Year 6 Science Curriculum Overview

During year 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Planning different types of scientific enquiries to complete comparative and fair tests including recognising and controlling variables where necessary so that questions can be answered.
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests and to ask questions surrounding patterns found
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or argument

Autumn One	Autumn Two
Electricity **'What is electricity?'** **'How does the number and voltage of cells affect how circuit components function?'**	**Light** **'How does light travel?'** **'How do we see?'**
Lesson 1: I can explain what electricity is.  Enquiry skill: ask questions, observe ***Activity idea: Recap Y4 learning - identify electrical items - battery or mains powered. Conductors or insulators sorting.*** Deepening Understanding: who is Alessandro Volta and how did he change the world we live in today? **Lesson 2:** I can identify circuit symbols and draw simple circuits.  Enquiry skill: observe, record, ask questions ***Activity idea: match name labels to physical circuit equipment and symbol diagram. Draw simple circuits, predict whether they work and investigate.***	Lesson 1: I can investigate how light travels.  Enquiry skill: ask questions, observe, report ***Activity idea: recap light sources. Use torches and card to investigate how light travels - predicting first what might happen*** Deepening Understanding: Talk like a scientist - using what you have learnt today, how do you think shadows are formed? Lesson 2: I can explain how we see objects  Enquiry skill: ask questions, record, ***Activity idea: use objects and string to model how we see things - representing the path of light travelling (Nicky Waller page 114)***

Deepening Understanding: draw a complete circuit for your partner using symbols for five different components. Can they identify the components you have used?

Lesson 3: I can investigate how the number and voltage of cells affects the volume of a buzzer

Enquiry skill: observe, record, measure, ask questions

Activity idea: Nicky Waller – Keeping it real.

Deepening Understanding: Talk like a scientist – Do you think anything other than the voltage of the cell could affect the volume or brightness?

Lesson 4: I can record my findings from a scientific enquiry

Activity idea: children to apply their learning about circuit symbols and their investigations to record the findings from their investigation

Deepening Understanding: Think like a scientist – how could accurate were your results? What other ways could you measure the brightness/volume? How fair was your test?

Lesson 5: I can apply my electricity knowledge to solve problems

Enquiry skill: observe, adapt, interpret, ask questions

Activity idea: Nicky Waller – Putting it into practice. An open ending challenge where pupils are encouraged to use trial and error to solve a problem/task

Deepening Understanding: Think like a scientist – what additional resources or materials would have made this task easier? Can you now think of any other ways which Alessandro Volta has changed the way we live today?

Deepening Understanding: Think like a scientist – concept cartoon (see PowerPoint)

Lesson 3: I can investigate reflection

Enquiry skill: observe, record, measure, ask questions

Activity idea: Light maze- Nicky Waller

Deepening Understanding: Think like a scientist – concept cartoon (see PowerPoint)

Lesson 4: I can apply my understanding of reflection to solve problems

Enquiry skill: observe, adapt, interpret, ask questions

Activity idea: Present children with a problem and create periscopes to solve – cereal boxes will be needed! Light dome visit week.

Deepening Understanding: Think like a scientist – concept cartoon (see PowerPoint)

Lesson 5: I can explain why shadows have the same shape as the objects that cast them

Enquiry skill: observe, record, measure, ask questions

Activity idea: Foil figures and torches activity – use foil to create a 'figure' investigate whether the shape of the shadow can be changed without touching the figure – see Nicky Waller page 114

Deepening Understanding: Talk like a scientist – what affects the shape and size of a shadow?

Vocabulary: circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage, Alessandro Volta **Resources:** wires with crocodile clips, bulbs, buzzers, batteries, cell holders, a selection of conductors and insulators, iPads, information about Alessandro Volta, **Better Reading Better Science texts:** Lighthouse Keeper's Lunch, Goodnight Mr Tom **Cross Curricular Links:** **Art:** technical drawing skills for circuits **History:** how the Ancient Greeks found static electricity **ICT/Literacy:** research and reading skills for Alessandro Volta **Mathematics:** trial and error method to solve problems	**Vocabulary:** light, light source, dark, transparent, translucent, opaque, shiny, matte, surface, shadow, reflect, sunlight, straight lines, light ray, periscope, angles **Resources:** torches, mirrors, card, model eye, string, cereal boxes, foil **Better Reading Better Science texts:** The Dark – Lemony Snickett, Look Up, Lights **Cross Curricular Links:** **Literacy:** use contrasting themes of light and dark to enhance descriptive writing **Mathematics:** use of angles when learning about reflection **R.E.:** Festivals of Light – Christmas, Diwali, Hanukkah **Art:** use of tone to enhance artwork **Music:** listen and play music which is contrasting and discuss what feelings are evoked from each piece

National Curriculum: By the end of the Autumn Term, pupils should be taught to

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- Use recognised symbols when representing a simple circuit in a diagram
- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

