sound travels to our ear.

Lesson 3: How do sounds travel?	Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. WS focussed assessment of WS**: Identify differences, similarities or changes related to simple scientific ideas and processes** Y4 – string telephones https://pstt.org.uk/resources/curriculum-materials/assessment	Introduction: Balloon filled with air/water, children can experience talking on the face of the balloon with another child the other side of the balloon. Can they hear the sound? Scratching underneath a table and ear to table. Coat hanger sounds. Marvin and milo. https://spark.iop.org/musical-coat-hanger All activities that demonstrate sound travels through a medium. Main activity: Explore string telephones Y4 TAPS lesson plan Ask a child to help you demonstrate how to use a string telephone. Discuss how this works; vibrations in air, vibrations in string, and the cup amplifies the vibrations, vibrations travel to ear. Provide a range of plastic pots (yoghurt pots) and different types of string/wool. In groups, ask children to investigate what makes the best string telephone.	After the investigation, children demonstrate their telephones to the class and explain why their telephone is/is not good.		Children Meeting the objective will be able to talk about the features, which make a good telephone, e.g. all work, *when the string is tight, the bigger cup is better.*
Lesson 4: How can I make a louder / quieter sound?	The loudness (volume) of the sound depends on the strength (size) of vibrations, which decreases as they travel through the medium.	Introduction: variety of musical instruments / objects for children to explore. Invite them to make a loud sound. How can they do this? Make a quiet sound. How would we draw an annotated diagram to show this? What is happening? Perhaps use slinky to show the sound waves and what this looks like.	Exploration Annotated diagrams to show learning.		Children will be able to give examples of how to change the volume of a sound e.g. increase the size of vibrations by hitting or blowing harder

Lesson 5: What happens to the sound as I move away?	Sounds decrease in volume as you move away from the source.	Activity: What happens to sound as I move away from the source? Children can investigate this question in different ways. Simply stand at one end of the playground make a sound. Move a step away, make the sound again, move further away etc. Keep going until you cannot hear the sound. How far away can you get before you cannot hear it anymore? Investigate different sounds and record distance before you cannot hear it anymore. Draw bar graph of results. Make a conclusion based on data – sounds decrease as I move away from a source. Loud sounds can travel a greater distance than quiet sounds. Making links between loudness of sounds and distance, they travel.	Children record date in groups. Independently draws a bar graph to show results. Makes a simple conclusion based on evidence either orally or in written form.		Can give examples to demonstrate that sounds get fainter as the distance from the sound source increases
Lesson 6: How can we protect our ears from very loud sounds? What is the best material to insulate sound?	A sound insulator is a material, which blocks sound effectively.	Play a recording of a drill / aeroplane to set the scene and ask the children to consider how they would protect their ears. Use a datalogger to measure the sound. Children set up an investigation to find out what materials are helpful in blocking the sound. Fun Plenary: Fill a balloon with flour and burst it the other side of the field. Demonstrates that light travels faster than sound.			
Lesson 7: What is pitch?	Pitch is the highness or lowness of a sound' Pitch is affected by features of objects producing the sounds. For example, smaller objects usually	Show children some homemade 'musical instruments': elastic bands over shoe box, 'straw flute', 'sound sandwich' (lolly stick and straw harmonica), stretched balloon 'drum skin' over tube, glass bottle containing water to blow or tap. Explore how to play them to make a sound and ask the	Children ask a question and carry out an investigation to answer the question.		Children meeting the objective will be able to ask questions and turn them into a form that can be

	produce higher pitched sounds. Use TAPS lesson plan Y4 Investigating Pitch https://pstt.org.uk/resources/curriculum-materials/assessment WS focussed assessment task: **Ask relevant questions and use different types of scientific enquiries to answer them**	children to suggest which parts are vibrating. Invite children to brainstorm and record questions that they could investigate, focusing on changing pitch. e.g. How does size of the elastic band affect pitch? Children then work in small groups investigating different ways of altering pitch. Plenary – look at musical instruments and consider how high/low sounds are created by the instrument when it vibrates.			investigated. E.g., *How does the size of the drum affect the pitch?* Can say whether outcome was what they expected.
Lesson 8 What have I learned?		Use concept cartoon to capture the children s learning: 13.1 Drums – looks at pitch and volume.	The children could annotate the concept cartoon to show their understanding. They will need to use evidence from the unit to back up their thinking.		

Electricity	Year 4 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I already know about electricity?			Children create a mind map/ poster/annotated diagrams to show what they already know about electricity. Title page for their new unit of work.		
Lesson 2: What needs electricity to work?	Many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries.	Provide children with a variety of pictures of objects to discuss and sort. Plenary: Explorify - odd one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/electrical-appliances	Children talk about the pictures and sort them in various ways and then by those that use electricity / batteries or neither. Sort using a Venn or Carroll diagram tree diagram – their choice.	Pictures to include: e.g. radio, phone, TV, computer, remote control car, shoe, brush, etc.	
Lesson 3: What do you need to make an electrical circuit? What happens if the circuit is not complete?	An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work.	Give children the simple equipment: bulb, bulb holder, wires, battery and battery holder. Ask them to explore the equipment and make a simple circuit. Challenge. Take away the bulb and give them a buzzer then motor. Can they make a circuit? A circuit needs to be complete for it to work. Plenary: Explorify Zoom in zoom out - https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/curly-coil How a light bulb works.	Make and draw a circuit, labelling the components. Challenge. Take away the bulb and give them a buzzer. Provide photos/pictures of circuits that children have to make and decide whether they work.		Children will be able to make electric circuits, naming the components in that circuit.

Lesson 4: How can I make a bulb turn on and off?	A switch can be added to a circuit to turn the component on and off.	Energy stick – human circuit – reinforces idea of a complete circuit to make the buzzer / bulb light up. Make a break in the circuit - the stick stops glowing / buzzing. Complete the circuit the stick glows. Liken this to a switch turning something on and off. Show the children the materials: paperclip, drawing pins, and card. Challenge them to make a switch and include this in their circuit. Greater challenge would be to provide a variety of materials: paperclips, rubber bands, drawing pins, foil, and pegs. Challenge them to make their bulb turn on and off using a simple switch. Plenary – look at a variety of switches – peg, paperclip, folded card. How do they all work?	Make a switch using the equipment provided and draw an annotated diagram to illustrate understanding of what is going on.		Children need to not only recognise that the switch turns the bulb on and off but also the fact that it opens and closes the circuit.
Lesson 5: Does it conduct electricity?	Metals are good conductors. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. **Working Scientifically LO Focus for assessment** *TAPS PLAN* Does it conduct electricity **Reporting on findings from enquiries, including oral and written**	Look at one of the circuits the children made in the previous lesson. Focus on the switch and the fact that it is allowing the electricity to flow through and complete the circuit. If the switch is open, what materials can be used to bridge this gap in the circuit? Introduce the term conduct. Display and discuss a news story about soldiers wearing 'smart' clothing which conducts electricity: http://www.bbc.co.uk/news/technology-17580666 Introduce the terms conductor/insulator. Example context: Why would a soldier need to be able to conduct electricity? Give the scenario of a soldier in the desert that has ripped part of his 'smart'	**Types of Enquiry focus:** Classification Inc. prediction *Children to create a small circuit to test whether objects are conductors or insulators (e.g. a circuit with a bulb, which lights when a gap in the circuit is bridged).* The children then need to produce a radio or video message to send to the soldier explaining what he needs to do to produce a working circuit therefore enabling his GPS. The children need to explain why they are confident that this		Children meeting the objective will be able to describe the circuit and explain how their results (orally/written form) show that (in general) metals conduct electricity and other materials do not.

	explanations, displays or presentations of results and conclusions using scientific evidence of their investigation to support their findings.	clothing and therefore lost part of the circuit in his GPS system. As he has no other navigation guides, he is unable to provide his location for rescue. Explain that the soldier has a pack containing a variety of objects. Objects from the pack will need to be used to complete a circuit to activate the GPS. Provide a collection of objects/ materials (including different metals and plastics). Ask them how they could find out whether electricity can pass through the materials and help them plan how to put the materials into a gap in a circuit with a bulb or buzzer to test them. Ask the children to focus on recording their results and explaining what the results show. Plenary – for fun use energy stick and place different objects in the circuit.	will work providing scientific evidence to reassure the solider. The children need to provide a list of all possible conductors (in case of damage) when the solider comes to use them.		
Lesson 6: Can I make a complete circuit? What materials are used to make the wire in a circuit?		Have some wires for children to handle. Discuss what they are made of –metal wires, covered in plastic (discuss why). Draw out plastic is an insulator and metal a conductor. Use explorify inside out Zoom in Zoom out activity. https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/inside-out Ask a child to make a simple circuit with the equipment: bulb, bulb holder, battery, battery holder and wires. Discuss different parts of the circuit and the materials used. Notice that a complete circuit has metal parts. Set a challenge by removing the wires and using the equipment provided so the children make their own wires to complete the circuit.	Challenge the children to make their own wires to complete a circuit. Provide materials: foil, cling film kitchen roll, paperclips, battery bulb and bulb holder.		

Lesson 7: What effect does a switch have in a circuit?		Make a game using a circuit – link to DT. Use switches to add to circuits to solve particular problems e.g. pressure switch for a burglar alarm.			Children will be able to explain incorporate a switch into a circuit to turn it on and off.
Lesson 8: What have I learned? How does a torch work?	This activity allows the children to use all their knowledge to consider what is happening. Complete circuit/switch and conductors/insulators.	Look at a torch and think about the different parts.	Can they dismantle a torch and then put it back together again? The children should produce a piece of writing explaining how the torch works. Annotated diagrams with all key words used.		

