KS3 Curriculum Plan

INTENT – Why are we doing what we are doing?

"If I have seen further, **it is by standing on the shoulders of giants**."
Sir Isaac Newton (Born 25th December 1642, Grantham Lincolnshire)

At Waltham Toll Bar we aim to enthuse and produce the next generation of scientists. In KS3, the Science curriculum establishes an understanding of the key disciplinary and substantive knowledge required to understand the scientific world around us. Students will have lessons in the three different disciplines of Science: Biology, Chemistry and Physics. Our very first topic will give students an insight into 'How Scientists Work' and these skills will be developed, practiced and embedded as they move through the key stage and onto key stage 4 and 5. These disciplinary skills give the students the tools to access and unlock knowledge through investigatory techniques. Throughout KS3, the students will progress through a substantive knowledge rich curriculum that builds the foundational concepts of science which underpin our everyday life. These foundational concepts and key themes will be embedded through retrieval practice across all of KS3 and built upon as they progress through the years. The students will begin to cover topics that develop their inquiring minds and these topics will be interleaved with the key disciplinary knowledge required to become a successful scientist. Students will continue to explore scientific concepts and analyse data they have obtained as they approach a new range of enquiry questions as the years progress. The challenge of having students to work like a scientist increases throughout the key stage as they begin to combine aspects of the 'How Scientists Work' key theme as well as accessing and analysing scientific texts throughout every topic.

Our locality is very important to our science curriculum in all key stages. We are extremely fortunate that our school is based in Grimsby and in extreme close proximity to the Humber bank which has strong links to the renewable sector. Alongside this, students study the production of electricity in Year 8 and our proximity to the DRAX Biomass power station gives a real opportunity to visit and demonstrate the scale of electricity production for the area. Data obtained from N.E. Lincs council allows us to really delve into the issues in the local area such as obesity and air pollution.

Progressing from year 9, all students are required to take at least Combined Science at GCSE. Students who have developed an analytical and scientific inquiry-based way of thinking throughout the KS3 science curriculum may opt to select Separate Science in their options in order to further discover the scientific world around us.

IMPLEMENTATION - Year 7

Date	**Unit Title**	**Unit Enquiry Question** *Should be the basis of the entire unit, the thing that drives the unit.*	**Intent** *Purpose of the specific unit.*	**Core Disciplinary (Skills) Knowledge Gained**	**Core Substantive (Content) Knowledge Gained**	**Careers Links**	**"Need to Know"** *Core content required to be covered during this unit.*	**"Neat to Know"** *Things that would be good for students to know but not essential. Will not feature in assessments etc.*
Autumn 1 September – October	1.Laboratory introduction	• How do Scientists work?	To gain a sound knowledge of a range of laboratory equipment in order to develop their independent use. As well as develop these through further unit and learning.	• Application to real life • Develop motor skills • Develop primary data collection skills (reading a thermometer)	• Recognition of laboratory-based equipment • Acknowledgement on how various equipment is used and begin to distinguish accuracy between equipment i.e. beaker and measuring cylinder	• Laboratory assistant • Research assistant	• Safety within a laboratory • Identify laboratory equipment • Describe how various laboratory equipment can be used	• Accuracy comparison between various piece of laboratory equipment • Scientific link to scientists and their influence on equipment
	Links between Units: Allows students to expand upon the foundational knowledge gained in unit 1 and explore how different cells can be observed within a laboratory setting							
Autumn 2 November – December	2.Cells	• What is the basis of all living organisms?	To gain fundamental knowledge into the basic building blocks of life as well as develop the skills gained in unit 1 to observe and draw biological images using a microscope.	• Compare/contrast • Biological drawings • Extended writing • Application of adaptations to a cell's/organism's purpose	• Explain how and why cells behave the way they do	• Microbiologist • Haematologist • Oncologist • Pathologist	• Components of plant and animal cells • Role of organelles within cells	• Scientific skills – constructing diagrams (biological drawings) • Influence of scientist n the discovery of cells
	Links between Units: Enables students to make the connections between the basic building blocks of cell sand their organisation within a organisms							

