Biddulph High School Curriculum Intent

To deliver a broad and enriching curriculum through engaging and challenging lessons that provide a wide range of opportunities for all students to achieve their potential.
Students will all be prepared to take their next steps in a diverse and ever changing future ready to make a positive contribution to society.
Through a broad programme of extracurricular activities students will have the opportunities to showcase their talents and experience new challenges.
We value individuals and all that they can offer as well as supporting each other with kindness and empathy.

Curriculum Intent for Biology:

The lessons in the Science department provoke students' curiosity through exciting lessons; creating an environment where students will need to critically think and provide logical reasoning using various methods of investigation, such as observation, comparison, experimentation, and mathematical manipulation of data.

All teachers will follow the schemes of work and resources provided by the department. This will ensure that all students receive the same high-quality provision. All units of work will provide a clear outline of the knowledge and skills required and assessments will ensure that this knowledge has been retained and that skills can be evidenced.

Teachers will ensure that gaps are closed through regular monitoring within the classroom. DINT activities will allow for interleaving and recap of previous learning. Misconceptions will be identified through effective questioning and the regular inspection of student work.

Biology Long Term Overview						
Year Group	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
9	Microscopes Cell structures Specialised cells Nutrition and excretion	Aerobic and anaerobic respiration in animal, plant and fungi Synthesis & breakdown of carbs, protein and fats Structure of a leaf Photosynthesis Testing for starch The effects of stimuli on a leaf	Pondweed practical The history of DNA Genetic information Extracting DNA Protein synthesis	Biological polymers Enzyme theory Enzyme practical's	Active transport Mitosis Cell differentiation Stem cells Exchange surfaces and practical Osmosis Types of exchange surfaces	Heart dissection and circulatory system Heart theory Blood vessels and blood Transport in a plant Factors affecting transpiration
10	Mitosis Cell differentiation Stem cells Exchange surfaces Heart theory and dissection Blood vessels Movement of water in plants	Movement of water through a plant Factors affecting transpiration Neurones Reflexes The eye Problems with sight	The brain Damage to the nervous system Hormones Adrenalin The menstrual cycle The control of fertility Plant hormones	Osmosis Structure and function of the kidneys Stresses to the kidney Ecosystems Competition and interdependence Pyramid of biomass	Decomposers Variation Mutations and genes Sexual v.s asexual reproduction Meiosis	Single gene inheritance Single gene crosses The history of genetics Classification
11	Natural selection	Sampling part 1 Sampling part 2	Food security	Health and disease Preventing disease	Smoking and alcohol Exercise and diet	

	Evidence for evolution Evolution theories	Biodiversity Maintaining biodiversity Monitoring biodiversity	Feeding the world Selective breeding Genetic engineering Use of biotechnology in farming	Monoclonal antibodies Plant disease and defences Bloo and the body defence mechanism vaccinations	Treating CVD New medicines Examinations	
12						
13						

Biology **Medium Term Overview**

Year 11	***Autumn Term 1***	**Unit Title: Natural selection and evolution. Including; global challenges**	**No of Lessons: 24**
Overview	Variation in the genome and changes in the environment drive the process of natural selection, leading to changes in the characteristics of populations. Evolution accounts for both biodiversity and how organisms are all related to varying degrees. Key individuals have played important roles in the development of our understanding of genetics. Learners should appreciate that changes in the environment can leave some individuals, or even some entire species, unable to compete and reproduce leading to extinction.		
Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**		

