BJS Science Curriculum

Term & Topic	Learning questions	Vocabulary	Knowledge	Skills	Enrichment	Global Citizen Links
Year 3 Science						
Aut 1&2 How Humans Work	What is important in a good prediction? What is important when taking or observing scientific measurements? What can I change when planning a scientific investigation? What is the function of the skeleton and the bones within it? What types of teeth do I have and why are they important? What are the roles of different nutrients on the body? What are the key parts of the digestion process? What are the function of key muscles within the body? What are the roles of vitamins and minerals within the body? What is the circulatory system and why is it important?	Nutrients Healthy Baby Elderly Fair test Comparative test Prediction Mouth Molar Tongue Teeth Oesophagus Stomach Movement Muscles Bones Skull Nutrition Skeletons Vitamins Minerals Circulatory Heart Blood	To understand that animals, including humans, need the right types and amount of nutrition. To know that there are physical similarities and differences between themselves and other people To know that animals, including humans, need the right types and amount of nutrition. To know that humans and some other animals have skeletons and muscles To know about the functions of skeletons and muscles in humans and some other animals To understand the simple functions of the basic parts of the digestive system in humans To know the different types of teeth in humans and their simple functions To know main parts of the human circulatory system	To be able to use own observations and ideas to suggest answers to questions To be able to ask simple questions and recognising that they can be answered in different ways To be able to plan an investigation changing only one independent variable To be able to set up simple practical enquiries, comparative and fair tests. To be able to make informed predictions To be able to record findings using simple scientific language. To be able to compare results and draw conclusions To be able to suggest ways of collecting evidence in response to a scientific question	Invite a doctor or dentist into school (could use a STEM ambassador)	Diversity – (differences between me and other people)

			To understand the importance of collecting scientific evidence through observation and testing	To be able to connect scientific investigations to real life To be able to make and record observations and take formal measurements To be able to record results in a table.		
Aut 2 Bright sparks	What do I need to make a circuit work? What materials make good conductors? How do I represent a circuit on paper? How does changing one variable affect the circuit?	Cells Wires Bulbs Switches Buzzers Battery Circuit	To know how to construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers To understand that a switch opens and closes a circuit To know a range of testable properties To understand that different materials are suited to different purposes To know that electricity is something which is generated To know the names of the components and the related symbols in a circuit To understand how to use electrical circuits to	To be able to observe closely, using simple equipment and using equipment safely and independently To be able to plan and perform simple tests, changing only one independent variable To be able to record findings using drawings, diagrams and tables. To be able to make informed predictions To be able to ask simple questions and recognising that they can be answered in different ways To be able to compare results to predictions and draw conclusions		STEM Ambassadors

			investigate the conductivity of various materials	To be able to make and record observations and take formal measurements		
Spr 1 **Shake It**	What information do you need on a table to compare different milks? How are solids, liquids and gases different? Do all liquids freeze? (experiment) How do I make butter? (experiment) Can I turn butter into a liquid? How does temperature affect the rate of butter melting? Is ice cream made from a reversible or irreversible change? What substances do you think will dissolve in milk? Do all liquids move at the same speed?	Solid Liquid Gas Melting Particles Temperature Freezing Heating Filter Dissolving Mixing Solubility	To understand how to compare and group solids, liquids and gases To know that some materials change state at different temperatures To know that some materials will dissolve in liquid to form a solution To understand how mixtures might be separated, including through filtering, sieving and evaporating To know that dissolving, mixing and changes of state are reversible changes To understand that some changes result in the formation of new materials, and that this kind of change is not usually reversible To know that heating or cooling can bring about a change of state	To be able to make observations and take accurate measurements using standard units and equipment, including thermometers and data loggers. To be able to use straightforward scientific evidence to answer questions or to support their findings To be able to plan an investigation changing only one independent variable To be able to record and describe the method and findings using drawings, diagrams and tables. To be able to understand the importance of collecting scientific evidence through observation and testing Be able to ask scientific questions To be able to make scientific predictions To be able to connect scientific	Cook a healthy meal	STEM Ambassadors