Spring One	Spring Two
Living things and their habitats **'How are living things classified?'**	

Lesson 1: I can identify the different groups of living things

Enquiry skill: ask questions

Activity idea: revisit Y4 learning of animal groups and classification. Physical sorting activity - living things/non-living things, human, animals, plants, fungi - gather ideas for key characteristics that separate these groups. Discuss the concept of Kingdoms

Deepening Understanding: Discuss the statement 'A log cannot be classified as a living thing'

Lesson 2 & 3: I understand that micro-organisms are living things

Enquiry skill: ask questions, observe, record, interpret

Activity idea: investigation - 'how can I prevent my bread from going mouldy' - record scientific investigation and results over two weeks

Deepening Understanding: True or false 'All micro-organisms are harmful' – encourage children to think about cheese, vitamins, antibiotics

Lesson 4: I can research the work of Carl Linnaeus

Enquiry skill: ask questions, report

Activity idea: research and present the work of Carl Linnaeus identifying how he impacted science and our lives today

Deepening Understanding: Talk like a scientist – what is good and bad about Carl Linnaeus' work – what would/could you do differently?

Lesson 5: I understand the process of classification

Enquiry skill: plan, interpret

Activity idea: use familiar objects e.g. shoes to practise the skill of classifying - asking yes/no questions that filter the objects down into smaller groups - use whiteboard to create a physical classification key

Deepening Understanding: test the classification charts – have they been successful? Why/why not?

Lesson 6: I can classify living things

Enquiry skill: set up enquiry, observe, report

Activity idea: apply all previous learning to classify animals practically. Extend to see whether pupils can draw a classification key

Deepening Understanding: 'Bats can be classified as a bird, because they can fly' – discuss and explain your reasoning

Lesson 7: I can identify habitat based on a living thing's characteristics

Enquiry skill: observe, report

Activity idea: provide children with a range of living things - identify an area of school where the living thing may choose to live. Record findings using iPads - photograph 'living thing' in its habitat

Deepening Understanding: odd one out – display different habitats – different answers possible encourage children to explain their reasoning

Lesson 8: I can apply my learning of living things and their habitats

Enquiry skill: record, interpret

Activity idea: children to create their own curious creature

Deepening Understanding: Classify your partners creature – explain how you did it

Vocabulary: micro-organisms, plants, animal, classification, invertebrates, insects, spiders, snails, worms, vertebrates, amphibians, reptiles, mammals, birds, fish, Carl Linnaeus, habitat

Resources: a range of living things sorting pictures, bread, sandwich bags, a range of locations, play animals, example classification keys

Better Reading Better Science texts: Beetle boy, Charlotte's Web, The Land of Neverbelieve, Mummy Laid an Egg

Cross Curricular Links:

Literacy: investigation write up

ICT: record findings using iPad and use as part of write up

History: work of Carl Linnaeus and how he has changed life today – where does he fit into the timeline of historic events we are familiar with

Mathematics: sorting activities use of Venn and Carroll diagrams

National Curriculum: By the end of the Spring Term, pupils should be taught to

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics

Summer One	Summer Two
Animals including humans **'What is the human circulatory system?'** **'How can we look after our bodies?'**	**Evolution and inheritance** **'How and why have living things changed over time?'** **'Why aren't humans identical to their parents?'**
Lesson 1: I understand the parts and the function of the human circulatory system  Enquiry skill: ask questions, report ***Activity idea: create a model of the circulatory system (e.g. using P.E. equipment) explore each part and it's function*** Deepening Understanding: What's the link? (Nicky Waller page 37) **Lesson 2: I can describe the function of the heart**  Enquiry skill: ask questions, observe, report ***Activity idea: VR activity - enter a lab and explore a model of a human heart. Heart rate investigation (Nicky Waller page 40)*** Deepening Understanding: Our heart rate will always reach the same level no matter what exercise we are doing – discuss and explain reasoning **Lesson 3: I understand the benefits of a balanced diet and exercise**	**Lesson 1: I understand that fossils tell us about things that inhabited the Earth over time**  Enquiry skill: ask questions, observe, report ***Activity idea: Fossil detectives (Nicky Waller pg. 68)*** Deepening Understanding: Think like a scientist – who do you agree with and why? • Evolution can happen over a few years • Fossils are the only proof we have of animals from millions of years ago • Scientists have evidence of every living thing from the past **Lesson 2: I recognise that living things produce that have similarities but are not identical to their parents**  Enquiry skill: observe, interpret, evaluate

Enquiry skill: research, report

Activity idea: create an 'ideal week' diary. Exploring what a balanced diet should look like - still ensuring some 'treats' but well balanced with healthy foods. Explore a 'balanced activity diet' too - number of hours spent outdoors/being active vs. number of hours gaming etc.

