# Co-teaching Entry Level Certificate and GCSE Combined Science: Synergy

## Biology

**Component 1 – The human body**

**Component 2 – Environment, evolution and inheritance**

This resource guides you through co-teaching our Entry Level Certificate (ELC) Science and Foundation Tier GCSE Combined Science: Synergy specifications.

Our ELC is ideal for students who may not achieve a grade 1. It’s also a valuable motivational tool for building the confidence for your Foundation Tier students.

**Biology: Component 1 – The Human Body**

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| ELC Outcomes | Summary of content covered in ELC | Same theme covered in Combined but extra content | New content on same topic  Rest of Combined Foundation content |
| 1. Cells basic building blocks of living organisms. | Parts of a cell  Types of specialisation of cells  Structure related to function | 4.1.3.2 Cell structures | 4.1.3.1 Electron microscopy  4.9 Key ideas  4.1.3.6 Cell differentiation  4.1.3.3 Transport into and out of cells  Required practical 4: Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue |
| Practical development | Observing and drawing cells | Required practical 3 - use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included. | |
| 1. Tissue and organs  exemplified by human circulatory system and the digestive system. | Definition and differences between tissues and organs | 4.2.1.2 Exchange surfaces |  |
|  | Identify the position and function of the major organs  Role of the heart and blood in the human circulatory system | 4.2.1.3 The human circulatory system | 4.2.1.4 Blood cells  4.3.1.3 Treatments for cardiovascular disease  4.3.2.7 Cancer |
| 1. Human digestive system | Position of the organs in the digestive system  Simple role of enzymes | 4.2.1.5 The human digestive system |  |
| Practical development | Investigating the effect of amylase on starch  focus on planning and conclusions | Required practical 20 - investigate the effect of pH on the rate of reaction of amylase enzyme.  Students should use a continuous sampling technique to determine the time taken to completely digest a starch solution at a range of pH values. Iodine reagent should be used to test for starch every 30 seconds. Temperature must be controlled by a water bath or electric heater. | |
| 1. Respiration | How living organisms make energy by respiration  Effect of lifestyle on health – diet, fitness and exercise (related to pulse rate) | 4.2.1.1 Respiration    4.3.1.2 Risk factors for non-communicable diseases | 4.9 Key ideas |
| Practical development | Investigate the effect of exercise on pulse rate.  Investigate the effect of caffeine on pulse rate.  Comparing energy content in foods (burning crisps/rice cakes) | Required practical 7 - use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict’s test for sugars, iodine test for starch, and Biuret reagent for protein | |
| 1. Infectious (communicable) diseases | Pathogens cause infectious diseases  Bacteria and viruses | 4.3.3.1 Spread of communicable diseases | 4.3.3.2 Human communicable diseases  4.2.2.8 Plant diseases |
| Practical development  This could also be undertaken for Outcome 7 | Evaluate the effect of disinfectants and antibiotics on pre-inoculated agar in Petri dishes. |  | |
| 1. White blood cells and vaccination | How white blood cells work  How a vaccination works | 4.3.3.4 The human immune system  4.3.3.5 Vaccination | 4.3.3.6 Medicines  4.3.3.7 Testing new drugs |
| 1. Medical drugs | Drug testing:  The effects of drugs and the meaning of dependency and withdrawal  The role of antibiotics |  | 4.3.3.7 Testing new drugs |
| Practical development:  As for Outcome 5 | Evaluate the effect of disinfectants and antibiotics on pre-inoculated agar in Petri dishes. |  | |
| 1. Automatic control systems in the human body | The control system -includes nervous responses and reflex actions | 4.3.1.4 Homeostasis | 4.2.1.6 The human nervous system |
| Practical development | Compare the speed of catching reflex of two people.  Reaction times could also be compared using computer programs. | Required practical 8 - plan and carry out an investigation into the effect of a factor on human reaction time. | |
| 1. Hormones | How hormones are released and transported  Exemplified using menstrual cycle | 4.2.1.7 The human endocrine system  4.3.1.6 Human reproductive hormones | 4.3.1.4 Homeostasis  4.3.1.5 Insulin and diabetes |
| 1. Uses of hormones in controlling fertility | Oral contraceptives to inhibit fertility  Fertility drugs to stimulate eggs  Benefits and problems of using fertility hormones | 4.3.1.7 Contraception |  |