				investigations to real life To be able to describe observations and results identifying possible patterns		
Sum 2 Scavengers and settlers	How are fossils formed? What are the 3 main types of rocks? What different properties to 3 main types of rocks have? Which rock would be the best to make Stone Age tools from? Why? How do the properties of stone and metal compare?	Fossils Igneous Sedimentary Metamorphic Fossilisation Properties	To know in simple terms how fossils are formed when things that have lived are trapped within rock To understand that soils are made from rocks and organic matter	To be able to compare and group together different kinds of rocks on the basis of their appearance and simple physical properties		
Year 4 Science						
Aut 2 Making Waves	How are sounds made? How do vibrations affect sound? How do we measure sound? How do we see things? How can we see around corners? How are shadows formed? (investigation) What are the similarities and differences in the way that light and sound travel?	Volume Vibration Wave Pitch Tone Speaker Shadows Mirror Reflective Dark Reflection	To know how sounds are made To know vibrations from sounds travel to the ear To know how sounds are changed by altering the nature of vibrations To understand pitch and volume To know that sounds get fainter as the distance increases To understand that light and sound travel at different speeds	To be able to ask relevant questions and using different types of scientific enquiries to answer them. To be able to report on findings from enquiries, including oral and written explanations. To be able to set up simple practical enquiries, comparative and fair tests. To be able to make systematic and careful observations and take accurate measurements	The Science museum	STEM Ambassadors Pioneers Inventors and creators Network – career fair

			To know that they need light in order to see things and that dark is the absence of light To know that light is reflected from surfaces To know that shadows are formed when the light from a light source is blocked by an opaque object To understand that light travels in straight lines To understand that objects are seen because they give out or reflect light into the eye To understand that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes To know that heat, light, sound and movement are evidence of energy transfer taking place	using standard units and a range of equipment, including thermometers and data loggers. To be able to suggest ways of collecting evidence in response to a scientific question To be able to understand the importance of collecting scientific evidence through observation and testing To be able to connect scientific investigations to real life To be able to make informed predictions To be able to record findings using simple scientific language, bar charts, tables and keys. To be able to compare results to predictions and draw conclusions To be able to record and describe the method and results in a variety of ways To be able to compare investigations and results identifying possible anomalies		
Spr 1 Land, Sea and Sky	What is the water cycle? What is land made of?	Evaporation Condensation Habitat Fish	To understand the water cycle To know the names of a variety of plants and	To be able to gather, record, classify and present data to help in answering questions	Hall Place	Caring for our world

	What is the impact of water erosion? How are different animals classified? How have water birds adapted to thrive in their environments? What are the functions of the major parts of plants? How have plants adapted to live in water? How are living things interdependent? (food chains) What are the positive and negative impacts of humans on other living things?	Reptiles Mammals Birds Amphibians Adaptation Evolution Characteristics	animals as well as their habitats. To understand how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution To know about the functions of the major parts of a plant To know that the sun is the source of energy in all food chains To understand the positive and negative impacts humans have on other living things To understand how animals and plants are physically suited to particular environments To understand the interdependence between all living things	To be able to identify differences, similarities or changes related to simple scientific ideas To be able to suggest ways of collecting evidence in response to a scientific question To be able to describe observations and results identifying possible patterns To be able to draw diagrams to illustrate simple food webs and chains in an ecosystem		Eco council, recycling Special week to raise awareness – ecological issues: Endangered animals and living things, loss of habitat Awareness of global issues – deforestation, water shortages and famine Local area comparisons with the wider world Values and community projects Awareness of global issues – deforestation
Sum 2 **Feel the Force**	How do you plan a fair test? What is friction? Where is friction in everyday life? What is magnetism?	Friction Push Pull Air resistance Buoyancy Gravity Newton	To know how things move on different surfaces To understand the effects of friction To understand positive uses for friction	To be able to ask relevant questions, make predictions and use different types of scientific enquiries to answer them.		Same as Spring 1

	What do magnets attract?		the shape of an object To understand why we need friction To know that forces have a direction To know how magnets attract or repel each other and attract some materials and not others	To be able to record findings using simple scientific language, bar charts, tables and keys. To understand the importance of collecting scientific evidence through observation and testing To be able to connect scientific investigations to real life To be able to compare results to predictions and draw conclusions To be able to compare investigations and results identifying possible anomalies		
Year 5 Science						
Aut 1 & 2 Space Scientists	What shape is the Earth and how do we know? How are the Earth and the Moon similar and different? Can you explain the relationships between the Earth, Moon and Sun? What are the phases of the moon? How does each planet's orbit differ and why?	Axis Rotation Phases of the Moon Star Constellation Mesosphere Troposphere Exosphere Stratosphere Waxing Waning	To know the movement of the Earth and other planets relative to the sun To know the movement of the moon relative to the Earth To know that the sun, Earth and moon are approximately spherical bodies To understand the idea of the Earth's rotation to explain day and night To understand the rotation of the earth to explain the changes in	To be able to report and present findings from enquiries, including conclusions, explanations in oral and written presentations To be able to explain using scientific vocabulary To be able to choose an appropriate way (research review, simulation or experimentation) to investigate a scientific issue	Greenwich Observatory	STEM Ambassadors

