specification maps

Click the link to take you to the relevant table – the table indicates which Engineering Everywhere practical activities are relevant to that specification.

AQA		
• **Biology 4411** • **Chemistry 4421** • **Physics 4451** • **Science A 4461** • **Science B 4462** • **Additional Science 4463**	TABLE 1	**[GO]**
• **Applied Science Double-award 4861**	TABLE 2	**[GO]**
• **Additional Applied Science 4863**	TABLE 3	**[GO]**
OCR 21ST CENTURY SUITE		
• **Biology A J633** • **Chemistry A J634** • **Physics A J635** • **Science A J630** • **Additional Science A J631**	TABLE 4	**[GO]**
• **Additional Applied Science A J632**	TABLE 5	**[GO]**
OCR GATEWAY SUITE		
• **Biology B J643** • **Chemistry B J644** • **Physics B J645** • **Science B J640** • **Additional Science B J641**	TABLE 6	**[GO]**
OCR		
• **Applied Science Double-award J649**	TABLE 7	**[GO]**
EDEXCEL 360 SCIENCE		
• **Biology 2105** • **Chemistry 2107** • **Physics 2109** • **Science 2101** • **Additional Science 2103**	TABLE 8	**[GO]**
EDEXCEL BTEC		
• **BTEC First Certificate / Diploma in Applied Science**	TABLE 9	**[GO]**
WJEC		
• **Biology** • **Chemistry** • **Physics** • **Science** • **Additional Science**	TABLE 10	**[GO]**
• **Applied Science Double-award**	TABLE 11	**[GO]**
• **Additional Applied Science**	TABLE 12	**[GO]**
SCOTLAND		
• **Standard grade physics**	TABLE 13	**[GO]**
• **Intermediate 2 physics**	TABLE 14	**[GO]**
• **Intermediate 1 physics**	TABLE 15	**[GO]**

TABLE 1: AQA

- **Biology 4411**
- **Chemistry 4421**
- **Physics 4451**
- **Science A 4461**
- **Science B 4462**
- **Additional Science 4463**

unit	topic		practical activities	
B2	12.7	sweating	fragrance	make a deodorant
B3	13.7	culturing micro-organisms; aseptic techniques	water	a water filter
C2	12.6	making a soluble salt	fragrance	make a deodorant
		making an insoluble salt	skeletons	inside bones
C3	13.3	solubility	fragrance	bath bombs
		water treatment (filtration and sterilisation)	water	a water filter
		water quality and hardness		water hardness
	13.5	chemical analysis	skeletons	inside bones
P1	11.1	heat transfer – size and shape	fragrance	heating and cooling
P2	12.1	measuring speed	sails	a model land yacht
			thrills	ejection seat
	12.2	changes in speed; acceleration due to gravity	thrills	ejection seat
P3	13.4	use of a lens in a camera; magnification	television	cameras
	13.7	electric motors	robots	robot actuators

TABLE 2: AQA

- **Applied Science Double-award 4861**

topic		practical activities	
Unit 2: Science for the needs of society			
11.4	material properties – strength	bikes	fatigue
		fragrance	bath bombs
	material properties – hardness	skeletons	hardness testing
	material properties – elasticity, water absorption	sails	making sails
	heat transfer	fragrance	heating and cooling
	useful mixtures	fragrance	make a deodorant
			bath bombs
11.5	calculating speed	sails	a model land yacht
	calculating acceleration	thrills	ejection seat
Unit 3: Developing scientific skills			
12.2	following standard procedures	all activities	
12.3	culturing micro-organisms; aseptic techniques	water	a water filter
12.4	chemical analysis	skeletons	inside bones
		water	water hardness
12.5	material properties – strength	bikes	fatigue
		fragrance	bath bombs
	material properties – elasticity, water absorption	sails	making sails
	material properties – density	skeletons	inside bones
	material properties – hardness		hardness testing
	material properties – surface friction		friction
Unit 4: Using scientific skills for the benefit of society			
13.3	making a chemical product	fragrance	make a deodorant
		skeletons	inside bones
13.4	assemble and test an electric / electronic device	bikes	a motion analyser
		robots	robot sensors
			robot actuators
			build a robot
		sails	a model tilt sensor
		television	a microphone
13.5	investigating a mechanical machine	robots	robot actuators
		water	lifting water
	performance of ball bearing race	thrills	bearings
	spring extension and compression		shock absorbers

TABLE 3: AQA

- **Additional Applied Science 4863**

topic		practical activities	
Unit 2: Science at work			
11.4	sports materials properties – strength	bikes	tube strength
			fatigue
	sports materials properties – elasticity, water absorption	sails	making sails
	sports materials properties – spring extension and compression	thrills	shock absorbers
Unit 3: Using scientific skills			
12.2	water purification, sterilisation, testing for bacteria	water	a water filter
12.4	sports materials – testing physical properties	bikes	tube strength
			fatigue
		sails	making sails
		skeletons	hardness testing*
			friction*
		thrills	bearings*
			shock absorbers
			** same activities, but different context*

