

Singleton Church of England Primary School

Science Overview

"Passion for LearningPassion for life"

Governors and school leaders facilitate a reflective and ambitious culture. Constructive challenge and creative ideas are encouraged, valued and used to inform whole school planning. The views of learners, parents, staff, governors, therapists, social workers and other stakeholders inform the evaluation of the quality of our work and provision, which in turn is used to identify areas for improvement.



Curriculum Overview

Intent

The aim of our curriculum is linked to our vision

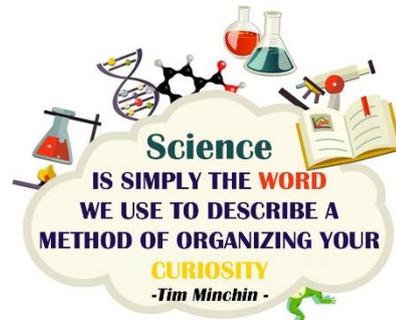
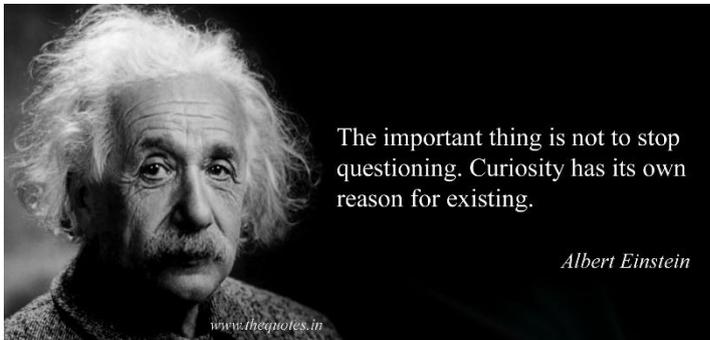
School Vision

To provide the children with a wide variety of engaging and challenging opportunities enabling them to live life to the full. Developing a growth mind-set, believing that with God everything is possible. To show, love, trust, wisdom and respect, becoming exemplary role models in our community and the wider world.

The rationale behind this is...

At Singleton Church of England School, we believe that every child must be provided with opportunities to develop socially, emotionally, academically and physically to achieve the highest possible standards. The sky is the limit for our children. We seek to inspire each other and learn to value greatness, ambition and achievement of all kinds. To belong to Singleton School is an honour. Each of us aspires to reach a potential, which is not limited, but is given wings through the creative curriculum and our Christian Values, which will truly enable us to embrace living our lives without limits.

As such, there is high academic / vocational / technical ambition for all pupils, and as a school, we do not offer disadvantaged pupils or pupils with SEND a reduced curriculum.



Singleton C of E Primary School is an exciting and innovative Church of England School committed to providing the highest standard of education for every pupil. We share, with parents, the responsibility for teaching our children and preparing them for the future. It is a place where children really matter and every individual's ability is recognised, developed and rewarded. We embrace every child's learning journey and encourage them to be the best they can be. Our mission statement is at the very heart of this.

'Passion for learning, Passion for life'

At Singleton C of E School, we believe Science is a vital part of the education for all children and that scientific knowledge and understanding is an essential skill for life. We are committed to delivering engaging and thought-provoking science lessons and experiences for our pupils- and we have planned and implemented a bespoke science curriculum that aims to provoke pupils' curiosity and offers opportunities to develop their observational, questioning and reasoning skills- whilst increasing their appreciation, knowledge and understanding of the world around them in the hope of stimulating a lifelong interest in science¹

EYFS

Our children will leave the Foundation Stage at Singleton CE Primary School with an increased knowledge and sense of the physical world around them, their community and the wider world. They will respect the world around them and others, celebrating our similarities and differences, including our religious and cultural differences. Our pupils will have a greater sense of themselves and the changing environment.

Y1 - 6

To support with teacher workload / work life balance we use a scheme of work called Rising Stars 'Switched on Science'

- Rising Stars 'Switched on Science' provides a Science Curriculum that is ambitious and designed for all pupils.
- It provides access to all subject knowledge and working scientifically objectives in a range of contexts to support the embedding of these concepts and skills. It has the same challenging academic ambitions for all pupils.
- Rising Stars 'Switched on Science' is a complete curriculum programme for primary science which provides 6 units of work per year group to cover all key aspects of the National Curriculum of study for Biology, Chemistry and Physics. It offers complete coverage of the Programme of Study for Science (updated 6 May 2015) and the criteria of the new Ofsted Education Inspection Framework (2019).
- From starting points suitable for all, pupils are engaged in asking questions and using one of the five science enquiry activities: observation over time; fair or comparative tests; identification and classification; research and pattern seeking. All activities have been planned so that they are relevant to the learning outcomes and pupil's experiences, ensuring that they are timely and meaningful. Where appropriate they are hands-on, ensuring that pupils engage in regular first-hand experience using a range of equipment, including ICT where suitable, to enhance and deepen learning.
- The units have key questions to encourage the use of scientific enquiry, as well as a focus on the acquisition and application of key subject knowledge, concepts, and vocabulary throughout.
- Skills, knowledge and understanding in Science progress through Year 1 to Year 6, being taught, developed and applied throughout the schemes of work. A range of opportunities are provided to enable all pupils to communicate their knowledge and understanding of the subject. Links are made within and across units to support pupils in making connections.
- As a school we recognise that we have a wealth of opportunity for outdoor learning and to take our scientific study outdoors right on our doorstep – with a wooded area and forest school within the school grounds- and an abundance of surrounding countryside- which we regularly utilise to enhance the children's learning.
- 'Switched on Science' provides a basis for exciting lessons- full of practical activities- to inspire and engage pupils and encourages wonder and active questioning- to encourage children to be active learners in their scientific knowledge acquisition and become above all active scientific 'thinkers'

The school's aim is to provide a Science Curriculum, which will enable each child to reach their full potential in learning in science. All of the children in Singleton C E School, including those with special educational needs and or disabilities, are given access to a broad, rich and deep curriculum. Singleton School recognises the importance of substance of the education with a real focus on enriching experiences that bring science to life and give scientific principles meaning in a real-world context. We believe that teaching these scientific skills provided the basis for how they will approach learning; how to formulate hypothesis based on previous scientific studies, knowledge and understanding; solve problems and make informed decisions. These skills are integral to every aspect of a pupils' education and life, from school to career and we want each and every one of our pupils to reach their full potential both in school and beyond.

Implementation

EYFS

In Foundation, children will learn about how family members lived in the past, as well as our local geographical area through our 'All About Me' topic. Children will have experience of using a range of equipment and sources (including maps) to enable them to find out and gather information which they then used to further their understanding and learning. Throughout the year, children will touch on a variety of world religions, allowing our children to further find out and understand about different celebrations within other cultures and religions. They will have had opportunities to explore, observe and find out about people, places, cultures, technology and the environment, and will take part in rich and meaningful first-hand experiences such as cooking, visiting places in the local community (e.g. church and library), as well as enjoying visitors and school trips that enhanced their learning. In Reception our

R.E. allows children to learn about Christianity and Sikhism in particular. Our children will understand the natural changes that occur throughout the year. In Reception this is through our Forest Schools sessions and 'Nature Detectives' topic.

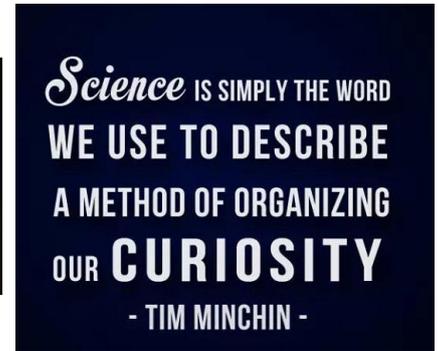
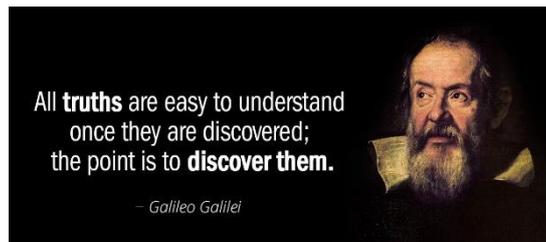
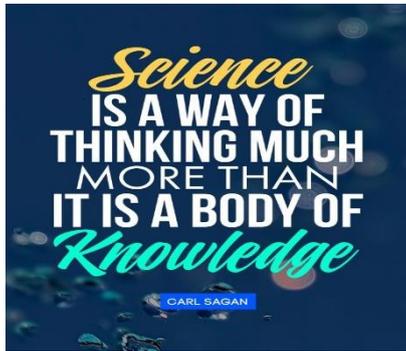
Y1-6

Implementation is how a scheme translates the objectives (intent) into activity. We recognise that everything a pupil does and thinks in science is important, so it is crucial that activities provide regular opportunities for pupils to engage in hands on practical activity as well as think about or research scientific ideas and skills.

