

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

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.	
2. 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

3. 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.	
4. 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	

5. 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.		
6. 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
7. 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.		
8. 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.	
9. 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
10. 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

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.	
2. 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.		
3. 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
4. Decay cycle	Living materials are recycled to provide the	4.4.1.2 The carbon cycle 4.4.1.7 The water cycle	4.9 Key ideas

	building blocks for future organisms When living things decay carbon is released which is then used by plants for photosynthesis		
Practical development	Investigate the variables that cause organic material to decay Investigate the change in temperature as grass cuttings decay		
5. 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		
6. 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.	

7. 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 than 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. (<i>cf</i> ELC Chemistry Component 4 Outcome 10)	
8. 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
9. Two types of reproduction	Explanation of the difference between	4.4.3.1 Chromosomes and genes	4.1.3.5 Meiosis

	sexual and asexual reproduction		
Practical development	Investigate how alike plants grown from runners are		
10. 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