TABLE 4: OCR 21ST CENTURY SUITE

- **Biology A J633**
- **Chemistry A J634**
- **Physics A J635**
- **Science A J630**
- **Additional Science A J631**

module	topic		practical activities	
B7	7.7	bones, muscles and movement	bikes	a motion analyser
		bone structure	skeletons	inside bones
		supporting broken bones / injured joints		hardness testing
		prosthetic joints		friction
C2	2.1	material properties – strength	bikes	fatigue
			fragrance	bath bombs
		material properties – elasticity, water absorption	sails	making sails
		material properties – density	skeletons	inside bones
		material properties – hardness		hardness testing
		material properties – surface friction		friction
C4	4.1	chlorine and iodine for water sterilisation	water	a water filter
C6	6.1	pH measurement	water	a water filter
	6.2	making a soluble salt	fragrance	make a deodorant
		making an insoluble salt	skeletons	inside bones
C7	7.4	quantitative analysis	skeletons	inside bones
		titration techniques	water	water hardness
P4	4.1	measuring speed	sails	a model land yacht
			thrills	ejection seat
	4.4	motion under gravity	thrills	ejection seat
		lifting a load	water	lifting water

TABLE 5: OCR 21ST CENTURY

- **Additional Applied Science A J632**

module	topic		practical activities	
AP4	4.2	making a soluble salt	fragrance	make a deodorant
		making an insoluble salt	skeletons	inside bones
	4.3	controlling chemical processes – heat transfer	fragrance	heating and cooling
	4.4	formulating a product	fragrance	bath bombs
	4.5	acid-metal reactions; calculating yield	fragrance	make a deodorant
AP5	5.2	understanding and building electronic circuits	bikes	a motion analyser
			robots	robot sensors
				robot actuators
				build a robot
	5.5	amplitude and frequency on an oscilloscope	television	a microphone
AP6	6.1	*the DVD shows examples of people and their work involving a range of materials*		
	6.2	compression and tension	thrills	shock absorbers
		mechanical properties – strength	bikes	fatigue
			fragrance	bath bombs
		mechanical properties – elasticity, water absorption	sails	making sails
		mechanical properties – density	skeletons	inside bones
		mechanical properties – hardness		hardness testing
		mechanical properties – surface friction		friction
		matching materials to required behaviour	sails	making sails
			thrills	bearings
		measuring velocity	sails	a model land yacht
			thrills	ejection seat
	6.3	heat conduction through a container	fragrance	heating and cooling
		sound frequency and amplitude	television	a microphone
	6.4	lenses	television	cameras

TABLE 6: OCR GATEWAY SUITE

- **Biology B J643**
- **Chemistry B J644**
- **Physics B J645**
- **Science B J640**
- **Additional Science B J641**

module	topic		practical activities	
B5	5a	bones, muscles and movement	bikes	a motion analyser
		bone structure	skeletons	inside bones
		supporting broken bones / injured joints		hardness testing
	5g	prosthetic joints	skeletons	friction
B6	6b	culturing bacteria; aseptic technique	water	a water filter
C2	2d	properties of metals related to uses	bikes	tube strength
				fatigue
C3	3b	measuring solubility	fragrance	bath bombs
	3e	chlorine and iodine for water sterilisation	water	a water filter
C4	4a	acid-base reaction	skeletons	inside bones
	4h	water purification	water	a water filter
C5	5a	percentage composition	skeletons	inside bones
	5d	titration techniques	water	water hardness
C6	6f	measuring water hardness	water	
P1	1c	heat loss through glass	fragrance	heating and cooling
	1e	investigating waveforms on an oscilloscope	television	a microphone
P3	3a	measuring speed	sails	a model land yacht
			thrills	ejection seat
	3b	measuring acceleration	thrills	ejection seat
	3c	using light gates to explore forces and motion	thrills	ejection seat
	3d	lifting weights	water	lifting water
	3h	elastic potential and gravity in a theme ride	thrills	ejection seat
P5	5h	examining lamps and cameras	television	studio lights
				cameras
P6	6b, 6c and 6f	using LEDs, LDRs, thermistors, motors and diodes	bikes	a motion analyser
			robots	robot sensors
				robot actuators
				build a robot

TABLE 7: OCR

- **Applied Science Double-award J649**

topic		practical activities	
Unit 1: Developing scientific skills			
practical tasks	following standard procedures	all activities	
	handling scientific equipment and materials		
	recording and analysing scientific data		
investigating organisms, chemicals and materials	culturing micro-organisms; aseptic techniques	water	a water filter
	chemical analysis	skeletons	inside bones
		water	water hardness
	investigating materials – strength	bikes	tube strength
			fatigue
		fragrance	bath bombs
	investigating materials – elasticity, water absorption	sails	making sails
	investigating materials – density	skeletons	inside bones
	investigating materials – hardness		hardness testing
	investigating materials – surface friction		friction
Unit 2: Science for the needs of society			
2.4.1	investigating mixtures	fragrance	bath bombs
		skeletons	inside bones
2.4.2	material properties related to uses	bikes	tube strength
			fatigue
		fragrance	bath bombs
		sails	making sails
		skeletons	inside bones
			hardness testing
			friction
		thrills	bearings
			shock absorbers
2.5.2	energy transfers – potential/kinetic	thrills	ejection seat
2.5.3	thermal energy transfer	fragrance	heating and cooling
Unit 3: Science at work			
making useful products and devices	making a chemical product	fragrance	make a deodorant
		skeletons	inside bones
	assemble and test an electric / electronic device	bikes	a motion analyser
		robots	robot sensors
			robot actuators
			build a robot
		sails	a model tilt sensor
		television	make a microphone
	assemble and test an optical device	television	studio lights
			cameras