	Why is Earth the best place for humans to live, thrive and survive? Will humans ever live on other planets?		Shadows throughout the day. Use the Earth's revolution to explain the seasons To understand that the position of the sun in the sky appears to change during the course of a day and this is different over the course of a year Know the names of the phases of the Moon Know that the Sun is the largest mass in our solar system, that has the strongest gravitational pull and keeps the planets in orbit Know that planets take different lengths of time and paths to orbit the Sun Understand how the Earth meets the conditions for sustaining human life Know that a force called gravity keeps things on the ground	To be able to suggest testable questions and generate a hypothesis To be able to make predictions related to the independent variable To be able to draw conclusions based on results and compare to original hypotheses and the real world To be able to use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. To be able to record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs.		
Spr 2 Roots, Shoots and Fruits	What are the major parts and functions of a plant? What are the different types of root systems? What do plants need in order to thrive?	Transportation Dispersal Pollination Flower Root Seed Leaves Stem Pollination Germination	To understand the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers To know what a plant needs to be healthy To understand the part that flowers play in the life cycle of flowering plants.	To be able to record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs. To be able to plan different types of scientific enquiries to answer questions To be able to generate a hypothesis	Garden Centre	Caring for our world Eco council, recycling Special week to raise awareness

	How do flowers attract bees and butterflies? What is the life cycle of the plant? What are the similarities and differences between different seeds? What are the different forms of seed dispersal?		To understand the reproduction in some plants. To know about factors that affect the growth of plants To know that photosynthesis requires carbon dioxide and results in the excretion of oxygen To know about pollination, fertilisation and methods of seed dispersal To understand how plants and animals adapt their behaviour in particular environments	To be able to conduct science investigations safely To be able to use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.		– ecological issues: Endangered animals and living things, loss of habitat Awareness of global issues – deforestation, water shortages and famine Local area comparisons with the wider world Values and community projects Awareness of global issues – deforestation
Sum 2 Being Human	How does my heart rate change throughout the day? What are the functions of each bone? How do we keep our joints and muscles healthy? How does the circulatory system work? How do we keep the circulatory system healthy?	Vessels Veins Arteries Oxygenated Deoxygenated Valve Exercise Respiration Adaption Evolution	To know the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. To understand the impact of diet, exercise and lifestyle on the way their bodies function. To understand the impact the environment has on our bodies. To know the ways in which nutrients and water are	To be able to take measurements, using a range of scientific equipment including data loggers. To be able to record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs. To be able to use results to draw simple conclusions, make predictions for new values,	Stem Ambassador (Doctor or sports coach)	Staying healthy Healthy living and healthy eating Global issues (obesity and factors that contribute to the upward trend of obesity in the world –

	How does food and water get absorbed by our body? What impact does the environment have on the respiratory system? How might environmental factors affect human development and growth? How do our bodies change as we develop into old age?		absorbed and transported within animals, including humans. To know the functions of the major internal and external parts of the human body To know how to describe some of the connections between systems in the human body To know the influences on the quality of life for living things	suggest improvements and raise further questions. To be able to understand the limitations of scientific investigation To be able to generate a hypothesis To be able to plan a fair (test) investigation		food supply vs politics)
Year 6 Science						
Aut 1 & 2 Existing, Endangered, Extinct	Why is classifying important? What is the essential information for identifying animal class? What are the changes and reasons that can cause a decrease in a species? What is adaption? What is the story of natural selection? What are the adaptations required for animals living in extreme environments?	Adaptation Evolution Characteristics Reproduction Genetics Vertebrates Invertebrates Micro-organisms, Amphibians Reptiles Mammals Natural selection Extinct Biodiversity	To know how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. To know that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. To understand how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	To be able to recognise scientific questions that do not yet have definitive answers. To be able to select methods to use to solve problems or answer questions, including a full range of enquiry methods, which are planned in detail To be able to use scientific evidence to answer questions to support findings. To be able to draw valid conclusions that utilise more than one piece of supporting evidence.		Caring for our world Global issues – endangered species (classifying) Loss of habitat due to i.e. deforestation or cow grazing etc. STEM Ambassadors