States of Matter	Year 4 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1:	AfL elicitation task.	Provide the children with the key vocabulary for the topic. Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, condensation, temperature, and water cycle. Read the words to the children if needed. A concept map may need modelling.	Children to create a concept map including arrows or concept sentences stating how the words link.	Key vocabulary on flashcards for children to use.	
Lesson 2: What do we know about solids, liquids and gases?	A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid poured keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume.	Introduction – children name some solids liquids and gases – teacher lists these on the board. Assess how diverse the list is. Provide a variety of objects for the children to discuss and consider whether they are solids, liquids or gases. These objects should be different to the ones the children mentioned, so more diverse. What makes a solid, a solid? Plenary – raisins in lemonade. What is going on?	Children list different solids, liquids gases on white boards. Using a given set of materials children sort them into groups and classify why. Thereby thinking about the properties of solids / liquids/ gases. Children put some raisins in the lemonade and have to explain what is going on using the vocabulary solid, liquid and gas.	Materials / pictures for children to sort: Toothpaste, rice, sand, ketchup, air freshener, perfume, Lemonade raisins	Children will be able to name properties of solids, liquids and gases.
Lesson 3: Is it always easy to tell whether something is a solid, liquid or gas?	Granular and powdery solids like sand can be confused with liquids because when poured they form a heap and they do not keep a level surface	Explore two activities with the children. Solids - focus on rice, sand, flour. Observe their behaviour when pouring. Draw out that although we can pour the rice, it is small particles. Explain you can pick up one particle. Sand and	Children to write a simple explanation informing an alien form another planet why it is not always easy to tell whether something is a sold, liquid or gas. In their explanations, they		Children will be able to justify why something is a solid or liquid.

	when tipped. Each individual grain demonstrates the properties of a solid.	flour are the same – made up of lots of small particles. Children observe foam burst shower gel in a container over time. In a few minutes, it will fill the cup with foam. Gas filled bubbles. Can they describe verbally what is going on? Using evidence from these investigations, can they write a reply to the initial question?	will need reference the properties of these materials and the evidence of the activities that they have just carried out.		
Lesson 4: What makes a material change its state?	Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid	Read Michael Rosen's poem 'Chocolate' whilst children hold a chocolate button in their hand. Allow children to investigate chocolate melting. What variables affect the chocolate melting? What do they want to find out? Model how to plan an investigation using planning boards – support now so that later in topic there is the chance to assess this skill. Plenary: Draw out the conclusion that heating causes materials to change state. Finish with fun discussion activity	Children choose something to investigate and carry out the investigation. A photo of their investigation and brief description of how they set it up – making it fair will be enough evidence.	Chocolate different types, bowls and hot water or hot water bottles, foil trays to place the chocolate in. Further activity/ Enrichment: ASE chocolate factory primary upd8 resource	From their investigations, children will be able to explain what affects how quickly a solid melts.
Lesson 5: What temperature is it? Maths link?	This is an assessed WS activity for this unit. Use the TAPS lesson plan for support. **WS focus: Take accurate measurements**	TAPS – Measuring temperatures. Take accurate measurements in carousel of temperature activities - see TAPS lesson plan.	Children record temperatures in a given table.	Variety of Thermometers Bowls of water/liquids of differing temperatures.	Assess whether the children can - Make reasonably accurate measurements of temperature independently

	using standard units, using a range of equipment including thermometers and data loggers The freezing point of water is 0C. Boiling is a change of state from liquid to gas when a liquid reaches a specific temperature and bubbles of the gas are in the liquid. Water boils when heated to 100C.				using units of measurement.
Lesson 6: What is going on?	Children need to experience a variety of materials and know that they can melt if subjected to a high enough temperature. Notice that things solidify when cooled.	Children observe a candle burning over time and make observations as to how the materials change. Then blow the candle out and observe. Heating/Melting - a candle burning Cooling/solidifying - blow out the candle and observe the liquid wax Can the children give further examples of materials that will change when they are heated or cooled? Plenary - Can metal melt?	Observational drawings – explanation of what's going on using the key vocabulary: Solid, liquid, heated, melts, cools, solidifies. List of further examples.		Children will be able to give examples of things that melt and know that their melting points may vary.
Lesson 7a: What is evaporation? Very short lesson prior to lesson 7b.	Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid.	Give children a piece of sugar paper and ask them to make a handprint on the paper with water. Where has the water gone? Introduce new vocabulary evaporation and water vapour.	Children describe what they notice. Can use O.P.O.E. technique to support discussion.(Observe, predict, observe, explain)		

Lesson 7b: Where is the best place to dry your washing? How does temperature affect the rate of evaporation?	This is the assessed WS activity for this unit. Use the TAPS lesson plan for support.**WS Focus: Set up a fair test** **Y4 – Materials drying** https://pstt.org.uk/resources/curriculum-materials/assessment Evaporation happens more quickly if the temperature is higher, the liquid is across a larger surface area or it is windy.	Plan an investigation to reach a conclusion within a real-life context, e.g. Where is the best place to dry your washing? Children to explain what conditions are needed to dry materials by evaporation. Make a list (warm, dry, and windy). Discuss different places to investigate. In mixed groups, children to decide on the type of material (cloth/paper towels), quantity of water, locations to test evaporation (e.g. could arrange washing lines in different locations around the school) and how often to observe/check. Provide measuring equipment including thermometers, jugs, and rulers. N.B. Paper towels can dry in an afternoon (heavy fabric will take longer).	Children plan an investigation and record this planning. Carry out the investigation and verbally report the conclusions. Written evidence should just be on the planning of the investigation.		Children meeting the objective will be able to carry out a fair test and say what is changed and that other factors could affect evaporation if not kept the same, e.g. *I will keep the same…amount of water, size of material.*
Lesson 8a: What is condensation ?	Condensation is the change back from a gas to a liquid caused by cooling	Use concept cartoon: Condensation Also, provide a tin filled with ice cubes that they can observe. What do they see on the outside of the tin? Introduction to lesson 9b. Very short lesson.	Children discuss.		Children will be able to explain why there is condensation of the outside of an icy water cup.
Lesson 8b: What is the water cycle?	Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy	Introduce the activity by playing the memory game: Picture outside – children in teams, one child goes and returns to describe what they saw to the team drawer, next child goes out, returns and describes. Compare their drawing to the real. What would they add or delete to improve their drawings? Mark / draw in a different	In English can they write an extended piece of writing telling the story of the water cycle by pretending to be a droplet of water that starts life falling from a cloud or comic strip etc.		Children will be able to present their learning of the water cycle in a range of ways.

	and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is precipitation. This is the water cycle.	colour. Focus on key vocabulary and discuss what is happening. Then make a mini model of the water cycle https://www.science-sparks.com/make-a-mini-water-cycle/			
Lesson 9: What have I learned?			Children go back to their initial concept maps and add new connections in a different colour or using the same, words create a new concept map showing the connections they can now make.		

Animals Including Humans	Year 4 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1:			What do I know about teeth, the digestive system and food chains? Create mind maps about each of these.		
Lesson 2: What teeth do we have and why do we need them? Why do we have different teeth?	Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing).	Children should eat an apple considering what teeth they use to eat the apple. Use mirrors to look at their own teeth. Consider which teeth are used for what purpose. Use books/internet to research these different teeth and make notes. Finally, with modelling clay try to make a model of the different teeth and take a photo. Label the teeth with the different names and explain what they do. Explorify https://explorify.wellcome.ac.uk/en/activities/the-big-question/why-do-we-have-different-teeth			Children should be able to point to the three different types of teeth in their mouth and talk about their shape and why different types of teeth are needed for eating and chewing food.
Lesson 3: Why do we get tooth decay?	This is a WS assessment task. Use the TAPS lesson plan for support. Y4 teeth https://pstt.org.uk/resources/curriculum-materials/assessment WS focussed assessment objective **Use results to draw simple conclusions, suggest**	Discuss how children look after their teeth. Could use video http://www.youtube.com/watch?v=-nBSQQHYdkE Explain that we will be using hard-boiled eggs to investigate tooth decay. As a class set up a fair test to investigate the affects that different liquids have on teeth e.g. cola, water, vinegar, milk, sports drink and orange juice.			Children meeting the objective can order liquids according to damage done to eggs and suggest reasons why. Able to raise further questions,

	improvements and raise further questions.				*e.g., I thought sports drink/orange juice was a 'healthy' drink but it was not, I wonder whether these drinks contain a lot of sugar?*
Lesson 4a: What happens to the food I eat?	Food enters the body through the mouth. Digestion starts when the teeth start to break the food down. As saliva is added and the tongue rolls the food into a ball. Food is swallowed from the mouth. Food passes down the oesophagus to the stomach. In the stomach, food is churned around with other chemicals, which are added in the stomach, and broken into small pieces. The food then passes into the small intestine.	Children should eat something and then draw an annotated diagram of what they think happens. AfL Main activity: Play group memory game to introduce the different parts of the digestive system and then groups can research the functions. Adding notes to the group diagram.	Eat a biscuit and diarise the journey through the body Groups try to describe the digestive system to a child who has to draw what they have been heard being described. Real picture given for them to compare What did they do well, what do they need to improve? P.65 Look think talk book Gaynor Weavers.		Children will be able to draw the main parts of the digestive system onto a human outline.
Lesson 4b: What happens to the food I eat? **What happens**	The small intestine removes nutrients from the food. The nutrients leave the digestive system (to be used by the body).	Model Demonstration: https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/35136-KS2ActivitySheet_humanbody_4.pdf	Take photographs of each part of the digestive system for the children to annotate after the event, describing what was happening.		Children should be able to use diagrams or a model to describe the

in each part of the digestive system?	The rest of the food then passes into the large intestine. The large intestine removes water for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet.	Using old tights, bananas, orange juice, water through to demonstrate food journey through the body			journey of food through the body explaining what happens in each part
Lesson 5: Can you tell what an animal eats from its teeth?		Identifying and classifying: *Skulls and teeth – match type of teeth to type of eater.* *Create a classification tree to sort using terms carnivore, omnivore and herbivore* *Plenary* - How do the teeth of carnivores and herbivores differ and why?	Provide children with pictures of animals and their teeth. Some pictures in resource: https://www.stem.org.uk/elibrary/resource/32715 Children sort the pictures into groups. Then identify which teeth belong to omnivores / herbivores and carnivores. Describe the differences.		Children should be able to explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores
Lesson 6: Who's eating what? Are you eating plastic for dinner?		Look at the pictures of the animals in the previous lesson. Identify the different groups and demonstrate a simple food chain based on resources in https://www.stem.org.uk/elibrary/resource/32715 E.g. grass, zebra, lion. Introduce vocabulary producer, predator and prey. Reinforce through game played in Y2 https://www.stem.org.uk/resources/elibrary/resource/34119/education-pack-food-chains			Children should be able to create food chains.