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
explain how evolution occurs through the natural selection of variants that have given rise to phenotypes best suited to their environment describe evolution as a change in the inherited characteristics of a population over time, through a process of natural selection, which may result in the formation of new species describe the evidence for evolution describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection and explain the impact of these ideas on modern biology	**Practical skills**: Investigation of ecological sampling methods. Using the symbols =, <, <<, >>, >, ?, ~ in answers where appropriate. (PAG B1, PAG B3) Investigation of sampling using a suitable model (e.g. measuring the red sweets in a mixed selection). Investigation into the effectiveness of germination in different strengths of acid rain. (PAG B3, PAG B6) Investigation into the effects of lichen distribution against pollution. (PAG B3)	Classification II 5.2.4b Natural Selection 5.2.1 Evidence for evolution 5.2.2 Evolution theories 5.2.3 Module 5 OCR assessment Intervention module 5 Sampling B6.1.1 Sampling II B6.1.2 Biodiversity I B6.1.3 Biodiversity II B6.1.4 Maintaining biodiversity B6.1.5 Monitoring biodiversity B6.1.6 Food security 6.2.1 Feeding the World 6.2.2 REVISION PRE MOCK

describe both positive and negative human interactions within ecosystems and explain their impact on biodiversity explain some of the benefits and challenges of maintaining local and global biodiversity evaluate the evidence for the impact of environmental changes on the distribution of organisms, with reference to water and atmospheric gases describe some of the biological factors affecting levels of food security describe and explain some possible agricultural solutions to the demands of the growing human population **Examination technique:** understanding key command words within examination style questions to build confidence in student responses	Research into the Rothamsted Research Broadbalk experiment. **Key terms**: Evolution Biodiversity Deforestation Sampling Identification keys Genes Inheritance Variation Allele Mutations Genetics Haploid cells Diploid cells	REVISION PRE MOCK REVISION PRE MOCK REVISION PRE MOCK Y11 MOCK WEEK Y11 MOCK WEEK Y11 MOCK WEEK Y11 MOCK WEEK Y11 MOCK WEEK Intervention **Homework** Seneca topic based homework to be set every fortnight. Seneca: Topics will be set to allow students to understand that the role of diffusion in the movement of materials in and between cells. They should also be familiar with the human gaseous exchange system. **Common misconceptions:** Learners are used to hearing the term evolution in everyday life but it is often used for items that have been designed and gradually improved in order to fit a purpose. They therefore find it difficult to grasp the idea that evolution by natural selection relies on random mutations. Learners also tend to imply that individuals change by natural selection. Statements such as 'a moth will change by natural selection in order to become better camouflaged' include both of these common misconceptions.
Careers Link	**Maths skills required:** calculate arithmetic means	**MY PB** **Social Me- active listening, speaking effectively, working with others**

marine and/or aquatic biologist, zoo biologist, conservation biologist, ecologist and environmental manager. Biologists in these roles carry out recovery programs for endangered species and provide education for the general public.	plot and draw appropriate graphs selecting appropriate scales for the axes understand and use percentiles extract and interpret information from charts, graphs and tables understand the principles of sampling as applied to scientific data	Practical work will require resilience and responsibility. **Thinking Me – evaluating & creativity** Evaluation will be utilised when comparing different methods of microscopy **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Biology **Medium Term Overview**			
Year 11	***Spring term***	**Unit Title: Global challenges, feeding the human race**	**No of Lessons: 21**

Overview	The human population is increasing rapidly and with this comes a need for more food. Biologists are seeking to tackle this increased demand, which will lead to an improvement in the lives of many people around the world. However, there are many things to consider in achieving this aim, not least the impact on ecosystems. There is much debate surrounding the use of gene technology as a potential solution to the problem of food security. Learners should be familiar with the content of a healthy human diet and the consequences of imbalances in a healthy daily diet. Their knowledge and understanding from topics 1, 4 and 5 will also be drawn together in this topic. This includes the organisation of DNA, what plants require enabling them to photosynthesise, interactions between species and the idea of variability within species and subsequent selection of characteristics.
Assessment	**Students will be assessed through a series of small tests to identify any misconceptions and the correct use of key scientific terminology.**