Singleton C E Primary School views science as an area where skill building is key. Children will practise and consolidate skills and techniques each year, therefore emphasising the process involved, in turn leading to a better standard of scientific concepts in our school. Right from the beginning of school, children will be given opportunities, to develop independent thinking in relation to all aspects of scientific study (as part of the 'Understanding the World' strand of the EYFS framework) and 'science based' experiences will be presented to children through first-hand practical experience. We have used a best 'endeavours approach' to organising the curriculum for mixed year classes. In doing this we ensure topics are fully in line with the National Curriculum and that children will build and revisit, through a spiral approach, key skills within science. This is planned for and addressed on the 2-year cycle and the progression in skills grids. By the end of Key Stage 2 pupils, in conjunction with the 2014 national curriculum, we endeavour to ensure that through an exciting and rigorous curriculum that all pupils, through a quality first teach approach, are taught the essential aspects of scientific knowledge and understanding under the three disciplines of biology, chemistry and physics (see Long Term Plan- Scientific Knowledge Progression of Skills) as well as a clear focus on the Progression of Skills in relation to Scientific Enquiry (observation over time; fair and comparative tests; identifying and classifying; pattern seeking and research (See Progression of Skills in Scientific Enquiry document)

Rising Stars 'Switched on Science' is designed to be delivered by non-specialists, with core scientific knowledge identified and explained throughout.

- A breadth of teaching approaches appropriate to the content and desired learning outcomes are used to engage all pupils and enable them to not just acquire knowledge but to apply it in meaningful contexts.
- Appropriate discussion is recommended as a means of checking pupils' scientific learning systematically, identifying misconceptions and providing immediate feedback.
- Questions and tasks to stretch and challenge the most able pupils are incorporated and supplemented from other areas where appropriate.
- Revisiting ideas and concepts in different, more challenging, contexts in later units, using varied assessments and the inclusion of quizzes are all designed to help pupils remember content and integrate new knowledge into their evolving conceptual framework. We also use 'skills organisers' to really focus in on the key skills/scientific knowledge and vocabulary required for each strand which are utilised as starter/plenary prompts within lessons and as a quick 'recap and revisit' tool throughout the two-year cycle. The knowledge organisers also allow teachers to ensure the 'key' concepts (in line with the NC) are being assessed and met regardless of any pupil absences etc (especially in the light of COVID isolation etc.)
- Quality resources and materials are provided online to support the science curriculum and are sequenced towards the accumulation of skills, knowledge and understanding for pupils' futures. There is emphasis on visual literacy in the use and questioning of these resources, as well as an emphasis on **practical investigations** led by the **children's own questioning and curiosity**.



- Engaging pupils in a range of approaches to communicating science ensures that all pupils can share ideas and by listening to themselves articulate ideas, pupils engage in self-assessment, either reinforcing their learning or changing ideas and therefore moving learning on. By using different approaches to recording and communicating, all pupils can share their science, which means that teachers can access learning through assessment and use outcomes to plan next steps.
- Key scientific vocabulary for each unit is listed (with definitions) so that teachers can share with pupils the expectation that these words should be learned word mats are also provided). A pupil's ability to use scientific words appropriately is an indicator of understanding of knowledge and skills. Teachers can use a pupil's ability to use key words as part of assessment for learning, listening for how the words are used and, if necessary, asking follow-up questions to check depth of understanding. However, this requires teachers to use a range of approaches to support learning and applying scientific vocabulary in different contexts. Linking literacy approaches for teaching vocabulary in science lessons will help to embed scientific vocabulary alongside teacher expectations that pupils should use correct words when speaking and writing.
- Application of literacy and numeracy skills in science Switched on Science activities are designed to ensure that the expectations of literacy and mathematics are appropriate to each year group in science and therefore application of literacy and numeracy skills are embedded throughout. Where appropriate, links with other curriculum subjects are included in the introductory section to topics and individual activities. This includes STEM suggestions for arts related visitors, such as engineers, photographers, artists, poets to work with pupils and visits to places where science and other subjects naturally link.

Impact

EYFS

Our children will leave the Foundation Stage with a firmer understanding and respect for people and communities and the world in which they live. Pupils understand the different roles people play within our society and will know that by calling 999 they can reach the emergency services. They will be observant, describing the changes they notice around them. They will be confident to talk about their families and friends. Pupils will care about their immediate environment and know that they can have an impact on the wider world.

Y1-6

Evidence of impact in Rising Stars 'Switched on Science'

- The impact of Rising Stars 'Switched on Science' is evidenced through the pupils' use and understanding of the identified scientific vocabulary; their independent application of their scientific knowledge of key concepts and their ability to apply their scientific enquiry to be able to make further predictions and draw conclusions as appropriate. The 'Switched on Science' lessons are planned with assessment opportunities embedded as an integral part of activities. The learning objectives at the beginning of each activity show the intention for learning and these are then used as the basis for assessment, the criteria for which are outlined in the assessment section are split into subject knowledge and working scientifically.

- It is evidenced by the use and outcomes of the varied activities, assessments (carousel activities; 'Big Finishes' such as posters/letters/information texts etc.) and utilising quizzes provided.
- It is also demonstrated by the pupils' ability to show progress along the 'observe, use scientific vocabulary to describe, compare, give reasons and explain what they are learning about' sequence, and in their acquisition, application and transferability of scientific skills.
- In particular, it is evidenced by the pupils' ability, willingness and confidence in addressing and discussing each unit's key question, giving an ability-indicative response focusing on scientific vocabulary, skills and concepts.

Rising Stars Scheme; - specifics

Intent – Y1 - 6

Why Rising Stars 'Switched on Science'?

It is a complete curriculum programme for primary Science, which provides 36 half-termly units of work (x6 per year group) to ensure pupils gain a coherent knowledge and understanding of the full breadth of the science. It offers complete coverage of the National Curriculum Programme of Study for Science (2014) and supports meeting the criteria of the new Ofsted Education Inspection Framework (2019). From starting points suitable for all, the units develop to provide appropriate challenges for KS1 and KS2 pupils of varying abilities. The units have key questions to develop the use of scientific enquiry, as well as a focus on the acquisition and application of key subject knowledge, concepts and vocabulary throughout. Due to having mixed age- classes we have therefore alternated the year group units out across the two-year rolling programme to ensure each child by the end of the key stage will have met and addressed all NC expectations. Through use of the knowledge organisers/mini quizzes etc. we also regularly re-visit concepts to check/deepen and enhance understanding and develop upon children's ability to apply scientific vocabulary and concepts through quality first teach questioning.

How the scheme is organised?

Structure of the Units

- Each year group includes the following:

Three units, each written to be taught within a half term.

- 'Switched on Science' offers 6 units per year group. As a school, due to mix aged classes, we teach within a two-year rolling programme to ensure that all concepts are met for each child over this two-year period. This spiral approach also means that's all concepts are revisited to make the learning experience as embedded and meaningful as possible. Children hopefully build upon their knowledge, skills and understanding during this two-year cycle leading to really secure learners. Rising Stars provides a choice of lessons (activity) options per subject (within each unit) so we have 'cherry-picked' the lessons which we feel best fit the NC expectations; make the most of our school environment and of course that we feel are the most engaging- and FUN (!) to truly capture our pupils imaginations and create a passion for scientific knowledge acquisition; utilise individual pupil strengths and approaches to learning and enhance all aspects of their scientific enquiry skills.

What is included in each year?

- Introduction and topic list
- Medium Term Planning and Curriculum Map (however due to mixed age planning we use bespoke long-term planners to meet both year group concepts over two-year rolling programme)
- Curriculum coverage and progression charts
- Six Units

What is included in each unit?

- **Unit Overview:** Information on progression – how this unit builds on previous ones and is linked to subsequent units.

- **Knowledge, skills and concepts:** LO: Key scientific knowledge and skills developed through the unit as well as working scientifically skills.
- **Cross-curricular links:** Suggestions on how this unit could be used in a cross curricular way alongside work in other subject areas.
- **STEM (STEAM) opportunities:** Ideas for visitors/visits and STEM ideas in class.
- **Background Info:** Key scientific knowledge teacher needs for unit.
- **Scientific Vocabulary:** key vocabulary to include/expose children to during unit (and build into assessment focus)
- **'Preparing the Classroom' & Independent Learning Areas:** Ideas for provision/displays/resources to enhance children's learning opportunities
- **Assessment:** What pupils might be expected to achieve at the end of the unit, expressed as what 'EM', 'EX' and 'EC' pupils can achieve

Curriculum Coverage, assessment and progression grids

In purchasing the scheme, the first thing we did was check the curriculum coverage against the National Curriculum for each unit of work. We then produced curriculum coverage, assessment and progression grids for Key stage 1 and Key Stage 2. These show for each unit, the key programmes of study from the National Curriculum that are covered they also give the staff a progression statement – so indicate for staff what expected looks like for their mixed age class, they identify a key assessment opportunity and they also cross reference the unit with the KLIPS (Key Learning Indicators of Performance) that we use to support with assessment for learning.

e.g.

Year 1 Unit 1 – Who am I?

Key – Science: Programme of Study Statements covered

Lesson 1: My Body Apron

- identify, name, draw and label the basic parts of the human body

Lesson 2: Smell Table

- and say which part of the body is associated with each sense

Lesson 3: What's the Taste?

- and say which part of the body is associated with each sense

Lesson 4: My Eyes

- and say which part of the body is associated with each sense

Lesson 5: Using my Hands

- and say which part of the body is associated with each sense

Lesson 6: Using Our Ears to Hear

- and say which part of the body is associated with each sense

Key Assessment Opportunity example:

<p>Learning objectives</p> <p>This topic covers the following learning objectives:</p> <ul style="list-style-type: none"> o Identify, name, draw and label the basic parts of the human body. o Say which part of the body is associated with each sense. 	<p>Working scientifically skills</p> <p>This topic develops the following working scientifically skills:</p> <ul style="list-style-type: none"> o Observe closely, using simple equipment. o Identify and classify. o Gather and record data to help in answering questions.
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ASSESSMENT

Working Scientifically

- o Em. With support, children identify and match pictures.
- o Exp. Children identify and match pictures independently.
- o Exc. Children are able to explain reasons for their choices.