		Foxes and rabbits game. Play game to model food chain but now use the terms producer, prey and predator. Also possibility of using Primary upd8 resource Food chains – Are you eating plastic for dinner? Links teeth, digestion and food chains.			
Lesson 7 What have I learned?			Go back to mind maps and add what they have learnt in a different colour.		

Living Things and Their Habitats	Year 4 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What is a habitat?	Living things live in a habitat, which provides an environment to which they are suited (Year 2 learning).	Discuss two of the habitats the children have drawn. Identify similarities and differences between them. If they have not identified different habitats perhaps look at arctic and desert habitats: Watch ***the first 2 ½ minutes*** of this BBC clip: https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-how-animals-have-adapted/z4y76v4 • What special features, or adaptations, does the **Arctic fox** have? • What adaptations does the **desert fox** have? Owls - how are they adapted to the habitat https://www.bbc.co.uk/bitesize/clips/zv7w2hv	Recap of Y2: Children to choose a habitat and draw a picture to represent that habitat labelling the plants and animals that they might find there. They should explain why we might find these plants/animals in that habitat. Complete the sentences This is a habitat. A habitat is…		
Lesson 2: How can we group living things?		Provide children with a variety of pictures of animals. These should include pictures of animals they named in lesson 1. *Children to use pictures and descriptions to put animal into groups in different ways (e.g. where they live, what they eat, how they move, how many legs, etc.)*		Pictures of the different animal groups: lion, giraffe, hippo, snake, bird, fish,	
Lesson 3: What can we identify	WS focus **gather, record, and classify data?**	Use TAPS lesson PLAN Y4 Local Environment study. Survey of local environment.	Local environment study noticing animals and plants locally. Use pooters to collect		Children meeting the objective will

and classify in our local environment?			minibeasts. Group the animals / plants		be able to identify that animals and plants that are classified in a number of possible ways including vertebrates and invertebrates, flowering and non-flowering plants.
Lesson 4: What is a classification key?	Living things are classified in different ways according to their features (grouped). Classification keys to identify and name living things.	Using a set of pictures teacher models progression - sorting into two groups using a single chosen criteria e.g. wings / no wings. Then model how to choose two criteria to create an intersecting Venn diagram. In small groups provide the children with pictures to play 'Guess who', asking questions that can only be answered with yes or no to identify which animal has been chosen. Show how to make a classification key. Based on: Lesson 3 ASE and http://www.saps.org.uk/attachments/article/560/SAPS%20Grouping%20&%20classification%20-%20PartE.pdf	Children create simple sorting groups and finally keys.		Assess children's ability to create a key.
Lesson 4: Name that plant. Can I use a key to identify an unknow plant?		p.25-29 Classification book https://www.saps.org.uk/attachments/article/1377/SAPS%20book%205%20-%20Grouping%20and%20Classification%20-%202016.pdf Activity related to buttercups to pick out observable characteristics and similarities and differences.	Using a key with buttercups. Children use a key to identify the buttercup/picture they have been given.		Children will be able to use a classification key to identify an unknow plant.

Lesson 5: Can I find leaves in my locality and create a key to identify them?	Recap the trees that children have learned in Y1. Assess WS objective: record findings using a key.	Use Woodland Trust materials to find typical leaves. http://www.treetoolsforschools.org.uk/activities/pdfs/pdf_leaf_spotter_sheet.pdf Collect the fallen leaves from the trees. Back at school identify similarities and differences and create keys to identify the leaves.	Create a key to identify trees in the local environment.		Assess children's ability to create a key independently of 4, 5 or 6 leaves. The making of keys has been modelled, they have used a key now need to show that they can create one Independently
Lesson 6: Why do environments change and how does this affect living things?	These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at	Use pictures as a stimulus of environmental change: 1. natural - flooding, drought 2. man – negative pollution on beaches – use David Attenborough clip 3. man – positive creating nature reserves, tree planting Children should research a positive and negative example and present their findings picture of environment annotated or a description provided of impact in poster format or a way of their choosing. Explorify – What if we did not plant trees? https://explorify.wellcome.ac.uk/en/activities/what-if/we-did-not-plant-trees	Creation of posters		Children will be able to give examples of how an environment may change both naturally and die to human impact.

	different times of the year.				
Lesson 7: What have I learned?			Provide the key vocabulary from the topic. Invite the children to write a short piece of writing to include these words	classification key environment habitat human impact positive negative	

Year 4/ Year B: Science Progression in Skills and Knowledge

Year 4/ Year 6	Pupils not securing learning	Pupils achieving depth in learning
• identify how sounds are made, associating some of them with something vibrating • recognise that vibrations from sounds travel through a medium to the ear • find patterns between the pitch of a sound and features of the object that produced it • find patterns between the volume of a sound and the strength of the vibrations that produced it • recognise that sounds get fainter as the distance from the sound source increases.		
Autumn 2: Electricity		
• identify common appliances that run on electricity • construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • recognise some common conductors and insulators, and associate metals with being good conductors		
Spring 1 and 2: States of Matter		
• compare and group materials together, according to whether they are solids, liquids or gases • observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature		

Summer 1: Animals including humans • describe the simple functions of the basic parts of the digestive system in humans • identify the different types of teeth in humans and their simple functions • construct and interpret a variety of food chains, identifying producers, predators and prey.		
Summer 2: Living things and habitats • recognise that living things can be grouped in a variety of ways • explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • recognise that environments can change and that this can sometimes pose dangers to living things		

Year 4/ Year B: Science Progression in Skills and Knowledge

Y3/4 Working Scientifically:	**Pupils not securing learning**	**Pupils achieving depth in learning**
• asking relevant questions and using different types of scientific enquiries to answer them		
• setting up simple 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		
Y3/4 Working Scientifically:	**Pupils not securing learning**	**Pupils achieving depth in learning**

• 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 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.		

KS2 Lesson Plans

Year A 5/6

Evolution and inheritance	Year 6 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know?	AfL – elicitation task	Using some of the key vocabulary children need to mind map what they know about these ideas and say how they think they might be connected.	Mind maps/concept maps of 4 of the key words from the unit: evolution inheritance adaptation fossils		
Lesson 2: What features do we inherit? What is inheritance?	All living things have offspring of the same kind. Features are inherited from parents due to sexual reproduction. The offspring are not identical to their parents and vary from each other. The book Molliebird could be used to support all the NC objectives: https://pstt.org.uk/resources/resources-available-through-tts/the-molliebird	Inheritance. Introduction – Using photos of yourself (or friends or celebrities) and parents or children- can the children match the children to the parents. E.g. Cameron Douglas, Michael Douglas, Kirk Douglas. What clues were there for the family groups? Use the word 'characteristics' 'inherited'. Main activity: Generation of traits activity: https://teach.genetics.utah.edu/content/heredity/files/Traits-Generations.pdf Teacher led. Plenary: Use explorify odd, one out (half-and-half) and discuss what characteristics have been inherited. https://explorify.wellcome.ac.uk/en/activities/odd-one-out/half-and-half	Matching exercise – explaining reasoning using vocab introduced. Carry out generation of traits activity. Answer questions posed and explain reasoning. Class discussion	Photos to match Generation of Traits activity sheets	
Lesson 3: How are living things adapted to	Plants and animals have characteristics that make them suited (adapted) to their environment.	Adaptation. Use: chapter 10. Slides 4 -7. https://www.millgatehouse.co.uk/smeresources/ Split the class in half and give each child a statement about either a	Children research either snake or lizard and then annotate their picture slide 6 or 7 with its key adaptations and why needed. How this		Children will be able to give examples of how plants and animals

their environment?		lizard or a snake from slide 4 or 5. Give the children time to research further information about their animal. Use the example of the horse to model expectations. Slide 20: Characteristic and how that enables it to survive. Two part annotation required. Slide 8. Use prompt cards (slide 9) for support. Plenary – class annotation of a plant e.g. cactus. Key features/characteristics thick waxy skin, large fleshy stems, spikes, shallow widespread roots. Class discuss and annotate how the adaptations enable the plant to survive.	adaptation enables the animal to survive.		have adapted to their environments. They will identify characteristics that will make a plant or animal suited or not suited to a particular habitat.
Lesson 4: How do organisms evolve?	If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young.	Evolution: Use Darwin's finches are a good example. Model activity to demonstrate evolution and how the finches evolved. https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/35875-Y6Evolution-DarwinsFinches.pdf Provide groups of children with a food source and beaks of tweezers, chopsticks, pegs etc. Which bird can collect enough food to survive? What would happen if the environment looked different? Would the same bird survive?	Children write an explanation of what this shows. Explain what would happen if the environment looked different?		
Lesson 5: What is the story of the peppered moth?	Over time, these inherited characteristics become more dominant within the population.	Introduction – Explorify odd one out https://explorify.wellcome.ac.uk/en/activities/odd-one-out/amazing-adaptations Main activity - The story of the peppered moth. Use book Moth by Isabel Thomas. Environments can change	Discussion Write a comic strip story of how the peppered moth evolved over time.		Can explain why the dominant colour of the peppered moth changed

