COWES ENTERPRISE COLLEGE
AN ORMISTON ACADEMY
*Educate for life*

**KEY**
- Foundations in Biology
- Exchange and transport
- Biodiversity, evolution and disease
- Genetics, evolution and ecosystems
- Communication, homeostasis and energy
- Cross curricular

# BIOLOGY KS5

Maths, Physics

### Basic components of living organisms: microscopy

How has our understanding of biology changed since the development of high resolution microscopy?

How has differential staining increased our understanding of eukaryotic and prokaryotic cell biology?

Chemistry

### Plasma membranes

How do substances enter and leave cells through a cell membrane by passive and active transport systems?

How does cell membrane structure influence the function of cell membranes?

Chemistry

### Cell division

How do somatic and germline cells divide and why is this important in producing variation?

What are stem cells, why do different stem cells have varying levels of potency and how does this affect cell differentiation?

**YR12**

Maths, Physics

### Basic components of living organisms: cell structure

How does the structure of organelles and other subcellular structures relate to their function?

How to eukaryotic cell differ from prokaryotic cells?

Chemistry

### Biological molecules

What is the structure of water, carbohydrates, lipids and proteins, and how do these structures relate to properties of these molecules and their significance in biology?

Why are nucleic acids replicated and how are nucleic acids used in protein synthesis?

Chemistry

### Enzymes

How do enzymes affect the rate of enzyme controlled reactions?

How do factors affect the rate of enzyme controlled reactions?

PE, Chemistry

### Classification

How are organisms classified and grouped together?

How do scientists study genetics and molecular biology in determining evolutionary relationships?

PE

### Transport in plants

How do molecules move through the phloem tissue via translocation and how does water move through the xylem by the transpiration stream?

How are the xylem and phloem adapted for transpiration and translocation?

PE, Chemistry

### Transport in animals

How does the mammalian heart pump blood around the body and how is the heart controlled?

How does haemoglobin transport gas molecules in the blood and how does this differ in fetal haemoglobin?

PE

### Exchange surfaces and breathing

How are multicellular organisms including; mammals, fish and insects adapted for gaseous exchange?

How is gas exchange and ventilation measured in mammals?

Geography

### Biodiversity

How do scientists measure levels of diversity through sampling techniques and the use of statistics?

Why is biodiversity important and how can we increase biodiversity?

Geography

### Ecosystems

What is ecology and how do ecosystems interact?

Why are ecosystems important and how does succession change communities over time?

Geography

### Communicable diseases

How do pathogens cause disease and how are these pathogens transmitted?

How does your innate and adaptive immune system work to prevent ill health caused by pathogens?

Geography

### Population and sustainability

How does competition affect the population size of organisms over time?

How can conservation and preservation techniques be used to increases levels of sustainability?

Chemistry

### Energy for biological processes

How do plants photosynthesise and how are photosynthetic pigments arranged in photosystems?

How are products of the light dependents stage of photosynthesis used in the light independent stage?

### Homeostasis

How is thermoregulation controlled in ectotherms and endotherms?

How are waste products metabolised by the liver and how are waste products removed by the kidneys?

Psychology, PE

### Neuronal communication

How are electrical signals generated, transported and move across synapses in the human body?

How does your brain coordinate responses and how do neuromuscular junctions ensure your muscles contract?

**YR13**

Chemistry

### Respiration

How is glucose used to make adenosine triphosphate through glycolysis and the Krebs cycle?

How does the electron transport chain, oxidative phosphorylation and ATP synthase work together to create large amounts of adenosine triphosphate?

### Plant responses

How do plant hormones control growth in plants?

How do plants respond to abiotic stress and herbivory?

Psychology, PE

### Hormonal communication

Why are hormones used to control the human body and how does the endocrine system coordinate responses?

How is blood glucose concentration regulated and how is diabetes controlled?

### Genetics of living systems

How do mutations in DNA and chromosomes, and hox genes in the developmental stages of life create variation in organisms?

How is gene expression controlled in eukaryotic and prokaryotic organisms?

### Manipulating genomes

How is DNA profiled through PCR and electrophoresis and how are genes sequenced through Sanger and Next Generation Sequencing techniques?

What is genetic engineering and how is genetic engineering used to benefit science?