ASSESSMENT

Subject Knowledge

- o Em. With support, children talk about the eye and the sense of sight.
- o Exp. Children know that they see with their eyes and the sense is sight.
- o Exc. Children name different parts of the eye.

ASSESSMENT

Subject Knowledge

- o Em. With support, children talk about the different parts of the body.
- o Exp. Children can name basic parts of the body.
- o Exc. Children name different parts of the human skeleton and compare similarities and differences with other animal skeletons.

Progression Statement in Switched on Science:

End of Year 1, expected:

- Children can name basic parts of the body.
- Children know that they see with their eyes and the sense is sight.
- Children identify and match pictures independently.

Curriculum Progression of skills and knowledge grids

Alongside the Curriculum Coverage, assessment and progression grids, we also produced for the staff Curriculum Progression of skills and knowledge grids.

These support the staff with planning for a mixed class. They give clarity as to the expectation at each stage, they identify the specifics from the National Curriculum that are addressed by the skills and knowledge and they give expectations for working towards, meeting expectations and exceeding. These in turn support with planning differentiated tasks and also with assessment for learning as they give the specific guidance to the staff upon which judgements can be made.

Progression Framework: Breaks down the Science National Curriculum into individual statements with 'what to look for' guidance for working towards, meeting, and exceeding expectations to help teachers identify gaps in pupils' knowledge and understanding.

NC:

Working scientifically:

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking simple questions and recognising that they can be answered in different ways
- observing closely, using simple equipment
- performing simple tests
- identifying and classifying
- using their observations and ideas to suggest answers to questions
- gathering and recording data to help in answering questions

Animals, including humans:

- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

AF. - Name and locate parts of the human body, including those related to the senses

KLIPS Coverage

Animals: Humans:

Pupils should be taught to:

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- Recognise that humans are animals.
- Compare and describe differences in their own features (eye, hair, skin colour, etc.).
- Recognise that humans have many similarities.

Pupils might work scientifically by using their observations to:

- Compare and contrast animals (humans) at first hand or through videos and photographs.
- Using their senses to compare different textures, sounds and smells

Curriculum Implementation

Singleton C E Primary School views science as an area where skills building is key. Children will practise and consolidate skills and techniques each year, therefore emphasising the process involved, in turn leading to a better standard of scientific concepts in our school. Right from the beginning of school, children will be given opportunities, to develop independent thinking in relation to all aspects of scientific study and 'science based' experiences (as part of the 'Understanding the World' strand of the EYFS framework) and these will be presented to children through first-hand practical experience. We have used a best 'endeavours approach' to organising the curriculum for mixed year classes. In doing this we ensure topics are fully in line with the National Curriculum and that children will build and revisit, through a spiral approach within science. This is planned for and addressed on the 2-year cycle and the progression in skills grids. By the end of Key Stage 2 pupils, in conjunction with the 2014 national

curriculum, we endeavour to ensure that through an exciting and rigorous curriculum that all pupils, through a quality first teach approach, are taught the essential aspects of scientific knowledge and understanding under the three disciplines of biology, chemistry and physics (see Long Term Plan- Scientific Knowledge Progression of Skills) as well as a clear focus on the Progression of Skills in relation to Scientific Enquiry (identifying and classifying; pattern seeking; research and fair testing (See Progression of Skills in Scientific Enquiry document)

Below are some examples of our exciting and engaging curriculum in action!

EYFS:



Foundation children role playing as doctors and nurses



Meeting Joey the Tortoise prior to hibernation



Investigating camouflage

Learning about the life cycle of



Welcome to Foundation Veterinary Surgery!



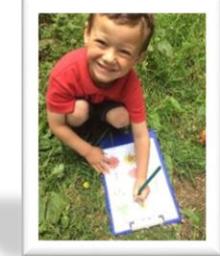
KS2 children supporting foundation in looking for signs of Spring!

KS1:



Investigating properties of bricks!

KS1 plant their own plants so they are able to observe and describe how seeds and bulbs grow into mature plants (life cycle of a plant)



KS1 pupils identifying and naming a variety of common wild and garden

KS2:



Investigating fossils

ing woodland creatures/mini-beasts and tl

Testing gravity and air resistance

Our Science curriculum is taught and implemented successfully, with the following strengths:

Whole School Approach:

- Subject knowledge (***including content and pedagogy***) of teachers is strong – this is supported by an effective scheme of work which includes additional supportive materials for teachers to read around prior to teaching.
- Timetable- science is taught formally for a minimum of x2 hours per week.
- Curriculum statutory requirements met in addition to effective cross-curricular links where appropriate.
- Scientific Literacy- children using scientific vocabulary with understanding (and re-visited through the use of key knowledge organisers) and pupils are given the opportunity to reason and explain their ideas through quality first teach principles.
- Scientific enquiry skills are interwoven into the unit planning and children regularly carry out practical investigations using a range of enquiry types

Raising the profile of science:

- Curriculum enhancement- linking science to locally and utilising local resources.
- Cultural capital- science talks; STEM and forest school weeks annually; annual gardening day; Fantastic Friday weekly with STEM focus- to name a few!
- Science Clubs: pre covid- MAD science club & forest school.

- Science competitions e.g. World Science Day 2021 eco- competition.
- Science Visits- local schools and colleges etc.
- Wider Community involvement: STEM ambassador visitors annually.

Teaching

Units: - Each unit employs the same structure and includes:

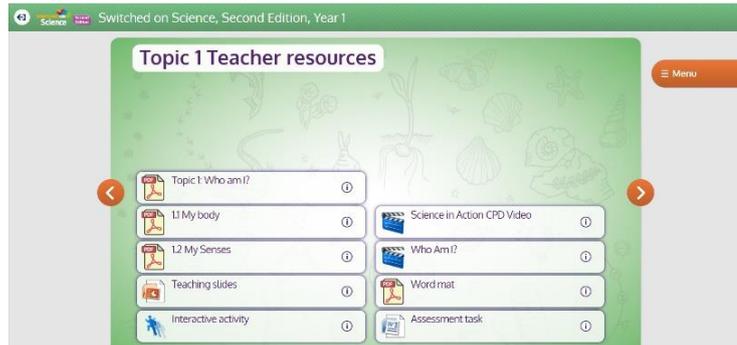
Unit Overview: An at-glance overview of what will happen in the half termly unit. It offers practical advice regarding the resourcing and teaching the unit of work.

It starts with the unit title and key enquiry question for the unit and includes these features:

Each unit employs the same structure and includes:

Unit overview:

Unit Overview: An at-a-glance overview of what will happen in the half-termly unit. It offers practical advice regarding the resourcing and teaching the unit of work. It starts with the unit title and key enquiry question for the unit and includes these features:



Who am I?

About this topic

Curriculum link: Year 1, Animals, including humans

Summary:
In this topic, children will learn about the basic parts of the human body and explore their five senses using a wide range of activities, which can be spread over a half term and from which the teacher can choose when appropriate.

Objectives:
1.1 My body 1.2 My senses
1.3 How do I see? 1.2 Eye chart

Activity Resources:
1.3 Appointment booking form
1.4 Parts of my body cards
1.5: Tests on cards

Online Resources:
Teaching Aids (Phonics) Who am I?
CPD video: Who am I?
Print: Who am I?
Word mat: Who am I?
Revision Planning: Who am I?
Topic: See: Who am I?

Learning objectives:
This topic covers the following learning objectives:
a Identify, name, draw and label the basic parts of the human body.
b Say which part of the body is associated with each sense.

Working scientifically skills:
This topic develops the following working scientifically skills:
a Observe closely, using simple equipment.
b Identify and classify.
c Gather and record data to help in answering questions.

CROSS-CURRICULAR LINKS
This topic offers the following cross-curricular opportunities:

Numeracy and mathematics
a Read and write numbers on a collecting data, e.g. eye colour, and represent as a pictogram.
b Measure arm length and height. Record results using tables.
c Sequence events in chronological order using time language, e.g. 'I'll be in bed, I'll be in bed only once', 'After I was two, I went to nursery', etc.
English
d Use a computer to find out information about the body.
e Use digital cameras to take photographs of objects around the school.
f Use a digital microscope to look at hair, skin, fabrics.
Music
g Learn and sing songs related to the body, e.g. 'Ten Sticks', 'Heads, Shoulders, Knees and Toes'.
h Record sentences using microphones, 'talk cards' or 'ten buttons and boxes'.

History
a Create a personal timeline from birth to present and place significant events on the timeline, e.g. moved house, started school, brother or sister born.
b Find out about what parents and grandparents did, were, or ate when they were the same age as the children.
c Ask children to find out what was an important event in the year that they were born.

Art
a Use different materials to create a sensory picture.
b Create a self-portrait using paints / Paint program.
c Create a self-portrait of themselves, in an action stance.

PE
a Create a dance sequence linked to music or use resource: amnesia cards (Activity Resource 1.1).
b Develop / improve a specific skill, e.g. throwing, catching, balancing.

HEALTH AND SAFETY
In this topic, some activities include food and tasting. Check for children with specific allergies also check for cultural norms each time there is a tasting/learning activity.

SUBJECT KNOWLEDGE

Sight
How the eye works to convert and, at this level, children need to know that in order to see objects we need light, to the opposite of that, without light (and darkness) we cannot see things. At this stage, children may not have experienced complete darkness so they can 'see' in the dark. Light is reflected off objects and travels in a straight line to the eye. The brain then makes sense of the signals sent from the eye to tell us what we can see.

