01/12/2021

Science Statement and Guidance

2022-23

Review Date	Version number	Reviewer/Owner (post holder)	Approved by (Committee)	Signature
1st December 2021	1	Miss Mandy Wilson		
December 2022	2	Miss Mandy Wilson		
January 2023	3	Miss Mandy Wilson		

Version Control

Aims and Scope

Science is a body of knowledge built up through experimental testing of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us. At Red Oaks Primary School, science is about
developing children's ideas and ways of working to enable them to make sense of the
world in which they live through investigation, as well as using and applying skills.

The school's aims are to:

- Prepare our children for life in an increasingly scientific and technological world.
- Foster concern about, and active care for, our environment.
- Help our children acquire a growing understanding of scientific ideas.
- Help develop and extend our children's scientific concept of their world.
- Develop our children's understanding of the international and collaborative nature of science.

Attitudes

As a school, we aim to:

- Encourage the development of positive attitudes towards science.
- Build on our children's natural curiosity and develop a scientific approach to problems.
- Encourage open-mindedness, self-assessment, perseverance and responsibility.
- Provide our children with an enjoyable experience of science, so that they will develop a deep and lasting interest and may be motivated to study science further.

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.

Other linked Policies

- Maths policy
- Design and Technology policy
- SEN policy
- Inclusion policy
- Marking policy

1. Policy Statement

Science is a body of knowledge built up through experimental testing of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us. At Red Oaks Primary School, science is about developing children's ideas and ways of working to enable them to make sense of the world in which they live through investigation, as well as using and applying skills.

Teaching and Learning

Early Years

In the foundation stage, science comes under the umbrella of knowledge and understanding of the world. Children are taught to investigate objects, materials and living things using all their senses. Children are encouraged to ask questions about why things happen and how things work; to look closely at similarities, differences, patterns and change.

Key Stage One

The principal focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, however at Red Oaks it is **always** taught in context which directly relates to the teaching of science content.

Lower Key Stage Two

The principal focus of science teaching in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and
the relationships between living things and familiar environments, and by beginning to
develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific
language, first, to talk about and, later, to write about what they have found out. The language of chemistry, biology and physics is introduced in lower key stage two and links are made to the unit of study. Children also have an opportunity to study a particular scientist linked to the unit as part of the curriculum offer at Red Oaks. Appendix 4.4 – map attached

'Working scientifically' is described separately in the programme of study, however at Red Oaks it is **always** taught in context which directly relates to the teaching of science content.

Upper Key Stage Two

The principal focus of science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this
through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At Upper Key Stage 2, they should encounter more abstract ideas and
begin to recognise how these ideas help them to understand and predict how the world
operates. They should also begin to recognise that scientific ideas change and develop
over time. They should select the most appropriate ways to answer science questions
using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge

and understanding to explain their findings. The language of chemistry, biology and physics is firmly embedded in lessons in upper key stage two and children are able to identify which are of science they are studying. Children continue to study a variety of scientists linked to the unit studied as part of the curriculum offer at Red Oaks. Appendix 4.4 – map attached

'Working scientifically' is described separately in the programme of study, however at Red Oaks it is **always** taught in context which directly relates to the teaching of science content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Teaching and Learning Styles

Teaching and learning should ensure that scientific enquiry is taught through contexts
taken from the three areas:

- Life processes and living things (Biology)
- Materials and their properties (Chemistry)
- Physical processes (Physics)

To support the planning of lessons, teachers will follow the National Curriculum, in conjunction with the Red Oaks scheme of work, to ensure all objectives are taught.

Key Stage Two will have access to resources on the TigTag website (www.tigtagworld.co.uk) to enhance their lessons but planning and activities should be adapted to suit individual classes and should not be based solely on TigTag. The Red Oaks ethos for teaching science is based on child led 'hands on' practical learning. Experiments and investigations should be at the heart of every science lesson.
Concept cartoons should be used at the start of every science lesson as a form of recapping previous learning.
Teachers will follow the science curriculum overview for Red Oaks (see overview in curriculum) which outline topics of study, lesson objectives and relevant skills to support the learning. These skills are differentiated from year 1 to 6 to show clear progression of working scientifically.