### Patterns of inheritance and variation

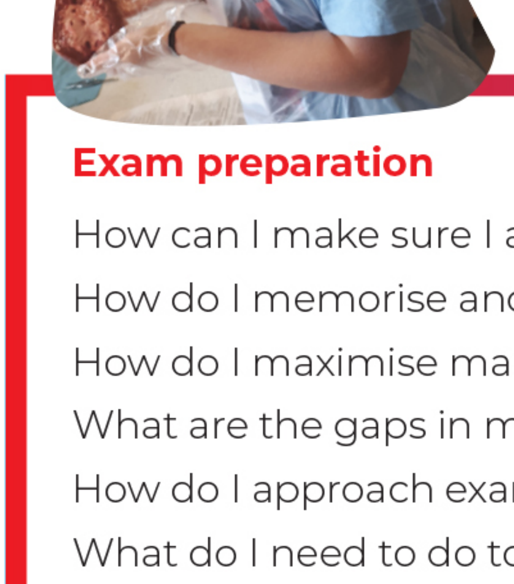
How are genes inherited and what factors affect inheritance of characteristics including; linkage, codominance and epistasis.

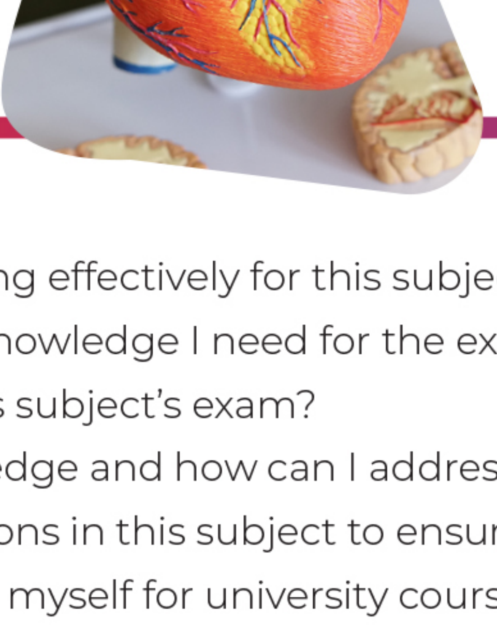
How do organisms evolve by natural selection and how do factors including; genetic bottlenecks and genetic drift affect evolution.

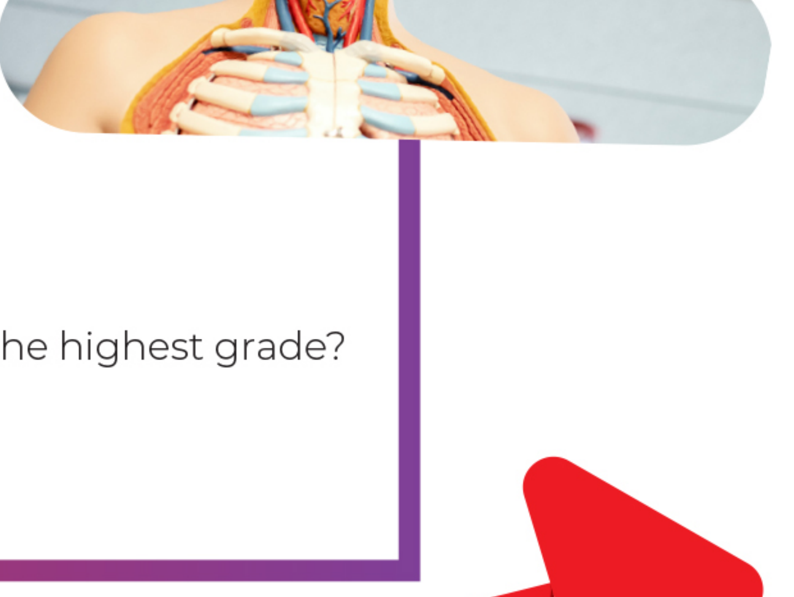
### Cloning and biotechnology

How are plants cloned naturally and artificially, and how are animals cloned through somatic cell nuclear transfer?

How can biotechnology be used for food and medicine production and what are the implications of biotechnology?







### Exam preparation

How can I make sure I am revising effectively for this subject?

How do I memorise and recall knowledge I need for the exam?

How do I maximise marks in this subject's exam?

What are the gaps in my knowledge and how can I address them?

How do I approach exam questions in this subject to ensure I reach the highest grade?

What do I need to do to prepare myself for university courses?

What do I need to do to prepare myself for employment?