Taste
Humans have taste buds (children can see these using a digital microscope). When we eat, the food rubs against the taste buds which send messages to the brain to tell us what the taste is. There are five tastes: sweet, sour, salty, bitter and umami (savoury), e.g. fish, mushrooms, peanut. Most children can recognise sweet, sour and salty, but may find bitter a difficult taste to identify. Sight and smell also play

SCIENTIFIC VOCABULARY: WHO AM I?
It is assumed that most Year 1 children know basic parts of the body, such as eyes, ears, head, mouth and nose, although they might not know how to write and spell them. You can download a Word mat of essential vocabulary for this topic from My Rising Stars.

backbone: the bones that run along the centre of the back; this is also called the spine

ear lobe: the fleshy part at the bottom of the ear

elbow: the joint between our upper arm and forearm; it is where we bend our arm

eye socket: part of the skull where the eye fits

hips: the hips help humans to support the weight of their body when they are standing or moving about; they help us to balance

joints: where bones meet, e.g. knee, elbow, shoulder, hips, ankle

rib: the set of bones that curve from the spine round to the chest

thigh: the part of the leg that goes from the knee to the hip

tongue: in humans, the tongue is a muscle that is used for tasting, eating, swallowing and talking

vertebrae: the small bones that make up the backbone

nail: a thin, hard material covering the end of the fingers and toes in humans and some other animals

Key words: backbone / chin / ears / elbow / eye socket / eyes / fingers / foot / feet / head / hair / hearing / hip / human / joints / knee / leg / neck / nose / rib / ribs / senses / sight / smell / spine / taste / thigh / toes / tongue / touch / vertebrae / wrist

PREPARE THE CLASSROOM

Area 1: Photo gallery
a In this area, you could include photographs of children when they were younger and now mix them up and challenge the children to identify and match the body to the part member of the class. This same could be done with photographs of members of staff. Children explain how they know.
b A big book photograph album where each child has a page to their own photographs, one for each year so far, with written comments of how they have changed.
c A 'talking photo album' where a photograph of each child in the class. When children press the button, they can listen to the child's recorded message, e.g. what they are good at, what they like at school.
d Get children by the children draw cards to form an art session, or challenge using an A4 package such as foam or children take photographs of each other using the digital camera (Activity Resource 1.1). Children identify who has painted the portrait and explain how they know.

Area 2: Opticians
If you make an optician to talk to the class or you visit an optician, children could help set this area up and include:
a Large interactive picture of the eye with movable labels for eyelashes, eyelids, iris, pupil, optic etc.
b Optician's eye chart (Activity Resource 1.2), then challenge children to think of other ways to test their eyes.
c A range of spectacles for children to use to look at their surroundings. They could use donated glasses from home, which can be given to clarify after the topic.
d A range of items that children can look through, e.g. binoculars, magnifying lenses, periscopes, telescopes, ladders, colour paddles, colour mixing glasses, sunglasses, 3D glasses, etc. How do they change what children see?
e Appointment booking form (Activity Resource 1.3) and role play the activity.
f Photographs of pictures of people wearing glasses; include members of school staff and children as well as famous people.

Area 3: I am a scientist
a Write laboratory coats (white shirts) for children to wear. You could limit these to regulate the number of children using the area.
b Children's goggles or protective glasses to wear to help them take on the role of a scientist.
c X-rays of different parts of the body. These could be stuck on a window so that children can see the detail. You could include pictures of parts of the body for children to match to the X-ray.
d A selection models, pictures of skeletons, skeleton pipework.
e A range of mirrors, (flat, concave and convex), for children to observe themselves. Children could use the emotion cards (Activity Resource 1.1) and watch themselves show the emotion on the card in the mirror.
f A table/book for children to listen to their own and their friend's heartbeat.
g Photographs and posters of scientists and people engaged in science-related jobs, e.g. optician, radiographer, doctor.

Knowledge, skills and concepts: Key science knowledge and skills developed through the unit. In particular clearly defined learning objectives (against the key NC expectations) and the 'Working Scientifically' skills.

Cross-curricular links: Suggestions on how this unit could be used in a cross curricular way alongside work in other subject areas.

Background information & key subject knowledge: The subject knowledge underpinning this unit that the teacher will need.

STEM (STEAM) and cultural capital opportunities: Suggestions on STEM opportunities as well as internal and external visits and visitor opportunities.

Scientific Vocabulary: Key scientific vocabulary for each unit is listed (with definitions) so that teachers can share with pupils the expectation that the words should be learned. A pupil's ability to use scientific words appropriately is an indicator of understanding of knowledge and skills. Teachers can

use a pupil's ability to use key words as part of assessment for learning, listening for how the words are used and, if necessary, asking follow-up questions to check depth of understanding. However, this requires teachers to use a range of approaches to support learning and applying scientific vocabulary in different contexts. Linking literacy approaches for teaching vocabulary in science lessons will help to embed scientific vocabulary alongside teacher expectations that pupils should use correct words when speaking and writing.

Independent learning area: Suggestions for displays and ideas on how to create a learning area related to the unit.

Assessment: What pupils might be expected to achieve at the end of the unit, expressed as differentiated assessment statements of Emerging (Em.), Expected (Exp.) or Exceeded (Exc.). These are utilised when carrying out a formative assessment and help teaching staff when considering next steps for pupils, moving them from Emerging to Expected to Exceeding.

Final Assessment 'Task': It is expected that teachers will use a range of evidence to assess pupil's progress. This includes observing them working, listening to their discussions and using questions to probe understanding and reasoning, alongside their writing and other products such as video clips, models and role play activities (moving forward as a school we will be utilising 'earwig' to record this information). As pupils progress through the school, self and peer assessment is another approach to complement teacher assessment. Not only does this develop a pupil's ability to reflect on their own learning, it also provides teachers access to how well pupils perceive their learning to be progressing and why. Within the 'Switched on Science' framework there is also opportunities each unit to develop upon 'Working Scientifically Skills' and 'Knowledge and Understanding' through regular **problem-solving activities**. This allows pupils to be challenged through applying their learning in new contexts as well as further embed ideas and skills. As a school we recognise that assessing how pupils respond to applying their knowledge and skills is an indicator of how successful their learning has been. Finally, there is a written 'quiz' to coincide with these practical and verbal assessment opportunities to form part of the complete summative assessment process.



Subject knowledge and teaching guidance: The subject knowledge underpinning the unit for the teacher to know prior to teaching.

Session plans:

Each unit has six sessions (based on roughly two hours for each), which move from a shared starting point to a final assessment (problem solving activity etc.) which we utilise to develop upon practical and verbal assessment opportunities that are carried out formatively throughout the unit. The planning is entirely editable and flexible. Due to mixed-aged classes we have implemented a spiral approach to revisit each topic to ensure that not only is every subject is covered over the two-year cycle- but in addition the children have the opportunity to revisit and consolidate what had been taught and be stretched upon the subject matter and scientific enquiry skill. We work on the key principle that **"Progress [for pupils] means knowing more** and remembering more." And our endeavour is to plan out a curriculum that truly embeds this vision.

ACTIVITIES

1 MY BODY APRON

L.O. Gather and record data to help answer questions. Identify, name, draw and label the basic parts of the human body.

- Powerpoint slides 1–5 can be used to introduce the topic, revise key words and introduce the apron below.
- Plastic disposable aprons can be purchased in packs of 100 and are great for a range of science activities as the children can draw and label body parts on them such as bones, e.g. ribs, sternum (breast bone) and hips; or the major organs such as the heart, stomach and lungs. Using dry wipe pens, children draw and label parts of the body on an apron. They can then share and compare with others and make changes if they want to. This activity is best carried out during the topic as children learn the different body parts as they go so they can add to the apron over a period of time. Children will love to wear these when they are working in the 'Science Laboratory' or during science sessions and will take ownership of them.
- Do buy disposable aprons for adults working with the children to wear and draw on during topic sessions.

YOU WILL NEED

- PowerPoint Slides 1–5
- Plastic disposable apron for each child
- Pens to draw on the aprons

ASSESSMENT

Subject Knowledge

- Em. With support, be able to name basic body parts, e.g. arm, leg.
- Exp. Be able to name a wide range of parts of the body, e.g. ankle, wrist.
- Exc. Be able to give some more scientific names for parts of the body, e.g. spine, skull, ribs.

Working Scientifically

- Em. With support be able to use labels to record basic parts of the body.
- Exp. Be able to use, e.g. a word mat, to find correct words to label parts of the body.
- Exc. Be able to label using more scientific language for parts of the body.

Learning objective: States the main objective of the session.

Key question/s: The pupils should be able to answer this/these on completion of the unit.

Success Criteria: Expressed as 'I can' statements.

Key vocabulary: The pupils should acquire, understand and be able to use this appropriately.

Activities: Engaging activities, often using focussed questions that introduce subject-specific skills and knowledge.

Subject knowledge: Scientific knowledge the teacher needs prior to the lesson.

Resources needed: Lists additional resources that are provided as separate files, as well as any additional resources required.

Teaching slides: Walk through the unit and can be used entirely flexibly by the teacher, however they see fit. They provide a starting point for the photographs, images and resources needed to teach the unit.



Pupil resources: Include images, scaffolds, continuous provision and pupil-facing materials.



