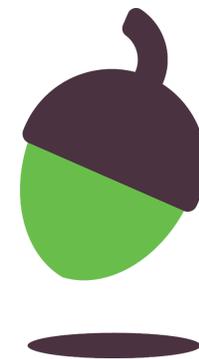


Science

Primary: Key Stage 1, Key Stage 2

Curriculum plan 2020-21



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1. Curriculum Principles

The following document outlines the Key Stage 1 and Key Stage 2 science curriculum for Oak Academy 2020-2021. Each unit of work is 6 lessons long and designed to last roughly one half term. The following curriculum map provides complete coverage of statutory topics contained within the national curriculum. Further units that go beyond the national curriculum are also included, to help pupils better understand the subject and the world, as well as preparing them for the next stage of study. Below are a set of principles we have sought to apply in our curriculum planning of both primary and secondary science.

Coherence and flexibility

We strive to support schools by giving them an online learning offer that can be flexible, to fit alongside their existing curriculum. We need to balance this together with coherence, as complete flexibility would imply only standalone lessons, where none can build upon any other. In striking this balance, we will lean towards giving the maximum flexibility possible where this does not compromise coherence. Where disciplinary knowledge (working scientifically) is woven into the units there will be reminders of previously used scaffolds and prompts. For the majority of units in KS1 there is no prior knowledge required and so biology, chemistry and physics units could be taught in any order within the key stage (see section 3 below for further clarification). For KS2, we have also tried to provide flexibility. However, there are more sequencing constraints in this key stage. In general, prior knowledge from KS1 has been assumed when planning KS2 units. However, prior knowledge will always be recapped within a lesson if required for that particular lesson. Within the disciplines of biology, chemistry and physics there are more sequencing constraints at KS2 (see section 3 below for further clarification and recommendations).



Knowledge organisation

The units in the science curriculum are grouped by key stage, with a suggested route organised within year groups. The substantive knowledge (i.e. the science content) will be taught in units, and the disciplinary knowledge (i.e. working scientifically) is taught in context. Hierarchical elements of working scientifically will be reflected in the units and therefore this will be built up accordingly.

Knowledge selection

We are seeking to support schools to deliver the national curriculum to children who cannot attend school. Our choice of what to teach will primarily be guided by the content specified in the national curriculum, but we have also chosen to broaden this to increase challenge and build aspiration (e.g., include more physics at KS1 and KS2, include units in KS1 and KS2 on a diverse range of influential scientists).

Inclusive and ambitious

We want Oak to be able to support all children. Our units will be pitched so that children with different starting points can access them. Pupils need to have a large amount of subject knowledge stored in their long-term memory in order to become competent at any subject, and this is especially true of science, where application is often an application of knowledge. For this reason, these lessons are designed to teach science in a clear and deliberate fashion, emphasising secure content knowledge before moving on to tasks. In this approach, the teacher is the subject expert and the emphasis is on instruction and explanation, followed by deliberate practice supported



by modelling, guided practice and scaffolding. Models and analogies will be used where appropriate to allow pupils to visualise or contextualise abstract ideas

Pupil engagement

We need pupils to be thinking during science lessons - both to engage with the subject and to strengthen memory of what is being learnt. Our lessons will not be video lectures. We seek to exercise pupils' minds throughout their lessons (based on the principles described in point 1.5 above). This will involve questions and tasks throughout instruction, just as we would with classroom teaching. We will aim to include purposeful practical science in as many of our lessons as possible.

Motivation through learning

Like all teachers, we recognise that good presentation helps pupils keep participating in our lessons. However, we are teachers, and not entertainers. We seek to motivate children through our subjects. We believe that what we teach is inherently interesting, and that the joy of learning is our primary motivator. In science, we will provide opportunities where possible for pupils to engage in home experimentation. We will include learning about relevant careers for that unit in many of our units. The scientists that we have chosen to study will reflect the diversity of backgrounds of our pupils. Finally, we will try to be explicit about the real-life relevance of each unit so that it is clear why this knowledge is important.



2. Subject structure overview

Units are split into KS1 and KS2 units and are colour coded to show the [Chemistry units](#), [Biology units](#) and [Physics units](#). Where a unit is not colour coded this is because it falls into all three domains. Links to the statutory requirements for working scientifically have been made explicit for each unit. Generic statements have been used for simplicity:

- Asking questions
- Performing tests
- Observing and measuring
- Gathering and recording data
- Identifying and classifying
- Using equipment
- Planning and setting up different types of enquiries
- Reporting, presenting and communicating data/findings



2.1 KS1 subject structure overview

Key stage	Unit title	Length of unit	Prior knowledge required	Working scientifically
KS1	Materials	6 lessons	None	<ul style="list-style-type: none"> - Asking questions - Performing tests - Observing and measuring - Gathering and recording data - Identifying and classifying
KS1	Building things	6 lessons	Materials	<ul style="list-style-type: none"> - Asking questions - Observing and measuring - Gathering and recording data - Identifying and classifying
KS1	Changing materials	6 lessons	Materials	<ul style="list-style-type: none"> - Asking questions - Performing tests - Observing and measuring - Gathering and recording data - Identifying and classifying
KS1	Mixing and making	6 lessons	Materials	<ul style="list-style-type: none"> - Asking questions - Observing and measuring - Gathering and recording data - Identifying and classifying
KS1	Plants	6 lessons	None	<ul style="list-style-type: none"> - Performing tests - Observing and measuring - Gathering and recording data - Identifying and classifying
KS1	The animal kingdom	6 lessons	None	<ul style="list-style-type: none"> - Identifying and classifying
KS1	Human lifestyle	6 lessons	None	<ul style="list-style-type: none"> - Performing tests - Using equipment



				- Observing and measuring - Gathering and recording data
KS1	Habitats	6 lessons	The animal kingdom	- Identifying and classifying
KS1	Seasons and change	6 lessons	None	- Observing and measuring - Using equipment - Gathering and recording data
KS1	Space	6 lessons	None	
KS1	Sound	6 lessons	None	- Observing and measuring - Using equipment
KS1	Extraordinary scientists	6 lessons	None	

2.2 KS2 subject structure overview

Key stage	Unit title	Length of unit	Prior knowledge required	Working scientifically
KS2	Practical skills	6 lessons	None	<ul style="list-style-type: none"> - Performing tests - Using equipment - Observing and measuring - Gathering and recording data - Reporting, presenting and communicating data/findings
KS2	Raw and synthetic materials	6 lessons	Materials (KS1)	<ul style="list-style-type: none"> - Identifying and classifying - Reporting, presenting and communicating data/findings
KS2	States of matter	6 lessons	None	<ul style="list-style-type: none"> - Observing and measuring - Identifying and classifying - Gathering and recording data
KS2	Rocks	6 lessons	States of matter	<ul style="list-style-type: none"> - Identifying and classifying
KS2	Separating mixtures	6 lessons	States of matter	<ul style="list-style-type: none"> - Reporting, presenting and communicating data/findings
KS2	Physical and chemical changes	6 lessons	States of matter	<ul style="list-style-type: none"> - Planning and setting up different types of enquiries - Observing and measuring - Gathering and recording data - Reporting, presenting and communicating data/findings
KS2	Particles in physical and chemical changes	6 lessons	States of matter	<ul style="list-style-type: none"> - Performing tests - Observing and measuring
KS2	Sustainability	6 lessons	Materials (KS1)	<ul style="list-style-type: none"> - Identifying and classifying - Reporting, presenting and communicating data/findings
KS2	Plants	6 lessons	None	<ul style="list-style-type: none"> - Asking questions - Performing tests - Observing and measuring



