Fellgate Primary School
Together Everyone Achieves More

Subject Overview with challenge

BOLD = National Curriculum Objectives
Italics = Concepts

Year 4 expected			
Working scientifically	Chemistry	Biology	Physics
Planning Investigations *Pupils can ask questions* **Ask relevant questions** • develop relevant, testable questions, e.g. based on observations of animals. *Pupils can plan an enquiry* **Plan different types of scientific enquiries to answer questions** • plan investigations using different types of scientific enquiry, e.g. exploring various materials by observing change over time, running comparative tests and conducting surveys. *Pupils can identify and manage variables* **Set up simple and practical enquiries, comparative and fair tests** • set up comparative and fair tests, e.g. finding patterns in the sounds made by elastic bands of different thicknesses**.**	**States of matter** *Materials have physical properties which can be investigated and compared* **Compare and group materials together, according to whether they are solids, liquids or gases** • Group materials according to their state of matter. *Materials can exist in different states and that these states can sometimes be changed* **Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature** • Describe how evaporation and condensation happen in the water cycle, and how temperature affects evaporation **Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)** • Identify changes of state and research values of degrees Celsius at which changes happen.	**Living things and their habitats** *Living things can be classified according to observable features* **Recognise that living things can be grouped in a variety of ways** • Suggest different ways of sorting the same group of living things, e.g. grouping birds according to where they live, what they eat and size of adults. **Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment** • Use classification keys to group and identify members from a range of familiar and less familiar living things **Recognise that environments can change and that this can sometimes pose dangers to living things** • Describe examples of living things that are threatened by changes to environments, e.g. owls and habitat loss.	**Sound** *Light & sound can be reflected & absorbed and enable us to see & hear* **Identify how sounds are made, associating some of them with something vibrating** • Explain, with reference to vibrations, how an object makes a sound. **Recognise that vibrations from sounds travel through a medium to the ear** • Describe the role of a medium in the transmission of sound. **Recognise that sounds get fainter as the distance from the sound source increases** • Describe the effect of moving further from the source of a sound. **Find patterns between the pitch of a sound and features of the object that produced it**

Conducting experiments *Pupils can use equipment to take measurements* **Make systematic and careful observations using a range of equipment, including thermometers and data loggers** • use various equipment, as instructed, repeatedly and with care, e.g. thermometers. *Pupils explore how to improve the quality of data* **Take accurate measurements using standard units, where appropriate** • recognise the importance of using standard units and measures accurately, e.g. measuring temperature when investigating its effect on washing drying.		**Animals, including humans** *The human body has a number of systems, each with its own function* **Describe the simple functions of the basic parts of the digestive system in humans** • Identify what each of the principal organs in the digestive system do. **Identify the different types of teeth in humans and their simple functions** • Describe the function of each type of tooth in the human skull. **Construct and interpret a variety of food chains, identifying producers, predators and prey** • Use a food chain to represent predator and prey relationships.	• Explain with reference to a particular object how the pitch of the sound can be changed. **Find patterns between the volume of a sound and the strength of the vibrations that produced it** • Explain with reference to a particular object how the volume of the sound can be changed.
Recording evidence *Pupils record work with diagrams and label them* **Record findings using simple scientific language, drawings and labelled diagrams** • use words and diagrams to record findings, e.g. how habitats change during the year. *Pupils can display data using labelled diagrams, keys, tables and bar charts*			**Electricity** *Electricity can make circuits work and can be controlled to perform useful functions* **Identify common appliances that run on electricity** • List examples of appliances that run on electricity. **Construct a simple series electrical circuit, identifying and naming its**

Record findings using keys, bar charts, and tables • use various ways to record evidence, e.g. comparing the teeth of herbivores and carnivores. *Pupils can display data using line graphs* **Gather, record, classify and present data in a variety of ways to help to answer questions** • use various ways to record, group and display evidence, e.g. grouping and classifying various materials.			**basic parts, including cells, wires, bulbs, switches and buzzers** • Construct a simple circuit and name its components. **Recognise some common conductors and insulators, and associate metals with being good conductors** • Sort materials into conductors and insulators, identifying metals as conductors. **Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery** • Predict whether a particular arrangement of components will result in a bulb lighting. **Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit** • Predict how the operation of a switch will affect bulbs lighting.
<u>Reporting findings</u> *Pupils process findings to develop conclusions and identify causal relationships* **Report on findings from enquiries, including oral and written explanations, of results and conclusions** • write a conclusion based on evidence, e.g. effect on brightness of bulbs if more cells are added. *Pupils use displays and presentations to report on findings* **Report on findings from enquiries using displays or presentations** • present findings either in writing or orally, e.g. relating to investigating which materials are conductors.			
<u>Conclusions and predictions</u>			

