Curriculum Matching Chart Ages 11-19

Your guide to how the In the Zone experiments fit with the Science and PE curricula

Curriculum links Ages 11-14

England – National Curriculum

Curriculum area	Reference	Statement
Science	1.1a	Using scientific ideas and models to explain phenomena and developing them creatively to generate and test theories.
	1.1b	Critically analysing and evaluating evidence from observations and experiments.
	1.2a	Exploring how the creative application of scientific ideas can bring about technological developments and consequent changes in the way people think and behave.
	2.1a	Use a range of scientific methods and techniques to develop and test ideas and explanations.
	2.1b	*Assess risk and* work safely in the laboratory, field and workplace.
	2.1c	Plan and carry out practical and investigative activities, both individually and in groups.
	2.2a	Obtain, record and analyse data from a wide range of primary and secondary sources, including ICT sources, and use their findings to provide evidence for scientific
	2.2b	Evaluate scientific evidence and working methods.
	2.3a	Use appropriate methods, including ICT, to communicate scientific information and contribute to presentations and discussions about scientific issues.
	3.3a	Life processes are supported by the organisation of cells into tissues, organs and body systems.
	3.3d	All living things show variation, *can be classified and are interdependent, interacting with each other and their environment*.
	4c	Use real-life examples as a basis for finding out about science.
	4k	Make links between science and other subjects and areas of the curriculum.
PE	1.4a	Understanding that physical activity contributes to the healthy functioning of the body *and mind* and is an essential component of a healthy lifestyle.
	2.2c	Plan and implement what needs practising to be more effective in performance.
	4g	Make links between PE and other subjects and areas of the curriculum.

Wales – National Curriculum

Curriculum area		Statement
Science	Independence and interdependence of organisms	1. The basic *structure and* function of some cells, tissues, organs and organ systems, and how they support vital life processes.
		2. How food is used by the body as fuel during respiration.
		6. Applications of science, medicine and technology that are used to improve health *and quality of life*.
	Communication	2. Communicate logically by speech, writing, *drawings, diagrams, charts, tables, bar charts, line graphs, video*s and ICT packages using a wide range of scientific vocabulary, terms, symbols and conventions.
		3. Work quantitatively, using appropriate mathematical conventions and using SI units appropriate to their work, e.g. *kg*, s, *N*, m, *J*, *W*.
	Enquiry: Developing	3. Identify, describe and explain patterns, trends and relationships.
		4. Use scientific prior knowledge to explain links between cause and effect when concluding.
PE	Health, fitness and well-being activities	3. Try different activities that affect their fitness and find out how appropriate training can improve fitness and performance.

Northern Ireland – statutory requirements

Curriculum area		Statement
Science	Developing pupils' knowledge, understanding and skills	Learn about: organisms and health – healthy body and mind. Develop skills in scientific methods of enquiry to further scientific knowledge and understanding: planning for investigations, obtaining evidence, presenting and interpreting
	Developing pupils as individuals	Explore physical, chemical and biological effects on personal health, for example, inherited characteristics, exercise and nutrition, *misuse of chemicals, loud sound etc*.
PE		Experience, monitor and understand a range of short-term effects of exercise on the body systems including cardiovascular and musculo-skeletal systems.

Scotland – Curriculum for Excellence

Curriculum area	Level	Reference	Statement
Science	Body systems and cells	SCN 3-12a	I have explored the *structure and* function of organs and organ systems *and can relate this to the basic biological processes required to sustain life*.
		SCN 3-12b	I have explored the role of technology in monitoring health *and improving the quality of life*.
	Topical science	SCN 3-20a	I have collaborated with others to find and present information on how scientists from Scotland and beyond have contributed to innovative research and development.
		SCN 4-20a	I have researched new developments in science and can explain how their current or future applications might impact on modern life.
Health and wellbeing	Physical wellbeing	HWB 3-15a, HWB	I am developing my understanding of the human body and can use this knowledge to maintain and improve my wellbeing and health.

* Italics indicate statement parts not covered by the investigation.

Specification links Ages 16-19

AQA AS and A2 Biology

Unit	Reference	Statement
Unit 1 Biology and disease	3.1.4	Pulmonary ventilation as the product of tidal volume and ventilation rate.
	3.1.5	Cardiac output as the product of heart rate and stroke volume.
	3.2.4	The role of haemoglobin in the transport of oxygen. The loading, transport and unloading of oxygen in relation to the oxygen dissociation curve.
Unit 4 Populations and environment	3.4.4	Glycolysis followed by the production of *ethanol or* lactate *and the regeneration of NAD* in anaerobic respiration.
	3.5.3	The role of ATP *and phosphocreatine* in providing the energy supply during muscle contraction.