Various methods and strategies are used for the teaching and learning of science at Red Oaks focussed around science enquiry. These focuses are as follows:

- **Pattern seeking –** identifying patterns and looking for relationships in enquiries where variables are difficult to control
- **Researching –** using secondary sources of information to answer scientific questions
- **Comparative and fair testing –** changing one variable to see its effects on another, whilst keeping all other the same
- **Identifying and classifying –** making observations to name, sort and organise items

- **Observation over time –** observe changes that occur over a period of time ranges from minutes to months

Skills

Children will practise skills throughout each unit. These will include opportunities to develop:

- Understanding of scientific processes.
- Practical scientific skills.
- The skills of investigation: observing, measuring, predicting, experimenting,
- communicating, interpreting, explaining and evaluating.
- The use of scientific language, recording and techniques.
- The use of ICT in investigating and recording.
- The ability to become effective communicators of scientific ideas.

The Learning Environment

The learning environment will enable the children to become independent learners, providing a comfortable atmosphere where children feel happy to take risks.

We recognise that all classes have children with widely differing scientific abilities. We provide suitable learning opportunities for all children by matching the challenge of the task to the ability and experience of the child. We achieve this in a variety of ways, by:

- Setting common tasks which are open-ended and can have a variety of responses.
- Setting different tasks for each ability group within the classroom.
- Providing resources of different complexity that are matched to the ability of the child.
- Using teaching assistants or communication support workers to support the work of individual children or groups of children.

Inclusion

We believe that all children have the right to access science lessons. In order to ensure that children with special educational needs achieve to the best of their ability, it may be necessary to adapt the delivery of the science curriculum for some pupils. This could involve using a multi-sensory approach.

We teach science to all children, whatever their ability. Science forms part of the National Curriculum to provide a broad and balanced education for all children. Through the teaching of science, we provide opportunities that enable all pupils to make progress. We do this by setting suitable challenges and responding to each child's individual needs.

Red Oaks is a Dyslexia Friendly School and all teachers are aware of the Dyslexia Friendly Schools guidelines. The school has also achieved the Inclusion Quality Mark.

Guidance and Procedures

Home / School Links

The importance of home/school links cannot be underestimated. Parents need to be encouraged to work with the school to support their children. Families must be supported to feel confident in approaching school. A range of activities are provided by Red Oaks to support the learning of science at home:

- Termly science challenges set on the website and class Dojo
- School scientists who will launch ideas, set challenge son the website and have email addresses for the children to contact them with questions to further their understanding
- School science weeks held on conjunction with the rest of TPAT schools
- Extra-curricular trip to the Royal Air Tattoo for gifted scientists across key stage two
- Whole school science fair held in the summer term with involvement from the wider community

The role of the Subject Leader

There is a science subject leader who is responsible for the implementation of science
policy across the school. Their role is to:

- Offer help and support to all members of staff (including teaching assistants) in
- the teaching, planning and assessment of science.
- Provide colleagues opportunities to observe good practice in the teaching of
- science.
- Maintain resources and advise staff on the use of equipment and resources.
- Monitor classroom teaching or planning.
- Monitor the children's progression in science, looking at examples of work of
- different abilities.
- Keep up-to-date with new developments and communicate information developments with colleagues.
- Lead staff training on new initiatives.
- Attend appropriate in-service training.
- Have enthusiasm for science and encourage staff to share this enthusiasm.
- Keep parents and governors informed on the implementation of science in the
- school.

The role of the Class Teacher

Individual teachers will be responsible for ensuring that the pupils in their classes have opportunities for studying science and using their knowledge, skills and understanding of science across the curriculum.

They will plan and deliver the requirements of the National Curriculum for Science to the best of their ability. We set high expectations for our pupils and provide opportunities for all to achieve, including boys and girls, pupils with educational special needs, pupils with disabilities, pupils from all social and cultural backgrounds and those from diverse linguistic backgrounds.

The class teacher's role is a vital role in the development of science throughout the school and will ensure continued progression in learning and understanding and create effective learning environments.