Pupils can analyse data **Identify differences, similarities or changes related to simple scientific ideas and processes** • recognise patterns that relate to scientific ideas, e.g. finding out which materials make better earmuffs. *Pupils can draw conclusions* **Use straightforward scientific evidence to answer questions or to support their findings** • use evidence to produce a simple conclusion, e.g. the effect of temperature on various substances. *Pupils can develop investigation further* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** • use evidence to suggest further relevant investigations, e.g. making own instruments, using ideas about pitch and volume.			
Year 4 challenging			
Working scientifically	Chemistry	Biology	Physics
<u>Planning Investigations</u> *Pupils can ask questions* **Ask relevant questions** • Independently develop a range of relevant testable questions. *Pupils can plan an enquiry*	**<u>States of matter</u>** *Materials have physical properties which can be investigated and compared* **Compare and group materials together, according to whether they are solids, liquids or gases**	**<u>Living things and their habitats</u>** *Living things can be classified according to observable features* **Recognise that living things can be grouped in a variety of ways** • Suggest why some ways of grouping living things may be more useful	**<u>Sound</u>** *Light & sound can be reflected & absorbed and enable us to see & hear* **Identify how sounds are made, associating some of them with something vibrating**

Plan different types of scientific enquiries to answer questions • answer questions using evidence gathered from different types of scientific enquiry. *Pupils can identify and manage variables* **Set up simple and practical enquiries, comparative and fair tests** • identify and manage variables.	• Recognise that some materials (e.g. toothpaste) cannot be easily classified as solid. liquid or gas. *Materials can exist in different states and that these states can sometimes be changed* **Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature** • Apply the relationship between rate of evaporation with temperature to everyday contexts. **Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)** • Suggest patterns in which kinds of materials change state at higher or lower temperatures.	than others, e.g. why grouping by number of legs is an easy aid to identification. **Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment** • Devise own classification keys to group living things. **Recognise that environments can change and that this can sometimes pose dangers to living things** • Describe examples of living things adapting to environmental change, e.g. urban foxes, and examples of extinction due to environmental change. •	• Group sound-making objects in terms of how they make sounds. **Recognise that vibrations from sounds travel through a medium to the ear** • Compare the effectiveness of different media in terms of their ability to transmit sound. **Recognise that sounds get fainter as the distance from the sound source increases** • Explain with reference to examples how sounds get fainter as the distance from the source increases. **Find patterns between the pitch of a sound and features of the object that produced it** • Identify generic features that cause the pitch of a note to be changed. **Find patterns between the volume of a sound and the strength of the vibrations that produced it** • Identify generic features that cause the volume of a note to be changed.

Conducting experiments *Pupils can use equipment to take measurements* **Make systematic and careful observations using a range of equipment, including thermometers and data loggers** • Independently select and use various equipment repeatedly and with care, e.g. measuring jug to measure volume, and discuss alternatives. *Pupils explore how to improve the quality of data* **Take accurate measurements using standard units, where appropriate** • Independently take measurements that are precise as well as accurate.		**Animals, including humans** *The human body has a number of systems, each with its own function* **Describe the simple functions of the basic parts of the digestive system in humans** • Explain why the simple functions of the basic parts of the digestive system in humans are necessary. **Identify the different types of teeth in humans and their simple functions** • Explain why humans have different types of teeth. **Construct and interpret a variety of food chains, identifying producers, predators and prey** • Suggest what might happen in a food chain if the population of one of the organisms changes**.**	**Electricity** *Electricity can make circuits work and can be controlled to perform useful functions* **Identify common appliances that run on electricity** • Compare and contrast appliances that run on mains electricity with those that run on batteries. **Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers** • Identify the functions of components within a circuit. **Recognise some common conductors and insulators, and associate metals with being good conductors** • Investigate graphite as a conductor and relate to other materials. **Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery** • Explain why certain arrangements will not result in the bulb lighting. **Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit**
Recording evidence *Pupils record work with diagrams and label them* **Record findings using simple scientific language, drawings and labelled diagrams** • start to use labelled diagrams to show more complex outcomes. *Pupils can display data using labelled diagrams, keys, tables and bar charts* **Record findings using keys, bar charts, and tables** • use various ways to record complex evidence.			

Pupils can display data using line graphs **Gather, record, classify and present data in a variety of ways to help to answer questions** • use line graph to record basic data.			• Explain how altering the location of a switch affects the operation of the circuit.
Reporting findings *Pupils process findings to develop conclusions and identify causal relationships* **Report on findings from enquiries, including oral and written explanations, of results and conclusions** • write a conclusion using evidence and identifying causal links. *Pupils use displays and presentations to report on findings* **Report on findings from enquiries using displays or presentations** • display and present key findings from enquiries orally and in writing.			
Conclusions and predictions *Pupils can analyse data* **Identify differences, similarities or changes related to simple scientific ideas and processes** • arrange data to make clear key characteristics.			

Pupils can draw conclusions **Use straightforward scientific evidence to answer questions or to support their findings** • show how evidence supports a conclusion. *Pupils can develop investigation further* **Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions** • suggest further relevant comparative or fair tests.			