	What do we know about extinct species? How is climate change threatening species and the consequences of this?		To understand the consequences of imbalance in an ecosystem To know that there is evidence that animals have changed or become extinct over time To understand the effects that changes in the environment may have on living things Be able to predict the outcome of disruption to a food chain	To be able to understand the limitations of scientific investigation To be able to analyse observations and results identifying those that are more or less significant		
Aut 2 **Full Power**	Can you predict which items may be conductors and which may be insulators? How can you make a circuit using a switch? Can you predict what will happen if you add more bulbs or different batteries to a circuit? How can you build a parallel circuit?	Conductors Insulators Conductivity Electrical conductors Electrical current Electricity flow Resistance Electrons Neurons Ions Electrostatics Electric shocks	To understand how to 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 To know symbols when representing a simple circuit in a diagram To know some common conductors and insulators. To know which properties to test to see if materials are suitable for a purpose To know that different appliances consume different amounts of energy to do different tasks To know the names of types of circuit To know how to draw and build series and parallel circuits	To be able to repeat sets of observations or measurements, where appropriate, selecting suitable ranges and intervals, to give sufficient depth of evidence. To be able to decide on the most appropriate formats to present sets of scientific data, such as using line graphs for continuous variables To be able to evaluate the effectiveness of their working methods, making practical suggestions for improving them. To be able to use scientific evidence to answer questions to support findings. To be able to make predictions related to the independent variable		STEM Ambassadors Pioneers Inventors and creators Network – career fair

				To be able to draw conclusions based on results and compare to original hypotheses and the real world		
Spr 1 **900 CE**	**Ancient Maya** **Maya** How could the Maya and Aztecs have purified their water? What rocks dissolve in water? (experiment) <u>OR</u> **Benin** What are the similarities between bronze, copper and brass? (Experiment) What physical properties of bronze, copper and brass might have been useful in Benin? <u>OR</u> **Islamic State** Which shape of paper aeroplane flies the furthest? What effect does adding paper clips to our paper aeroplanes have?	Soluble Dissolved Purified Porous Absorbent	To know which rocks dissolve in water and those that don't To know that rocks were used to purify water To know that some materials will dissolve in liquid to form a solution and what factor impact solubility -------- To know the physical differences between bronze, brass and copper -------- To understand how air resistance operates	To be able to use scientific evidence to answer questions to support findings. To be able to plan a fair (test) investigation. To be able to compare and group together different kinds of rocks or metals on the basis of their physical properties and purpose To be able to draw conclusions based on results and compare to original hypotheses and the real world To be able to use test results to make predictions to set up further comparative and fair tests		
Sum 1 & 2 **Fairgrounds**	What are Newton's Three Laws of Motion?	Newton Gears Pulleys	To understand the effects of friction and how this effects movement	To be able to provide explanations for differences in repeated observations or	The London Eye	STEM Ambassadors

	How does friction affect movement? What are the five possible effects a force can have? What are examples of air resistance? What are examples of water resistance? What mechanisms can cause a smaller force to have a greater effect?	Friction Kinetic Fulcrum Magnet Magnetic Poles Series Parallel circuit Amps Volts	To understand levers, pulleys and gears which allow a smaller force to have a greater effect To know the five possible effects a force can have To understand how friction and air resistance impact on movement To know that a fulcrum provides a pivot point	measurements, identifying reasons for any anomalies noticed. To be able to take observations and measurements, using a range of scientific equipment with increasing accuracy and precision, taking repeat readings when appropriate (must use data loggers)? To be able to record the method and results in a range or graphs and diagrams including scatter graphs To understand the limitations of scientific investigation To be able to evaluate investigations for fairness and suggest improvements To be able to make predictions related to the independent variable To be able to analyse observations and results identifying those that are more or less significant To be able to measure forces using a Newton meter		Pioneers Inventors and creators Network – career fair
Sum 2 **Bake it!**	How are you able to group and classify materials according to testable properties?	Hardness	To understand how to compare and group	To be able to select methods to use to solve problems or answer questions, including a full range		STEM Ambassadors

	How do different amounts of heating and cooling bring about changes of state? What are the basic factors that affect solubility? What are reversible changes? What are irreversible changes? How can we separate simple mixtures?	Solubility Transparency Conductivity Magnetic Filter Evaporation Condensing Dissolving Mixing	together a variety of everyday materials To know that some materials will dissolve in liquid to form a solution and what factor impact solubility To know that dissolving, mixing and changes of state are reversible changes To understand that changing some materials makes them more or less suitable for their purposes To know that there are different ways to reverse a selection of changes To know that different amounts of heating or cooling are required to bring about a change of state To know that elements cannot be broken down into smaller parts	of enquiry methods, which are planned in detail. To be able to explain why particular pieces of equipment or information sources will provide better quality evidence. To be able to communicate findings in written form, across a range of genres, and uses multi-media and other forms of presentations. To be able to record the method and results in a range or graphs and diagrams including scatter graphs To be able to take systematic and accurate measurements or observations using the most appropriate tools and conventions To be able to analyse observations and results identifying those that are more or less significant		Pioneers Inventors and creators Network – career fair