				<ul style="list-style-type: none"> - Gathering and recording data - Reporting, presenting and communicating data/findings
KS2	Adaptations	6 lessons	The animal kingdom (KS1) - Plants (KS1)	<ul style="list-style-type: none"> - Identifying and classifying
KS2	Ecosystems	6 lessons	The animal kingdom (KS1)	<ul style="list-style-type: none"> - Asking questions - Identifying and classifying
KS2	Human anatomy	6 lessons	None	<ul style="list-style-type: none"> - Identifying and classifying
KS2	Reproductive cycles	6 lessons		<ul style="list-style-type: none"> - Identifying and classifying
KS2	Humans and animals over time	6 lessons	Rock cycle	
KS2	Diet and lifestyle	6 lessons	Human anatomy	<ul style="list-style-type: none"> - Observing and measuring
KS2	Light & dark	6 lessons	None	<ul style="list-style-type: none"> - Observing and measuring - Using equipment - Identifying and classifying
KS2	Magnetism	6 lessons	Materials (KS1)	<ul style="list-style-type: none"> - Performing tests - Observing and measuring - Identifying and classifying - Gathering and recording data
KS2	Electrical circuits	6 lessons	None	<ul style="list-style-type: none"> - Planning and setting up different types of enquiries - Using equipment - Gathering and recording data - Observing and measuring - Identifying and classifying
KS2	Sound	6 lessons	Human lifestyle (KS1)	<ul style="list-style-type: none"> - Asking questions - Performing tests - Observing and measuring



				<ul style="list-style-type: none"> - Identifying and classifying - Gathering and recording data
KS2	Forces	6 lessons	None	<ul style="list-style-type: none"> - Performing tests - Gathering and recording data - Observing and measuring
KS2	Space	6 lessons	Understanding of light and darkness and gravity	
KS2	Light	6 lessons	None	<ul style="list-style-type: none"> - Performing tests - Gathering and recording data - Observing and measuring - Identifying and classifying
KS2	History of science	6 lessons	None required but will build on learning of electricity, materials, human anatomy and space.	<ul style="list-style-type: none"> - How scientific ideas and evidence change over time
KS2	Notable scientists	6 lessons	None	



3. Suggested sequence

Below is the sequence in which we suggest teaching these units, with detailed rationales at each key stage.

Teachers should note that whilst this sequence adheres to the National Curriculum in terms of teaching content within the correct key stage, not all content is taught in the year group suggested by the National Curriculum.

Where that is the case, the rationale is below. The affected units have been deliberately designed so that they can be taught in any sequence, and so schools can place these units wherever they prefer.

3.1 KS1 recommendations

For KS1 we have tried wherever possible to make units that could be taught as standalone units to provide ultimate flexibility. For the majority of units in KS1, there is no prior knowledge required. Where prior knowledge is required it will never be assumed in the lessons and will always be retaught. For this reason, the units could be taught in any order with a few exceptions. We would recommend that the 'Materials' unit precede the 'Building things', 'Changing materials' or 'Mixing and Making' units. We would recommend that the units 'Plants' and 'The animal kingdom' precede 'Habitats'.

The unit 'Extraordinary scientists' has been designed to teach pupils about a diverse group of scientists in a range of different fields. The message of this unit is that anyone can be a scientist! In the suggested sequence of units this has been placed in Year 2 but we would recommend including this unit in Year 1 sequencing plans too. Each lesson will be designed to be standalone, so that lessons could be taught in isolation if there is not enough time in your school's plans to include the whole unit, e.g., if teaching 'The animal kingdom' you could include the lesson on Jane Goodall from 'Extraordinary scientists' as there are strong links.



3.2 KS2 recommendations

For KS2, we have also tried to provide flexibility wherever possible. However, there are more sequencing constraints in this key stage. We acknowledge that the majority of schools would normally be following the national curriculum but that curriculum plans for this year may look different to previous years due to potential missed content in 2019-20. As an example, the 'Plants' unit would align with Year 3 on the national curriculum, but it might be more appropriate for some schools in 2020-21 to teach this in Year 4 if they think these pupils may have missed out on this learning in 2019-20. We understand that each school's science curriculum needs could be quite unique this year and so we have designed units that could be used for multiple year groups. Wherever possible we have tried to assume no prior knowledge but in units where this is not possible (see table in section 2 which details where prior knowledge is required) we will ensure that this knowledge is retaught. The suggested sequence in the table below is just one of many options that schools could consider.

KS2 sequencing suggestions:

- We would advise that the 'States of matter' unit be taught before 'separating mixtures', 'Physical and chemical changes' and 'Particles in physical and chemical changes'.
- We have suggested 'Rock cycle' is taught in Year 4 after the 'States of matter' as there are lots of references to changes of state in this unit.
- We would advise that 'Light & dark' and 'Forces' be taught before 'Space'.
- We would advise that 'Plants' is taught before 'Ecosystems' and 'Adaptations'.



- 'Notable scientists' could be taught in any year group. This unit has been designed to teach children about a diverse group of scientists in a range of different fields. In the suggested sequence of units this has been placed in Year 3 but we would recommend including this unit in all year groups. Each lesson will be designed to be standalone so that lessons could be taught in isolation if there is not enough time in your school's plans to include the whole unit. For example, if teaching the unit 'Space', then the lesson on Katharine Johnson from the 'notable scientists' unit could be taught in conjunction as there are many links.
- 'History of Science' is a unit that could be placed flexibly but it covers ideas taught in 'Space', 'Raw and synthetic materials', 'Electricity' and 'Human anatomy'. While the lessons will be accessible without the knowledge from these units, it would be better suited for UKS2 as it will provide knowledge from these units to be consolidated.
- The 'Electrical circuits' unit is in Year 4 but can also be used for Year 6 as it includes all of the statutory requirements of electricity on the Year 6 national curriculum.
- The 'Practical skills' unit could be taught in any year group. It goes through each stage of conducting a scientific investigation and writing a report of the investigation. Each lesson from this unit could also be taught in isolation and included in curriculum plans to suit the needs of your pupils. For example, the lesson on writing a method could be taught as a refresher if this is a skill you think your pupils need more practise on. Or the lesson on scientific conclusions could be taught before undergoing an investigation in a different unit or topic.