The class teacher will also:

- Secure pupil motivation and engagement.
- Provide equality of opportunity using a range of teaching approaches and techniques.
- Use appropriate assessment techniques and approaches.
- Maintain up-to-date assessment records.

Learning Resources

Science resources are stored centrally in the maths and science cupboard. All resources should be returned to this location after they have been used. An audit of resources will take place annually and purchases made when necessary and when funds are available. Knowledge Organisers should be provided for every child. Widgit language grids should be provided for SEND learners, EAL and though who would benefit from more explicit language explanation.
These should be stuck in to books at the beginning of each unit of science and referred to during every lesson.

Health and Safety

The school is aware of the health and safety issues involved in the children's use of scientific equipment. We will promote a safe working environment for the children by demonstrating the correct use of equipment and reinforcing this regularly. Please also refer to the Health and Safety policy for more guidance.

Marking, Assessment and Record Keeping

Lesson marking in EYFS

Evidence of children's learning is uploaded to the ILD under communication and language and understanding the world.

Lesson marking in key stage one

Science books must be marked following the taught lesson and prior to the next lesson. This can be done in a manner that challenges and supports every learner in every lesson. When marking books teachers should correct scientific language or indicate incorrectly spelt words for children to correct (where appropriate).

Teachers should acknowledge the working scientifically objective ('how' section of the LO – see appendix 4.1) by highlighting it yellow for achieved and green for not achieved. This information should be uploaded to the science data sheet as part of the marking process to inform teachers of the success of the working scientifically objective. This system should inform teachers of weaker areas that need revisiting.

In year 1 the children will begin to see the marking stamps in their books from January (term 3) or when the Phase lead deems it appropriate. This should be a minimum of twice a term as the focus should be on practical learning.

GD - 

WA - 
WT - 

Children with a WT stamp will form part of an over teach group with an adult to go over any misconceptions (this will be evidenced in books). WA stamp will complete a review question at the beginning of the following lesson, WT children will be part of this group to build on and consolidate previous learning.

The GD stamp group of children will complete a challenge task to extend and challenge their learning with an adult.

Where a child has a specific misconception, this will be addressed with personal marking and 1:1 support to ensure understanding is secure.

In Year 2 the children will receive a stamp in their book:

GD - 

WA - 
WT - 

This should be a minimum of twice a term as the focus should be on practical learning. These stamps will correlate with a review question on the first slide of the following week's lesson.

See appendix 4.5 These questions should be written with a TeeP command word and be used to deepen understanding, secure knowledge, ascertain understanding or address misconceptions.

Children should be given time to blue pen and respond to their question at the beginning of every lesson. Children in year 2 may show their understanding in written form or a picture depending on ability.

Where a child has a specific misconception, this will be addressed with personal marking and 1:1 support to ensure understanding is secure.

Lesson marking in key stage two

Science books must be marked following the taught lesson and prior to the next lesson. This can be done in a manner that challenges and supports every learner in every lesson. When marking books teachers will correct scientific language or indicate incorrectly spelt words for children to correct.

Teachers should acknowledge the working scientifically objective ('how' section of the LO – see appendix 4.1) by highlighting it yellow for achieved and green for not achieved. This information should be uploaded to the science data sheet as part of the marking process to inform teachers of the success of the working scientifically objective. This system should inform teachers of weaker areas that need revisiting. As part of the marking process please indicate where children need to complete or explain their work.

In years 3-6 each child should receive a stamp in their book:

GD - 

WA - 
WT - 

These stamps will correlate with a review question on the first slide of the following weeks lesson.

See appendix 4.5 These questions should be written with a TeeP command word and be used to deepen understanding, secure knowledge, ascertain understanding or address misconceptions.

Children should be given time to blue pen and respond to their question at the beginning of every lesson. We aim for children in upper Key Stage two to answer in full sentences (SEND with guidance).

Where a child has a specific misconception, this will be addressed with personal marking and 1:1 support to ensure understanding is secure.

On occasion, this marking system may not be appropriate and so it is up to the teachers discretion if they do not use the stamps.

End of unit assessments

Unit assessments of the key objectives taken from the National Curriculum are completed at the end of every unit.