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
explain the impact of the selective breeding of food plants and domesticated animals describe genetic engineering as a process which involves modifying the genome of an organism to introduce desirable characteristics describe the main steps in the process of genetic engineering explain some of the possible benefits and risks of using gene technology in modern agriculture describe and explain some possible biotechnological solutions to the demands of the growing human population	**Practical skills**: Research into the advantages and disadvantages of selective breeding and genetic engineering. Research into the growth of GM crops or livestock. Research into whether children should be routinely vaccinated? Investigation into growth bacterial cultures using aseptic techniques. (PAG B1, PAG B7) Investigation into growth bacterial cultures using aseptic techniques. (PAG B1, PAG B7)	Selective breeding 6.2.3 Genetic Engineering I 6.2.4 Genetic Engineering II 6.2.5 Use of biotechnology in Farming 6.2.6 6.2 test Health and Disease 6.3.1 The spread of disease 6.3.2 Preventing the spread of disease 6.3.3 Human Infections 6.3.4 Plant diseases and plant defences 6.3.5 and 6 Identification of Plant diseases 6.3.7 Blood and the body's defence mechanism 6.3.8 Vaccinations 6.3.10 Monoclonal antibodies 6.3.9

describe the relationship between health and disease describe different types of diseases describe the interactions between different types of disease explain how communicable diseases (caused by viruses, bacteria, protists and fungi) are spread in animals and plants explain how the spread of communicable diseases may be reduced or prevented in animals and plants describe a minimum of one common human infection, one plant disease and sexually transmitted infections in humans including HIV/AIDS describe physical plant defence responses to disease describe chemical plant defence responses describe different ways plant diseases can be detected and identified, in the lab and in the field explain how white blood cells and platelets are adapted to their defence functions in the blood describe the non-specific defence systems of the human body against pathogens	**Key terms**: Antibiotics Contagious Vectors Antigens Incubation Genes Nucleus Communicable Pathogens Genetic modification Plasmid Host Gene pool Percentiles Generations Characteristics Disease	The prevention and treatment of disease 6.3.11 Aseptic technique 6.3.12 New Medicines 6.3.13 Smoking and drinking alcohol 6.3.14 Exercise and diet 6.3.15 Treating CVD 6.3.16 Modern Advances in medicine I 6.3.17 and 18 **Homework** Seneca topic based homework to be set every fortnight. Seneca: Topics will be set to allow students to understand the content of a healthy human diet and the consequences of imbalances in a healthy daily diet. **Common misconceptions:**. Learners can often think that genetic engineering leads to the increased use of pesticides.

explain the role of the immune system of the human body in defence against disease describe some of the ways in which monoclonal antibodies can be used describe the processes of discovery and development of potential new medicines **Examination technique:** understanding key command words within examination style questions to build confidence in student responses		
Careers Link Biotechnologists create and improve products and processes for agriculture, medicine and conservation using biological organisms. They study the genetic, chemical and physical attributes of cells, tissues and organisms, and identify industrial uses for them.	**Maths skills required:** extract and interpret information from charts, graphs and tables understand and use percentiles	**MY PB** **Social Me- active listening, speaking effectively, working with others** Practical work will require resilience and responsibility. **Thinking Me – evaluating & creativity** Evaluation will be utilised when comparing different methods of microscopy **This is Me – Resilience, responsibility, self-motivation, integrity, self-management** Students will need to demonstrate resilience and self-management when looking at the assessed points across the lessons

Biology **Medium Term Overview**			
Year 11	***Summer term***	**Unit Title: Revision and examinations**	**No of Lessons:12**
Overview **Assessment**	Develop scientific knowledge and conceptual understanding through the specific disciplines of Biology. • Develop understanding of the nature, processes and methods of science, through different types of scientific enquiries that help them to answer scientific questions about the world around them. • Develop and learn to apply observational, practical, modelling, enquiry and problem solving skills in the laboratory, in the field and in other learning environments. • Develop their ability to evaluate claims based on science through critical analysis of the methodology, evidence and conclusions, both qualitatively and quantitatively PAG sheets and end of unit tests. Mock examinations		