3.3 Suggested year group map

Year	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
1	Materials	Building things	Animal kingdom	Plants	Seasons and change	Sound
2	Changing materials	Mixing and making	Human lifestyle	Habitats	Space	Extraordinary scientists
3	Practical skills	Raw and synthetic materials	Plants	Adaptations	Light & dark	Magnetism
4	States of matter	Rocks	Human anatomy	Eco-systems	Electrical circuits	Sound
5	Separating mixtures	Physical and chemical changes	Reproductive cycles	Notable scientists	Forces	Space
6	Particles in physical and chemical changes	Sustainability	Humans and animals over time	Diet and lifestyle	Light	History of science

4. Unit specifics

Materials, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What is a material? <ul style="list-style-type: none"> Identifying different materials: wood, wool, plastic, glass, metal & paper 	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials Compare and group together a variety of everyday materials on the basis of their simple physical properties.
2	Lesson question: What are objects made from? <ul style="list-style-type: none"> Identifying the materials used to make different objects 	
3	Lesson question: How can I describe a material? <ul style="list-style-type: none"> Using different properties of materials to describe them e.g. hard, soft, rough, smooth, shiny, heavy, transparent 	
4	Lesson question: Which materials float and sink? <ul style="list-style-type: none"> Predicting whether materials will float or sink based on how heavy they are Testing whether different materials float or sink 	
5	Lesson question: Which materials are waterproof? <ul style="list-style-type: none"> Testing whether materials are absorbent or waterproof 	
6	Lesson question: Which material is best for different objects? <ul style="list-style-type: none"> Choosing the best material based on properties for different uses 	



Building things, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: Which materials are waterproof? <ul style="list-style-type: none"> Deciding the best material to build with based on waterproofness 	<ul style="list-style-type: none"> Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Describe the simple physical properties of a variety of everyday materials
2	Lesson question: What material could I use to build a wall? <ul style="list-style-type: none"> Designing a wall Planning an experiment to test waterproofness 	
3	Lesson question: Is the wall I've built waterproof? <ul style="list-style-type: none"> Building a wall and testing the waterproofness 	
4	Lesson question: Which materials can withstand strong winds? <ul style="list-style-type: none"> Designing a wall Planning an experiment to test ability to withstand strong wind 	
5	Lesson question: Will the wall I've built withstand strong winds? <ul style="list-style-type: none"> Building a wall and testing the strength 	
6	Lesson question: What is a mixture? <ul style="list-style-type: none"> Learning about combining/mixing materials to make stronger materials 	



The animal kingdom, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What is a living thing? <ul style="list-style-type: none"> • Features of a living thing • What animals need to survive • Offspring 	<ul style="list-style-type: none"> • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals • Identify and name a variety of common animals that are carnivores, herbivores and omnivores • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) • 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)
2	Lesson question: What is the difference between an invertebrate and a vertebrate? <ul style="list-style-type: none"> • Differences between invertebrate and vertebrates • Classification keys • Grouping based on characteristics 	
3	Lesson question: Which animal families are invertebrates? <ul style="list-style-type: none"> • Characteristics of arachnids, insects and crustaceans • Exoskeletons 	
4	Lesson question: Which animal families are vertebrates? <ul style="list-style-type: none"> • Characteristics of amphibians • Characteristics of reptiles 	
5	Lesson question: What are the differences between mammals and birds? <ul style="list-style-type: none"> • Characteristics of mammals • Characteristics of birds 	
6	Lesson question: What types of food do living things eat? <ul style="list-style-type: none"> • Carnivores, omnivores and herbivores • Looking at the teeth of different animals 	



Plants, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: How do I plant a bean? <ul style="list-style-type: none"> ● Planting a bean and setting up an investigation into what plants need to survive 	<ul style="list-style-type: none"> ● Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees ● Identify and describe the basic structure of a variety of common flowering plants, including trees. ● Observe and describe how seeds and bulbs grow into mature plants ● Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
2	Lesson question: What types of plants grow in the wild? <ul style="list-style-type: none"> ● Identifying wildflowers ● Understanding importance of wildflowers 	
3	Lesson question: What is the difference between deciduous and evergreen trees? <ul style="list-style-type: none"> ● Differences between deciduous and evergreen trees ● Identifying common trees from their leaves 	
4	Lesson question: What are the parts of trees and plants called? <ul style="list-style-type: none"> ● Parts of a tree: trunk, leaves, fruit, branches, roots ● Parts of a plant: seeds, flower, buds, leaves, stem, roots 	
5	Lesson question: What changes occur in the life of a tomato plant? <ul style="list-style-type: none"> ● Stages of growth ● Planting seeds ● Root vegetables 	
6	Lesson question: What changes have occurred to my bean plant? <ul style="list-style-type: none"> ● Recording changes to bean plant including drawing a diagram and measuring with a ruler 	



Seasons and change, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What do we know about the weather? <ul style="list-style-type: none"> ● Different types of weather ● Identifying the 4 seasons based on weather ● Starting a weather log (used throughout whole unit) 	<ul style="list-style-type: none"> ● Observe changes across the four seasons ● Observe and describe weather associated with the seasons and how day length varies.
2	Lesson question: How does the weather change across seasons? <ul style="list-style-type: none"> ● Describing the weather in each season ● Temperature and how it changes 	
3	Lesson question: How do trees change across seasons? <ul style="list-style-type: none"> ● Describing trees ● Linking the months of the year to each season ● What will trees look like during different events e.g. Father's Day, Halloween 	
4	Lesson question: How can you measure rainfall? <ul style="list-style-type: none"> ● Defining a liquid ● Making a rain gauge 	
5	Lesson question: What is hibernation? <ul style="list-style-type: none"> ● What hibernation is ● Examples of animals that hibernate ● Why animals hibernate ● Where animals hibernate 	
6	Lesson question: How can we record wind direction? <ul style="list-style-type: none"> ● Ordering types of wind by strength ● Using a scale to record wind strength 	



Sounds, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What are the 5 senses? <ul style="list-style-type: none"> ● The body part associated with each sense ● Recording the sounds you can hear 	<ul style="list-style-type: none"> ● Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
2	Lesson question: What is sound? <ul style="list-style-type: none"> ● Definition of sound ● Ordering sounds from quietest to loudest 	
3	<ul style="list-style-type: none"> ● Lesson question: How do we hear? ● How we hear ● Causes of deafness ● Sign language 	
4	Lesson question: How do we look after our ears? <ul style="list-style-type: none"> ● The zones of the ear ● How to look after each zone e.g. cleaning, protecting from loud volumes 	
5	Lesson question: How can we describe the pitch of sounds? <ul style="list-style-type: none"> ● Difference between high and low pitch sounds ● Identifying high and low pitched sounds 	
6	Lesson question: How can we make and describe different sounds? <ul style="list-style-type: none"> ● Describing sounds based on volume and pitch ● Grouping sounds based on volume and pitch ● Making a range of sounds 	



Changing materials, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: Which material should I use? <ul style="list-style-type: none"> ● Common materials and their properties ● Matching materials to uses based on their properties 	<ul style="list-style-type: none"> ● 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
2	Lesson question: How can the shape of solid objects be changed? <ul style="list-style-type: none"> ● Solid objects ● Squashing, bending, twisting, stretching ● Testing different materials 	
3	Lesson question: Which fabric is the stretchiest? <ul style="list-style-type: none"> ● Testing the elasticity of different fabrics 	
4	Lesson question: Are hard materials absorbent? <ul style="list-style-type: none"> ● Testing whether a variety of materials used are absorbent 	
5	Lesson question: How do humans change raw materials? <ul style="list-style-type: none"> ● Raw vs synthetic materials (Natural vs man-made) ● Sorting materials 	
6	Lesson question: Why do we change materials? <ul style="list-style-type: none"> ● Comparing the properties of raw vs synthetic materials ● Material scientists 	



Mixing and making, KS1

Lesson number	Core content	National curriculum links
1	<ul style="list-style-type: none"> Lesson question: What are the differences between solids, liquids and gases? 	<ul style="list-style-type: none"> 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.
2	<ul style="list-style-type: none"> Lesson question: What happens when you heat a solid? 	
3	<ul style="list-style-type: none"> Lesson question: Which mixture makes the best bubbles? 	
4	<ul style="list-style-type: none"> Lesson question: What happens when I mix a solid and liquid together? Insoluble and soluble solids 	
5	<ul style="list-style-type: none"> Lesson question: How can I separate a mixture? 	
6	<ul style="list-style-type: none"> Lesson question: Are there some changes that we can't reverse? 	