Once children complete a unit of work, they will be assessed in an open-ended task where children are free to demonstrate what they know. This can be shown in a variety of ways including: diagrams, lists, drawings, prose etc. The teacher will then

use the children's work to assess whether they are working towards the standard, at the expected standard or exceeding the standard (GD) against the unit objectives and sticky knowledge that is captured on the knowledge organisers for each unit.

This can be carried out as a whole class, groups or 1:1 depending on the teacher's discretion and the age of the children. This information is uploaded on to the year group science assessment excel sheet and recorded against the child's name and unit objectives. Occasionally there is more than one assessment strand for a unit and the assessment data may show a difference in understanding for each strand. It is important that the data is a true reflection of the child's understanding of that strand as the data is calculated to create an overall picture of each child's scientific understanding. The data is recorded as 1 (PWT) 2 (WT) 3 (WA) 4 (GD). Percentages are shown on the excel sheet for each child's understanding and for the unit understanding. This informs future planning, any over-teach needed for individual children or groups or if a unit or objective needs revisiting.

It will be the teacher's responsibility to ensure these sheets are kept up to date and are completed post assessment and are ready for data analyses at the end of terms 2, 4, 6. (See appendix 4.2 and 4.3). If a weakness arises in a unit of science the expectation is for the unit/ objective or concept to be revisited swiftly to ensure any misconception is not embedded. This should be evidenced in books.

These assessment sheets must be completed fully by the end of the year by the current class teacher to inform the next teacher of any areas to revisit.

As well as this, children in five and six will have exposure to different science assessment questions from Testbase. This is planned in conjunction with Abbey Park and Lydiard Park as part of the cross-phase trust approach in getting children secondary ready.

Monitoring and Reviewing

The monitoring of the standards of the children's work and of the quality of teaching in science is the responsibility of the subject leader. The subject leader is also responsible for supporting colleagues in the teaching of science, for keeping informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school. The subject leader will be responsible for carrying out the task of reviewing samples of the children's work through book scrutiny's, carrying out learning walks to observe teaching and conducting pupil interviews.

Appendices

1) An example of a science learning objective linked to a working scientifically objective

What: Compare and group together different kinds of rocks

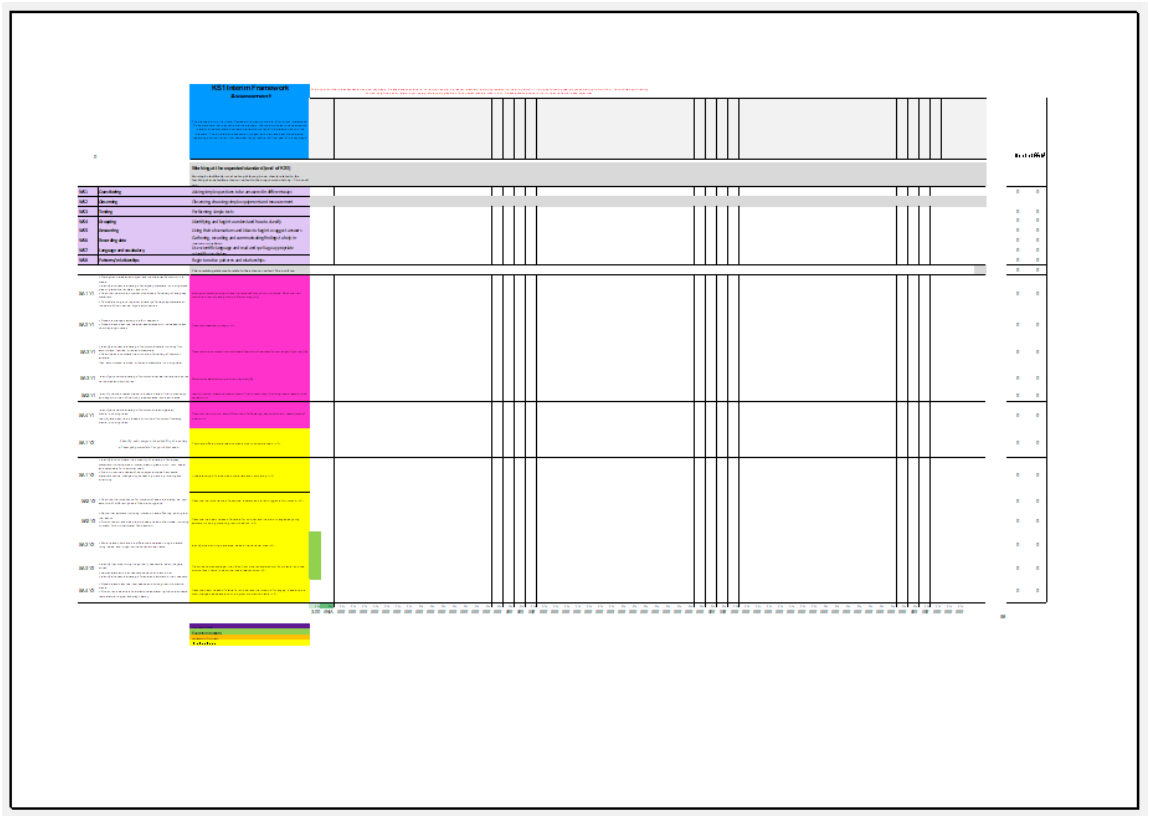
How: Observe the buildings in the local environment to see the change over time and to see how different rocks are used

