Progression Framework

Science

Year Six

Progression Framework

Introduction

The Progression Framework for science is divided into two parts: *Progression in concepts and Working Scientifically*:

- *Progression in concepts* is based on the statements relating to key ideas in science. It is split into Biology, Chemistry and Physics; within each of these a number of 'big ideas' have been identified and used to show how later statements progress from earlier ones. See below for more information about the big ideas.
- *Working Scientifically* is based on the main skill areas which are broadly viewed as processes (e.g. planning investigations, reporting findings). Each of these is then subdivided into individual skills. As the Programme of Study statements are by Key Stage rather than by year, these have been taken as relating to the second year of each Key Stage and statements have been developed for the previous year that represent progress towards that.

Progression Framework for Science, Year Six

Domain: Biology

'Big idea'	Progression statement	What to look for guidance (Working towards expectations)	What to look for guidance (Meeting expectations)	What to look for guidance (Exceeding expectations)
1) Living things can be classified according to observable features	6.1.1 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	Identify the broad groups into which living things are classified, e.g. mammals.	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.	Explore why some living things, such as the duck billed platypus, don't neatly fit into one group.
	6.1.2 Give reasons for classifying plants and animals based on specific characteristics	State how plants and animals can be classified using specific characteristics.	Explain why certain features are useful in classifying living things, e.g. backbones in animals and flowers in plants.	Explain why other features are less useful as a basis for classification, such as size or colour.
2) Habitats provide living things with what they need	There is no content for this Big Idea in Year 6.			
3) Living things exhibit variation and adaptation and these may lead to evolution	6.3.1 Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago LINK 4.1.1	Recognise that fossils provide information about living things from millions of years ago, e.g. understand that they are preserved remains of extinct living things.	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.	Suggest possible reasons for changes to living things over time, e.g. why penguins can't fly but are good at swimming.
	6.3.2 Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents	Recognise that living things produce offspring of the same kind, but normally offspring vary, e.g. that puppies have common features but are not identical.	Recognise that offspring normally vary from each other and from their parents, e.g. that puppies vary from each other and from their parents.	Recognise that selective breeding may result in offspring with certain features, e.g. pedigree dogs with a certain shape or colour.

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	6.3.3 Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution	Identify ways in which certain animals and plants are adapted to suit their environment in different ways.	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.	Give examples of living things that have evolved in different ways, e.g. different types of finch.

Domain: Biology

'Big idea'	**Progression statement**	**What to look for guidance (Working towards expectations)**	**What to look for guidance (Meeting expectations)**	**What to look for guidance (Exceeding expectations)**
4a) Life exists in a variety of forms and goes through cycles – Plants	There is no content for this Big Idea in Year 6.			
4b) Life exists in a variety of forms and goes through cycles – Animals	There is no content for this Big Idea in Year 6.			
5) The human body has a number of systems, each with its own function	6.5.1 Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood	Name the main parts of the human circulatory system, e.g. heart, arteries, veins.	Describe what heart, blood vessels and blood do, e.g. carry oxygen to all parts of the body.	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.
	6.5.2 Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function	Recognise that diet, exercise, drugs and lifestyle impact on the way the body functions, e.g. knowing that exercise changes the body.	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.	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.

	6.5.3 Describe the ways in which nutrients and water are transported within animals, including humans	Describe that nutrients and water are transported within humans.	Describe with aid of diagrams the route that water takes within animals, e.g. through the human body.	Compare the ways in which nutrients and water are transported in two animals that are quite different.

Domain: Chemistry

'Big idea'	**Progression statement**	**What to look for guidance (Working towards expectations)**	**What to look for guidance (Meeting expectations)**	**What to look for guidance (Exceeding expectations)**
1) Different rocks have different properties and the formation of soil & fossils can be explained	There is no content for this Big Idea in Year 6.			
2) Materials have physical properties which can be investigated and compared	There is no content for this Big Idea in Year 6.			
3) The physical properties of materials determine their uses	There is no content for this Big Idea in Year 6.			
4) Materials can exist in different states and that these states can sometimes be changed	There is no content for this Big Idea in Year 6.			