Human lifestyle, KS1

Lesson number	Core content	National curriculum links
1	<ul style="list-style-type: none"> Lesson question: What are the different parts of the human body? 	<ul style="list-style-type: none"> 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.
2	<ul style="list-style-type: none"> Lesson question: Why is exercise so important? 	
3	<ul style="list-style-type: none"> Lesson question: What is a healthy diet? 	
4	<ul style="list-style-type: none"> Lesson question: How do our bodies change as we get older? 	
5	<ul style="list-style-type: none"> Lesson question: Why is it important to be hygienic? 	
6	<ul style="list-style-type: none"> Lesson question: Whose job is it to keep people healthy? 	



Habitats, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What are the characteristics of living things? <ul style="list-style-type: none"> ● Identifying living and non-living things ● Indicators of living things ● What organisms need to survive 	<ul style="list-style-type: none"> ● Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ● 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.
2	Lesson question: What is a habitat? <ul style="list-style-type: none"> ● Defining a habitat ● Simple food chains 	
3	Lesson question: What is a microhabitat? <ul style="list-style-type: none"> ● Woodland habitats ● Microhabitats in woodlands 	
4	Lesson question: What lives in a desert habitat? <ul style="list-style-type: none"> ● Conditions in a desert ● Desert animals ● Desert plants 	
5	Lesson question: What lives in a rainforest habitat? <ul style="list-style-type: none"> ● Rainforest animals ● Rainforest plants ● Conditions in a rainforest 	
6	Lesson question: Can a city be a habitat? <ul style="list-style-type: none"> ● Urban environments ● Urban animals ● Importance of green spaces 	



Space, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: What is space? <ul style="list-style-type: none"> ● Defining space ● How we learn about space ● Things found in space: planets, sun, moon, stars 	For working scientifically links see: 2. Subject structure overview
2	Lesson question: What are the planets in our solar system? <ul style="list-style-type: none"> ● Order of planets in solar system ● Facts about planets in the solar system 	
3	Lesson question: How does the Earth orbit and rotate? <ul style="list-style-type: none"> ● Earth's rotation, orbit and tilt (why we have seasons and day and night) 	
4	Lesson question: What are constellations? <ul style="list-style-type: none"> ● Stars and famous constellations ● Drawing constellations 	
5	Lesson question: When and how was space discovered? <ul style="list-style-type: none"> ● History of space discovery ● Famous astronauts 	
6	Lesson question: What kind of scientists study space? <ul style="list-style-type: none"> ● Different jobs in space 	



Extraordinary scientists, KS1

Lesson number	Core content	National curriculum links
1	Lesson question: Who is Katharine Johnson? <ul style="list-style-type: none"> ● Life story and contributions to science ● NASA 	<ul style="list-style-type: none"> ● Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene ● Links to non-statutory guidance on a range of topics
2	Lesson question: Who is Jane Goodall? <ul style="list-style-type: none"> ● Life story and contributions to science ● Animal behaviour (chimpanzees) ● Conservation 	
3	Lesson question: Who is Alan Turing? <ul style="list-style-type: none"> ● Life story and contributions to science ● Code breaking 	
4	Lesson question: Who is Louis Pasteur? <ul style="list-style-type: none"> ● Life story and contributions to science ● Vaccinations ● Microbes ● Pasteurisation of milk 	
5	Lesson question: Who is Caroline Herschel? <ul style="list-style-type: none"> ● Life story and contributions to science ● Stars and constellations 	
6	Lesson question: Who is Mae Jemison? <ul style="list-style-type: none"> ● Life story and contributions to science ● Day in the life of an astronaut 	



Practical skills, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is a variable? <ul style="list-style-type: none"> ● Define a dependent, independent and control variable ● Know how to plan a 'fair test' ● Identify the variables in a range of experiments 	<ul style="list-style-type: none"> ● Recognise that soils are made from rocks and organic matter ● For working scientifically links see: 2. Subject structure overview
2	Lesson question: How do you draw a scientific diagram? <ul style="list-style-type: none"> ● Know the difference between a diagram and an illustration ● Identify good scientific diagrams ● Draw a range of scientific diagrams 	
3	Lesson question: Why is a method important? <ul style="list-style-type: none"> ● Can identify a good method ● Can follow the instructions in a method ● Can write a method for an investigation 	
4	Lesson question: What can we do with the data we collect? <ul style="list-style-type: none"> ● Describe how to collect results ● Can draw a results table ● Know how to present results 	
5	Lesson question: How can we communicate our results? <ul style="list-style-type: none"> ● Know how to interpret results ● Can write a conclusion ● Know how to present a conclusion 	
6	Lesson question: How can we record an entire investigation? <ul style="list-style-type: none"> ● Can draft an investigation report ● Know how to edit an investigation report ● Can redraft an investigation report 	



Raw and synthetic materials, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is a raw material? <ul style="list-style-type: none"> ● Explain what a raw material is. ● Sort raw materials based on where they come from. ● Describe the uses of some raw materials. 	<ul style="list-style-type: none"> ● Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency
2	Lesson question: What is a synthetic material? <ul style="list-style-type: none"> ● Explain what a synthetic material is. ● Sort materials into synthetic and raw materials. ● Describe the uses of some synthetic materials. 	
3	Lesson question: How are synthetic materials made from raw materials? <ul style="list-style-type: none"> ● Explain that raw materials change properties when made into synthetic materials. ● Describe how glass is made from sand. ● Describe how the properties of sand change to the properties of glass. 	
4	Lesson question: How is paper made? <ul style="list-style-type: none"> ● Describe how paper is made from wood. ● Describe a range of uses of paper. ● Explain why it is a good thing to recycle paper. 	
5	Lesson question: What is recycling and why is it important? <ul style="list-style-type: none"> ● Describe what the process of recycling involves. ● Explain making synthetic materials takes energy. ● Explain the negative impact of using raw materials. 	
6	Lesson question: What does it mean to live sustainably? <ul style="list-style-type: none"> ● State what sustainably means. ● Describe ways to live sustainably. ● Explain some difficulties with living sustainably. 	