Why: Assist me in my understanding of the world

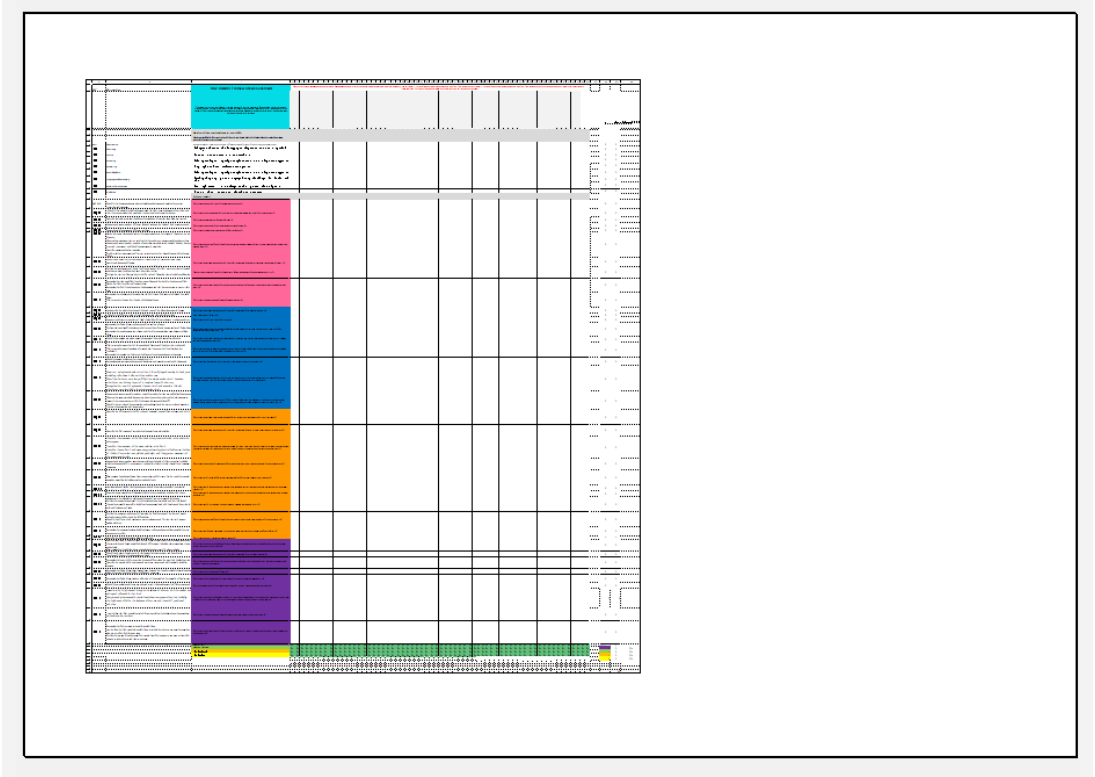
In this instance the working scientifically is WS2 – to use make careful observations