OCR AS and A2 Biology

Module	Unit		Statement
2 Exchange and transport	1.2.2 Transport in animals	l	Describe the role of haemoglobin in carrying oxygen and carbon dioxide.
		m	Describe and explain the significance of the dissociation curves of adult oxyhaemoglobin at different carbon dioxide levels (*the Bohr effect*).
4 Respiration	4.4.1 Respiration	a	Outline why *plants*, animals and *microorganisms* need to respire, with reference to *active transport and* metabolic reactions.
		c	State that ATP provides the immediate source of energy for biological processes.

Edexcel A2 Biology

Unit	Topic	Reference	Statement
5 Energy, Exercise and Coordination	7 Run for your life	5	Describe the overall reaction of aerobic respiration as splitting of the respiratory substrate (e.g. glucose) to release carbon dioxide as a waste product and reuniting of hydrogen with atmospheric oxygen with the release of a large amount of energy.
		11	Explain the fate of lactate after a period of anaerobic respiration in animals.
		13	Explain how variations in ventilation and cardiac output enable rapid delivery of oxygen to tissues and the removal of carbon dioxide from them, including how the heart rate and ventilation rate are controlled and the roles of the cardiovascular control centre and the ventilation centre.

WJEC AS and A2 Biology

Assessment unit	Unit	Reference	Statement
BY2: Biodiversity and Physiology of Body Systems	2.2	c	Structure and function of the human breathing system. Ventilation in humans and exchange of gases.
BY4: Metabolism, Microbiology and Homeostasis	4.1	a	*The importance of chemical energy in biological processes*. The central role of ATP as an energy carrier and its use in the liberation of energy for cellular activity. Structure of ATP.
	4.2	a	All living organisms carry out respiration in order to provide energy in the cell.

CCEA AS and A2 Biology

Unit	Topic	Statement
AS 2: Organisms and Biodiversity	2.1 Transport and exchange mechanisms (b) Gaseous exchange	2.1.8 Practical work: Understand the use of a simple respirometer: • measuring O_2 consumption (*with KOH present*); • measuring the net difference between CO_2 production and O_2 consumption (*with no KOH present*) and so determining CO_2 production.
Unit A2 2: Biochemistry, Genetics and Evolutionary Trends	5.1 Respiration	5.1.7 Compare aerobic and anaerobic respiration: • *the larger yield of ATP from aerobic than anaerobic respiration, though dependent on the availability of oxygen*; • the significance of anaerobic respiration in providing ATP without the use of oxygen; • the different strategies for anaerobic respiration in animals, *and in plants and fungi*: in animals extra ATP is generated rapidly, over and above that produced aerobically (for a burst of activity over a short period of time) and results in an oxygen debt; *in plants and fungi anaerobic respiration allows survival for some time in anaerobic conditions*; • oxygen debt as the additional oxygen required to further metabolise accumulated lactic acid and/or resynthesise depleted ATP.
		5.1.9 Practical Work: Refer to the use of a simple respirometer in 2.1 (b).

SQA Higher Biology

Unit	Topic	Statement
1 Cell Biology	c) Energy release	The role and production of ATP: i Importance of ATP as a means of transferring chemical energy. The role of ATP in cellular processes. iv Distinction between aerobic and anaerobic phases of respiration with reference to the level of ATP production and final metabolic products.

SQA Advanced Higher Biology

Unit	Topic	Statement
Optional unit: Physiology, Health and Exercise	a) Exercise and the cardiovascular system	i Structure and function of the cardiovascular system (CVS). iii Effect of exercise on the CVS. The 'athletic heart'. The protective effects of exercise. Principles of exercise testing.

** Italics indicate statement parts not covered by the investigation.*

Curriculum Matching Chart Ages 11-19

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Specification links Ages 14-16

AQA Science A and Additional Science

Unit	Topic	Reference	Statement
Biology 1	B1.1.1 Diet and exercise	b	*A person loses mass when the energy content of the food taken in is less than the amount of energy expended by the body*. Exercise increases the amount of energy expended by the body.
Biology 2	B2.6.1 Aerobic respiration	f	Energy that is released during respiration is used by the organism. The energy may be used: • in animals, to enable muscles to contract.