Light & dark, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is light? <ul style="list-style-type: none"> • Definitions of light and dark • Identifying different light sources 	<ul style="list-style-type: none"> • Recognise that they need light in order to see things and that dark is the absence of light • Notice that light is reflected from surfaces • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes • Recognise that shadows are formed when the light from a light source is blocked by an opaque object • Find patterns in the way that the size of shadows change.
2	Lesson question: How can we see objects? <ul style="list-style-type: none"> • Steps for how we see 	
3	Lesson question: What is the difference between night and day? <ul style="list-style-type: none"> • Earth rotating on an axis • How position of sun and Earth create night and day 	
4	Lesson question: Which materials are reflective? <ul style="list-style-type: none"> • What happens to light when it's reflected • Differences between reflective and non-reflective materials • Testing/sorting reflective and non-reflective materials 	
5	Lesson question: How are shadows formed? <ul style="list-style-type: none"> • Transparent vs opaque objects • Making shadows 	
6	Lesson question: How can you change the size of a shadow? <ul style="list-style-type: none"> • Making a shadow puppet theatre • Exploring how to change the size of a shadow by moving it further from/closer to the light source 	



Sound, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is sound? <ul style="list-style-type: none"> ● Describe what sound waves are ● Describe how we see sounds ● Explain how we can stop sound 	<ul style="list-style-type: none"> ● 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.
2	Lesson question: How are different sounds produced? <ul style="list-style-type: none"> ● Describe how sounds are produced ● Describe ways that different sounds can be made ● Make your own instrument 	
3	Lesson question: What are pitch and frequency? <ul style="list-style-type: none"> ● Describe what the pitch of a sound is ● Describe ways to change the pitch of a sound ● Give example of objects that produce high and low pitch sounds 	
4	Lesson question: What do we mean by amplitude of sound? <ul style="list-style-type: none"> ● Describe what we mean by the amplitude of sound ● Describe how to change the amplitude of a sound ● Give examples of high amplitude and low amplitude sound 	
5	Lesson question: How do scientists design objects that use sound? <ul style="list-style-type: none"> ● Explain what the science of acoustics involves ● Describe how scientists dampen noise that is not wanted ● Describe how engineers build venues to improve sound quality 	
6	Lesson question: What are some of the uses of sound? <ul style="list-style-type: none"> ● Explain how a string telephone works ● Describe how loudspeakers and microphones work 	



Forces, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are forces? <ul style="list-style-type: none"> ● Define a force ● Know the effect forces can have on an object ● Can name the forces acting on a range of objects 	<ul style="list-style-type: none"> ● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object ● Identify the effects of air resistance, water resistance and friction, that act between moving surfaces ● Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
2	Lesson question: How can we measure the size of forces? <ul style="list-style-type: none"> ● Describe what Newton discovered about forces ● Explain what a Newtonmeter and what it does ● Describe how to measure the size of a range of forces 	
3	Lesson question: What are contact forces? <ul style="list-style-type: none"> ● Define contact forces ● Explain what causes a range of contact forces ● Describe ways of changing the size of a frictional force 	
4	Lesson question: What are non-contact forces? <ul style="list-style-type: none"> ● Define non-contact forces ● Describe the cause and effect of gravitational forces ● Describe how a magnetic force may lead to attraction or repulsion 	
5	Lesson question: What factors affect an object's ability to float? <ul style="list-style-type: none"> ● Describe the forces acting on an object that floats in water ● Explain why the forces acting on an object may lead to it floating or sinking ● Describe features of an object that enable it to float 	
6	Lesson question: What impact do gears, levers and pulleys have on forces? <ul style="list-style-type: none"> ● Describe what gears, levers and pulleys are ● Explain why gears, levers and pulleys are helpful ● Describe applications of gears, levers and pulleys 	



Plants, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What conditions could we change to investigate the growth of a plant? <ul style="list-style-type: none"> ● The 3 main types of variables ● What a plant needs to survive ● How to plan an investigation into the factors that affect plant growth 	<ul style="list-style-type: none"> ● Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers ● Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant ● Investigate the way in which water is transported within plants ● Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
2	Lesson question: What happens to a plant's growth if we change the conditions it is in? <ul style="list-style-type: none"> ● The main parts and functions of a plant ● How to draw a scientific diagram ● How to write a conclusion for an investigation 	
3	Lesson question: What happens to a plant's growth if we change the conditions it is in? <ul style="list-style-type: none"> ● The main parts of a flower ● The functions of each of the main parts of a flower ● How to identify the parts on a real flower 	
4	Lesson question: What are the parts of a plant's life cycle? <ul style="list-style-type: none"> ● The parts of a flowering plant's life cycle ● The conditions required for germination ● Three ways in which seed dispersal takes place 	
5	Lesson question: How does a plant transport water? <ul style="list-style-type: none"> ● Describe what transpiration is ● The three main steps of water transport in plants ● How to prove that water moves up a plants stem 	
6	Lesson question: How do plants adapt to different conditions? <ul style="list-style-type: none"> ● What a plant adaptation is ● How plants adapt to extreme hot and cold ● How plants adapt to attract animals or keep them away 	



Ecosystems, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is an ecosystem? <ul style="list-style-type: none"> Defining a habitat and ecosystem Different components in ecosystems 	<ul style="list-style-type: none"> Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat Recognise that living things can be grouped in a variety of ways Recognise that environments can change and that this can sometimes pose dangers to living things. Construct and interpret a variety of food chains, identifying producers, predators and prey
2	Lesson question: How do we classify the diets of animals? <ul style="list-style-type: none"> Carnivores, omnivores and herbivores 	
3	Lesson question: Why are producers so important? <ul style="list-style-type: none"> How plants make their own food and why they are important 	
4	Lesson question: How do we construct a food chain? <ul style="list-style-type: none"> Labelling and constructing food chains Showing energy transfer between organisms 	
5	Lesson question: How do we construct a food web? <ul style="list-style-type: none"> Showing energy transfer on food webs Drawing a food web 	
6	Lesson question: What can cause disruptions to food webs? <ul style="list-style-type: none"> How removing one organism can have knock-on effects Disruptions to food webs e.g. pesticides, deforestation, hunting 	



States of matter, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: What are the properties of solids, liquids and gases?</p> <ul style="list-style-type: none"> Describe what is meant by the property of a substance Name the properties of solids, liquids and gases Explain which state of matter a substance is in based on its properties 	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature
2	<p>Lesson question: How do particles behave inside of solids, liquids and gases?</p> <ul style="list-style-type: none"> Describe what a particle is Describe how particles are arranged in solids, liquids and gases Explain how we know particles in liquids and gases are moving 	
3	<p>Lesson question: What happens when you heat or cool each state of matter?</p> <ul style="list-style-type: none"> Describe what happens to particles when a substance is heated or cooled Predict what happens to a solid, liquid or gas when it is heated or cooled Give the evidence to show that each state expands when heated and contracts when cooled 	
4	<p>Lesson question: What are changes of state and why do they take place?</p> <ul style="list-style-type: none"> Describe what happens to the arrangement of particles when a substance changes state Name each of the changes of state Give an example of each change in state 	
5	<p>Lesson question: How can we measure the melting points and boiling points of a substance?</p> <ul style="list-style-type: none"> Describe what is meant by melting point and boiling point 	



	<ul style="list-style-type: none"> • Describe how it is possible to measure the melting point and boiling point of a substance • Suggest which state of a matter a substance will be in given its temperature 	
6	<p>Lesson question: Which substances do not fit into one state of matter?</p> <ul style="list-style-type: none"> • Give examples of substances that do not show typical properties of any state of matter • Explain how some not show typical properties of one state of matter • Describe what a non-Newtonian fluid is 	