Spring 1 January – February	3.Body systems	• How does our body work to keep us alive?	To build upon knowledge of cells gained from unit 1 and KS 1 & 2 and the link this knowledge to core processes and organisation with the body of an organism. To develop an understanding on how body systems are created and their individual roles.	• Begin to make predictions using scientific knowledge and understanding under pinned from unit 1. • Develop and use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety • make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements	• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function • Describe the ways in which nutrients and water are transported within animals, including humans	• Sports therapist • Sports Scientist • Physiotherapist • Chiropractor	• Identify main parts of the human circulatory system • Describe the functions of the heart, blood vessels and blood • Describe the ways in which nutrients and water are transported within animals, including humans	• Recognise the impact of diet, exercise, drugs and lifestyle on the way their body's function
	Links between Units: Enables students to make the connections between organs systems working with other system to achieve their role within an organism							
Spring 2 February – March	4.Body systems working together (2)	• How do organs systems work together, for our body to respond to change?	• To be able to explain how different body systems work together i.e., muscular skeletal system and Cardiovascular and the respiratory system.	• Create links between the functions of body stems and how they work in unison	• How organ systems work together to achieve their role	• Neurologist • Surgeon	• Describe what a hormone is • The organisation of the central nervous system • Describe mechanisms used to maintain homeostatic balance	• biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles
	Links between Units: creating synoptic links between unit 2 and 3. How cells are created within organ systems to aid procreation							
Summer 1 April – May	5. Reproduction	• How do organisms procreate?	• To build upon knowledge of reproduction gained from unit 2 (specialised cells) and KS 1 & 2 and the link this knowledge to the fertilisation process and development of offspring.	• Sex cells contain genetic material • Adaptation of sex cells • Pollination • Methods of seed dispersal with plants (burst, 'Velcro hooks)	• Identify the parts of a flower and their role within reproduction • Different ways organisms reproduce • Understand the gestational term varies between organisms	• Ecologist • Gynaecologist	• Adaptations of sex cells • Processes that occurs within a menstruation cycle • Parts of a flowering plant	• Stages of a pregnancy of a foetus • Contraception methods- hormonal/barriers
	Links between Units: Appreciate the continued development of an organism post fertilisation as well as the actions undertaken to measure their abundance							

Summer 2 June – July	6.Ecology	• How do living things interact within their environments and how is this measured?	• To be able to analyse the importance of diversity within a range of different ecosystems and how this diversity interacts with feeding relationships. To analyse data collected into the diversity and abundance of flora suing sampling techniques and abiotic factors equipment.	• observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions	• Methods of sampling dependent of the organism • Factors that influence germination and abundance • How to use an identification key	• Botanist • Conservationist	• reproduction in plants, including germination • Primary data collection including quantitative investigation of some dispersal mechanisms and germination of cress. • Methods of sampling – Quadrat including the use of an identification key	• Various factors that influence the abundance of plants and organism can be categorised as abiotic or biotic factors • Different methods of sampling – Pitfall traps

IMPACT – What do we want students to know at the end of Year 7?

By the end of Year 7, students should be secure in their disciplinary knowledge surrounding the various laboratory techniques and equipment. Students will have gained an understanding that life originated from cells. A core knowledge related to individual processes in an organism, the environment will have been established. Alongside a knowledge of the connections between cells, tissues, organs and organ systems and how they work together. Students should be able to explain, with references to core examples, how factors that effect the organisms can be measured. Students should have a basic understanding of the importance of special texts like identification keys. Students will be formatively assessed through a range of methods including, but not limited to, the use of cold calling, mini whiteboards and end of unit assessments. The data gathered will be used to inform future planning of the curriculum and assessments.