Eye chart



Appointment booking form

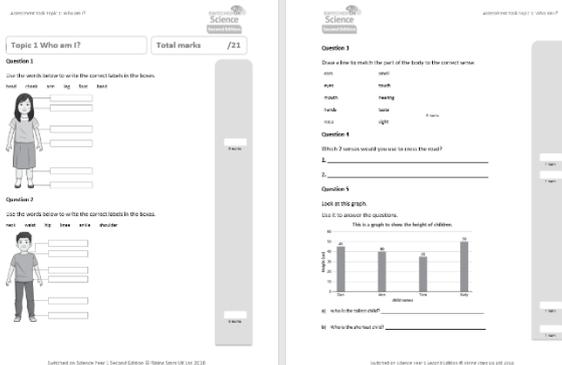
Date		Time	
Name			
Class			
Address			

Eye colour <input checked="" type="checkbox"/> (insert tick please)	Do you wear glasses?	
Blue	Yes	No
Brown		
Green		
Grey		
Hazel		

Which letters can you read? (insert tick please)

a	c	f	g	h	k	m	o	s	t	x	z
---	---	---	---	---	---	---	---	---	---	---	---

End-of-unit quizzes: these can be completed independently or as a class. They allow summative assessment of key vocabulary and knowledge acquired in the unit.



Approach of the Units

From Year 1 to Year 6 the scope of each unit increases, expanding and building upon the children's increasing knowledge and skills both in terms of scientific knowledge as well as scientific enquiry.

Purpose of Study:

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims:

The national curriculum for science aims to ensure that all pupils:

- *develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics*
- *develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them*
- *are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.*

(DFE 2013)

Topics

All topics are fully in line with National Curriculum.

- See the deep dive coverage of skills/knowledge and assessment grids for clarity as to how and when topics are taught, and NC is covered.
- All statutory requirements are covered
- Due to mixed classes, the topics are taught on a 2-year rolling programme.
- Topics are listed on the long-term planners. Science is taught directly in each class once a week (with a focus on the [Rising Stars- Switched on Science](#) Programme of Study (Scheme of Work) from September 2020) as well as discreetly throughout the curriculum, where appropriate.



- Mixed classes do present challenges when it comes to delivery but due to our bespoke spiral approach to revisiting all skill areas- are intention is to enhance pupil's skills and knowledge and allow for these skills to become embedded.

Progression

This provides informal differentiation, as some will be able to get further than others. Even the youngest pupils can progress, thinking scientifically and demonstrating their ability, using language and ideas in contexts appropriate to them.

Science is dynamic, and work should be active and visual, not dependent wholly on reading and writing. In our school we try to get a balance as we recognise that 'Visual literacy' is also important:

- Pupils that are working above expectations are expected within our school to undertake activities with greater independence and to be provided with some opportunities to make choices on how they learn and can communicate their knowledge.

Assessment

1. Teachers monitor and track using the KLIPs (Key Learning Indicators of Progression) these are a set of skills / knowledge that have been devised through breaking down the national curriculum into progressive steps
 - Each lesson has been cross referenced with the KLIPs as well as the National Curriculum. Teachers highlighted the KLIPs coverage and understanding as they teach. The KLIP grids form a continuous record of progress.
2. Alongside the KLIPs tracking we use the assessment tasks within the scheme. These tasks are linked directly to the National Curriculum.
 - These are identified as the Key assessment opportunity. The Key assessment opportunities have been developed to ensure that all aspects of the National Curriculum are assessed throughout the child's 'scientific learning journey' at primary school.
3. Assessment guidance and support has been developed by the SMT for each unit.
 - This identifies for staff the NC that is being assessed.
 - This identifies the skills, knowledge and concepts
 - This identifies Key vocabulary to be assessed
 - It also gives an assessment overview – which includes an outline of the task, what to look for in the responses from the children and gives clarity as to what working towards, meeting and working in greater depth specifically looks like for that unit.
 - The guidance also provides prompts for Key questions and areas to make notes
4. The Switched-on Science scheme also provides in-depth overviews of each assessment task.
 - The assessment opportunities included in Rising Stars; Switched on Science are planned to have maximum impact on pupils while adding the minimum burden to teacher workload. Each unit has a key assessment opportunity which links with the Switched-on Science progression framework that is cross-referenced to the National Curriculum. It also links to the information contained in the Curriculum Coverage and Progression Charts. These assessment opportunities will enable the teacher to monitor progress made by individual pupils and review areas where the class or groups excels, or where areas of learning need to be revisited, developed and consolidated in a different context. The subject leader can also utilise the information to inform and further develop curriculum design, teaching approaches and resourcing. It can provide opportunities for moderation across classes and enable pupils to know how they are performing in the subject and what they need to do to achieve the next stage in their learning journey.
 - Formative assessment opportunities are integrated throughout the units. Some are informal and depend on the use of talk, eavesdropping on pupil-pupil discussion, or teacher-pupil conversation, checking that historical vocabulary has been acquired, is understood and can be used correctly (associated with visual images where relevant). These opportunities check understanding, identify misconceptions, enable direct feedback and allow for adaptation without unnecessary elaboration or differentiation.
 - Much of the evidence of pupil progress in science can be collected without adding extra workload or adapting teaching approaches. The use of a science floor-book or achievement folder, including images with annotations of the broad range of practical work covered, could provide a valuable source of evidence of impact.

- Finally, an end-of-unit quiz is also included in each unit. These are designed to enable pupils to assess their own progress in acquiring knowledge and to support retention of the information. They can also provide the teacher with a quick check on where an aspect of learning needs revisiting and reinforcing.

Impact

At Singleton, we believe assessment is on-going and a vital tool to aid future planning. Children are assessed on their ability to develop ideas, master techniques and personalise inspiration. In KS1 and KS2, teachers will assess the children using the progression of skills document, which is in line with the Lancashire KLIPS. Foundation Stage children will be assessed using the development matters and early learning goals document.

The following topics are taught in each year group with the working scientifically strand as a running thread through all of them.

Cycle A- Science

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1 /2 Science Switched on Science	SEASONAL CHANGE (Y1/2) TOPIC 2: MATERIALS MONSTER (Y2)	TOPIC 2: CELEBRATIONS (Y1)	SEASONAL CHANGE (Y1/2) TOPIC 6: LITTLE MASTER CHEFS (Y2)	TOPIC 3: POLAR PLACES (Y1)	SEASONAL CHANGE (Y1/2) TOPIC 3: SQUASH, BEND, TWIST AND TWIST (Y2)	TOPIC 5: ON SAFARI (Y1)
Year 3/4 Science Switched on Science	TOPIC 2: FOOD AND OUR BODIES (Y3)	TOPIC 3: LOOKING AT STATES (Y4)	TOPIC 5: FORCES AND MAGNETS (Y3)	TOPIC 4: TEETH AND EATING (Y4)	TOPIC 6: SCIENCE IN ACTION: THE NAPPY CHALLENGE (Y3)	TOPIC 6: THE BIG BUILD (Y4)
Year 5/6 Science Switched on Science	TOPIC 4: LET'S GET MOVING (Y5)	TOPIC 2: HEALTHY BODIES (Y6)	TOPIC 5: GROWING UP AND GROWING OLD (Y5)	TOPIC 3: EVOLUTON & INHERITANCE (Y6)	TOPIC 6: AMAZING CHANGES (Y5)	TOPIC 6: THE TITANIC (Y6)

Cycle B- Science

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1 /2 Science Switched on Science	SEASONAL CHANGE (Y1/2) TOPIC 4: OUR LOCAL ENVIRONMENT (Y2)	TOPIC 1: WHO AM I? (Y1)	SEASONAL CHANGE (1/Y2) HEALTHY ME (Y2) (links to PSHE)	TOPIC 4: PLANTS AND ANIMALS WHERE WE LIVE (Y1)	SEASONAL CHANGE (Y1/2) TOPIC 5: YOUNG GARDENERS (Y2)	TOPIC 3: HOLIDAY (Y1)
Year 3/4 Science Switched on Science	TOPIC 1: ROCKS, SOILS AND FOSSILS (Y3)	TOPIC 1: WHAT'S THAT SOUND? (Y4)	TOPIC 3: LIGHT AND SHADOWS (Y3)	TOPIC 5: POWER IT UP (Y4)	TOPIC 4: HOW DOES YOUR GARDEN GROW? (Y3)	TOPIC 2: LIVING THINGS (Y4)
Year 5/6 Science Switched on Science	TOPIC 1: OUT OF THIS WORLD (Y5)	TOPIC 5: ELECTRICITY (Y6)	TOPIC 2: MATERIAL WORLD (Y5)	TOPIC 4: LIGHT (Y6)	TOPIC 3: CIRCLE OF LIFE (Y5)	TOPIC 1: CLASSIFYING LIVING THINGS (Y6)

Assessment:

As a school we endeavour to use our own bespoke assessment system to which we are in the process of developing. We use EARWIG and KLIPS which works well – however we are also currently introducing the progression of skills and bespoke APP system to highlight which children (against the science assessment focus's and NC coverage) are below/meeting/exceeding age related expectation (# system) We are in the process of developing our use of the assessment for learning (AFL) techniques:

- [knowledge](#) and [working scientifically](#) matrices that provide additional guidance which clarifies the statements for each year of the National Curriculum
- annotated collections of children's work that provide [examples of work](#) that meet the expectations of the knowledge statements for each topic from each year of the science National Curriculum
- progression documents that highlight the [links between the topics](#) taught in different year groups and the [development of working scientifically skills](#)

Formative Assessment:

- Self-assessment: The curriculum expects pupils to work scientifically and develop their scientific enquiry and questioning skills. We therefore encourage our pupils to reflect and assess their own learning and adapt their work accordingly throughout- particularly for investigatory work. This is currently recorded in the pupils Science/Class Floor books.
- Peer-assessment: Due to the nature of science being a collaborative approach for many aspects of the curriculum- pupils are often therefore working with a partner/in small groups and are as such able to review, offer thoughts and ideas, or provide critical, constructive feedback on each other's work.
- Open questioning: As part of the Quality First Teach approach, we use open questioning as a means to both assess and develop pupils grasp of concepts. For example, 'Why' and 'how' questions work well. E.g. Why do you think the shadow moves over the course of the day? How could we measure these changes?
- Discussion with peers: We encourage pupils to use similar open questions to consider what they've learned, rather than only on what they've done.
- Target setting: We believe pupils taking ownership of their target setting gives them more focus and understanding of where their curriculum is taking them and as such leads to higher standards and a growth mindset of personal improvement and reflection.
- KWL: KWL grids are used across the curriculum at our school and therefore pupils are very familiar with this approach and we feel it supports independent learning in science. In particular, this can be applied to the logical reasoning needed to explain specific theories/key areas of study, with pupils first establishing a firm foundation, before exploring alternatives and subsequently reviewing what they have learned, rather than only what they have done.