Rocks, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: How is igneous rock formed? <ul style="list-style-type: none"> ● Describe how igneous rock is created ● Explain what intrusive and extrusive igneous rocks are ● Know how to classify different types of igneous rock 	<ul style="list-style-type: none"> ● Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ● Describe in simple terms how fossils are formed when things that have lived are trapped within rock ● Recognise that soils are made from rocks and organic matter. ● Explore and use classification keys to help group, identify and name
2	Lesson question: How is metamorphic rock formed? <ul style="list-style-type: none"> ● Describe what metamorphosis is ● Describe how metamorphic rock is formed ● Give the properties and uses of different metamorphic rock 	
3	Lesson question: How is sedimentary rock formed? <ul style="list-style-type: none"> ● Describe how sedimentary rock is formed ● Describe how fossils are formed ● Explain how we can tell the age of a sedimentary rock ● Mary Anning 	
4	Lesson question: How can we identify and classify different types of rock? <ul style="list-style-type: none"> ● Describe what a geologist is ● Describe how geologists classify rocks ● Draw an identification key 	
5	Lesson question: How do the rocks on our Earth's surface change? <ul style="list-style-type: none"> ● Describe the effect that water can have on rocks ● Describe what chemical weathering is and what it does ● Explain how large earth movements can cause rocks to change 	
6	Lesson question: What are the steps in the rock cycle? <ul style="list-style-type: none"> ● Understand how the processes in the rock cycle fit together ● Know how to correctly order the processes in the rock cycle 	



Light, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: What is light and where does it come from?</p> <ul style="list-style-type: none"> • Definitions of light and dark • Different light sources • Testing transparent, translucent and opaque materials 	<ul style="list-style-type: none"> • Recognise that they need light in order to see things and that dark is the absence of light • Notice that light is reflected from surfaces • Recognise that light from the sun can be dangerous and that there are ways to protect their eyes • Recognise that shadows are formed when the light from a light source is blocked by an opaque object • Find patterns in the way that the size of shadows change. • 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.
2	<p>Lesson question: What is reflection and how can we use it?</p> <ul style="list-style-type: none"> • What happens to light when it is reflected • Different types of reflection • Different uses of reflection 	
3	<p>Lesson question: What is refraction and how can we use it?</p> <ul style="list-style-type: none"> • What happens to light when it refracts • Identifying whether reflection or refraction has taken place 	
4	<p>Lesson question: How do we see light?</p> <ul style="list-style-type: none"> • Parts of the eye • How glasses work 	
5	<p>Lesson question: Where do different colours come from?</p> <ul style="list-style-type: none"> • How white light is split into different colours • Primary and secondary colours of light • How a rainbow is made 	
6	<p>Lesson question: What are some uses of light?</p> <ul style="list-style-type: none"> • Building a shadow puppet theatre • How a periscope works • How different types of lenses work 	



Space, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are solar and lunar eclipses? <ul style="list-style-type: none"> ● Describe how the Moon, Earth and Sun move around each other ● Describe what happens during a lunar eclipse ● Describe what happens during a solar eclipse 	<ul style="list-style-type: none"> ● Describe the movement of the Earth, and other planets, relative to the Sun in the solar system ● Describe the movement of the Moon relative to the Earth ● Describe the Sun, Earth and Moon as approximately spherical bodies ● Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.
2	Lesson question: What is the solar system? <ul style="list-style-type: none"> ● Explain what the solar system is ● Name the parts of the solar system ● Explain the difference between comets, meteors and meteorites 	
3	Lesson question: How do the planets in the solar system differ? <ul style="list-style-type: none"> ● Can name the planets of the solar system in order ● Describe the difference between the inner and outer planets ● Explain why Pluto is no longer considered a planet 	
4	Lesson question: What are stars and star constellations? <ul style="list-style-type: none"> ● Explain what stars are ● Describe some types of stars ● Explain what star constellations are 	
5	Lesson question: What is the universe and what is it made from? <ul style="list-style-type: none"> ● Describe what we mean by the universe ● Explain what a galaxy is ● Describe what the Milky Way is 	
6	Lesson question: What do astronomers do? <ul style="list-style-type: none"> ● Describe what the work of an astronomer is ● Name famous astronomers and what they discovered ● Describe what astronomers are currently trying to find out about the universe 	



Adaptations, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What is an adaptation? <ul style="list-style-type: none"> ● Define an adaptation ● Understand that adaptations are not a 'choice' ● Learn a range of common adaptations e.g. camouflage 	<ul style="list-style-type: none"> ● Identify how animals and plants are adapted to suit their environment in different ways and that adaptation ● 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 ● Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
2	Lesson question: How are organisms adapted to hot environments? <ul style="list-style-type: none"> ● Describe the conditions of hot and dry environments ● Adaptations of desert animals ● Adaptations of desert plants 	
3	Lesson question: How are organisms adapted to cold environments? <ul style="list-style-type: none"> ● Describe the conditions of cold environments ● Common adaptations of animals to cold environments e.g. insulation ● Make comparisons between organisms from different cold environments 	
4	Lesson question: What adaptations do nocturnal animals have? <ul style="list-style-type: none"> ● Describe the conditions of night time environments ● Compare the eyes of nocturnal and diurnal animals ● How echolocation works 	
5	Lesson question: How are organisms adapted to live underwater? <ul style="list-style-type: none"> ● Describe the conditions of underwater environments ● Common adaptations of fish ● Common adaptations of marine mammals 	
6	Lesson question: How do adaptations compare across different environments? <ul style="list-style-type: none"> ● Comparison of the adaptations and animals learn about over the unit ● Classification keys 	



Human anatomy, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are organs and why do we need them? <ul style="list-style-type: none"> ● Can label major organs in human body ● Describe the functions of the major human organs ● Explain why organ donation is so important 	<ul style="list-style-type: none"> ● Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat ● Identify that humans and some other animals have skeletons and muscles for support, protection and movement. ● Describe the simple functions of the basic parts of the digestive system in humans ● Identify the different types of teeth in humans and their simple functions ● Describe the changes as humans develop to old age.
2	Lesson question: What are the major bones in the human body? <ul style="list-style-type: none"> ● Can label the human skeleton ● Describe the functions of the skeleton ● Describe the difference between an endoskeleton and an exoskeleton 	
3	Lesson question: How does human anatomy compare to other animals? <ul style="list-style-type: none"> ● Describe variation within the animal kingdom ● Compare the human skeleton to other animals ● Compare human organs to other animals 	
4	Lesson question: Are all teeth the same? <ul style="list-style-type: none"> ● Compare the teeth of different animals ● Identify the types of human teeth ● Describe the function of different types of teeth 	
5	Lesson question: How is oxygen transported around our bodies? <ul style="list-style-type: none"> ● Explain why we need oxygen ● Give the components of the circulatory system ● Describe how the circulatory system works 	
6	Lesson question: How do humans digest food? <ul style="list-style-type: none"> ● Can label the major components of the digestive system ● Describe the function of the different parts of the digestive system ● Describe the journey food takes through our digestive system 	



Separating mixtures, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What makes something pure? <ul style="list-style-type: none"> ● Describe what a pure substance is ● Give examples of some pure substances ● Explain how we can tell if something is pure or not 	<ul style="list-style-type: none"> ● 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
2	Lesson question: What makes something a mixture? <ul style="list-style-type: none"> ● Know what a mixture is ● Give examples of mixtures of substances from the same state ● Describe examples of mixtures with substances in different states 	
3	Lesson question: What is a formulation? <ul style="list-style-type: none"> ● Describe what a formulation is ● Explain why formulations are useful ● Give examples of formulations 	
4	Lesson question: How can we separate mixtures into pure substances? <ul style="list-style-type: none"> ● Describe how to remove large solid particles from a mixture ● Describe how to remove insoluble substances from a mixture ● Describe how to remove soluble substances from a mixture 	
5	Lesson question: How can you separate a mixture of sand, salt and water? <ul style="list-style-type: none"> ● Define solution, solute, solvent, soluble and insoluble ● Describe how to use filtration to separate some mixtures ● Describe how you can use evaporation to separate some mixtures 	
6	Lesson question: How can we separate river water into separate parts? <ul style="list-style-type: none"> ● Carry out separation of substances in river water ● Evaluate how the method for separating substances in river water ● Suggest how an environmental scientist could check the water quality in a river 	