Essential Knowledge (what must students know):	**Essential Skills (what must students be able to demonstrate):**	**Lessons to cover**
1. Grades 8 and 8–8 1.1 To achieve Grades 8 and 8–8 candidates will be able to: • demonstrate relevant and comprehensive knowledge and understanding and apply these correctly to both familiar and unfamiliar contexts using accurate scientific terminology • use a range of mathematical	**Students will be able to: Scientific thinking** • understand how scientific methods and theories develop over time • use models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts • discuss ethical issues arising from developments in science • explain everyday and technological applications of science • recognise the importance of peer review of results and of communicating results to a range of audiences • make decisions based on the evaluation of evidence and arguments	1. Revision of B1 – use of the QLAs from the mock examinations and knowledge organisers 2. B1 Exam questions. Modelling WAGOLL 3. Revision of B2 – use of the QLAs from the mock examinations and knowledge organisers 4. B2 Exam questions. Modelling WAGOLL 5. Revision of B3 – use of the QLAs from the mock

skills to perform complex scientific calculations • critically analyse qualitative and quantitative data to draw logical, well-evidenced conclusions • critically evaluate and refine methodologies, and judge the validity of scientific conclusions.

2. Grades 5 and 5–5 2.1 To achieve Grades 5 and 5–5 candidates will be able to: • demonstrate mostly accurate and appropriate knowledge and understanding and apply these mostly correctly to familiar and unfamiliar contexts, using mostly accurate scientific terminology • use appropriate mathematical skills to perform multi-step calculations • analyse qualitative and quantitative data to draw plausible conclusions supported by some evidence • evaluate methodologies to suggest

AO1	**Demonstrate knowledge and understanding of:** ▪ scientific ideas ▪ scientific techniques and procedures.
AO2	**Apply knowledge and understanding of:** ▪ scientific ideas ▪ scientific enquiry, techniques and procedures.
AO3	**Analyse information and ideas to:** ▪ interpret and evaluate ▪ make judgements and draw conclusions ▪ develop and improve experimental procedures.

examinations and knowledge organisers

6. B3 Exam questions. Modelling WAGOLL
7. Revision of B4 – use of the QLAs from the mock examinations and knowledge organisers
8. B4 Exam questions. Modelling WAGOLL
9. Revision of B5 – use of the QLAs from the mock examinations and knowledge organisers
10. B5 Exam questions. Modelling WAGOLL
11. Revision of B6 – use of the QLAs from the mock examinations and knowledge organisers
12. B6 Exam questions. Modelling WAGOLL

Homework
Seneca topic based homework to be set every fortnight.
Seneca: Topics will be set to allow students to review all modules across the course.

improvements to experimental methods, and comment on scientific conclusions.

3. Grades 2 and 2–2 3.1 To achieve Grades 2 and 2–2 candidates will be able to: • demonstrate some relevant scientific knowledge and understanding using limited scientific terminology • perform basic calculations • draw simple conclusions from qualitative or quantitative data • make basic comments relating to experimental method.

Assessment Objective elements	
AO1	**Demonstrate knowledge and understanding of scientific ideas and scientific techniques and procedures.**
AO1.1	Demonstrate knowledge and understanding of scientific ideas.
AO1.2	Demonstrate knowledge and understanding of scientific techniques and procedures.
AO2	**Apply knowledge and understanding of scientific ideas and scientific enquiry, techniques and procedures.**
AO2.1	Apply knowledge and understanding of scientific ideas.
AO2.2	Apply knowledge and understanding of scientific enquiry, techniques and procedures.
AO3	**Analyse information and ideas to interpret and evaluate, make judgements and draw conclusions and develop and improve experimental procedures.**
AO3.1	Analyse information and ideas to interpret and evaluate.
AO3.1a	Analyse information and ideas to interpret.
AO3.1b	Analyse information and ideas to evaluate.

Assessment Objective elements	
AO3.2	Analyse information and ideas to make judgements and draw conclusions.
AO3.2a	Analyse information and ideas to make judgements.
AO3.2b	Analyse information and ideas to draw conclusions.
AO3.3	Analyse information and ideas to develop and improve experimental procedures.
AO3.3a	Analyse information and ideas to develop experimental procedures.
AO3.3b	Analyse information and ideas to improve experimental procedures.