		https://askabiologist.asu.edu/peppered-moths-game/			over a very short period.
Lesson 6: What is a fossil?	Over a very long period, these characteristics may be so different to how they were originally that a new species is created. This is evolution.	Fossils Introduction what is a fossil? Recap Y3 If needed, make a fossil sandwich or activity done in Y3 making the fossil if not previously done. See Y3 rocks. Fossils are in sedimentary rock. The bread represents the rock; jellybeans represent the fossil. Then use: chapter 10. Slide 11 https://www.millgatehouse.co.uk/smeresources/ Give each group one of the fossil images on slide 11. Stick this onto a large piece of paper, discuss, and draw what they think the rest of the animal may have looked like. Give them another bone and ask them to discuss and edit their drawings based on this new evidence. Finally give them the third bone and edit pictures. Once completed provide them with slide 14, (16, 17) The scientists drawings based on all the evidence available. Ask them to compare their drawings with the scientists. Plenary Who was Mary Anning? https://www.bbc.co.uk/bitesize/topics/zd8fv9q/articles/zf6vb82	Make a fossil sandwich. Drawings of animals based on fossil evidence. Analysis of own and scientist's drawings comparing and contrasting.		Children should be able to explain what a fossil is in simple terms. Children will be able to give examples of fossil evidence to support the theory of evolution.
Lesson 7: What can we learn from fossils?	WS focussed objective: **Identifying scientific evidence that has been used to support or refute ideas or arguments**. Y6 TAPS lesson plan	Y6 TAPS lesson plan fossil habitats Provide children with photos (or better still real or resin) fossils (trilobite, ammonite, ichthyosaurus). Discuss what the animals could have looked like- back up with evidence using secondary sources. Discuss what they could have eaten (link to teeth) or where	Discussion Research Design a habitat – draw and label creature and its habitat. Make comparisons with modern creatures.		Children meeting the objective will be able to: identify physical characteristics from fossil evidence Plus

	fossil habitats. https://pstt.org.uk/resources/curriculum-materials/assessment	they could have lived (provide details of where fossils found). Children to design a habitat that the animal could have survived in when it was alive millions of years ago. Draw and label the creature in its habitat. Make comparisons to modern creatures. e.g. whales- sea living prehistoric creatures, birds to many prehistoric creatures			can suggest where the creature might have lived, and what we can learn from fossils using correct scientific vocabulary
Lesson 8 What have I learned?			Go back to original mind maps / concept maps and add to them in a different colour or make a new version showing their learning.		

Forces	Year 5 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I already know?			Provide children with the key vocabulary for the unit and a KWL grid. Find out what they already know about forces and what they would like to know.		
Lesson 2: Why do objects fall to the Earth?	A force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Gravity pulls everything to the Earth. Gravity causes unsupported objects to fall.	Introduction: Use 3 images: parachutist, acorn on a tree and kicked ball. Which is the odd one out? Teacher to drop and ball. What do the children notice (all fall). Introduce gravity as a force that acts between the Earth and an object pulling it down. Use Explorify to discuss – What if there was no gravity PMI this question. https://explorify.wellcome.ac.uk/en/activities/what-if/there-was-no-gravity	Post its to collate thoughts on odd one out. PMI – no gravity Children show effect of gravity on objects through annotated diagrams. Typical example of Earth and ball dropped at various points on the World.		Children will be able to demonstrate the effect of gravity acting on an unsupported object.
Lesson 3: How can we measure force?		Reinforce that gravity is a force that acts between the Earth and an object pulling it down. All objects on Earth are pulled to the centre of the Earth – how can we measure this pull? Introduce force meters and that we measure force in newtons. Plenary - Our weight can be different on different planets because gravity is different. Our mass is the same on all planets but our weight is different because of the effect of gravity. Weight is mass x gravity. Weight is the force of	Activity: Children have a variety of objects that they can put in plastic poly – pockets and use the force meters to measure the force. Take accurate readings and record in a table. Order their results.	Force meters Variety of classroom objects: scissors, pencil case, mug, calculator etc.	

		gravity on an object; this is measured in Newtons (N). Could use: Ogden Trust materials playdough picnic https://www.ogdentrust.com/resources/phizzi-practical-planetary-picnic			
Lesson 4: Investigating falling objects. How does air resistance affect a falling object?	This is the WS focussed assessment task. TAPS plan Y5 spinners https://pstt.org.uk/resources/curriculum-materials/assessment WS: **Measure, taking repeat readings** Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object.	Introduction. Teacher to play devil's advocate. Which paper will fall first green / blue? Use the same paper but scrunch one up. Discuss what is happening. Introduce vocab - air resistance and define. Make sure key question is not up at the start of the lesson. Activity: Look at a video of a parachutist. What variables affect the time it takes for the parachute to fall? Children to investigate. Make either parachutes or spinners. Use TAPS lesson plan spinners as a guide. Plenary: Show video clip Prof Brian Cox and discuss the effect of no air resistance. https://www.youtube.com/watch?v=QyeF-_QPSbk	**Activity** Explore, make, and drop a spinner. In groups consider variables and formulate a question *e.g. How does the length of wing/number of paper clips/size of paper affect the time it takes to fall?* Group roles may be useful e.g. dropper, timer, recorder, fair test checker. Groups or individuals to draw graphs then consider patterns in results.		The children meeting the objective will be able to take repeat measurements and either choose the middle value or find the mean average (may need support to find mean) to plot points on a line graph and comment on the pattern, e.g. *the more paper clips, the longer it took*. Some explanation in terms of air resistance.
Lesson 5: What is friction? Why do we need to know about friction?		Introduction: Rub hands together what is happening two surfaces in contact easily slide over each other, produces heat. This is friction. Then use toothbrushes. Not easy to slide over each other. Main activity – Hovercraft investigation	Children explore the effect of friction in terms of creating a hovercraft and exploring its movement over different surfaces. Draw conclusions based on evidence. Which surface does it travel the furthest? Why? Research examples of greater and		Children will be able to give examples of when it is beneficial to have low resistance.

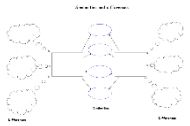
		Plenary: Discuss what it would be like to live in a world without friction.	less friction in real life. List.		
Lesson 6: How much force is needed to overcome friction?		Activity: Set challenge of Egyptians and moving large stones to build the pyramids (or similar idea sport focus). Set up an investigation to measure the force needed. Based on Explorify https://explorify.wellcome.ac.uk/en/activities/problem-solvers/move-large-stones	Explore moving a brick over different surfaces. How much force is needed? How can we reduce friction? Set up an investigation and take measurements and record results. Extension: Does increasing the weight affect the force/angle of slope Using brick in shoe box (add a kg weight) and friction slope pull with a force meter and record in Newtons		
Lesson 7: What shapes travel easiest through water?	Use TAPS lesson plan Aquadynamics. Focus on **degree of trust in the results**	Introduction- Discuss the term water resistance. What do they think this means? Should be able to refer back to air resistance and use this information to define what water resistance is. Activity Discuss test results and their trustworthiness. Use the test results to predict which shapes will fall through the water the fastest. If time, challenge pairs to change the shape so that it falls quickly through the water. Plenary – link to everyday life and shapes of speedboats etc.	Comparative drop tests – using play dough; reshape to improve each design Would objects fall at the same rate in different liquids? Extension: create streamline boats – testing speed along a section of drainpipe		Children meeting the objective will be able to evaluate how effectively variables were controlled, e.g. *We couldn't get the position the same because some shapes turned over at the surface slowly, so we didn't know whether to time from when it went in the*

					water, or when it had turned over.
Lesson 8: What do gears, levers and pulleys do?	A mechanism is a device that allows a small force to increase to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.	Introduction: As a class define, what they think the vocab lever, gear and pulley is. Set task that after exploring the activities we want to define this vocabulary Main activity: Carousel of activities to explore: Gears – use a bike or maths clock that uses gears and foundation gear construction kit Explore what is happening. Exploring the rotation of turns of bike peddles to rotate the rear wheel of a bike into a higher gear and lower gear. Levers – Balance ruler on a fulcrum. Put a weight one end and push down with their finger at the other. Explore effect. See saw idea. Pulleys – Use dowel and cotton reels and string and try lifting a filled milk carton. Jolly roger flag idea. Pull down string to lift weight. Plenary – Look back at initial definitions – do we want to amend these? Finish with Explorify-Cogs in the kitchen https://explorify.wellcome.ac.uk/en/activities/odd-one-out/cogs-in-the-kitchen What do the mechanisms do? Make work easier - i.e. allow a smaller force to have a greater effect.	Children draw annotated diagrams of each explaining what is going on in the different activities. Draw a general conclusion as to what these machines do. I.e. allow a smaller force to have a greater effect. Make life easier!		Children will be able to demonstrate how pulleys, levers and gears work and can demonstrate the effects of these – how a small force can result in a larger force.
Lesson 9: What have I learned?			Go back to KWL grid and complete the section of what they have learnt.		

			Challenge extension task: Make a product that involves a lever, gear or pulley for use in a Wallace & Gromit film. Draw annotated diagrams to explain thinking. Note children applying creative higher order thinking.		

Living Things and Their Habitats	Year 5 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know?	AfL elicitation task As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.		Children write definitions for the key vocabulary of the unit. Using the pictures children should ask questions related to the lifecycles of these animals. What do they want to know about these animal lifecycles?	Provide a list of the key vocabulary and pictures of a variety of animals at various stages of their lifecycle.	
Lesson 2: What is a lifecycle?	WS focussed assessment task **Report and present findings from enquiries, in oral and written forms such as displays and other presentations, using appropriate scientific language.**	Intro - https://explorify.wellcome.ac.uk/en/activities/whats-going-on/coming-out-to-play butterfly form chrysalis Main activity – use TAPS lesson plan https://pstt.org.uk/resources/curriculum-materials/assessment Y5 Lifecycle research.	Children to research two different lifecycles. -		Children meeting the objective will be able to select relevant facts from their research compare the life cycles of different animals and present their findings in an appropriate manner.

Lesson 3: How do different animals grow and change? Compare and contrast.	Animals, including humans, have offspring, which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young, which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is metamorphosis.	Focus on the four animal groups: mammal, amphibian, insect, bird. Watch this 6 minute clip. It describes many life cycles, including amphibians (frogs), insects (butterflies) and birds (ospreys). https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-the-life-cycles-of-different-organisms/zvh8qp3 Discuss similarities and differences between the different animal groups, also using information children gleaned from their research. Children to record the similarities and differences of two lifecycles. Resources from Lesson 4 Animal lifecycles very good.https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children select two animals and complete a graphic  organiser comparing and contrasting the two animals. In groups, the children could make mobiles of the lifecycle of one of the animal groups studied or create a game or drama to represent the lifecycle. - Insect – butterfly - Amphibian – frog - Bird - Mammal		Children meeting the objective will be able to draw the lifecycle of a range of animals identifying similarities and differences between the lifecycles.
Lesson 3b How do the gestation periods of different animals compare?	Extension/Enrichment lesson.	Resources form lesson 5 Gestation of mammals extremely good. https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children can drw a graph and compare the gestation periods for different mammals and look for patterns.		
Lesson 4: What is the difference between incomplete and complete metamorphosis?		Look at the lifecycle of the butterfly. It would be great if the class had caterpillars and observed the changes over real time creating a diary of these changes using annotated diagrams and scientific vocabulary. This is an example of complete metamorphosis.	Children show the difference between the two in a format of their choice.		