Summative Assessment:

We use assessment grids (APP system with use of Lancashire KLIPS statements to highlight which children (against the science assessment focus's and NC coverage) are below/meeting/exceeding age-related expectation (# system). We are also in the process of developing a bespoke assessment grid for each science unit so the assessment framework will be 'built into' the school curriculum so that we can easily check what pupils have learned and whether they are on track to meet expectations at the end of the key stage, and so that we can report regularly to parents. Our teachers will therefore form a judgement as to whether each child has learned all the content of the programme of study by the end of the key stage and is 'ticked off', with evidence of this achievement forming part of the child's science portfolio (see 'evidence'). Moreover, as a pupil's profile of achievement is built up, the statements yet to be achieved will provide a clear guide for planning, showing exactly where the 'gaps' are in each pupil's knowledge, skills and understanding, and thus where subsequent teaching should be targeted. This is supported by our spiral approach to planning of revisiting concepts to further/better imbed all aspects of key learning.

Evidence

- All children have their own science book to record their learning/practical experiments write ups in.
- Children also have their own 'Pupil' share drive on the computers with their own folders to save any ICT work and this will move with them through school.
- Floor books are also used to support the children's journey in relation to STEM learning and Forest School with STEM (which is predominately practical work)
- We also celebrate children's work via Earwig and Facebook.

Reporting

- Children's progress and attainment will be reported to parents in their annual report. As a school, we report end of KS1 and end of KS2 attainment on pupil data sheets based upon the end of Key Stage outcomes.
- In EYFS parents are informed where the children's abilities lie in the 'Understanding the World' strand.

References:

Whole School Planning

Singleton C E Primary School uses a mixture of Rising Stars- Switched on Science and our own bespoke approach (for example using our fantastic outdoor area to teach STEM and forest school; gardening in our KS1 garden etc (see 'Cultural Capital' sub section) to support planning.

- These plans have been written to be fully in line with the National Curriculum
- Topics have been selected and ensure full coverage of progression of skills
- Cross curricular links are encouraged for example- recipes in literacy are linked into healthy eating and 'nutrition science' and seasonal changes is taught through art, for example finger painting/collage and writing weather reports in literacy:



- Each Topic comes with plans and resources and assessment tools
- Teachers are encouraged to stretch beyond the plans and be creative. Taking ownership of their plans and reflect on which activities were the most engaging and successful for their class.
- STEM week is taught each year in co-ordination with [British Science Week](#) and is included in our long term planners.



STEM Ambassador Visits:



Visits from Chartered Aeronautical Engineers from BAE Systems



STEM visit from Mr Marshall- Chartered Mechanical Engineer from C2V+

STEM afternoon at B&FC Lancashire Energy HQ:



KS2 pupils getting to look round the workshops, entering a nuclear simulator (!) and investigating structures & testing their strength by creating marshmallow towers and making earthquakes!

STEM challenges in school:

Each year all pupils in our school- work towards gaining their Crest Award by completing STEM challenges during Science Week.



Below are just a selection of some of the activities completed in our Science Week STEM Challenges (see class floor books for more extensive examples):

Foundation:



Creating Time Capsules



Using the Very Hungry Caterpillar story as a stimulus to investigate shape and texture

Investigating the best insulators



'Rainbow' Collectors

'Useless Umbrellas'



'Crafty Rafts'

KS1:



Sneaky Shadows using our light box



'Brilliant Bubbles' experiment

'Be safe. Be seen' investigation



Mini Best Hunt!

LKS2:



Static Electricity testing!



Bird Nest- creating habitats!

'A sticky situation'- making our own glue

UKS2:



Kite Calamity!

Forest School Week:

As well as having an annual STEM week and gardening day each year we also have a whole school Forest School Week with both a STEM and biology focus:



forest%20school%20timetable%20class?



Fantastic Fridays

Every Friday afternoon we have our 'Fantastic Friday' whereby year groups have a half termly enhanced curriculum focus. One of the key focuses is STEM/computing strand whereby the children use Lego We Do 2.0 and Lego Mindstorm and their associated apps to create algorithms through utilising coding blocks to be able to program their designs! Utilising observation skills/trial and error and questioning skills.



Pupil Voice:



We believe strongly in giving our pupils a real voice in decision making and our Junior Leadership Team (JLT) include two representatives for Science and STEM. Pupils work with the Science Co-Ordinator, our governors and HT to look at ways in which to improve science across school in terms of resources ideas/ideas for trips and lesson delivery! Pupils monitor floor books and evidence and take pride in seeing their ideas implemented across school! Most recently our STEM JLT led World Science Day 2021 with an eco-competition- including a whole school assembly; social media promotion and the chance to win eco-prizes for the winning pupils!



Visits – Cultural Capital Opportunities

In order to develop a broad, rich and deep science education we believe children learn through experience. It is therefore considered essential to provide the children with hands on experiences, through educational visits. We aim to address this with suggestions on the two-year cycle with educational visits, trips and real experience.

As a school we also see the non-statutory requirements of the National Curriculum as an opportunity to further enrich our children's learning and life experiences and developed these as Cultural Capital enhancements that very much make up the foundation of our schools vision. In school we have STEM clubs/ Science & STEM week & science-based visits both in and out of school. We have excellent links with our local high schools and colleges who offer a variety of sessions for our pupils throughout the year. We are also blessed with the locality on our doorstep and we regularly utilise our forest school wood and surrounding area to enhance our children's science learning.



Microsoft Word 97
- 2003 Document

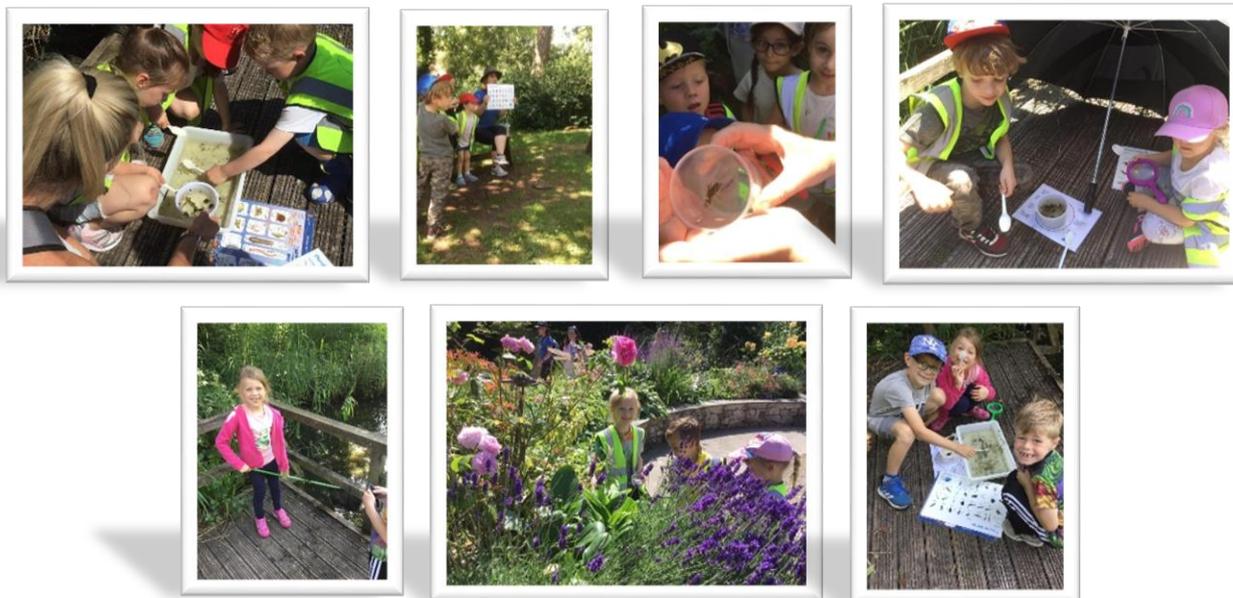
National Curriculum Non-Statutory Guidance

'To provide the children with a variety of challenging and enriching opportunities, enabling them to live life to the full. Developing a growth mind-set, believing that with God everything is possible. To show, love, trust, wisdom and respect, becoming exemplary role Models'

EYFS Visit from Mrs Stagg (veterinary nurse):



KS1 & LKS2 Visits to Leighton Moss:



UKS2 Hodgson High School Science Enrichment Sessions & STEM challenge Mornings:



Forensics, separating mixtures, waves & investigating space

UKS2 Baines High School for their 'Science Road Show' with Lancaster University & Blackpool Sixth Form.



