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**Introduction to**

**A level Biology**

**OKEHAMPTON COLLEGE**

**During the first year you will study:**

Topic 1 Lifestyle, health and risk

This topic builds on the knowledge and understanding which students bring to the course on the functioning of the circulatory system and the importance of diet in maintaining the body. The role of diet and other lifestyle factors in maintaining good health is considered with particular reference to the heart and circulation and to cardiovascular disease (CVD). The structures and functions of some carbohydrates and lipids are also detailed within this context. Ideas about correlation, causation, and the concept of risks to health are covered.

Topic 2 Genes and health

This topic considers the following biological principles: the properties of and transport of materials, across cell membranes and gas exchange surfaces, DNA structure and replication, protein synthesis, enzymes and monohybrid inheritance through the context of the genetic disease cystic fibrosis. The potential that gene therapy offers as treatment for cystic fibrosis is examined. The topic also allows for discussion of the social and ethical issues surrounding the diagnosis and treatment of genetic conditions.

Topic 3 The voice of the genome

This topic follows the story of the development of multicellular organisms from single cells to complex individuals. Cell structure and ultrastructure, cell division, the importance of fertilisation, the roles of stem cells, gene expression, cell differentiation and tissue organisation are all considered within this topic, as is the role of the genotype and the effect of the environment on phenotype.

Topic 4 Biodiversity and natural resources

The topic focuses on biodiversity and the wealth of natural resources used by humans. The meaning of biodiversity and how it can be measured is considered first, and how all this diversity has come about through adaptation and natural selection. It has sections on both traditional and novel uses of plants and plant fibres, and the use of chemical extracts from animals and plants. The concern for disappearing biodiversity and loss of potential natural resources is used to highlight the need for biologists to identify, name and classify species. The topic finishes by looking at the role of zoos in the conservation of endangered species. General biological principles covered include the relationship of plant anatomy to function, and the structure and role of cellulose and starch.

**During the second year you will study:**

Topic 5 On the wild side

This topic builds an appreciation that photosynthesis is the primary process underpinning the majority of ecosystems, and provides students with an understanding of how ecosystems work. The topic continues by looking at whether climate change will lead to extinction of species or evolution by natural selection, and looks at the evidence for global warming and its effects on plants and animals. By the end of the topic, students should appreciate how scientific understanding can make us aware of our responsibilities as stewards of the environment.

Topic 6 Infection, immunity and forensics

This topic starts by looking at how forensic pathologists use a wide variety of analytical techniques to determine the identity of a person or other animal, and to establish the time and cause of death of organisms, including humans. It then considers how bacteria and viruses use a variety of routes into their hosts, and how hosts have evolved barriers and internal mechanisms to combat infections. These protections are not always successful, and many people in the world still die from infectious diseases. This topic also investigates the evolutionary battles that take place between invading pathogens and their hosts.

Topic 7 Run for your life

This topic is centred on the physiological adaptations that enable animals and humans, particularly sports people, to undertake strenuous exercise. It explores the links between an animal's physiology and its performance. The topic summarises the biochemical requirements for respiration, and looks at the links between homeostasis, muscle physiology and performance. It ends by looking at how medical technology is enabling more people to participate in sport, and by raising the issue as to whether the use of performance-enhancing substances by athletes can be justified.

Topic 8 Grey matter

The scene is set by considering how the working of the nervous system enables us to see. Brain imaging and the regions of the brain are considered. The topic also demonstrates how an understanding of brain structure and functioning is relevant to such issues as the response to stimuli, the development of vision, and learning. It investigates how imbalances in brain chemicals may result in conditions such as Parkinson's disease, and its treatment with drugs is investigated. Students discuss the ethical issues raised by the Human Genome Project, and the risks and benefits of using genetically modified organisms.

**What can the course lead to in terms of higher education and future careers?**

This course is an excellent foundation (and indeed essential) for further study of biology, biomedical science, medicine, botany, veterinary science, dentistry, physiotherapy and related subjects such as pharmacy, and pharmacology. It is also highly recommended for other sciences. This course also provides a valuable education if you take biology no further but wish to pursue further education as it is a highly respectable academic course which teaching you the importance of planning, investigation, problem solving and research.

**What are the formal entry requirements for this course?**

A level Biology is both a theory and practical based course. National evidence suggests it is difficult to succeed unless you have an appropriate base of knowledge and a good track-record of success in exam based courses at GCSE. To ensure you have a reasonable chance of success our recommendation is at least **BB in GCSE Science and Additional Science (or B in GCSE Chemistry with a B grade in either Biology or Physics) together with a 6 in GCSE Maths (Higher Level)**. Applied Science or Additional Applied Science or non-GCSE Science qualifications are not suitable as preparation for A level study.