		Complete metamorphosis has 4 distinct stages: **egg, larva, pupa, and adult**. Incomplete metamorphosis has 3 distinct stages: egg, nymph, and adult. Compare this to an example of incomplete metamorphosis.			
Lesson 5: How do plants reproduce including flowering plants? What is the lifecycle of a flowering plant?		Recap of Y3 – pollination and seed dispersal. Provide the children with the key vocabulary, which they should discuss in pairs: pollination, anther, stigma, pollen, seed dispersal, seed germination. From this, they should produce a piece of writing/or a notated diagram. Plenary - Use lesson 2 Pollination to show sexual reproduction of flowering plants. https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children should write an extended piece of writing to explain the process of reproduction in flowering plants or annotated diagrams showing the lifecycle of the plant.		Do the children understand the process of sexual reproduction in plants? Do their explanatory texts explain the lifecycle of a flowering plant?
Lesson 6: What is the difference between sexual reproduction and asexual reproduction in plants?	Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction, which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.	Use resources form Lesson 1 Plant reproduction for support https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children can draw / explain how plants reproduce. A4 paper split in half one side sexual reproduction in plants the other side explaining asexual reproduction. Can they give examples of plants that reproduce in these ways?		Children meeting the objective will be able to explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways.

Lesson 7 What have I learned?			Using the same vocabulary given at the start of the unit the children should now write definitions for the key vocabulary of the unit. Reflect on any changes they have made i.e. I used to think ….but now I know…because		

Animals Including Humans	Year 5 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	**Pupil learning activity**	**Resources**	**Assessment**
Lesson 1: What do I know? Can you describe the different stages of a human's life from baby, child, adolescent, mature adult, older adult?	When babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce. This content needs to be taught alongside PSHE.	This content needs to be taught alongside PSHE. The new statutory requirements for relationships and health education can be found below: - Statutory guidance on Physical health and mental wellbeing (primary and secondary). Other useful guidance includes: - Joint briefing on teaching about puberty in KS2 from PHSE Association and Association for Science Education Briefing on human's development and reproduction in the Primary Curriculum from PHSE Association and Association for Science Education.	Provide the children with four PowerPoint slides: Baby Child Adolescent (puberty) Mature adult Older adult Children should annotate these slides with the key information.		
Lesson 2: What could we measure to show how humans develop as they grow older?	WS focussed assessment task **Take measurements with increasing accuracy and precision.**	Use TAPS lesson plan for support Y5 Growth survey. https://pstt.org.uk/resources/curriculum-materials/assessment Groups decide e.g. forearm length, arm span, foot length, etc. Discuss how we could measure this and the number of children/adults we would need to measure. How accurate do our measurements need to be? Decide on how many decimal places or unit. Ensure that children understand that they also need to record the age of the person.	Children measure different groups of children recording information. They should create a scatter graph of results and identify any patterns or anomalies explain reasoning whey this might be the case.		Children meeting the objective will be able to **measure** accurately in cm and mm and record data in a scatter graph suggest reasons for a pattern, and identify any anomalies.

		Children go to different year groups to measure specified number of children. Bring data together to create class table. Ask groups to create scatter graphs to present the data, can use ICT to do this			
Lesson 3: What happens during puberty?	WS LO Reporting and presenting findings from enquiries in written forms	Possibility of interviewing school nurse to support children's understanding of puberty.	Prior to visit children write questions they want to know about puberty. (Teacher vet the questions!) After visit children present work as an information leaflet or answers to a problem page. E.g. What happens to a person when they go through puberty?		Children achieving the objective will be able to: present findings clearly and explain the changes that take place in boys and girls during puberty.
Lesson 4: What have I learned about human development?			Go back to the PowerPoint slides and children add any new information they have learned in a different colour.		

Year 5/ Year A Science Progression in Skills and Knowledge

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Autumn 1: Evolution and inheritance • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.		
Autumn 2: Light • recognise that light appears to travel in straight lines • use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.		
Spring 1 and 2: Forces • explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • identify the effects of air resistance, water resistance and friction, that act between moving surfaces • recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.		

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Summer 1: Animals including animals • describe the changes as humans develop to old age.		
Summer 2: Livings things and habitats • describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals		

Year 5/ Year A Science Progression in Skills and Knowledge

Y5/6 Working:	Pupils not securing learning	Pupils achieving depth in learning
• planning different types of scientific enquiries to answer questions, including recognising 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		

Y5/6 Working:	Pupils not securing learning	Pupils achieving depth in learning
• 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 degree of trust in results, in oral and written forms such as displays and other presentations		
• identifying scientific evidence that has been used to support or refute ideas or arguments.		

KS2 Lesson Plans

Year B 5/6

Animals Including Humans	Year 6 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	**Pupil learning activity**	**Resources**	**Assessment**
Lesson 1: What do I think is happening inside and outside my body when I exercise?	AfL Elicitation	Take the children outside and engage them in a physical activity for 5 minutes. Return to the classroom and ask the children to draw and annotate a large-scale drawing of a body. Plan this activity in small groups or individually. Plenary – share the key vocabulary. Children can add this to their posters in a different colour or underline key words that they had already identified.	The children should draw a large body outline and annotate it, recording to what they think is happening outside and inside the body during exercise.	Paper pens	
Lesson 2: What is the circulatory system?	The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body.	Group work: 1 child goes outside the room to look a model of the inside of the human body. The child comes back in and must describe to other members of their group what they saw. Members of the group draw this based on their description. Groups can research the functions. Adding notes to the group diagram. Use Siemans circulatory system model to support research : https://35058.stem.org.uk/humanbody/index.html .	Group activity – recreating a diagram of the circulatory system. Correct diagram given to children and they reflect on work and comment on what they did well and what they need to improve – improving work by using a different colour Based on P.65 Look think talk book Gaynor Weavers Carry out research and add to their diagrams.		
Lesson 3: Why do we need to pump blood	Children have looked at the theory and carried out research - now need to model it to	Use following resources as a support to model the circulatory system as a class or similar resource. https://www.stem.org.uk/system/files/elibrary-	Children act out the system. Extension. Hot seat a child (red blood cell) to create an audio tour to explain the	Red blood cells Red / blue felt tip pens.	Can they use the role-play model to explain the main parts of

around the body? How does the circulatory system work?	support their understanding.	resources/legacy_files_migrated/24893-The_Circulation_Game_Notes_and_Worksheets.pdf This model is a simple version and does not show the double circulatory system but is useful to show what is happening at a simple level.	journey - what is happening in the system? Children orally describe the circulatory system to each other. Extension – sickle cell cards		the circulatory system and their role?
Lesson 4: What is in our blood?	Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart. The cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system.	Use the internet to show diagrams of blood vessels. Children make blood. First make plasma – add water to two drops of yellow food colouring in a bottle. Plasma carries things like nutrients around our body so the children could add a sprinkle of salt to represent minerals found in plasma. Red blood cells carry oxygen around the body. Represent this by mixing Cheerios with red food colouring. When the red Cheerios are in the plasma, they will turn red too. This represents the plasma in our blood. White blood cells – add a small number of white marshmallows. They help fight infection. White blood cells are bigger than red – they help protect us from infections. Raisins can represent platelets.	Make representations of what is in our blood. Research the different parts of blood and t their function. Children could photograph or draw annotated diagrams and explain how the different parts in blood have special functions. Extension – how are the different parts of the blood carried around our body? Leads into next session.		
Lesson 5: How do we get the nutrients from our food?	Some children might still need to make the connection between lesson 3 and 4.	You may need to recap the digestive system – see Y4 Lesson 4b animals including humans. Use resource from: https://www.millgatehouse.co.uk/smeresources/ Chapter 9 Circulatory system Each group to have an A3 model of the			Children achieving the objective will be able to: draw a diagram of the circulatory system and

		heart slide 7-8 – Teacher to read out the script slide 6 copied below. Children show what is happening (model on small sale) and use nutrient and water circles. This shows the double circulatory system. Demonstration of the transportation process including delivery of nutrients and removal of waste products.	Modelling the transportation of blood and nutrients and water around the body. Children create an explanation text e.g. Espresso / explanation text		label the parts and annotate it to show what the parts do Produce a piece of writing that demonstrates the key knowledge e.g. explanation text, job description of the heart
Lesson 6: What happens to our heart rate when we exercise?	Children carry out a fair test – effect of different activities on my pulse rate	Use resources from in the zone – Lesson 1 P.26 PowerPoints and lesson ideas found here: https://www.stem.org.uk/elibrary/resource/34279 Measuring own heart rate before and after an activity. Observe differences in heart rate in different exercises. Plenary – discuss children's results. Devise a class conclusion along the lines of 'The harder I exercise, the faster my heart beats.'	Record results of exercise and pulse rates in a table form. Draw conclusions from the data.	Stethoscope – found in the 'in the zone box'	
Lesson 7: What happens to our heart rates when we do a *headstand*? Investigation into which	WS focussed assessment task. TAPS Y6 heart rate headstands WS **Use test result to make predictions to set up further comparative and fair tests**	TAPS Y6 Heart rate headstands lesson plan: https://pstt.org.uk/resources/curriculum-materials/assessment Ask children to think about factors that could change their pulse rate. List their ideas and discuss why pulse rate increases during exercise: *emphasise that blood carries oxygen around the body and that when you exercise the*	Discussion Carrying out a test Group recording of results in a table/graph Individual recording on explanation of what their data		Children meeting the objective will be able to: use their data to make predictions linking how hard the heart has to work

groups of people have a higher or lower resting pulse rate? Loosely based on idea with lesson 2 in the zone. https://www.stem.org.uk/elibrary/resource/34279	Pattern seeking – exploring heart rates for different groups of people.	*muscles in your body need more oxygen so your heart works harder to supply more oxygen.* Discuss with the children how to plan and carry out a test into headstands or similar to see if there are any patterns between people. Consider how long the headstand should last, how many measurements should be made, how many people should be tested, how to carry out the tests safely. Ask the children to carry out the test and record results as a group (tables or graphs). Focus individual recording on explanation of what their data shows, their explanations, degree of trust in results and making further predictions. Extension based on their results what do you think the pulse rate would be if a child from another class carried out the same test.	shows, their explanations, degree of trust in results and further predictions.		with the heart rate, *e.g. When you are upside down the distance that the blood needs to be pumped upwards is greater, so your heart works harder and beats faster.*
Lesson 8 What effect do drugs have on my body?		Invite outside speakers to support e.g. Police education officers to talk about negative effect of drugs / nurse to talk about positives.	Asking questions Own research into drugs e.g. smoking and effect on body Drawing conclusions - Bullet point positives and negatives of drugs.	Visiting speaker	
Lesson 9: What does a healthy lifestyle mean?		Class discussion on what this means in terms of diet, exercise and drugs. Mind map ideas for each.	Children Present information learned e.g. in a health leaflet describing impact of drugs and lifestyle on the body		