IMPLEMENTATION - Year 8

Date	**Unit Title**	**Unit Enquiry Question** *Should be the basis of the entire unit, the thing that drives the unit.*	**Intent** *Purpose of the specific unit.*	**Core Disciplinary (Skills) Knowledge Gained Theme skill**	**Core Substantive (Content) Knowledge Gained**	**Careers Links**	**"Need to Know"** *Core content required to be covered during this unit.*	**"Neat to Know"** *Things that would be good for students to know but not essential. Will not feature in assessments etc.*
Autumn 1 September – October	1- Nutrition	• Why is nutrition needed?	• To build upon units 3 & 4 from year 7. Looking at the main components of a human diet as well as the role an adaptation of the digestive system	• Use a range of laboratory equipment when investigating biological food molecules within examples • Make observations • Make appropriate conclusions	• 7 food groups and their role • Calculations of energy requirements • Consequences of imbalances in the diet- Deficiency and malnourishment • Enzymes are biological catalysts that can be used to aid digestion	• Bariatrician • Nutritionist • Dietician • Strength and Conditioning Coach	• Recall the 7 food groups and the role in the body • Reagents and positive and negative result for food tests • Describe the role of bacteria and enzymes within digestion	• The digestive system consists of billion bacteria that aid digestion and are called flora and fora. Links between good gut health and immunity to secondary infections
	Links between Units: Links can be made between the need of nutrition for survival and the over and underconsumption of food. The impact lifestyle factors will have on a organism.							
Autumn 2 November – December	2- Health & Lifestyle	• What can the true impact of lifestyle have on health?	• To build upon their knowledge of unit 4 in year 7 and become aware of how lifestyle factors can impact their normal way of working.	• Concluding into the cause of some environmentally linked diseases • Identification of issues	• Describe the basic needs of animals, including humans, for survival (water, food and air) • Importance for humans of exercise, eating the right	• Neurologist • Doctor • Nurse • Occupational therapist	• Impact lifestyle factors like smoking has on the function of the huma body • Structure and function of the heart	• Mental health community link • Causation and correlation with foetal mass and mothers that were/not smokers during pregnancy

					amounts of different types of food, and hygiene			
	Links between Units: Allows students to expand upon the foundational knowledge gained in unit 1& 2 as to the ability to survive is more than just nutrition it's variation within genetics and environment.							
Spring 1 January – February	3- Evolution	• What evidence is there to support the theory of evolution?	• To build upon worldwide knowledge of ideas about creationism and evolution. As well as revisit the idea that 'species show variation' in unit 5 from year 7 is central to understanding how organisms have evolved from the process of natural selection.	• Compare/contrast • Extended writing • Application of beliefs to practices • Identification of issues • Textual analysis • Graphical drawing skills	• Variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation • Variation is the drive-in natural selection and evolution • The integral role Rosalind Franklin, Watson, Crick and Darwin played the discovery of DNA and evolution.	• Geneticist • Palaeontologists	• The resources organisms have to complete for them to survive • Mechanisms for adaptation – behaviour and physical • The reasons why siblings and identical twins may develop differently • How Charles Darwin developed his theory of evolution by natural selection. • The importance of photo 51 created by Rosalind Franklin	• Similar ideas linking variation to natural selection of the time – Lamarck • Creation – Extinction • When beliefs are misused • Unequal rights (sexism)
	Links between Units: Enables students to make the connection between certain beliefs and meanings found in texts to the application of evolution and natural selection.							
Spring 2 February – March	4- Evolution 2	• Can variation cause extinction?	• To use the theorists studied from unit 3 and the foundational knowledge from unit 5 from year 7 to understand core beliefs from a range of worldviews. To be able to draw effective comparisons between fossils and evolutionary keys. As well as understand the plans of conservations to prevent extinction.	• Research • Debate • Compare/contrast • Extended writing • Application of beliefs to practices	• Describe the 4 main stages of natural selection • Appreciate environmental pressures that influence natural selection – peppered moth • Understand what biodiversity is and the methods of preservation • Understand the difference between endangered and extinct	• Archaeologist • Conservationist	• 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	• Linking understanding of natural selection to changes in species within England. • Formation of fossils and the importance of strata layers
	Links between Units: The need of adaptation to survive occurs in plants too and make links that plants are the bases of all feeding relationships and store starch which can be tested using a reagent.							
Summer 1	5. Ecological Processes	• If plants don't eat and breath, how	• To be able to link core concepts of	• Compare/contrast	• Structures of plants and the process by	• Ecologists • Conservationist	• The word equation of photosynthesis	• The practical use of a potometer