UKS2 Saint Aidan's High School- pond dipping & wildlife walk:



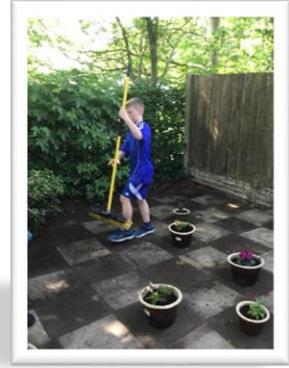
MAD Science (whole school visit):



Coram Life Education 'Life bus Experience' (whole school visit):



Gardening Day (whole school including parents and governors):



Class Pets!



KS1 have their own class pets and get see biology in action. Looking at different animal habitats/micro habitats; basic animal needs for survival and reproduction- we have serval stick insects babies 'nymphs' to also take care of.

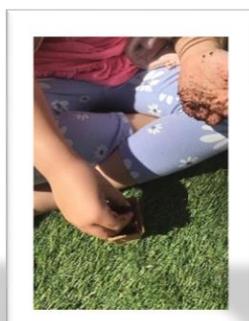
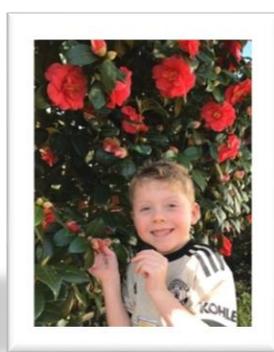
Clubs:

We have an external agency (from the 'Forest School Association') who comes in to teach forest school skills to the school (pre-covid) which we hope to re-instate moving into the Spring 2/Summer Term and Mrs Marshall will also be running a STEM with Forest School club for KS1 pupils from Summer Term 2022.



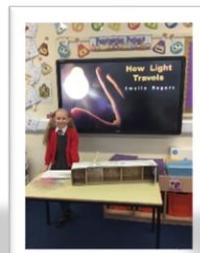
Homework:

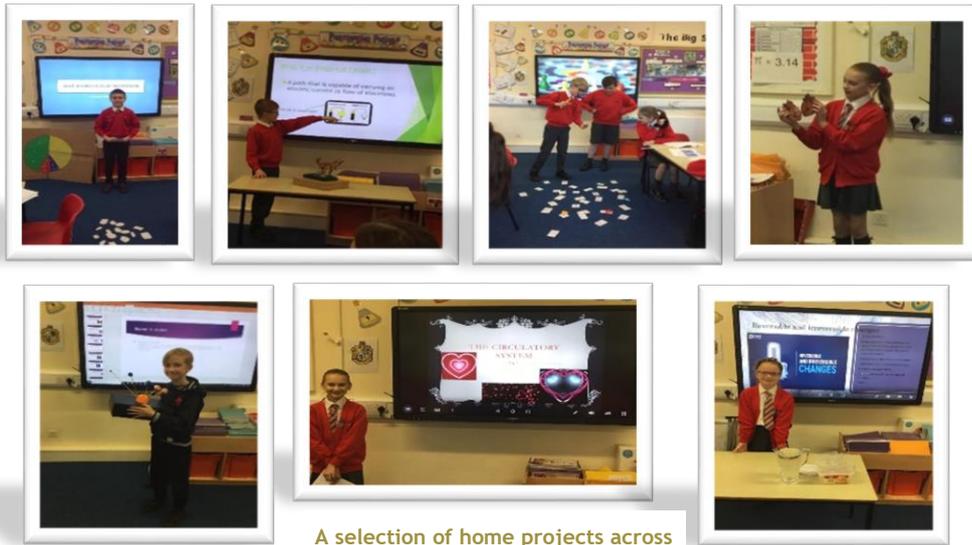
To promote independence, confidence and enhance our pupils learning and understanding in a real-world context- KS2 (both lower and upper) complete a scientific based 'Home Project' each year and present to their class. Presentations/models and practical experiments are encouraged! Our Foundation and KS1 children are also encouraged to develop their understanding of scientific topics by, for example, taking seeds home to grow over Spring/Summer Term (planned for in long term planners); create teeth moulds (as part of human anatomy) and going on leaf/plant hunts as part of the plant topics. These practical and engaging projects have been incredibly popular with both pupils and parents and are planned for carefully to be enriching tasks to our curriculum.



KS1/2 pupils growing sunflowers and plants for home projects as well as creating teeth moulds (as part of human anatomy studies)

Home Projects:





A selection of home projects across KS2 including models, games, and videos.

KS1 Home Projects:



Resources:

Outdoor Resources:

As a school we have ensured our curriculum developments are supported by resources that enhance our pupils learning, understanding and independent problem-solving skills. As a school we are very blessed to have a Foundation Stage wood; a KS1 vegetable garden area; a whole school Forest School wood (including hedgehogs (!) and 'minibeast' habitats) and a large field. This fantastic outdoor space means outdoor learning for all aspects of scientific disciplines forms a central part of our children's learning.

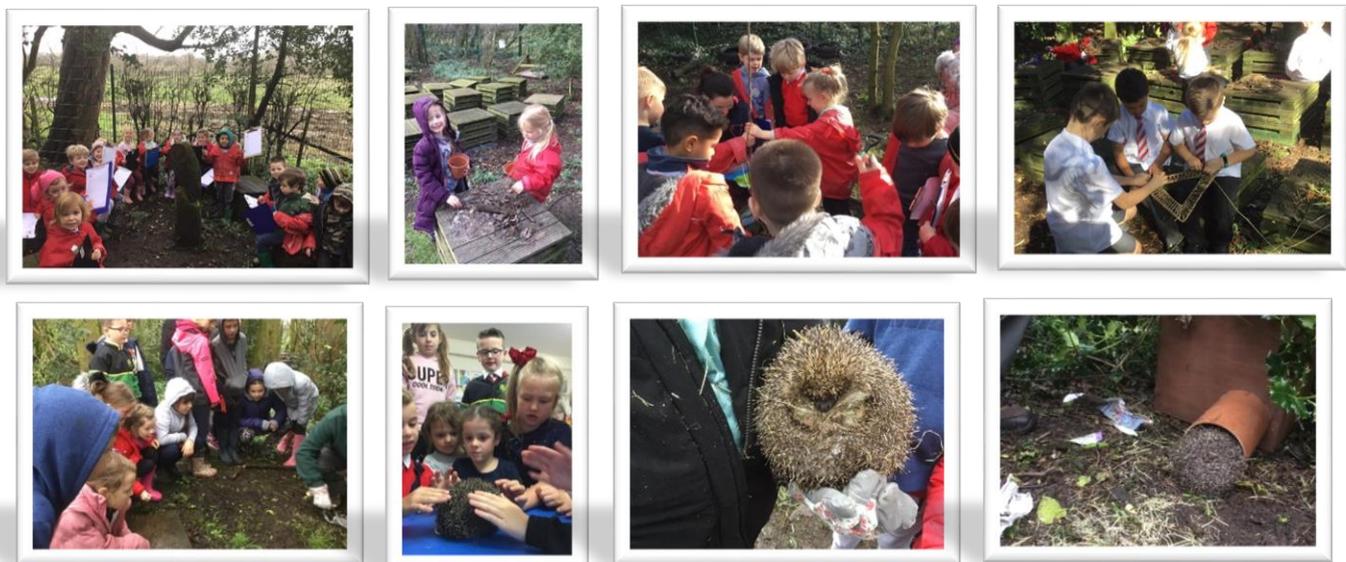
Foundation Wood and Outdoor Area:



KS1 Vegetable Patch:



Forest School utilised by the whole school:



Practical Resources and use of technology:

As a school, with support from our fantastic FOSS team, we have very much invested in our science based practical resources for all ages to enhance and support the delivery of our science curriculum including science-based apps, books, models and equipment (e.g. data loggers) for investigations and experiments.



Rationale for Sequencing and Selection of Units

The science curriculum at Singleton School is designed (using a best endeavours approach within a two year rolling programme) to enable pupils to acquire a rich web of knowledge as the sequence and selection of topics builds on previous units and feeds forward to future learning.

The units revisit skills, knowledge and concepts throughout the Key stages which means we can constantly build upon prior learning

IMPACT

- The impact of Switched-On Science is evidenced through the pupils' use and understanding of the knowledge, skills, concepts and specialist vocabulary.
- It is evidenced by the use and outcomes of the varied activities, assessments and quizzes provided.
- The broad range of approaches for pupils to communicate their knowledge ensures that everyone can demonstrate progression and impact. In particular, it is evidenced by the pupils' ability, willingness, and confidence in addressing and discussing each unit's key question, giving a response focusing on scientific vocabulary, skills and concepts.
- Pupils understand and can clarify to others what science is and the importance and value of studying the subject. They can explain to others how they are progressing and what they can do to get better in the subject.

Subject knowledge for teachers

The Rising Stars Switch on Science Scheme focuses on the subject as an individual discipline, and it sets high expectations for the quality of teaching within the subject. However, the structure and levels of support within the scheme takes into account that most primary teachers and many science subject leads are not subject specialists.

The core scientific knowledge needed by each teacher is identified in the unit overview and in greater depth in the session plans. Sample responses are provided to questions posed to guide non-specialist teachers on expectations. A resource list with useful quality websites and resources is included to support further teacher research.

We believe that this vital to support with workload and also quality teaching and learning experiences.