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Domain: Physics

'Big idea'	Progression statement	What to look for guidance (Working towards expectations)	What to look for guidance (Meeting expectations)	What to look for guidance (Exceeding expectations)
1) There are contact and non-contact forces; these affect the motion of objects	There is no content for this Big Idea in Year 6.			
2) Day, night, month, seasonal change & year are caused by the position and movement of the Earth	There is no content for this Big Idea in Year 6.			
3) Light & sound can be reflected & absorbed and enable us to see & hear	6.3.1 Recognise that light appears to travel in straight lines	Recognise that light travels from one point to another.	Represent light using straight line ray diagrams.	Recognise that even when light changes in direction, the path is still continuous.
	6.3.2 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	Recognise that some objects reflect light.	Draw diagrams using straight lines showing light travelling to the eye.	Draw diagrams using straight lines showing light reflecting off objects and into the eye.
	6.3.3 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	Describe how light travels from light sources to our eyes.	Explain how we can see an object by referring to light travelling into the eye.	Refer to the idea that some objects may be better reflectors than others.
	6.3.4 Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them	Relate the shape of shadows to the shape of the object that makes them.	Draw a diagram showing an object, shadow and light to relate object shape to shadow shape.	Use a diagram to explain that although a shadow is the same shape as the object, it may not be the same size.

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Domain: Physics

'Big idea'	Progression statement	What to look for guidance (Working towards expectations)	What to look for guidance (Meeting expectations)	What to look for guidance (Exceeding expectations)
4) Electricity can make circuits work and can be controlled to perform useful functions	6.4.1 Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in a circuit	Recognise that changing the number and voltage of cells may alter the operation of a circuit.	Explain how number and voltage of cells affects the lamp or buzzer.	Relate the number or voltage of cells to the number and operation of bulbs or buzzers that can be run from them.
	6.4.2 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	Identify the function and operation of different components.	Explain the use of switches, how bulbs can be made brighter and buzzers made louder.	Explain the effect of changing the order of the components in a circuit.
	6.4.3 Use recognised symbols when representing a simple circuit in a diagram	Understand that components can be represented by symbols.	Represent a circuit that has been constructed using symbols.	Design circuits using symbols.

Progression Framework for Science, Year Six

Domain: Working scientifically

Process	Sub-process	Progression statement	What to look for guidance (Working towards expectations)	What to look for guidance (Meeting expectations)	What to look for guidance (Exceeding expectations)
1) Planning investigations	a) Pupils can ask questions	There is no content for this sub-process in Year 6.			
	b) Pupils can plan an enquiry	6.1.b.1 Plan different types of scientific enquiries to answer questions (^) LINK 4.1.a.1	Pupil can, with support, can answer questions using evidence gathered from different types of scientific enquiry.	Pupil can answer questions using evidence gathered from different types of scientific enquiry, e.g. operation of circulatory system from experiment, survey and secondary research.	Pupil can suggest which type of enquiry is likely to be more successful at providing answers to a particular question.
	c) Pupils can identify and manage variables	6.1.c.1 Recognise and control variables where necessary (^)	Pupil can, with prompting, identifies and manages variables.	Pupil can identify and manage variables, e.g. distances and sizes in shadow formation.	Pupil can identify and manage variables and recognises variables that cannot be easily managed.
2) Conducting experiments	a) Pupils can use equipment to take measurements	6.2.a.1 Take measurements using a range of scientific equipment (^)	Pupil can, following discussion of alternatives, select appropriate equipment, e.g. measuring jug to measure volume.	Pupil can use appropriate equipment, such as meter rule, to take measurements, such as distance travelled by light.	Pupil can recognise limitations of available equipment, e.g. accuracy of balance.
	b) Pupils explore how to improve the quality of data	6.2.b.1 Take measurements with increasing accuracy and precision (^)	Pupil can take measurements that are precise as well as accurate.	Pupil can consider how by modifying instrument or technique, measurements can be improved, e.g. when recording route of light rays.	Pupil can evaluates different techniques, with reference to accuracy and precision.
	c) Pupils understand the role of repeat readings	6.2.c.1 Take repeat readings when appropriate (^)	Pupil can know how to process repeat readings.	Pupil can identify situations in which taking repeat readings will improve the quality of evidence, e.g. investigating the behaviour of components in a circuit.	Pupil can explain why repeatedly taking repeat readings is of little value.