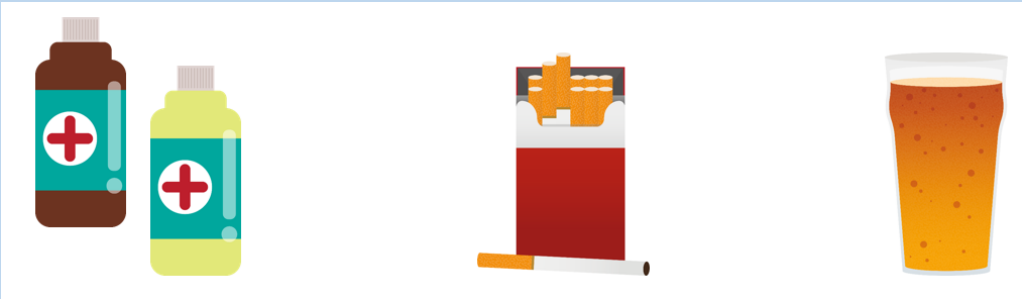
Deepening Understanding: To stay healthy you just need to eat a balanced diet – discuss and share reasoning for your answer.

Lesson 4: I recognise how lifestyle choices can impact the way a body functions

Enquiry skill: research, report

Activity idea: talk about legal/illegal drugs. Use a range of sources to research the impact drugs can have on the human body (exploring negative and positive) - pupils produce a non-chronological text to share findings

Deepening Understanding: odd one out – ensure pupils explain their reasoning



Lesson 5: I understand how nutrients and water are transported around my body

Enquiry skill: observe, evaluate, report

Activity idea: recap digestive system from Y4. Learning more about blood (Nicky Waller page 42)

Activity idea: Little Miss and Mr Men offspring activity - see picture

Deepening Understanding: Why do you humans have similarities and differences to their siblings?

Lesson 3: I can investigate how animals need to adapt in order to survive

Enquiry skill: set up enquiry, observe, report

Activity idea: Introduce Charles Darwin. Carry out Investigating animal adaptations (Nicky Waller pg 69)

Deepening Understanding: Provide each table with a different habitat – how what adaptations do you think an animal would need to survive here? Why?

Lesson 4: I can use secondary sources to research and report on adaptations

Enquiry skill: research, report

Activity idea: Use secondary sources to find out about how the population of Peppered Moths changed during the industrial revolution - report information found using a range of presentations - graphs, diagrams, writing

Deepening Understanding: 'humans have not needed to adapt' – discuss and explain reasoning

Lesson 5: I can investigate how plants adapt to their environment

Enquiry skill: set up enquiry, observe, measure, report

Activity idea: Use VR to explore the rainforest and the different leaf types found there. Investigating plant adaptations (Nicky Waller pg. 70)

Deepening Understanding: 'Although they compete to survive, plants aren't at risk of extinction.' – Discuss and explain reasoning

Deepening Understanding: 'The shape of blood cells is important so that they can move easily thought the blood vessels' – true/false. Discuss reasoning.	
Vocabulary: heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle **Resources:** P.E. equipment or equivalent to create a circulatory system, VR headsets, model of a heart, stopwatches, balanced diet plates, age appropriate sources of information about drugs, plastic bottles, yellow food colouring, salt, cheerios, red food colouring, sealable food bags, white marshmallows/pompoms, raisins **Better Reading Better Science texts:** Pig heart Boy, Skellig, A Heart Pumping Adventure **Cross Curricular Links:** **RSE -** drugs awareness/education **Mathematics -** time **Literacy -** non-chronological text write up **P.E. -** use of different activities to ensure a healthy lifestyle	**Vocabulary:** characteristics, inheritance, adaptation, evolution, fossil, traits, extinction, Charles Darwin, environment, habitat, DNA, genes, offspring, sibling, theory **Resources:** fossils, fossil images, Mr Men and Little Miss examples to support, pipe cleaners, seeds, rice, raisins, marshmallows, 'bird beak' utensil, timer, sources of information about Peppered Moths, range of laminated leaf outlines, pipettes **Better Reading Better Science texts:** Molliebird, DNA Detectives, One Beetle too many (Charles Darwin's story), One Smart Fish (see www.stem.org.uk/teaching-science-through-stories), Our family Tree (Picture book), Moth: An Evolution Story **Cross Curricular Links:** **RE - creation of life - religion vs science** **Literacy - written reports** **Geography - habitats and environments around the world**
National Curriculum: By the end of the Summer Term, pupils should be taught to • Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans. • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	
Science capital: Educational visit: visit high school for heart dissection School environment: use of VR to explore the heart/circulatory system	

Creative Homework: create a model of the heart or circulatory system, make a physical classification key and photo – send via dojo

Parent workshops: family tree afternoon

Professional visits: Light Dome visit during Autumn 2

Themed days: Annual science day/science week