Teaching:

- Teachers at Singleton are continuously encouraged to be high practitioners.
- Quality first teach model implemented across school.
- Lessons are observed, evaluated and discussed in the appropriate manner
- Lesson delivery is monitored
- Staff use My Rising Stars 'Switched on Science' and our bespoke long-term planners to plan and execute lessons. They supplement and personalise these plans with a wider range of resources off the internet.

'Real' Science

The focus throughout is on contextualized science with children understanding the difference that scientists make to our World- both historically and in the present and how scientists continue to shape our future- from aeronautical visits to meet with student engineers to STEM ambassador in school visitors; nurse talks; visits from veterinary nurses just to name a few- our children have a rich and varied understanding of how science truly is everywhere and is very much our future! We want to inspire our children to be true questioners- from stepping into nature in our forest school to carrying out investigations in the classroom- to looking through telescopes into space we want a truly exploratory approach to our science curriculum!



Throughout the units, knowledge, skills and concepts are brought together holistically, underpinned by the development of a strong and evolving subject vocabulary with which to talk about and discuss the science being learned.

An enquiry approach is used as a shared experience, with key and supplementary questions, to encourage curiosity, scientific thinking, exploration and research, and to combine relevant knowledge with skills. This hopefully mitigates against a didactic approach and encourages teaching and learning to become a joint pupil / teacher 'adventure' or 'journey'. Pupils will often discover that some of the questions have more than one answer, some of which are 'better' than others. This is particularly true when environmental issues are discussed, and experts propose different solutions. Pupils can explore how 'real world' decisions are made!

- As well as the prompt questions included, it is hoped that the pupils will develop skills in posing their own questions.
- Through this approach, pupils will acquire a model of learning whereby they are able to transfer knowledge and understanding from one unit studied to another.
- Following this process, pupils (and teachers) will acquire greater confidence to take on the challenges of learning about a new topic.
- The Curriculum Coverage and Progression Chart and the key assessment opportunities will support teachers in identifying those pupils working at greater depth and ensuring sufficient challenge and pace.

Seasonal Change (KS1):



The Seasonal change coverage is an important element of the curriculum; its aim is to develop children's understanding of how their environment changes across the year, and how humans also change in what they wear, eat and do. It is appropriate that children develop their understanding of this across Key Stage 1 for the following reasons: Seasonal change repeats, children should have experience of comparing what happened when they were in Year 1 with Year 2. What were the similarities and differences? What is repeated? Placing learning about plants and animals in just one term means that children only learn about the living things in their environment during that time. Studying habitats regularly throughout the year allows children to observe and record change. Studying habitats regularly throughout the year means that they will learn about plants and animals that appear at different times of the year. Visiting the local environment across the year means that children get a 'second bite' at learning, e.g., observation, identifying and naming plants and animals so that by the end of Key Stage 1 children are confident and competent in naming living things. Recording observations of Seasonal change allows children to look back and compare similarities and differences between the seasons. Year 2 children can progress in deepening and broadening their understanding of local habitats and begin to use standard measurements in observations, e.g., temperature. As a school we have adopted an approach where Seasonal change is developed over a year with teachers timetabling regular visits into the school grounds, forest school and woods. During each visit, the children carry out a range of activities including 'Adopt a tree' or habitat and record changes, e.g., photograph each visit. We are going to begin to use a 'Big Book' approach where children record their observations of Seasonal change over a year in Year 1, and then the Big Book goes with the class to Year 2 so that they can look back and continue their work in Year 2. For Year 1, the Seasonal change unit is divided into six sections, each covering a two-month period. Year 2 is the same, but it builds on and extends learning from Year 1. Due to having a mixed aged Y 1-2 class we have therefore planned to visit the seasonal change units x3 times a year formally and will differentiate observational expectations in accordance with the year group e.g. Year One's will focus on describing the weather but Year Two's will have the opportunity to use thermometers to measure and compare the temperature more formally.

Adapting to schools' individual settings, needs and priorities

We have found the Switched on Science scheme to be inherently flexible.

- All resources are editable so, once teachers are confident with the material, they can edit them to suit a cohort, a setting, the school environment, a teacher's own experiences, topical events and local or global issues.
- They can also build up their own resource of local materials, especially photographs, aerial photographs, plans and maps.
- Our staff are encouraged to consider how science can link meaningfully within other areas of learning within the school curriculum prior to embarking on the scheme.

Quick Overview of Topic by discipline:

	Biology	Chemistry	Physics
Year 1	Animals, including humans Plants	Everyday Materials	Seasonal Changes
Year 2	Animals, including humans Plants Living things and their habitats	Everyday Materials	
Year 3	Animals, including humans Plants Living things and their habitats	Rocks	Forces and Magnets Light
Year 4	Animals, including humans Plants Living things and their habitats	Everyday Materials	Electricity Sounds
Year 5	Animals, including humans Living things and their habitats	Everyday Materials	Forces and Magnets Earth and Space
Year 6	Animals, including humans Living things and their habitats Evolution and Inheritance		Light Electricity

Possible Learning Challenge Questions:

Year	Topics Covered	Learning Challenge Question
1	Plants	Which birds and plants would Little Red Riding Hood find in our park? What might she grow in her own garden?
	Animals, including humans	Why are humans not like tigers?
	Everyday Materials	Which material should the Three little pigs have used to build their house?
	Seasonal Changes	How do seasons impact on what we do? Why does it get darker earlier in winter?
2	Living things and their habitats	Why would a dinosaur not make a good pet?
	Plants	How can we grow our own salad?
	Animals, including humans	How will eating my 'five a day' help to keep me healthy?

	Use of everyday materials	What is our school made of? Why do you think this material was chosen?
3	Plants	Why are bees so important for our environment?
	Animals, including humans	What are the main food groups we need in our diet and why?
	Rocks	What do rocks tell us about how the Earth was formed?
	Light	Why do shadows change and move during the course of the day? How could we track/investigate these changes?
	Forces and Magnets	Can you explain how knowing the different poles of a magnet can help you predict if they will attract or repel each other? How could we test this? How have forces been used in construction?
4	Animals, including humans	What happens to food when we eat?
	States of matter	What happens when we heat a liquid? Can this process then be reversed? How?
	Sound	Why is the sound, that a popular band makes, enjoyed by so many? How are these sounds made?
	Electricity	How could we test if something is a good insulator? Why would this be useful to know?
	Living things and their habitats	Which animals and plants thrive in Singleton?
5	Living things and their habitats	Do all animals and plants start life as an egg?
	Animals, including humans	How different will you be when you are as old as your grandparents?
	Forces	What will happen if I drop an object from different heights? How could I make it fall faster/slower do you think?
	Properties and changes of materials	If we dissolve something in liquid- how would we get that solid back?
	Earth and Space	Will we ever send another human to the moon?

6 Living things and their habitats

Animals, including humans

What would a journey through your body look like?

Evolution and Inheritance

Have we always looked like this?

Electricity

What would happen to a buzzer if I increased the voltage?

Light

Why do shadow puppets shadow make the same shape as the puppet?

Teacher Topic Overview Information:

What is *Switched on Science*?

The second edition of *Switched on Science* provides full coverage of the primary science curriculum. You can follow the course as a whole and be reassured of delivering a coherent, complete science curriculum which helps pupils to progress their knowledge, understanding and skills. You can also adapt all that is here to suit your own school's context, your curriculum, and the enthusiasms and interests of your pupils and colleagues.

The course comprises of:

- Print Teacher's Guide for each year group
- Online resources for each year group



SWITCHED ON Science
Second Edition

What is included in the Teacher's Guide?



- **Introduction** – Gives detail of the structure and explains how to use the course.
- **Six topics** – Including a plan, preparation for teaching the topic and comprehensive step-by-step instructions for each of the teaching sessions.
- **Activity resources** – Photocopiable resources for pupils, such as diagrams, flashcards, tables, posters and instructions sheets.
- **Seasonal change activities (KS1 only)** – Additional activities to help pupils develop understanding of how their environment changes over the year.



What is included in the online resources?



For each year group:

- Full PDF of the Teacher's Guide
- Editable medium-term plan
- Equipment list
- List of useful websites

For each topic:

- Split PDFs of the Teacher's Guide
- PowerPoint teaching slides
- Interactive activities
- Pupil videos and a CPD video
- Assessment tasks
- Activity resource sheets
- Word mats

Equipment and kit list for Switched on Science Year 4

Topic 1 – What's that sound?

- Tuning fork
- Drums
- Bristlewood
- Objects such as plastic containers
- Boxes
- Guitar
- Water

- Rubber bands
- Mini whiteboards or pans and paper
- Headphones or earbuds
- Alarm clock
- Plastic coat hanger
- Metal coat hanger
- Metal spoon

Here are 6 dinosaurs. Follow the questions and drag and drop each dinosaur to complete the classification key. When you are done, click 'Check' to see if you are right.

Microraptor

Stegosaurus

Diplodocus

Titanosaur

Parasaurolophus

Archaeopteryx

Has it got 4 legs?

YES → Does it have an elongated neck?
 YES → Does it have horns?
 YES →

NO → Does it have wings?
 YES → Does it have a domed head?
 YES →

NO →

NO →

NO →

NO →

Check Reset

3) Access the resources

Click on the resource icon and you will be taken to the menu screen. There is a planning screen, and then resources are structured by topic (as referenced in the Teacher's Guide). A contents menu can be accessed from the top-right of the screen.



1. Society of Biology (2014); *Position Statement on Primary Science The importance of biology in the primary curriculum: engaging learners in the life sciences*; Charles Darwin House, 12 Roger Street, London WC1N 2JU