April – May		do they make their own food?	cell structure and organs within a plant to describe how an integral chemical reaction takes place- photosynthesis	• Observing closely, using simple equipment • Performing simple tests • Using observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions	which plants make their own food. • Factors that limit the rate of photosynthesis. • The role of stomata pores in the movement of gases needed for photosynthesis. • Testing for the process of photosynthesis- (starch test) • Describe how deficiencies in plants can cause problems		• Location within a plant cell where photosynthesis takes place • How reactants within photosynthesis gain entry into a plant • The minerals that are needed for heath plant growth	• Observing stoma using a light compound microscope
	Links between Units: The link between processes both respiration and photosynthesis with the need to transfer energy within a life cycle. This allows the retrieval of organelles from unit 2 in year 2 and the previous unit ecological processes.							
Summer 2 June – July	6. Ecology and the environment	• How all processes interact creating the 'circle of life'	• To be able to explain how metabolic process are integral in feeding relationships.	• Performing simple tests • Using observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions • Synoptic links and application of thinking	• Word equation for aerobic and anaerobic respiration • Linking photosynthesis to the position of producers in a food chain • Understanding of interdependence • Process and implication of bioaccumulation and eutrophication	• Environmental scientist • Marine biologist	• The word equation of aerobic and anaerobic respiration • Comparison between both types of respiration • Variable with a practical – yeast and fermentation • Organisation of organisms within food chain. • Eutrophication link to respiration and photosynthesis in a community	• Over fishing and use of quotas – Grimsby dock (Community link) • Monocultural intensive farming practices

IMPACT – What do we want students to know at the end of Year 8?

By the end of Year 8 students should have built upon the knowledge they gained within Year 7 on the use of various laboratory equipment and understanding that life originated from cells. Students develop understanding of the nature, processes and methods of science through different types of science inquiries that help them to answer scientific questions about the world around them. Students should know that there are multiple ways of approaching different questions and issues and should be able to critically assess these different ways of approaching effectively with reference to specific texts. Students should be able to record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements. Students will be formatively assessed through a range of methods including, but not limited to, the use of cold calling, mini whiteboards and end of unit assessments. The data gathered will be used to inform future planning of the curriculum and assessments.

IMPLEMENTATION - Year 9

	Unit Title	**Unit Enquiry Question** *Should be the basis of the entire unit, the thing that drives the unit.*	**Intent** *Purpose of the specific unit.*	**Core Disciplinary (Skills) Knowledge Gained**	**Core Substantive (Content) Knowledge Gained**	**Careers Links**	**"Need to Know"** *Core content required to be covered during this unit.*	**"Neat to Know"** *Things that would be good for students to know but not essential. Will not feature in assessments etc.*
Autumn 1 and 2	1. Genetics and Inheritance (B1)	• How do people get genetic disorders?	• To be able to compare and contrast between	• Compare/contrast • Identification of issues	• Most cells can be classified as either	• Geneticist • Genetic epidemiologist	• Comparison between	• Links between recessive disease