Earth in Space	Year 5 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning: Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1:	AfL – elicitation activity to find out knowledge and misconceptions.	True / False / Not sure activity based on P.142 Active assessment book (Thinking, Learning and Assessment in Science) Stuart Naylor. Typical question might be: Day and night are caused by the Earth spinning on its axis.	True / False not sure series of statements that children have to categorise.		
Lesson 2: What other planets are there in our solar system? How big are they? How far away from the Sun are they?	The Sun is a star. It is at the centre of our solar system. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits.	Find out what planets the children already know and what they know about them. Start to create a fact file for a Hitchhikers Guide to the solar system. Look at: 1. Sizes of planets: create a scaled model of 'human ' solar system Ogden Trust materials playdough planets: https://www.ogdentrust.com/assets/general/phizzi_practical_playdough_planets.pdf 2. Distance from sun: https://www.ogdentrust.com/assets/general/Phizzi_Practicals_solar-system-pocket.pdf Plenary Zoom in Zoom out The Great red spot. https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/the-great-red-spot	Create a scaled model of the solar system to show the relative sizes of the planets. Create a pocket solar system – take this home and explain what this shows to members of their family. Start creating fact files for the Planets include QR code links to video graphics based on their research.		
Lesson 3/4: How can we describe	WS focus for assessment – **identifying scientific evidence that has**	Introduction use Explorify: Maps of the solar system. Odd/one/out discussion.	Discussion Role play		Children meeting the objective will be able to:

the movement of planets, including the earth around the sun?	**been used to support or refute ideas or arguments.** TAPS lesson plan Y5 -Solar system research https://pstt.org.uk/resources/curriculum-materials/assessment	https://explorify.wellcome.ac.uk/en/activities/odd-one-out/maps-of-the-solar-system Role play the planets around the sun. Really pick out why it is a heliocentric not geocentric. Evidence. Allow children to research, role play, form a debate before composing an extended piece of work related to WS objective for a scientific journal. Use handout Heliocentric model of the Universe for support. TAPS lesson plan Solar System research	Research Writing of an extended piece of work.		Present planet research clearly, demonstrating an understanding of the planet's position in the solar system referring to scientists findings to support their ideas.
Lesson 5: What causes day and night?	Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night).	Use starting point concept cartoon 14.1 24 Hours. Modelling - the children can represent the Earth. In this model the children should form a circle, all facing outwards, and then link arms. Select a child to represent the UK and another Australia and label them with a sticker. As the Earth rotates they will see when the respective countries are in daylight and when in darkness. They should also be able to say when it is sunrise, midday, sunset or night in their country according to how much of the light source they can see. With these models the globe / Earth should rotate in anticlockwise direction if we are looking at it from the North Pole. Handout 4 day and night. Also modelling with globe and torch/Blu Tac.	Discuss and annotate concept cartoon with their initial thoughts. Children model what's happening Describe this to other's - reflect on their explanations and improve. Draw annotated diagrams and create a voice over to explain or write an explanation. Go back to concept cartoon and in a different colour add their thoughts now, based on research and understanding.		Children meeting the objective will be able to orally or in written form explain the Earth's rotation on its axis, causing day and night. https://pstt.org.uk/application/files/8714/7021/6048/Y5egSpace_Orbit_expln.pdf
Lesson 6: Why does the sun appear to	As the Earth rotates, the Sun appears to move across the sky. The Sun, Earth and	Introduction – Use Explorify What's going on Earth https://explorify.wellcome.ac.uk/en/activities/whats-going-on/earth	Children set up a shadow clock and collect data and graph it.		Children should be able to explain

move across the sky?	Moon are approximately spherical.	Make first-hand observations of how shadows caused by the Sun change through the day. Research – compare times of day at different places on the Earth through the internet. Maths Whizz Y6 time zones. Video references form ISS / time lapse.	Make reference to the position of the sun that causes the shadow. Relate this back to Earth rotating on its axis.		evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model. They will also be able to explain verbally, using a model, why we have time zones.
Lesson 7: Why does the Moon appear to change shape over time?	The Moon orbits the Earth. It takes about 28 days to complete its orbit.	Introduction - Explorify What if there was no moon? https://explorify.wellcome.ac.uk/en/activities/what-if/there-was-no-moon Modelling - use a model to explain how the Earth moves in relation to the Sun and the Moon moves in relation to the Earth. Children take on the role of Earth, sun and moon and take turns to experience each of these. Use handout 2 moon phases.	Discussion Modelling – explain thinking Make moon diaries over a period of a month. Draw what they see every 4 days giving 7 pictures – identify patterns in data. Compare their pattern with research www.planetaria.org.uk Use annotated diagrams to show movement of moon.		Children will be able to use diagrams to show the movement of the Earth and Moon in relation to the Sun.
Lesson 8: What happens when different meteors crash into the surface	Y5 plan TAPs Craters https://pstt.org.uk/resources/curriculum-materials/assessment **Record data and results of increasing**	TAPs crater investigation **Activity** Children to investigate the formation of 'craters' by dropping meteors (e.g. marbles or balls) into a tray of sand and observing the craters produced. Introduce by looking at photos/websites of impact craters. As a class drop a	Carry out investigation Record data in a table		Children meeting the objective will be able to: make decisions about what to record and

of the moon?	**complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**	variety of different spherical objects into the sand and measure the diameter of the craters, creating a class graph. As a class, consider what could be changed and measured (could use a sticky note planning board) and allocate different variables to different groups of children (height of drop, size of meteor, type of sand). Ask each group to make measurements and record them in a table/graph of their own design.	Plot graph		where to put information in a simple table/graph. With support, can calculate/plot mean or median if repeat measurements have been taken.
Lesson 9: What have I learned?		Introduction Explorify Celestial objects https://explorify.wellcome.ac.uk/en/activities/odd-one-out/celestial-objects	Use the same set of true / false / not sure statements and ask children to repeat the exercise – comment on what evidence they now have to support any change in thinking.		

Handout 1 – Helliocentric Model

National Curriculum 2014 Objectives

Physics – Earth and Space:

- Y5 describe the movement of the Earth, and other planets, relative to the Sun in the solar system

The misconception!

- The Sun moves around the Earth.
- The Earth lies at the centre of the solar system, with the sun and the planets orbiting around it.
- Planets have a shared orbit around the Sun, meaning that they follow the same path rather than have their own defined orbit a classic misconception.

The correct science.

Pupils need to understand how the geocentric model of the solar system (Earth at the centre of the Universe as believed by Ptolemy) gave way to the heliocentric model (Sun at the centre of the solar system as first described by Copernicus).

The modern heliocentric model has the sun at the centre of the solar system with the eight planets, their moons and asteroids orbiting around it. Each planet orbits the sun on its own ecliptic plane. The moon orbits the Earth whilst the Earth orbits the Sun.

Pluto has been downgraded to a dwarf planet as it does not meet the three basic criteria for describing a planet as defined by the International Astronomical Union, these being:

1. It is in orbit around the Sun.

2. It has sufficient mass to assume a nearly round shape.

3. It has "cleared the neighbourhood" around its orbit which means that there are no other bodies of comparable size other than its own satellites in its vicinity in space.

Practical strategies to support pupil's learning.

Get the children to create a fruit solar system using various fruits. This will help students grasp the various sizes of planets in our Solar System using mostly fruit with some other items. The class discussion before the activity encourages students to take an educated guess as to which planet each item represents.

Reference: http://www.nationalstemcentre.org.uk/elibrary/resource/7336/fruit-solar-system

This BBC video http://www.bbc.co.uk/programmes/p00n6zgy shows a model of the solar system being created with fruits and also uses toilet paper to show the relative distances between the planets and the sun.

The Winchester materials provide planet clue cards. (P.8.) Children can work in teams, using the evidence within the cards, to order the planets.

http://www.winchestersciencecentre.org/_files/Planetarium/7D09EDD92BE2A7D8D29CEC855D9BFC17.pdf

Investigate relative distances of planets from Sun using a scale of 1cm = 1000km. Select one child to be the Sun and to be the point from where all measurements will be taken, you may want children to round their distance to the nearest 0.5m,

58,000 = 58cm Mercury,
108,000 = 108cm or 1m 8cm Venus,
150,000 = 150cm or 1m 50cm Earth,
228,000 = 2m 28cm Mars,
778,000 = 7m 78cm Jupiter,
1,427,000 = 14m 27cm Saturn,
2,871,000 = 28m 71cm Uranus,
4,498,000 = 44m 98cm Neptune,

Get the children to stand in line and look at distances between planets, what do they notice?