1	SAY	**KS2 Interim Framework Assessment**
2		The standard within the interim framework contains a number of 'pupil can' statements. To demonstrate that they have met the standard, teachers will need to have evidence that a pupil demonstrates consistent attainment of all of the statements within the standard. This will draw on assessment judgements that have been made earlier, regarding science content that has been taught before the final year of the key stage.
4		**Working at the expected standard (end of KS2)**
5		**Working scientifically (this must be taught through, and clearly related to, the teaching of substantive science content in the programme of study)**
6	WS1	Asking relevant questions and [illegible] of scientific enquiries to answer them
7	WS2	Making careful observations and, where appropriate, taking accurate measurements using standard units with a range of equipment.
8	WS3	Setting up simple practical enquiries, comparative and fair tests
9	WS4	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
10	WS5	Using straightforward scientific evidence to answer questions
11	WS6	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
12	WS7	Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
13	WS8	Identifying differences, similarities or changes related to simple scientific ideas and processes
14	WS9	Using results to draw simple conclusions, make predictions for new values

2)
An example of a KS1 assessment sheet



3)
An example of a KS2 assessment sheet



4)

Curriculum unit Overview with scientist study and cross-curricular links

Years 1-6 Subject: Science

Each unit has a scientist contact to email questions and discoveries

Biology — Professor Bublebunce professorbumblebunceou@yahoo.com

Chemistry — Professor Von Strudel-Hammer professorvonstrudelhammeruov@yahoo.com

Physics — Professor Nobella Boomrocket professornboomrocketicl@yahoo.com

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Everyday materials Chester Greenwood-Earmuffs 1858 - America	Seasonal changes - revisited termly Holly Green-Meteorologist - 1979 - England	Animals including humans Chris Packham-Animal Conservationist - 1961 - England Local environment		Plants Beatrix Potter-Author & Botanist - 1866 - England	
Year 2	Uses of everyday materials Charles Mackintosh-Waterproof coat 1766 - Scotland	Animals including humans Florence Nightingale-Pioneer of modern nursing in GB 1820 - England	Uses of everyday materials - properties John MacAdam-Tarmac 1756 - Scotland	Living things and their habitats Rachel Carson- Marine Pollution 1907 - American	Plants Agnes Arber-Botanist 1879 - England	
Year 3	Animals including humans Wilhelm Rontgen - X rays 1845 - Germany	Rocks Mary Anning- Fossil hunter 1799 - England	Forces Isaac Newton- Gravity (pull and Push) 1643 - England		Plants Joseph Banks-Botanist 1743 - England	Light Ibn al-Haytham - Light and our Eyes 965AD - Iraq
Year 4	Animals including humans Ivan Pavlov- Digestive System Mechanisms 1849 - Russia	Living things and their habitats George Cuvier - extinction (1769 - France)	Sound Alexander Graham Bell -Invented the telephone 1847 -Scotland		Electricity Thomas Edison-Lightbulb 1847 - America	States of matter Anders Celsius - Temperature Scale 1701 - Sweden
Year 5	Living things and their habitats Sir David Attenborough-Animal Behaviourist 1936 - England	Earth and Space Stephen Hawking- Black Holes 1942 - England	Properties and changing materials Compare - Becky Schroeder - fluorescence material 1961 - America Spencer Silver, Arthur Fry and Alan Amron - Post-It Notes 1941 - America Ruth Benerito - Wrinkle-Free Cotton 1916 - America		Forces Galileo Galilei - Gravity and Acceleration 1564 - Italy	Animals including humans Sarah Gilbert - Covid vaccine 1962 - England
Year 6	Living things and their habitats Carl Linnaeus - classification - 1707 Sweden	Animals including humans Sir Richard Doll- Linking Smoking and Health Problems 1912 - England	Evolution and inheritance Charles Darwin-Evolution 1809 - England	Electricity William Kamkwamba 1987 - Malawi He brought electricity to his village in Malawi from reading books about wind energy Film - The Boy who harnessed the wind (Netflix)	Light Percy Shaw - The Cats Eye 1890 - England	Science sessions at Abbey Park Physics

5)