September – December			• eukaryotes and prokaryotes • To be able to confidently complete and interpret genetic crosses for inherited diseases. • Understand that some diseases have more prevalence than others	• Mathematic data percentage, probability and ratio	• eukaryote and prokaryotes • That variation within genetics is caused by mutations • Complete and interpret genetic crosses for inherited diseases. • The importance of genetic testing	• Genetic disease councillor • Physiotherapist	• eukaryotes and prokaryotes • Number of chromosomes inherited from each gamete. • The importance of alleles in the expression of certain genetic diseases • Genetic crosses • Genetic tests	• Sickle cell and malaria cases. • Process of IVF
	Links between Units: Understand that genetic diseases are non-communicable and other diseases caused by pathogens can be highly infectious							
Spring 1 and 2 January – March	2. Health, disease and the development of medicines (B2)	• What is a pathogen and how does it cause disease?	• State the four types of microbe and examples of disease that they cause • Understand the difference between communicable and non-communicable • Describe the non-specific defence systems and specific immune response of the human body against pathogens, including examples of physical, chemical and microbial defences.	• Compare/contrast • Using observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions	• Pathogens are microbes that cause disease • Different pathogens have different methods of transmission • The human body has non-specific defence systems and specific immune response that help to defend against the entrance and impact of pathogens • What is a vaccine and how does it create immunity? • Th importance of testing medication before distributed to general public.	• Microbiologist • Immunologists • Pathologist • Oncologist • Plant pathogens	• What are pathogens • Methods of transmission and preventing the spread • Non-specific defence systems and specific immune response • Plant diseases • How vaccine work • Testing of medication • Use of monoclonal antibodies	• MMR controversy with link between the MMR vaccine, Celiac bowel disease and autism- Horizon video • Reflection of the importance of clinical trails – Thalidomide • Idea of herd immunity • Formation of cancer
	Links between Units: Consolidation of laboratory skills and impact of data into the effectiveness of an investigation							
Summer 1 April – May	3. Scientific skills	• How is an idea tested?	• To be able to link a range of data collection techniques, the appropriate use of laboratory equipment. • Become confident in analysing both primary data and secondary data (peer) • Confidently concluding whether a	• Use a range of laboratory equipment when investigating • Gathering and recording data to help in answering questions • Make observations • Make conclusions • Critically evaluate methods	• There is a sequence needed when planning a practical investigation • Understanding the importance of a risk assessment • The ideas of repeatability and calculating of means	• Research scientist • Engineer	• Creating a hypothesis • Planning sequence of a practical • What are variables? • Identifying outliers in a set of data • Making conclusions based on trends and explaining the science behind it • Critically evaluating methods of data collection	• Comparison between repeatability and reproducibility

			hypothesis is correct • Critically evaluating methods of data collection and suggesting ways for improving a practical investigation.					
	Links between Units: Encourages students' into independent group work in planning and carrying out a practical investigation							
Summer 2 June – July	4. Investigational planning	• Doing a practical for ourselves	• To be able to link the planning of a practical investigation into actively carrying one out safely	• Use a range of laboratory equipment when investigating • Gathering and recording data to help in answering questions • Make observations • Make conclusions • Critically evaluate methods	• There is a sequence needed when planning a practical investigation • Understanding the importance of a risk assessment • Ensure a repeatability • Calculate a mean • Draw an appropriate graph • Conclude and evaluate results • Compare results with other peer groups to see if it is reproducible	• Research scientist • Data analysis • Engineer	• Creating a hypothesis • Planning sequence of a practical • What are variables? • Identifying outliers in a set of data • Making conclusions based on trends and explaining the science behind it • Critically evaluating methods of data collection • Compare results with other peer groups to see if it is reproducible	• Comparison between repeatability and reproducibility

IMPACT – What do we want students to know at the end of Year 9?

At the end of year 9, students should have built on the knowledge they gained in year 7 and 8. By the improvement in the quality and variety of language used when articulating scientific concepts. Students will now have developed the ability to pay attention to the concern for accuracy, precision, repeatability and reproducibility. As well as understand that scientific methods and theories that develop earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review. Thus preparing students for the complexity of KS4 and the application elements within the biology specification. Students will be formatively assessed through a range of methods including, but not limited to, the use of cold calling, mini whiteboards and end of unit assessments. The data gathered will be used to inform future planning of the curriculum and assessments.

LINKS – How does our curriculum link between the year groups?