OCR A Additional Science

Module	Unit	Reference	Statement
B4 The processes of life	B4.3 How do living organisms obtain energy?	1a	Understand that all living organisms require energy released by respiration for some chemical reactions in cells, including chemical reactions involved in: movement.

OCR Biology B (Including Module B1 for Core Science)

Module	Unit	Statement
Module B1: Understanding Organisms	B1a Fitness and health	Analyse the results of different ways of measuring fitness (strength, stamina, *flexibility, agility, speed and cardiovascular efficiency*).
		(H) Evaluate different ways of measuring fitness.
Module B3: Living and Growing	B3c Respiration	Describe examples of life processes that require energy from respiration, to include: • muscle contraction.

OCR Additional Applied Science

Topic A1: Sport and fitness	Reference	Statement
Unit A1.2 Assessing fitness	8	Understand how lifestyle factors can adversely affect fitness, to include *food*, *drink*, exercise and *stress*.
Unit A1.4 Monitoring and improving performance	4	Describe aspects of a training programme designed to improve general fitness, including a muscle-building exercise *and an aerobic fitness exercise*.

Edexcel BTEC Level 2 First Sport

Unit	Learning outcome	Statement
1 Fitness Testing and Training	3	Be able to assess their own levels of fitness.
4 Anatomy and Physiology for Sport	4	Know the structure and function of the muscular system.

WJEC Science A – Additional Science

Unit	Reference	Statement
4 Respiration	a	Understand that all cells require a constant supply of energy to carry out cell processes and so enable organs and systems to function, and that energy is released in cells by respiration.

WJEC Additional Applied Science

Unit 1, Topic 1: Science and Health	Reference	Statement
1.2 Physiological changes associated with exercise	1.2.7	Understand that muscles need energy to do work (contract).
1.4 Monitoring and improving health and fitness	1.4.2	Understand that lifestyle factors (e.g. *food, alcohol consumption, smoking*, exercise, *and stress*) can adversely affect health and fitness.

WJEC Applied Double Science

Science at Work	Statement
Unit 4 Monitoring living organisms	Monitor the performance of a person in a physical *or mental* activity.

CCEA Applied Science (Double Award)

Unit	Statement
6 Unit 2: Science for the needs of society	That respiration may be aerobic or anaerobic depending on the availability of oxygen, *and that 'oxygen debt' may occur in muscles during vigorous exercise*.

CCEA Biology

Module	Topic	Reference	Statement
A Living organisms and life processes	Respiration	3.1.16	Understand that respiration may be aerobic or anaerobic depending on the availability of oxygen.

CCEA Science (Double Award)

Module	Topic	Reference	Statement
A Living organisms and life processes	Respiration	3.1.12	Understand that respiration may be aerobic or anaerobic depending on the availability of oxygen.

Scottish Standard Grade Science

Level and Grade	Topic	Reference	Statement
General	Topic 1.3 Fit for life	11	The differences between the different aspects of fitness; strength (e.g. being able to lift heavy objects with ease), *suppleness (e.g. being able to bend the body in many ways without feeling stiff and sore)*, stamina (e.g. being able to continue exercise without getting out of breath).

Scottish Standard Grade Biology

Level and Grade	Topic	Reference	Statement
General level Grades 4, 3	Topic 5d Changing Levels of Performance	21	State that continuous or rapidly repeated contraction of muscle results in fatigue.
Credit level Grades 2, 1	Topic 5d Changing Levels of Performance	21	Explain muscle fatigue *in terms of anaerobic respiration*.

Scottish Intermediate 1

Topic	Reference	Statement
Unit 1 Topic 4 A healthy body	4 (iv) Exercise and the health of muscles	The importance of regular exercise in the maintenance of the size and strength of muscles. Muscle size and strength decrease if muscles are not exercised regularly. Muscle fatigue during exercise occurs when insufficient oxygen is available to the muscles and can be relieved by relaxation. The concept of oxygen debt through the production of lactic acid is not required.

Scottish Intermediate 2

Topic	Reference	Statement
Unit 1 Living cells	d) Aerobic and anaerobic respiration	Effect of lactic acid on muscle cells (i.e. muscle fatigue) and subsequent repayment of oxygen debt.

** Italics indicate statement parts not covered by the investigation.*