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Domain: Working scientifically

Process	Sub-process	Progression statement	What to look for guidance (Working towards expectations)	What to look for guidance (Meeting expectations)	What to look for guidance (Exceeding expectations)
3) Recording evidence	a) Pupils record work with diagrams and label them	6.3.a.1 Record data and results of increasing complexity using scientific diagrams and labels (^)	Pupil can start to use labelled diagrams to show more complex outcomes.	Pupil can use labelled diagrams to show complex outcomes, e.g. relating specific adaptations of organisms to environmental factors.	Pupil can explain why a labelled diagram may be particularly effective.
	b) Pupils can display data using labelled diagrams, keys, tables and bar charts	6.3.b.1 Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar charts (^)	Pupil can, with prompting, uses various ways to record complex evidence.	Pupil can use various ways, as appropriate, to record complex evidence, e.g. in the construction of a key to aid plant identification.	Pupil can evaluate various ways of recording complex data.
	c) Pupils can display data using line graphs	6.3.c.1 Record data and results of increasing complexity using line graphs (^)	Pupil can use a line graph to record basic data.	Pupil can use line graphs to display complex data, e.g. size of object in relation to the size of the shadow it casts.	Pupil can explain the advantages of using line graphs.
4) Reporting findings	a) Pupils process findings to develop conclusions and identify causal relationships	6.4.a.1 Report and present findings from enquiries, including conclusions and causal relationships (^)	Pupil can, with prompting, write a conclusion using evidence and identifying causal links.	Pupil can write a conclusion using evidence and identifying causal links, e.g. in the design of a periscope.	Pupil can suggest possible limits to causal relationships.
	b) Pupils use displays and presentations to report on findings	6.4.b.1 Report and presents findings from enquiries in oral and written forms such as displays and other presentation (^)	Pupil can, with support, display and present key findings from enquiries orally and in writing.	Pupil can display and present key findings from enquiries orally and in writing, e.g. deciding how well classifications fit unfamiliar animals and plants.	Pupil can evaluate the best way of displaying and presenting key findings.

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	c) Pupils explain confidence in findings	6.4.c.1 Report and present findings from enquiries, including explanations of, and degree of, trust in results (^)	Pupil can, with support, indicate why some results may not be entirely trustworthy.	Pupil can, in conclusions, indicate how trustworthy they are, e.g. in relating brightness of bulb to voltage supplied.	Pupil can, in conclusions, indicate, if appropriate, why the results may not be entirely trustworthy.

Domain: Working scientifically

Process	**Sub-process**	**Progression statement**	**What to look for guidance (Working towards expectations)**	**What to look for guidance (Meeting expectations)**	**What to look for guidance (Exceeding expectations)**
5) Conclusions and predictions	a) Pupils can analyse data	There is no content for this sub-process in Year 6.			
	b) Pupils can draw conclusions	6.5.b.1 Identify scientific evidence that has been used to support or refute ideas or arguments (^)	Pupil can show how evidence supports a conclusion.	Pupil can identify how an idea is supported or refuted by evidence, e.g. selective breeding to produce animals or plants with desirable characteristics.	Pupil can suggest how factors other than evidence may support or oppose an idea.
	c) Pupils can develop investigation further	6.5.c.1 Use test results to make predictions to set up further comparative and fair tests	Pupil can suggest further relevant comparative or fair tests.	Pupil can 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.	Pupil can evaluate which further comparative or fair tests would be particularly useful.