Key Theme	Year 7	Year 8	Year 9	Years 10 & 11 (GCSE)
Cells	Understand that living organisms are made up of building blocks called cells and can be observed using light compound microscopes.	Students further explore how nutrition and life style factors impact the functionality of cells. Students will start to understand how cells are organised with organisms.	Studenst are developing the confidence with the scientific methods and how theories develop. What new evidence and new ideas together with the importance of publishing results and peer review can influence the credibility of a theory or discovery.	Studenst will build upon their KS3 knowledge and understand the ways in which cells are adapted for their function and the application of methods of cellular transport. By using a variety of concepts and models to develop scientific explanations and understanding. The maintenance of cells will be explored in the understanding of homeostatic balance and negative feedback. As if these are not maintained eukaryotic cells lysis and crenation as well as the turgidity within plant cells due to their cellulose cell walls
Inheritance and Evolution	Students will develop the notation that DNA is stored with the nucleus within a cell. That they have acquired within their previous theme.	Students will start to develop the understanding that variation is a combination of genetic inheritance and environmental factors. Changes in the DNA called mutations will cause the	Students will continue to develop their understanding of eukaryotes versus prokaryotes. The structure of DNA and its link with chromosomes, genes and proteins will be learnt.	Speciation of a new species due to isolation. This is discussed with the understanding that over many years the environmental pressures will differ. Allowing for certain genetic variants to

	Specialised sex cells fuse nuclei to create a zygote and variation in the offspring.	development of new features that can aid survival and reproduction of a species called natural selection. The introduction of scientists' contribution to the discovery of DNA and the development the theory of evolution.	Protein synthesis will be developed with the understating of genetic mutations and their effect on the production and formation of proteins. Theses changes in the genome will in turn effect the variation in a population and aid the process of natural selection and evolution.	be selected for. Therefore, the genetic linage and divergence in the genetic tree will be further apart. Resulting in a new species so they cannot interbreed with the original population and produce fertile offspring.
Organisms	Students will look at how cells are organised within an organism. As well as the organs within specified organ systems within a human and their role. The relationship between body systems is explored and students develop the appreciation that organ systems are not stand-alone systems but rely on each other for the overall survival of the entire organism. The introduction of homeostatic balance is briefly explored as a necessity to survival.	Students will now start to develop links between environmental impacts on the functionality of an organism. The make up of a balanced diet, repercussions of malnutrition and the formation of deficiencies is discussed with the overall impact on the body and quality of life. The aid of microorganisms in digestion alongside enzymes is briefly addressed.	The link between the genome and the development of the organism is solidified further as the development of genetic diseases and symptoms. Communicable and non-communicable diseases is developed to the level of KS4. The prevention of communicable diseases through chemical, physical means is examined. The role of specific and non-specific defences and the importance of vaccinations and herd immunity for the survival of an organism.	The formation of biological sex and the role of the SRY gene and the release of male androgens-testosterone causes the formation of male phenotypes – tetes. Homeostatic balance of water, temperature and blood glucose levels is learnt and the notion of negative feedback. The prevention of communicable diseases through chemical, physical means is examined. The role of specific and non-specific defences and the importance of vaccinations and herd immunity for the survival of an organism. Drug testing and the efficacy of medications is evaluated through clinal trails and data. If medications are not tested thoroughly enough the likelihood of adverse side effects are likely. Learning from history from Thalidomide has made the testing more rigorous.
Ecological Processes	Students are encouraged to consider that chemical reactions are need for certain processes to happen, the notion of reactants and products and their origins are explored.	Understand and use SI units and IUPAC (International Union of Pure and Applied Chemistry) chemical nomenclature. Studenst are beginning to use and derive simple equations and carry out appropriate calculations with more complex metabolic processes like respiration. Respiration, photosynthesis, fermentation and chemosynthesis is compared.	Studenst are aware of the chemical and metabolic processes that occur in organisms. As well as the limiting factors within them. The comparison between the reasons for high metabolic activity is developed i.e.- skeletal muscle and liver when it comes to the release of energy from respiration.	Studenst should be confident in the use of chemical nomenclature. As well as the importance of scientific quantities and understanding how they are determined. Balanced symbol equations are expected for photosynthesis and aerobic respiration. The link that photosynthesis is an endothermic reaction made up of two stages light dependent and dark stage. Further application inti the limitations of these process with the use of the inverse square law.
How Scientists Work	Studenst will be encouraged to ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience. Building upon their knowledge begin to make informed predictions using scientific knowledge and understanding. Students will develop and apply mathematical concepts and calculate results. Begin to present observations and data using appropriate methods, including tables and graphs with guidance students will begin to interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.	With the aid of more scientific examples' students will develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience. Building upon their knowledge begin to make informed predictions using scientific knowledge and understanding. Studenst have now developed the understanding on how to select, plan and carry out some appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables.	Studenst are now developing a more mastery skill of how to select, plan and carry out some appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables. They will know test to prove the presence and change in reactants and the implications there is on the formation of product. Together with the importance of publishing results and peer review. Begin to use the terms repeatability and reproducibility when evaluating primary data.	Student will be able to plan experiments to make observations, test hypotheses or explore phenomena. By applying a knowledge of a range of techniques, apparatus, and materials to select those appropriate both for fieldwork and for experiments developed upon KS3. Carrying out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations. Students should be confident in the use of chemical nomenclature. As well as the importance of scientific quantities and understanding how they are determined. The use of prefixes and powers of ten for orders of magnitude (e.g. tera, giga, mega, kilo, centi, milli, micro and nano) to show the production of products in a quantitative state. The skills of interconverting units, using an appropriate number of significant figures in calculations will be developed alongside mathematics. Ensuring answers are in the required significant figure is developed.

