BOLD = National Curriculum Objectives
Italics = Concepts

Year 6: expected			
Working scientifically	Chemistry	Biology	Physics
Planning Investigations *Pupils can plan an enquiry* **Plan different types of scientific enquiries to answer questions** • can answer questions using evidence gathered from different types of scientific enquiry, e.g. operation of circulatory system from experiment, survey and secondary research. *Pupils can identify and manage variables* **Recognise and control variables where necessary** • identify and manage variables, e.g. distances and sizes in shadow formation.		**Living things and their habitats** Living things can be classified according to observable features **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** • Use similarities and differences in observable features to decide how living things should be grouped, e.g. a cat is a mammal because it is warm blooded and gives birth to live young. **Give reasons for classifying plants and animals based on specific characteristics** • Explain why certain features are useful in classifying living things, e.g. backbones in animals and flowers in plants.	**Light** *Light & sound can be reflected & absorbed and enable us to see & hear* **Recognise that light appears to travel in straight lines** • Represent light using straight line ray diagrams. **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** • Draw diagrams using straight lines showing light travelling to 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** • Explain how we can see an object by referring to light travelling into the eye.

Conducting experiments *Pupils can use equipment to take measurements* **Take measurements using a range of scientific equipment** • use appropriate equipment, such as meter rule, to take measurements, such as distance travelled by light. *Pupils explore how to improve the quality of data* **Take measurements with increasing accuracy and precision** • consider how by modifying instrument or technique, measurements can be improved, e.g. when recording route of light rays. *Pupils understand the role of repeat readings* **Take repeat readings when appropriate** • identify situations in which taking repeat readings will improve the quality of evidence, e.g. investigating the behaviour of components in a circuit.		**Evolution and inheritance** *Living things exhibit variation and adaptation and these may lead to evolution* **recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago** • Use fossils as evidence that living things have changed over time, e.g. explain that these have died out and others have taken their place. **recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents** • Recognise that offspring normally vary from each other and from their parents, e.g. that puppies vary from each other and from their parents. **identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.** • Describe examples of a living thing that has adapted to live in a particular habitat and evolved as a result, e.g. a polar bear or cactus.	• **Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them** • Draw a diagram showing an object, shadow and light to relate object shape to shadow shape.

Recording evidence *Pupils record work with diagrams and label them* **Record findings using simple scientific language, drawings and labelled diagrams** • use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors. *Pupils can display data using labelled diagrams, keys, tables and bar charts* **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar charts** • use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to aid plant identification. *Pupils can display data using line graphs* **Record data and results of increasing complexity using line graphs** • use line graphs to display complex data, e.g. size of object in relation to the size of the shadow it casts.		**Animals, including humans** *The human body has a number of systems, each with its own function* **Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood** • Describe what heart, blood vessels and blood do, e.g. carry oxygen to all parts of the body. **Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function** • Suggest how their bodies are affected by substances and actions, e.g. that a high fat diet coupled with little exercise is likely to lead to obesity. **Describe the ways in which nutrients and water are transported within animals, including humans** • Describe with aid of diagrams the route that water takes within animals, e.g. through the human body.	

Reporting findings *Pupils process findings to develop conclusions and identify causal relationships* **Report and present findings from enquiries, including conclusions and causal relationships** • write a conclusion using evidence and identifying causal links, e.g. in the design of a periscope. *Pupils use displays and presentations to report on findings* **Report and presents findings from enquiries in oral and written forms such as displays and other presentation** • display and present key findings from enquiries orally and in writing, e.g. deciding how well classifications fit unfamiliar animals and plants. *Pupils explain confidence in findings* **Report and present findings from enquiries, including explanations of, and degree of, trust in results** • in conclusions, indicate how trustworthy they are, e.g. in relating brightness of bulb to voltage supplied.			**Electricity** *Electricity can make circuits work and can be controlled to perform useful functions* **Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit** • Explain how number and voltage of cells affects the lamp or buzzer. **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** • Explain the use of switches, how bulbs can be made brighter and buzzers made louder. **Use recognised symbols when representing a simple circuit in a diagram** • Represent a circuit that has been constructed using symbols.
Conclusions and predictions *Pupils can draw conclusions*			