Reference: Misconceptions in Primary Science, Michael Allen, McGraw Hill, Open University Press, 2010, P. 181

Day and Night - Handout 4

National Curriculum 2014 Objectives

Physics – Earth and Space:

- Y5 Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

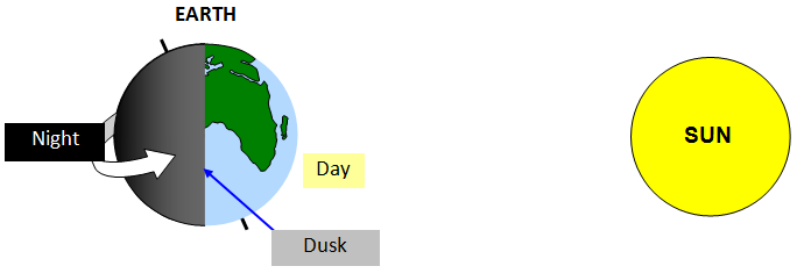
The misconception!

- The sun moves around the Earth once a day; this is why day and night occur or the Earth goes around the Sun once a day. (Danaia and McKinnon 2007)
- Night comes because the moon blocks sunlight.
- The sun and moon swap places causing day and night

The correct science.

The Earth rotates on its axis. The Earth's axis is an imaginary line that passes through the North and South poles and it is slanted at a 23.5 degree angle. It rotates once every twenty four hours. Whilst it is rotating on its axis the Earth is also orbiting the Sun (once every 365¼ days).Whilst half of the world is in daylight half of the world experiences night. It is because of this rotation that we have day and night. The earth rotates from East to West which explains the rising and setting of the sun. The sun is stationary; it is our rotation of the Earth that causes day and night.

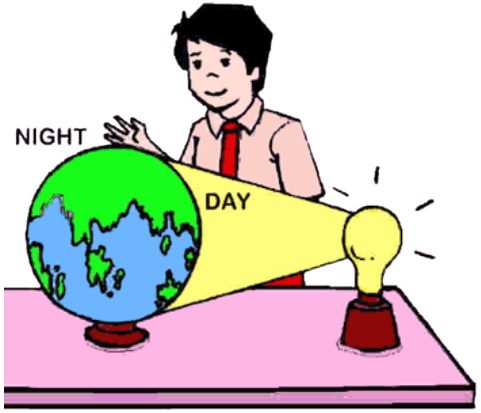
http://www.schoolphysics.co.uk/age11-14/glance/Astronomy/Day_and_night/index.html#top



(Note: this diagram is not to scale. If you view this file with the Earth shown as a disc about 5 cm in diameter the Sun would be a disc over 5 m in diameter and nearly 600 m away)

Practical strategies to support pupil's learning.

The concept of day and night is best taught through demonstrating with a strong light source and a globe of the Earth. The light source (Sun) should remain stationary whilst the globe slowly rotates on its axis through 360 degrees. If blue tac is used to show where the UK is on the globe and then it rotates the children will see when it is daylight and nighttimes in the UK. This will also help them to appreciate sunrise and sunset and how the sun appears to move across the sky.



In a similar model the children an can represent the Earth. In this model the children should form a circle, all facing outwards, and then link arms. Select a child to represent the UK and another Australia and label them with a sticker. As the Earth rotates they will see when the respective countries are in daylight and when in darkness. They should also be able to say when it is sunrise, midday, sunset or night in their country according to how much of the light source they can see.

With these models the globe / Earth should rotate in anticlockwise direction if we are looking at it from the North Pole.

Reference: Misconceptions in Primary Science, Michael Allen, McGraw Hill Open University Press, 2010, P.185-191

http://www.childrensuniversity.manchester.ac.uk/interactives/science/earthandbeyond/sunrisesunset/

Properties and Changes of Materials	Year 5 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I already know? Initial elicitation task		Provide children with the key words for this unit of work: Y4 - solid, liquid, gas, evaporation, condensation, Y5 -Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material NB Some Y4 vocab is included here as the children really need to know these words to understand the concepts applied to separating materials	Allow children to sort the words into those that they know/do not know. Using the list of words, they know - write definitions of each of the words and state how confident they are that this is what the word means.	List of key vocabulary for the unit.	
Lesson 2: Can you compare and group materials based on specific properties?	Materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets.	Discuss with the children words from lesson 1 to describe the properties of materials. Provide them with a selection of materials to handle. Allow them to think about the materials and consider ways to sort them based on the materials properties. They may need to devise tests to determine whether the material is e.g. an electrical conductor. Show a range of ways that they could present their sorting: Carroll diagram, Venn diagrams, branching database.	Using a given set of materials the children can test the materials in respect of hardness, conductivity, response to magnets and then sort them according to criteria that they have chosen. They should decide which method of sorting they are going to use to communicate their findings.	Materials: e.g. cork, coins (magnetic non-magnetic) sponge, tin foil, rubber, paperclip, etc.	
Lesson 3: Do materials disappear when they dissolve?	Some materials will dissolve in a liquid, form a solution while others are insoluble, and form sediment.	Observation over time enquiry using different powders e.g. talc, sugar, salt, sand etc. Identify which materials will dissolve. Plenary activity: https://www.science-sparks.com/skittles-experiment/ Use	Children carry out the testing of different materials and determine whether they dissolve or not. Can they then answer the original question posed? How do they know when or	Flour, sugar, coffee, talc, sand, beakers, water, skittles	Children will be able to explain what dissolving means, giving examples.

		observe, predict, observe, and explain to structure the discussion. If they observe closely, they should observe that the s does not dissolve because it is made of paper.	if a material has dissolved? What has happened to it? Get children to place some skittles on a white saucer and cover with water. Children should explain what is happening in this simple observation over time activity using evidence to support their explanations.		
Lesson 4: What factors will affect the rate of sugar dissolving?	**Use this activity to focus teach the children in understanding this skill.** Fair testing - enquiry TAPs Dissolving **Plan: Ask questions and plan enquiry** Plan scientific enquiry to answer question and recognise and control variables where necessary	**Activity**: Ask children to think of everyday example of dissolving solids in water (e.g. sugar in tea, salt in cooking water). Ask them to suggest ways of making the sugar dissolve faster (e.g. stirring, temperature of the water, size of sugar grains, volume of water). Ask them to choose a factor to investigate and to plan a fair test. Carry out tests and discuss outcomes Plenary: challenge question. How could we get the sugar back? Evaporate the water off. Set this up to observe over time.	Children should plan and carry out a fair test enquiry to answer the question they have decided to investigate.	Sugar, beakers, thermometers, timers, water.	Children meeting the objective will be able to plan a fair test identifying one thing to change, one thing to measure/observe and important factors to keep the same.
Lesson 5: How could you clean this dirty water? How could you separate out different mixtures or solutions?	Observation over time enquiry Mixtures can be separated by filtering, sieving and evaporation	Use: Practical action resource Ditch the Dirt *https://practicalaction.org/schools/ditch-the-dirt/* The classroom activity enables pupils to investigate ways of making dirty water cleaner through sieving and filtering and	Children design and test a filter system to clean dirty water. Take a photograph; draw an annotated diagram to explain the materials they have used to make their filter and what is happening. Opportunity to carry out further research into filters in real life.	Dirty water samples, 2litre pop bottles, selection of materials to make the filter: Marbles, gravel, sand, cotton wool, cloth, tights,	Children will be able to name equipment used for filtering and sieving.

		to explore ways of making water safe to drink.		filter paper, hand towels.	
Lesson 6: Which materials are best for their purpose? Investigating thermal insulation.	WS LO **Use test results to make predictions to set up further comparative and fair tests** TAPs Plan Insulation layers lesson plan.	Investigation 1:- How can I keep my drink warm? Which cup would be best? TAPS plan insulation layers. AND / OR Investigation 2: Provide 4 bags and allow children to investigate which bag for life would be best for the shopkeeper to invest in for his /her customers? Children devise tests to determine which is best. Plenary: Use explorify activity All ground up. Racetrack made of a particular material for a particular purpose. https://explorify.wellcome.ac.uk/en/activities/zoom-in-zoom-out/all-ground-up	Before the lesson show, the children different cups of hot water, e.g. paper cup, stacked paper cups, thermos mug. Measure the temperature of the water and repeat after about one hour (at the beginning and end of lunchtime). **Activity** Use the results of the pre-activity to make predictions about insulations (a good insulator has more layers / traps air / made of….). Provide a collection of different materials and invite the children to discuss their ideas about which might be good for keeping the drink warm. The children could order the materials according to the best insulators.		Can use test evidence gathered about different properties to suggest an appropriate material for a particular purpose
Lesson 7: Can you reverse a material's change in state? Why are some changes irreversible? What happens when you	Misconceptions exist around reversible and irreversible changes, including around the permanence or impermanence of the change. There is confusion between physical/chemical changes and reversible and irreversible changes.	Discuss reversible / irreversible. What does this mean? Use loaf of bread and cut it – discuss that although shape has changed it is still that loaf of bread. Physically it is the same. Make some burnt toast. Describe what has happened. Chemical change has occurred and if I put this piece back with the loaf, it would not be the same. Draw out the fact that reversible changes mean that we can get the original materials back whereas irreversible a	Children to create a table of examples of reversible / irreversible changes. Drawing writing presenting information in a suitable format.		Children will be able to describe some simple reversible and non-reversible changes to materials, giving examples.

burn materials?	They do not correlate simply. Chemical changes result in a new material. These are mostly irreversible. Physical changes are often reversible but may be permanent. These do not result in new materials e.g. cutting a loaf of bread. It is still bread, but it is no longer a loaf. The shape, but not the material, has changed.	new material has been made which may be useful. Teacher demo of burning some different materials – children notice what happens each time – ash (carbon) observations of different materials. Plenary look at the creation of a new material through a chemical change. Either show or do activity based on explorify What's going on - Fire fighting https://explorify.wellcome.ac.uk/en/activities/whats-going-on/fire-fighting			
Lesson 9: What affects the amount of gas produced when vitamin C tablets are added to water?	This is the WS Skill for focus assessment: Fair testing - enquiry **Plan: Ask questions and plan enquiry** Plan scientific enquiry to answer question and recognise and control variables where necessary	Start with explorify activity: balloon surprise https://explorify.wellcome.ac.uk/en/activities/whats-going-on/fire-fighting Then ask the question what could affect the amount of gas produced? Amount of tablet, amount of water, temperature of water etc.	Children should plan and carry out a fair test enquiry to answer the question they have decided to investigate.		Children meeting the objective will be able to plan a fair test identifying one thing to change, one thing to measure/observe and important factors to keep the same.
Lesson 10: What have I learned?			Provide the vocab for the unit and their original definitions. Are there any definitions that they now want to amend? Allow them to improve these in a		Assess whether the children's knowledge has moved on and their

			different colour or rewrite. How confident are they that this is what the word means?		confidence in using scientific vocabulary.

