



Topic name	Term	Skills developed	Link to NC subject content	Prior learning	Next link in curriculum
Inheritance and variation	Autumn	Scientific attitudes - Understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review Experimental skills and investigations - Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience - Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements Analysis and evaluation - present observations and data using appropriate methods, including tables and graphs - interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions - present reasoned explanations, including explaining data in relation to predictions and hypotheses - evaluate data, showing awareness of potential sources of random and systematic error - identify further questions arising from their results. Measurement - use and derive simple equations and carry out appropriate calculations	Inheritance, chromosomes, DNA and genes - heredity as the process by which genetic information is transmitted from one generation to the next - a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model - differences between species - the variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation - the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection - changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction - the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material	Links from KS2: LIVING THINGS and their HABITATS Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. Recognise that environments can change and that this can sometimes pose dangers to living things. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. Links to other KS3 topics: Y7 Human reproduction Y7 Plant reproduction	Links to GCSE Topic: 4.6 Inheritance, variation and evolution (taught in Y11) KS5 AQA A-level Biology 3.4.1 DNA, genes and chromosomes 3.4.4 Genetic diversity and adaptation 3.7.1 Inheritance 3.7.3 Evolution may lead to speciation



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Health and disease	Spring	Scientific attitudes - understand that scientific methods and theories develop as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review - evaluate risks. Experimental skills and investigations - Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience - Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements Analysis and evaluation - present observations and data using appropriate methods, including tables and graphs - interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions - Translate disease incidence information between graphical and numerical forms, construct and interpret frequency tables and diagrams, bar charts and histograms, and use a scatter diagram to identify a correlation between two variables. - Interpret data about risk factors for specified diseases. Understand the principles of sampling as applied to scientific data in terms of risk factors	Health - the effects of recreational drugs (including substance misuse) on behaviour, health and life processes. Nutrition and digestion - the consequences of imbalances in the diet, including obesity, starvation and deficiency diseases - the importance of bacteria in the human digestive system Gas exchange systems - the impact of exercise, asthma and smoking on the human gas exchange system Data and disease Translate disease incidence information between graphical and numerical forms and use a scatter diagram to identify a correlation between two variables in terms of risk factors. Understand the principles of sampling as applied to scientific data, including epidemiological data. - discuss the human and financial cost of these non-communicable diseases to an individual, a local community, a nation or globally - explain the effect of lifestyle factors including diet, alcohol and smoking on the incidence of non-communicable diseases at local, national and global levels	ANIMALS including HUMANS Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. Links to other KS3 topics: Y7 Cells, tissues and organs (digestive system) Y8 Respiration, breathing and movement (nutrition and gas exchange)	Links to GCSE Topic: 4.3 Infection and response (taught in Y10) KS5 AQA A-level Biology 3.2 Cells 3.2.4 Cell recognition and the immune system



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		- present reasoned explanations, including explaining data in relation to predictions and hypotheses - evaluate data, showing awareness of potential sources of random and systematic error - identify further questions arising from their results. Measurement use and derive simple equations and carry out appropriate calculations			
Cells and microscopes	Summer	Experimental skills and investigations - Make and record observations - Use and derive simple equations and carry out appropriate calculations. - Use appropriate techniques, apparatus and materials during lab work paying attention to health and safety Measurement - Use prefixes centi, milli, micro and nano. Use of standard form. Recognise, draw and interpret images of cells. Images of cells in videos, bioviewers, photographs and micrographs can be used as comparison for students own drawings. - Use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. Analysis and evaluation - Ability to carry out research using appropriate resources and reference - Recognise specialised cells, be able to explain structure linked to function	Building on principles studied in Y7 &Y8 - transition to GCSE Eukaryotes and prokaryotes Animal and plant cells explain how the main sub-cellular structures, including the nucleus, cell membranes, mitochondria, chloroplasts in plant cells and plasmids in bacterial cells are related to their functions Cell specialisation Cells may be specialised to carry out a particular function: - sperm cells, nerve cells and muscle cells in animals - root hair cells, xylem and phloem cells in plants. Microscopy use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.	Links to other KS3 topics: Y7 Cells, tissues and organs Y8 Photosynthesis (plant cells)	Links to GCSE Topic: 4.1 Cell biology (taught in Y10) KS5 AQA A-level Biology 3.2 Cells



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			Explain how electron microscopy has increased understanding of sub-cellular structures. carry out calculations involving magnification		