Physical and chemical changes, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What happens during a state change? <ul style="list-style-type: none"> ● Describe how particles are arranged in solids, liquids and gases ● Explain what happens to particles in substances that change state ● Identify phase changes present in a range of examples 	<ul style="list-style-type: none"> ● 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 ● 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.
2	Lesson question: What is a physical change and how can we identify it? <ul style="list-style-type: none"> ● Know what a physical change is ● Describe signs that a physical change has taken place ● Give examples of physical changes 	
3	Lesson question: What is a chemical change and how can we identify it? <ul style="list-style-type: none"> ● Know what a chemical change is ● Describe signs that a chemical change has taken place ● Give examples of chemical changes 	
4	Lesson question: How do physical and chemical changes compare? <ul style="list-style-type: none"> ● Describe the similarities and differences between physical and chemical changes ● Identify whether a physical or chemical change has taken place ● Suggest when a physical or chemical change may be useful 	
5	Lesson question: What can we do to investigate chemical reactions? <ul style="list-style-type: none"> ● Explain how to tell which reaction is larger ● Describe what the variables will be in a acids-metals investigation ● Give a method for investigating a reaction between acids and metals 	
6	Lesson question: What happens when we place metals into acid? <ul style="list-style-type: none"> ● Can complete an investigation into acid and metal reactions ● Can use evidence to make a conclusion ● Know how to compare your results with other sets of results 	



Magnetism, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are non-contact forces? <ul style="list-style-type: none"> ● What are forces? ● What are contact and non-contact forces? ● Name contact and non-contact forces 	<ul style="list-style-type: none"> ● Compare how things move on different surfaces ● Notice that some forces need contact between two objects, but magnetic forces can act at a distance ● Observe how magnets attract or repel each other and attract some materials and not others ● Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials ● Describe magnets as having two poles ● Predict whether two magnets will attract or repel each other, depending on which poles are facing.
2	Lesson question: What are magnets? <ul style="list-style-type: none"> ● Know what magnets are ● Describe when magnets attract and repel ● Describe how to test the strength of a magnet 	
3	Lesson question: How does a compass work? <ul style="list-style-type: none"> ● Explain what a compass is ● Describe what a compass does ● Describe how to make a compass 	
4	Lesson question: How can we see a magnetic field? <ul style="list-style-type: none"> ● Describe how field lines help us to understand the effect of an invisible force ● Describe how field lines around a magnet can be mapped out ● Use a diagram of field lines to see where the force will be strongest and where it will be weakest 	
5	Lesson question: How can we tell if a material is magnetic or not? <ul style="list-style-type: none"> ● Describe how to find out if a material is magnetic or not ● State the difference between permanent magnets and temporary magnets ● Name examples of magnetic and non-magnetic materials 	
6	Lesson question: What are some uses of magnetic materials? <ul style="list-style-type: none"> ● State what an electromagnet is ● Describe how to make an electromagnet ● Give examples of uses of magnets and electromagnets 	



Electrical circuits, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: What is static electricity?</p> <ul style="list-style-type: none"> Describe what static charge is Describe how to create a build up of static charge Explain how a build up of charge leads to sparks through the air 	<ul style="list-style-type: none"> Identify common appliances that run on electricity Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit Recognise some common conductors and insulators, and associate metals with being good conductors. 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
2	<p>Lesson question: What are the parts of an electrical circuit?</p> <ul style="list-style-type: none"> Describe the parts of an electrical circuit Explain how electricity in a circuit is different to static electricity State the conditions for electricity to flow in a circuit 	
3	<p>Lesson question: How can we build basic circuits?</p> <ul style="list-style-type: none"> Explain what a circuit diagram is Identify the component from the circuit symbols provided Can build a basic circuit from the circuit diagram provided 	
4	<p>Lesson question: What are electrical insulators and conductors?</p> <ul style="list-style-type: none"> Describe what electrical insulators and conductors are Give examples of electrical insulators and conductors Describe how to test whether a material is an insulator or a conductor 	
5	<p>Lesson question: What happens in a circuit when we change the components?</p> <ul style="list-style-type: none"> Can write a prediction for what will happen when we change the components in a circuit Carry out an investigation to test your prediction Evaluate whether your prediction was correct or not using your results 	
6	<p>Lesson question: How much do we rely on electricity?</p> <ul style="list-style-type: none"> Create a circuit with a buzzer that can be turned on and off Design a game that uses the buzzer 	



	<ul style="list-style-type: none">• Create the buzzer game that has been designed	<p>brightness of bulbs, the loudness of buzzers and the on/off position of switches</p> <ul style="list-style-type: none">• Use recognised symbols when representing a simple circuit in a diagram.
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Notable scientists, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: Who is Katharine Johnson? <ul style="list-style-type: none"> ● Katharine Johnson's life story and contributions to science ● Trajectories of flight ● NASA 	<ul style="list-style-type: none"> ● Identify how sounds are made, associating some of them with something vibrating ● Identify common appliances that run on electricity ● Recognise that environments can change and that this can sometimes pose dangers to living things. ● Recognise that soils are made from rocks and organic matter. ● 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 ● Links to non-statutory guidance on a range of topics
2	Lesson question: Who is Alexander Graham Bell? <ul style="list-style-type: none"> ● Life story and contributions to science ● Invention of the telephone ● Deafness ● Patents 	
3	Lesson question: Who is Rachel Carson? <ul style="list-style-type: none"> ● Life story and contributions to science ● Pesticides ● Writing a letter about an environmental cause 	
4	Lesson question: Who is George Washington Carver? <ul style="list-style-type: none"> ● Life story and contributions to science ● Crop rotation ● Soil chemistry ● importance of agriculture 	
5	Lesson question: Who is Stephen Hawking? <ul style="list-style-type: none"> ● Life story and contributions to science ● The big bang ● Black holes 	
6	Lesson question: Who is Marie Curie? <ul style="list-style-type: none"> ● Life story and contributions to science ● Nobel prize ● Radioactivity 	



Reproductive cycles, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: How can we classify different things?</p> <ul style="list-style-type: none"> • Can label parts of a flower • Describe stages of the life cycle of a flower plant • Describe different methods of pollination and seed dispersal 	<ul style="list-style-type: none"> • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • Describe the life process of reproduction in some plants and animals. • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics
2	<p>Lesson question: Why do plants have flowers?</p> <ul style="list-style-type: none"> • Know how new plants can be grown from cuttings and bulbs • Know how to take a cutting • Compare sexual and asexual reproduction in plants and talk about the advantages and disadvantages of both 	
3	<p>Lesson question: How do you clone a potato?</p> <ul style="list-style-type: none"> • Explain metamorphosis • Describe the main stages of the life cycle of an insect and an amphibian • Compare similarities and differences between the life cycles of amphibians and insects 	
4	<p>Lesson question: How does the lifecycle of an insect compare to an amphibian?</p> <ul style="list-style-type: none"> • Describe the process of sexual reproduction • Describe the life cycles of different types of mammal • Compare the life cycles of different types of mammal 	
5	<p>Lesson question: Are the life cycles of all mammals the same?</p> <ul style="list-style-type: none"> • Identify the stages of a bird's life cycle • Can label the parts of an egg • Describe how some birds attract a mate 	
6	<p>Lesson question: Why do birds lay eggs?</p> <ul style="list-style-type: none"> • Describe the differences in the life cycles of different animals • Explain the differences between the life cycles of different animals • Know how to report and present scientific findings 	