Electricity	Year 6 Term

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1a: What do I know?			Practical starter – using the equipment can you make the light bulb work? Draw and annotate their work		
Lesson 1b: How can I correctly represent a circuit?		Use the children's work as a starter. They have probably drawn pictures. Discuss is this easy to read? Model the correct way of drawing a circuit and show the symbols. Making and drawing circuits using correct symbols.	Can play games matching symbols and pictures using cards from: http://primary.cleapss.org.uk/Resource/E230p-CIRC-KIT-Teaching-Electric-Circuits.aspx These cards can also be used to support less able children making and drawing their circuits. Children make different circuits and draw a circuit diagram. This diagram can be given to another child to make to see if it works and can be read.		Children will be able to communicate structures of circuits using circuit diagrams with recognised symbols.
Lesson 2: Which of the circuit diagrams show working circuits? Problem solving	WS assessment opportunity: **Reporting and presenting findings from enquiries**	Introduction – play bingo. Children draw symbol on their whiteboards teacher holds up component. Getting children used to the symbols. Use Ogden Trust materials – circuit analysts to compare and give reasons for variations in how components function.	Children are given a set of circuit diagram cards to analyse and construct. They test each circuit to see if it works. When they find one that doesn't, the children draw a corrected version. They need to report their findings back explaining reasoning.		See Ogden Trust materials for example of work at expected level. To write a formal letter to the manager of the company,

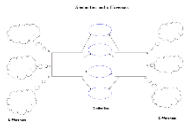
	including conclusions and explanations of results in written form				suggesting which of the engineers is making mistakes and which engineers work accurately.
Lesson 3: How can I make a bulb shine brighter?	WS focussed assessment: **Plan a scientific enquiry to answer a question, recognising and controlling variables.**	Use TAPS lesson plan: Y6 Bulb brightness: https://pstt.org.uk/resources/curriculum-materials/assessment Children investigate how they can change the brightness of the bulb using the full range of equipment available. In pairs/groups, use planning devices (Post-it Planners) to generate a list of variables which could be changed in their circuit. Each group/pair select the variable they wish to change and how they will measure the effect of this change and use this to form a scientific question. Draw the test circuit.	Each group report their question and list their variables (what to measure, what to change, what to keep the same) to the class for feedback		Children meeting the objective will be able to: Identify a range of circumstances that may affect the brightness of the bulb and define a succinct scientific question to test
Lesson 4: How can I change the output for a given device?	Adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb	Use concept cartoon Circuits 10.7: The lamp is brighter if you use a bigger battery. It is brighter if you use more batteries It is brighter if you use a bigger lamp It is brighter if you use more lamps. Allow the children time to discuss. Look at the batteries and voltage.	Using information from the previous lesson the children should explore any of the other statements that they are not sure of. Provide the equipment and allow them to explore the scenario. Making conclusions. They should take the statements and provide evidence to support or refute the statement. Can they then apply their thinking to what would		The children need to appreciate that adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you

	less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter.		happen if you used a motor instead of a bulb? What if we added more bulbs but only had one battery? Form a generalisation.		use a battery with a higher voltage, the same thing happens.
Lesson 5 -8 Link to DT and Engineering: Can I use a switch in a circuit and apply what I know to solve a problem?		A series of 4 lessons where the children make a super sucker: https://www.stem.org.uk/elibrary/resource/35625 It provides a practical context in which children focus on electric circuits, motors and batteries to build their own mini-vacuum cleaner. The series of four lessons begins by introducing the engineering problem and asking the children to solve the problem. In the second lesson children, take a detailed look at a hairdryer identifying its different parts and their functions. Applying previous learning about circuits, they then look at motors and fans, focussing on how differences in design change the effectiveness of the fan. They then make a switch for their device. In lesson, three children work in groups to design and build their own vacuum cleaner, thinking about materials and component parts and how they will work to solve the initial problem. Finally, the class discuss their different solutions and evaluate their designs against the initial criteria.			Children will be able to predict results and answer questions by drawing on evidence gathered to solve a problem.

Lesson 9: What have I learned? Can I apply my understanding of electricity to make a scribblebot?		https://www.ogdentrust.com/assets/general/Phizzi_Practicals_scribblebot.pdf Children could explore changing the features of the scribblebot to see how it affects its behaviour. They could try changing the position of the motor, pens or cork to explore how these variables affect scribblebot movement.	Children make a scribblebot. Take photos draw diagrams, explain how it works using the key vocabulary from the unit.		

Living Things and Their Habitats	Year 6

What are we learning:	What do teachers need to know? Key learning	How are we learning:			
		Teaching input:	Pupil learning activity	Resources	Assessment
Lesson 1: What do I know?	AfL elicitation task As part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg.		Children write definitions for the key vocabulary of the unit. Using the pictures children should ask questions related to the lifecycles of these animals. What do they want to know about these animal lifecycles?	Provide a list of the key vocabulary and pictures of a variety of animals at various stages of their lifecycle.	
Lesson 2: What is a lifecycle?	WS focussed assessment task **Report and present findings from enquiries, in oral and written forms such as displays and other presentations, using appropriate scientific language.**	Intro - https://explorify.wellcome.ac.uk/en/activities/whats-going-on/coming-out-to-play butterfly form chrysalis Main activity – use TAPS lesson plan https://pstt.org.uk/resources/curriculum-materials/assessment Y5 Lifecycle research.	Children to research two different lifecycles. -		Children meeting the objective will be able to select relevant facts from their research compare the life cycles of different animals and present their findings in an appropriate manner.

Lesson 3: How do different animals grow and change? Compare and contrast.	Animals, including humans, have offspring, which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young, which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is metamorphosis.	Focus on the four animal groups: mammal, amphibian, insect, bird. Watch this 6 minute clip. It describes many life cycles, including amphibians (frogs), insects (butterflies) and birds (ospreys). https://www.bbc.co.uk/teach/class-clips-video/science-ks2--ks3-the-life-cycles-of-different-organisms/zvh8qp3 Discuss similarities and differences between the different animal groups, also using information children gleaned from their research. Children to record the similarities and differences of two lifecycles. Resources from Lesson 4 Animal lifecycles very good.https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children select two animals and complete a graphic  organiser comparing and contrasting the two animals. In groups, the children could make mobiles of the lifecycle of one of the animal groups studied or create a game or drama to represent the lifecycle. - Insect – butterfly - Amphibian – frog - Bird - Mammal		Children meeting the objective will be able to draw the lifecycle of a range of animals identifying similarities and differences between the lifecycles.
Lesson 3b How do the gestation periods of different animals compare?	Extension/Enrichment lesson.	Resources form lesson 5 Gestation of mammals extremely good. https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children can drw a graph and compare the gestation periods for different mammals and look for patterns.		
Lesson 4: What is the difference between incomplete and complete metamorphosis?		Look at the lifecycle of the butterfly. It would be great if the class had caterpillars and observed the changes over real time creating a diary of these changes using annotated diagrams and scientific vocabulary. This is an example of complete metamorphosis.	Children show the difference between the two in a format of their choice.		

		Complete metamorphosis has 4 distinct stages: **egg, larva, pupa, and adult**. Incomplete metamorphosis has 3 distinct stages: egg, nymph, and adult. Compare this to an example of incomplete metamorphosis.			
Lesson 5: How do plants reproduce including flowering plants? What is the lifecycle of a flowering plant?		Recap of Y3 – pollination and seed dispersal. Provide the children with the key vocabulary, which they should discuss in pairs: pollination, anther, stigma, pollen, seed dispersal, seed germination. From this, they should produce a piece of writing/or a notated diagram. Plenary - Use lesson 2 Pollination to show sexual reproduction of flowering plants. https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children should write an extended piece of writing to explain the process of reproduction in flowering plants or annotated diagrams showing the lifecycle of the plant.		Do the children understand the process of sexual reproduction in plants? Do their explanatory texts explain the lifecycle of a flowering plant?
Lesson 6: What is the difference between sexual reproduction and asexual reproduction in plants?	Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction, which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.	Use resources form Lesson 1 Plant reproduction for support https://www.ase.org.uk/ase-coronavirus-hub-primary-remote-learning-resources#year5	Children can draw / explain how plants reproduce. A4 paper split in half one side sexual reproduction in plants the other side explaining asexual reproduction. Can they give examples of plants that reproduce in these ways?		Children meeting the objective will be able to explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways.

Lesson 8 What have I learned?			Using the same vocabulary given at the start of the unit the children should now write definitions for the key vocabulary of the unit. Reflect on any changes they have made i.e. I used to think ….but now I know…because		

Year 6/ Year B Science Progression in Skills and Knowledge

NC Knowledge	Pupils not securing learning	Pupils achieving depth in learning
Autumn 1: Animals including humans • identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • describe the ways in which nutrients and water are transported within animals, including humans		
Autumn 2: Earth and space • describe the movement of the Earth, and other planets, relative to the Sun in the solar system • describe the movement of the Moon relative to the Earth • describe the Sun, Earth and Moon as approximately spherical bodies • use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.		
Spring 1 and 2: Properties and changes in materials • compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.		
NC Knowledge	**Pupils not securing learning**	**Pupils achieving depth in learning**

Summer 1: Electricity • associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • use recognised symbols when representing a simple circuit in a diagram.		
Summer 2: Living things and habitats • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics.		

Year 6/ Year B Science Progression in Skills and Knowledge

Y5/6 Working Scientifically:	**Pupils not securing learning**	**Pupils achieving depth in learning**
• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary		
• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate		

Y5/6 Working Scientifically:	Pupils not securing learning	Pupils achieving depth in learning
• 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 degree of trust in results, in oral and written forms such as displays and other presentations		
• identifying scientific evidence that has been used to support or refute ideas or arguments.		