ONE PAGE SUMMARIES – How will each unit look like?

Each unit will have a one-page summary which will be used to focus planning of the unit, planning of individual lessons and the delivery of these lessons. These summaries will be used by all members of the department to understand the required content and think rigorously about their planning and practice.

YEAR:8 TIME: 9 Lessons	UNIT TITLE: Evolution	ENQUIRY QUESTION: What evidence is there to support the theory of evolution?
	AIMS OF THIS UNIT (SUBSTANTIVE KNOWLEDGE): • Variation between individuals within a species being continuous or discontinuous, to include measurement and graphical representation of variation • Variation is the drive-in natural selection and evolution • The integral role Rosalind Franklin, Watson, Crick and Darwin played the discovery of DNA and evolution.	

LINKS			
HOW DOES THIS LINK TO OUR LAST UNIT?	Allows students to expand upon the foundational knowledge gained in unit 1& 2 as to the ability to survive is more than just nutrition it's variation within genetics and environment.	HOW DOES THIS LINK TO THE NEXT UNIT?	Enables students to make the connection between certain beliefs and meanings found in texts to the application of evolution and natural selection.

TITLE OF LESSON	Competition and adaptation	Birds beaks practical	Adapting to change	Variation	Discontinuous and Continuous data	Inheritance	Discovery of DNA	Charles Darwin (The race for discovery)	Charles Darwin- Literacy
LESSON AIM(S)	Describe what organisms compete for within the environment Compare predators and prey Explain some of the adaptations that allow survival	Describe how variation can cause feature that may aid survival Collect primary data and make a conclusion	Describe how animals have to change to suite their environment Read a designated text and describe the pressure polar bears have for survival	Understand what is meant by the term variation Identify whether a feature genetic or environmental.	Identify whether a set of data is Discontinuous or Continuous Describe Discontinuous data Describe Continuous data Collect Continuous within the class- height (cm) Plot a scatter/line graph	Inheritance is from DNA inherited from sex cells Sex cells contain half the genetic material needed for an organism Organisation of DNA, Gene, Chromosome, nucleus, cell	Describe the research that several scientists made into the structure of DNA Become aware the limitations for some scientists within the scientific field of that time.	Who was Charles Darwin? Influence of other scientists- Wallace and Lamarck Evaluation of theories of natural sections Limitations to which Charles Darwin delayed the publication of his book 'Origin of species'	Understand where Darwin travelled to collect his samples for evidence The importance of peer review and assistance in ideas and collaborative working. How Darwin created the first evolutionary tree 'tree of life'
KEY FEATURES OF LESSON	How plants and animals compete for resources Analysing different organisms for their ability to complete for resources Physical adaptation between similar species Fennec fox and Antarctic fox Collaborative working physical/behaviour adaptations	Visual que to gauge understanding of variation in Finches and probe for the possible reason (food) Groups work – Spinddley woos Table of collected results is analysed for outliers Conclusion drawn and link to the idea of natural selection and survival of the fittest	Competitive and environmental pressures for adaptation Same fox- different season Think pair share- What could happen if the artic fox was unable to adapt to its environment? Independent task What may cause an environmental change?	Variation within a litter of puppies Think pair share- what causes variation in a population? Task: sort the following features into whether they are inherited or environmental QWC- Why can identical twins look different to each other? Use ideas and examples of	What colours can eye colour be? Link to Discontinuous data. Definitions of Discontinuous and Continuous data and some examples Discontinuous or Continuous? Collection of Continuous data- Height	Retrieval – Explain the difference between discontinuous or continuous data Identify where genetic material is found in call Number of chromosomes in a sex cells and body cell.	The work of Roseline Franklin How discoveries from some scientist aided the development of further discoveries of DNA.	Who was this man- Charles Darwin How peer scientist lent a hand Comparison between theories Evidence for evolution Problems Darwin faced	Class discussion- Finches variation in beak size Comparison- The development of the theory of evolution and natural selection Multiple choice questions