**Why should I consider taking an A level in Biology?**

It will enable you to develop a wide range of transferable skills. It will also help develop your interest and enthusiasm for biology, including developing your interest in further study and careers in biology. The content allows you to develop your interest in the human biology and its mechanics as well as understanding the importance of the plant world around us. It will help you appreciate how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society.

**What will I be examined on?**

There are 3 papers at the end of the 2 year course all equally weighted (33.33%)

Paper 1 covers The natural environment and species survival

Paper 2 covers Energy, Exercise and co-ordination

Paper 3 covers General and practical applications in Biology.

**The Summer Task**

Baseline assessment

Your task over the summer holidays I to complete the 9 question baseline assessment found in your transition guide. Please can print this out and complete it ready for your first lesson back. Tick any targets for improvement that arise and use the summary sheets and appendices to support your learning.

**Resources**

In order to support your programme of study and revision, we have identified two resources that we feel would be the most effective to help them. These books are not essential for success but as most students find they are a real help, we thought this would be a good time to direct you to the most effective guides.

Available through the CPG Website:

Edexcel Biology A Level Complete Revision and Practice – ISBN 978 1 78294 298 6

Available from Waterstones and other online providers:

Salter Nuffield AS/A Level Biology Revision Work Book – ISBN 9781447992707

**Provided by college - AS Course text book**

AS Salters-Nuffield Biology Student Book 1 + ActiveBook

ISBN 9781447991007

**Reading list**

In order to gain a genuine understanding of the topics covered it is essential that you read regularly and widely about your chosen field of study.

**Magazines, Newspapers and journals.**

New Scientist

Nature

Science

Biological Sciences Review

British Medical Journal

Any scientific articles in newspapers (eg the Guardian on Wednesday)

**Books**

There is no required reading material for students but we recommend that you read regularly and select lots of different topics from a varied range of authors.

You may find the following books interesting and informative at a general level. A number of these are available from Mr Every’s lab (415). It may also be possible to order them from the college library.

Richard Dawkins:

The Selfish Gene

The Blind Watchmaker.

Unweaving the Rainbow

Climbing Mount Improbable

The Ancestor’s Tale

Steve Jones:

Y: The Descent of Men

[In the Blood: God, Genes and Destiny](http://www.amazon.co.uk/Blood-God-Genes-Destiny/dp/0002555123/ref=pd_sbs_b_4/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

[Almost Like a Whale: The 'Origin of Species' Updated](http://www.amazon.co.uk/Almost-Like-Whale-Species-Updated/dp/055299958X/ref=cm_lmf_tit_1_rdssss0/202-5159057-0957406)

The Language of the genes

Matt Ridley

[Genome: The Autobiography of a Species in 23 Chapters](http://www.amazon.co.uk/Genome-Autobiography-Species-23-Chapters/dp/185702835X/ref=pd_sbs_b_1/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

[The Red Queen: Sex and the Evolution of Human Nature](http://www.amazon.co.uk/Red-Queen-Evolution-Human-Nature/dp/0060556579/ref=pd_sbs_b_2/202-5159057-0957406?ie=UTF8&qid=1185891131&sr=1-23)

The Language of Genes

Francis Crick: Discoverer of the Genetic Code

Nature Via Nurture: Genes, Experience and What Makes Us Human

James Watson:

DNA: The Secret of Life

The Double Helix: Personal Account of the Discovery of the Structure of DNA

Lewis Thomas:

The Lives of a Cell: Notes of a Biology Watcher.  
The Medusa and the Snail: More Notes of a Biology Watcher Barry Gibb: [The Rough Guide to the Brain (Rough Guides Reference Titles)](http://www.amazon.co.uk/Rough-Guide-Guides-Reference-Titles/dp/1843536641/ref=pd_bbs_sr_1/202-5159057-0957406?ie=UTF8&s=books&qid=1185891563&sr=8-1)

Charles Darwin: The origin of species

Armand Marie Leroi: Mutants: On the Form, Varieties and Errors of the Human Body

David S. Goodsell: The Machinery of Life

Ernst Mayr: This Is Biology: The Science of the Living World

George C. Williams: Plan and Purpose in Nature

Steve Pinker: The Language Instinct

Edward O Wilson: The Diversity of Life

Primo Levi: The Periodic Table

Richard Leaky: The Origin of Humankind

Bill Bryson: A Short History of Nearly Everything

TV and radio

There is a whole host of programmes dedicated to deepening our understanding of the world around us. These are just a few recommendations:

[The infinite Monkey Cage](http://www.bbc.co.uk/programmes/b00snr0w/episodes/downloads) – BBC Radio 4

[Inside Science](http://www.bbc.co.uk/programmes/b08tbf4v) - BBC Radio 4

[Natural Histories](http://www.bbc.co.uk/programmes/b08tcbrt) – BBC Radio 4

[The One Show](http://www.bbc.co.uk/programmes/p01nrznh)

BBC – [Science and Nature](http://www.bbc.co.uk/iplayer/categories/science-and-nature/highlights)