Identify scientific evidence that has been used to support or refute ideas or arguments • identify how an idea is supported or refuted by evidence, e.g. selective breeding to produce animals or plants with desirable characteristics *Pupils can develop investigation further* **Use test results to make predictions to set up further comparative and fair tests** • use evidence to suggest further comparative or fair tests that would develop the investigation, e.g. in the design of rear view mirrors for cars.			
Year 6: challenging			
Working scientifically	Chemistry	Biology	Physics
<u>Planning Investigations</u> *Pupils can plan an enquiry* **Plan different types of scientific enquiries to answer questions** • suggest which type of enquiry is likely to be more successful at providing answers to a particular question. *Pupils can identify and manage variables* **Recognise and control variables where necessary** • identify and manage variables and recognises variables that cannot be easily managed.		**<u>Living things and their habitats</u>** Living things can be classified according to observable features **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** • Explore why some living things, such as the duck billed platypus, don't neatly fit into one group. **Give reasons for classifying plants and animals based on specific characteristics**	**<u>Light</u>** *Light & sound can be reflected & absorbed and enable us to see & hear* **Recognise that light appears to travel in straight lines** • Recognise that even when light changes in direction, the path is still continuous. **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** • Draw diagrams using straight lines showing light reflecting off objects and into the eye.

		• Explain why other features are less useful as a basis for classification, such as size or colour.	**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** • Refer to the idea that some objects may be better reflectors than others. **Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them** • Use a diagram to explain that although a shadow is the same shape as the object, it may not be the same size.
<u>Conducting experiments</u> *Pupils can use equipment to take measurements* **Take measurements using a range of scientific equipment** • recognise limitations of available equipment, e.g. accuracy of balance. *Pupils explore how to improve the quality of data* **Take measurements with increasing accuracy and precision** • evaluates different techniques, with reference to accuracy and precision. *Pupils understand the role of repeat readings* **Take repeat readings when appropriate**		**<u>Evolution and inheritance</u>** *Living things exhibit variation and adaptation and these may lead to evolution* **recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago** • Suggest possible reasons for changes to living things over time, e.g. why penguins can't fly but are good at swimming **recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents**	**<u>Electricity</u>** *Electricity can make circuits work and can be controlled to perform useful functions* **Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit** • Relate the number or voltage of cells to the number and operation of bulbs or buzzers that can be run from them. **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**

• explain why repeatedly taking repeat readings is of little value.		• Recognise that selective breeding may result in offspring with certain features, e.g. pedigree dogs with a certain shape or colour. **identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.** • Give examples of living things that have evolved in different ways, e.g. different types of finch.	• Explain the effect of changing the order of the components in a circuit. **Use recognised symbols when representing a simple circuit in a diagram** • Design circuits using symbols.
Recording evidence *Pupils record work with diagrams and label them* **Record data and results of increasing complexity using scientific diagrams and labels** • Explain why a labelled diagram may be particularly effective. *Pupils can display data using labelled diagrams, keys, tables and bar charts* **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar charts** • evaluate various ways of recording complex data. *Pupils can display data using line graphs* **Record data and results of increasing complexity using line graphs** • explain the advantages of using line graphs.		**<u>Animals, including humans</u>** *The human body has a number of systems, each with its own function* **Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood** • Explain some characteristics of the heart, blood vessels and blood, e.g. explain that the arteries are thicker because they carry blood at a higher pressure. **Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function** • Explain how decisions about lifestyle can affect the quality of life, e.g. recognise that making excessive use of convenience foods may introduce more additives into the diet.	

Reporting findings *Pupils process findings to develop conclusions and identify causal relationships* **Report and present findings from enquiries, including conclusions and causal relationships** • suggest possible limits to causal relationships *Pupils use displays and presentations to report on findings* **Report and presents findings from enquiries in oral and written forms such as displays and other presentation** • evaluate the best way of displaying and presenting key findings. *Pupils explain confidence in findings* **Report and present findings from enquiries, including explanations of, and degree of, trust in results** • in conclusions, indicate, if appropriate, why the results may not be entirely trustworthy.		**Describe the ways in which nutrients and water are transported within animals, including humans** • Compare the ways in which nutrients and water are transported in two animals that are quite different	
Conclusions and predictions *Pupils can draw conclusions* **Identify scientific evidence that has been used to support or refute ideas or arguments** • suggest how factors other than evidence may support or oppose an idea.			

Pupils can develop investigation further **Use test results to make predictions to set up further comparative and fair tests** • evaluate which further comparative or fair tests would be particularly useful.			