			Comprehension task – On thin ice.	inherited and environmental factors (6 marks) Key words given to lower ability groups	Plot a line graph to show bell curve trend.				
ASSESSMENT OPPORTUNITIES	Verbal questioning Exam questions Paired activity RAG/mini white board quiz	Finches think pair share Monitoring and questioning during the practical Class discussion in the results collect and possible reasons why.	Mini white boards Think pair share- questions on walk round Independent task Comprehension	Class discussion Independent task- SA QWC- teacher assessed/SA/PA	Range in eye colour discussion Discontinuous or Continuous? Quick fire questions Line graph- marking via visualiser	QWC- Explain the difference between discontinuous or continuous data Video questions- SA Low stake questions- SA/PA Organisation of genetic material flow diagram.	Extended writing task Hands down questioning- Roseline Franklin Class discussion in to the limitations Roseline Franklin had. Comprehension- how the teams contributed how the teams were held back from the discovery individually.	Class discussion- Charles Darwin Theories similar to Darwin's- compare and contrast Questions on evolution an natural selection- SA/PA How fossils provide us with evidence of natural selection The importance of sample size	Difference in finches' beaks- an example of natural selection Comprehension task- Could do domino reading, teacher lead reading using the visualiser- with pause and probe questioning. Comprehension questions- SA Multiple choice questions- mini white boards.

KEY SKILLS (DISCIPLINARY KNOWLEDGE)	CAREERS OPPORTUNITIES	TIER 2 & 3 VOCABULARY	STRETCH AND CHALLENGE OPPORTUNITIES	QUESTIONS TO CONSIDER WHEN PLANNING AND DELIVERING EACH LESSON
The use of scientific equipment Application Compare/contrast Analysis Making observations Extended writing Critical Thinking Critically evaluating	• Laboratory assistant • Research assistant • Microbiologist • Conservationist • Environmental scientist • Pathologist	Nucleus, Helix, Variant, Mutation, Gamete, Chromosome, DNA, Gene, Genomics, Amino Acid, Nucleotide, Helix, Variant, Mutation, Evolution, natural selection, Xray, survival of the fittest	KS 4/5 analysis tasks Analysing data prey and predator population graphs Questioning Modern-day case studies- Natural selection Students identify misconceptions Advanced lenses (e.g., sexism)	• **INTENT:** ○ **What is the intention of this lesson?** ○ **How does this lesson build on from the previous lesson?** ○ **How does this lesson link to the forthcoming lesson?** ○ **How does this lesson link to forthcoming topics in this Key Stage and the forthcoming Key Stages?** ○ **Why is this being taught now?** ○ **Why is this being taught in the way it is?** • **IMPLEMENTATION:** ○ **Is tier 3 vocabulary being effectively taught in this lesson?** ○ **How can I effectively assess students within this lesson?** ○ **Are students recalling prior knowledge effectively?** ○ **Is the right level of support being given for all students?** ○ **Are students being pushed enough in this lesson?** ○ **Are misconceptions prompted, prevented and/or addressed effectively?** • **IMPACT:** ○ **How will I know students have achieved the aims of the lesson?** ○ **Do students have the opportunity to develop their personal knowledge?** ○ **What skills will students develop during this lesson?**