Particles in physical and chemical changes, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: How do particles in solids, liquids and gasses behave?</p> <ul style="list-style-type: none"> ● Draw particle diagrams to represent states of matter ● Name the physical changes that convert substances between states of matter ● Describe the physical properties of solids, liquids and gases 	<ul style="list-style-type: none"> ● 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
2	<p>Lesson question: What do the particles in pure substances and mixtures look like?</p> <ul style="list-style-type: none"> ● Define pure, impure and mixture ● Draw particle diagrams to represent pure and impure materials ● Give examples of useful mixtures 	
3	<p>Lesson question: What happens to particles during dissolving?</p> <ul style="list-style-type: none"> ● Define solvent, solute and solution ● Draw particle diagrams to represent a solution ● Describe what happens to particles during dissolving 	
4	<p>Lesson question: How can mixtures be separated?</p> <ul style="list-style-type: none"> ● State three methods of separating mixtures ● Select an appropriate separation technique for a given mixture ● Plan an experiment to isolate components of a mixture 	
5	<p>Lesson question: How can we tell when a chemical reaction has taken place?</p> <ul style="list-style-type: none"> ● Define chemical reaction, physical process ● State the 5 indicators of a chemical reaction ● Identify examples of chemical reaction and physical changes 	
6	<p>Lesson question: What happens to particles during burning?</p> <ul style="list-style-type: none"> ● Define the words combustion, fuel, reactant and product ● Write a word equation for the combustion of common fuels ● Compare different fuels using experimental data 	



Sustainability, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are everyday materials made from? <ul style="list-style-type: none"> ● Describe the properties of glass, ceramics and plastics ● Describe how glass, ceramics and plastics are made ● Explain what happens to glass, ceramics and plastics in landfill sites 	<ul style="list-style-type: none"> ● Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic ● Explain that some changes result in the formation of new materials
2	Lesson question: Why is recycling important? <ul style="list-style-type: none"> ● Know the definition of recycling ● Describe how to identify plastics that can and can't be recycled ● Explain why recycling plastic is important for the environment 	
3	Lesson question: What is a life cycle assessment? <ul style="list-style-type: none"> ● Give the definition of a life cycle assessment ● Know how to use data to make a life cycle assessment ● Compare reusable and one-use plastic bags over their lifetime 	
4	Lesson question: What happens when fuels are burnt? <ul style="list-style-type: none"> ● Define what is meant by a fuel and combustion ● Represent combustion reaction using word equations ● Describe the impact of burning fuels on the environment 	
5	Lesson question: What is global warming? <ul style="list-style-type: none"> ● Describe what global warming is ● Describe the evidence for global warming ● Describe what scientists think are the causes of global warming 	
6	Lesson question: What is climate change? <ul style="list-style-type: none"> ● Describe what climate change is ● Describe the effects of climate change ● Suggest how humans can reduce their impact on climate change 	

History of science, KS2

Lesson number	Core content	National curriculum links
1	<ul style="list-style-type: none">Lesson question: How has human use of materials changed over time?	<ul style="list-style-type: none">Links to non-statutory guidance on a range of topics
2	<ul style="list-style-type: none">Lesson question: How did our understanding and use of electricity develop?	
3	<ul style="list-style-type: none">Lesson question: How has our understanding of the human body changed over time?	
4	<ul style="list-style-type: none">Lesson question: How has the discovery of DNA changed science?	
5	<ul style="list-style-type: none">Lesson question: What is the history of space discovery?	
6	<ul style="list-style-type: none">Lesson question: How have our ideas about the universe changed over time?	



Humans and animals over time, KS2

Lesson number	Core content	National curriculum links
1	<p>Lesson question: What is the theory of evolution?</p> <ul style="list-style-type: none"> • How random changes in characteristics lead to an advantage in an organism • How the survival of these organisms leads to evolution • How Charles Darwin came up with the theory of evolution 	<ul style="list-style-type: none"> • Describe in simple terms how fossils are formed when things that have lived are trapped within rock • Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • Give reasons for classifying plants and animals based on specific characteristics. • 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
2	<p>Lesson question: How do fossils provide evidence for evolution?</p> <ul style="list-style-type: none"> • What a fossil is and how it is made • What fossils show us about changes in species over time • Why fossils do not give us a complete record of past organisms 	
3	<p>Lesson question: How have different animal kingdoms developed over time?</p> <ul style="list-style-type: none"> • The name of each of the animal kingdoms • The key traits of each animal kingdom • How the evolutionary tree shows us how animal kingdoms are related 	
4	<p>Lesson question: Which types of organisms have lived over each era of time?</p> <ul style="list-style-type: none"> • The names of the main periods of time • Which groups of organisms existed in each period • The reasons why some organisms became extinct 	
5	<p>Lesson question: What impact have humans had on organisms over time?</p> <ul style="list-style-type: none"> • Know the key stages in the development of homo sapiens • Describe the impact of homo sapiens on plants • Describe the impact of homo sapiens on animals 	
6	<p>Lesson question: What is the likely impact of humans on organisms in the future?</p>	



	<ul style="list-style-type: none">• Describe the decline in numbers of species over the last 200 years• Describe the impact of homo sapiens hunting animals and cutting down forest• Know what a conservationist is and what they are trying to do	and that adaptation may lead to evolution
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Diet and lifestyle, KS2

Lesson number	Core content	National curriculum links
1	Lesson question: What are the key parts of a healthy diet? <ul style="list-style-type: none"> ● Describe the key parts of a healthy diet ● Describe the effect of each food group ● Give examples of nutritional deficiencies 	<ul style="list-style-type: none"> ● 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. ● Describe the changes as humans develop to old age
2	Lesson question: What are the key parts of a healthy diet? <ul style="list-style-type: none"> ● Describe what is meant by different lifestyles ● Explain why different people may need different diets ● Design a diet for two people with different lifestyles 	
3	Lesson question: What effect does exercise have on the muscles? <ul style="list-style-type: none"> ● Describe how muscles enable movement ● Describe what happens to muscles during exercise ● Explain how muscles may change over time due to exercise 	
4	Lesson question: What happens to the circulatory system during exercise? <ul style="list-style-type: none"> ● Describe the parts of the circulatory system ● Describe the changes that will occur during exercise ● Describe how an athlete's body will respond differently to exercise 	
5	Lesson question: What are medicinal drugs? <ul style="list-style-type: none"> ● Describe what is meant by medicinal drugs ● Give some examples of common medicinal drugs ● Describe how medicinal drugs may affect the body 	
6	Lesson question: What are nicotine and alcohol? <ul style="list-style-type: none"> ● Describe what nicotine and alcohol are ● Explain how nicotine and alcohol came to be used by humans ● Describe some effects of using nicotine and alcohol to excess 	