**Biology: Component 2 – Environment, evolution and inheritance**

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| ELC Outcomes | Summary of content covered in ELC | Same theme covered in Combined but extra content | New content on same topic  Rest of Combined Foundation content |
| 1. Photosynthesis | Source of energy for photosynthesis  Word equation for photosynthesis | 4.2.2.5 Photosynthesis | 4.2.2.6 Factors affecting the rate of photosynthesis  4.9 Key Ideas  4.2.2.1 Meristem tissue  4.2.2.3 Transpiration |
| Practical development | Investigate the rate of photosynthesis using pond weed. | Required practical 10: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed. | |
| 1. Adaption of animals and plants | How organisms are adapted to live in their natural environment | 4.4.4.2 Evolution through natural selection  4.4.2.2 Interdependence and competition |  |
| Practical development | Investigate the use of choice chambers. For example: maggots or woodlice. |  | |
| 1. Food chains and food webs | How feeding relationships are represented by food chains  How food chains are interlinked in a food web | 4.4.2.1 Levels of organisation in an ecosystem | 4.9 Key ideas |
| 1. Decay cycle | Living materials are recycled to provide the building blocks for future organisms  When living things decay carbon is released which is then used by plants for photosynthesis | 4.4.1.2 The carbon cycle  4.4.1.7 The water cycle | 4.9 Key ideas |
| Practical development | Investigate the variables that cause organic material to decay  Investigate the change in temperature as grass cuttings decay |  | |
| 1. Competition | What do plants and animals compete for? | 4.4.2.2 Interdependence and competition |  |
| Practical development | Compare the growth of plants when seeds are planted at different densities |  | |
| 1. Environmental changes that effect animals and plants | Simple idea of biotic and abiotic factors affecting living things. For example, temperature and predation | 4.4.2.3 Factors that affect communities |  |
| Practical development | Compare the distribution of plants in a trodden and non-trodden area | Required practical 12: Measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species. | |
| 1. Pollution of water, air and the land | Sources of pollution and how the growing population is increasing this pollution | 4.4.2.6 Negative human impacts on ecosystems | 4.4.2.5 Biodiversity  4.4.1.5 Climate change: impacts and mitigation  4.4.2.7 Positive human impacts on ecosystems |
| Practical development | Investigate whether rainwater in a city is more acidic that rainwater in the countryside.  Compare the quality of water from different sources. For example, running and still. | Chemistry Required practical 11: analysis and purification of water samples from different sources, including pH, dissolved solids and distillation.  *(cf* ELC Chemistry Component 4 Outcome 10) | |
| 1. Evolution, natural selection and artificial selection | Evidence for evolution from the fossil record.    Simple idea of natural selection using peppered moth as an example of having characteristics most suited to surviving which then allow it to breed successfully  Explanation of artificial selection with examples. | 4.4.4.2 Evolution through natural selection  4.4.4.3 Evidence for evolution  4.4.4.5 Selective breeding | 4.4.3.4 Genotype and phenotype  4.9 Key ideas |
| 1. Two types of reproduction | Explanation of the difference between sexual and asexual reproduction | 4.4.3.1 Chromosomes and genes | 4.1.3.5 Meiosis |
| Practical development | Investigate how alike plants grown from runners are |  | |
| 1. Genes, chromosomes and DNA.   Principles of genetic engineering | Where and what chromosomes are made of  Chromosomes pairs and inheritance of sex  Potential benefits and risks of genetic engineering | 4.4.3.1 Chromosomes and genes  4.4.3.2 Sex determination in humans  4.4.4.6 Genetic engineering | 4.4.3.3 Single gene inheritance  4.9 Key ideas |