TABLE 8: EDEXCEL 360 SCIENCE

- **Biology 2105**
- **Chemistry 2107**
- **Physics 2109**
- **Science 2101**
- **Additional Science 2103**

unit	topic		practical activities	
C1	6.1-6.3	making a soluble salt	fragrance	make a deodorant
		making an insoluble salt	skeletons	inside bones
		identify uses of citric acid	fragrance	bath bombs
C2	6.1	physical properties of metals	bikes	tube strength
				fatigue
C3	3.7	measuring chemical quantities and formulating mixtures	fragrance	make a deodorant
				bath bombs
	3.12, 3.17 and 3.19	determining concentration by titration	water	water hardness
	3.20	water purification and sterilisation		a water filter
P1	9.6 and 9.7	using LDRs and thermistors	robots	robot sensors
				robot actuators
				build a robot
	11.14	amplitude and frequency on an oscilloscope	television	a microphone
P2	9.1 and 9.2	investigating speed and acceleration	sails	a model land yacht
			thrills	ejector seat
	10.1	potential energy and gravity	thrills	ejector seat

TABLE 9: EDEXCEL 360 SCIENCE

- **BTEC First Certificate / Diploma in Applied Science**

unit	topic		practical activities	
1	1	scientific units and quantities	all activities	
	2	investigating material properties – strength	bikes	tube strength
				fatigue
			fragrance	bath bombs
		investigating material properties – elasticity, water absorption	sails	making sails
		investigating material properties – density	skeletons	inside bones
		investigating material properties – hardness		hardness testing
		investigating material properties – surface friction		friction
		investigating linear motion	sails	a model land yacht
			thrills	ejection seat
		effects of forces – speed and direction	sails	a model land yacht
		effects of forces – Hooke's Law		making sails
		effects of forces – compression and tension	thrills	shock absorbers
2	3	impact of engineering technology	all activities	
	4	links between science and engineering		
3	4	energy factors in chemical processing	fragrance	heating and cooling
4	1	mechanical energy transfer	thrills	ejection seat
			water	lifting water
		thermal energy transfer	fragrance	heating and cooling
	2	light and lenses	television	studio lights
				cameras
		sound waves (amplitude and frequency)		a microphone
	3	electric motors	robots	robot actuators
5	4	harmful effects of micro-organisms	water	a water filter
6	3	safe working practices	all activities	
	4	general laboratory practices		
10	2	bone analysis	skeletons	inside bones

TABLE 10: WJEC

- **Biology**
- **Chemistry**
- **Physics**
- **Science**
- **Additional Science**

unit	topic		practical activities	
B3	4d,4e	aseptic techniques; testing for bacteria	water	a water filter
C1	2f	acid-metal reactions	fragrance	make a deodorant
C2	2d	physical properties of metals	bikes	tube strength
				fatigue
	4f	calculate percentage yield	fragrance	make a deodorant
	6h	properties of polymers and other materials	sails	making sails
	8a	water treatment (filter beds and chlorination)	water	a water filter
	8c,8d	measuring hardness		water hardness
C3	3f	titration	water	water hardness
P1	4a-c	heat loss from vessels	fragrance	heating and cooling
	6a	amplitude and frequency on an oscilloscope	television	a microphone
P2	6a,6b	measuring speed and acceleration	sails	a model land yacht
			thrills	ejection seat
	8a-e	forces and motion	sails	a model land yacht
			thrills	ejection seat
			water	lifting water

TABLE 11: WJEC

- **Applied Science Double-award**

topic		practical activities	
Unit 1: Developing scientific skills			
2.1	following standard procedures	all activities	
2.2	handling scientific equipment and materials		
2.3	recording and analysing scientific data		
3.2	culturing micro-organisms; aseptic techniques	water	a water filter
4.2	quantitative chemical analysis	skeletons	inside bones
		water	water hardness
5.2	investigating material properties – strength	bikes	tube strength
			fatigue
		fragrance	bath bombs
	investigating material properties – elasticity, water absorption	sails	making sails
	investigating material properties – density	skeletons	inside bones
	investigating material properties – hardness		hardness testing
	investigating material properties – surface friction		friction
Unit 2: Science and society			
c 20 - 24	material properties related to uses	bikes	tube strength
			fatigue
		fragrance	bath bombs
		sails	making sails
		skeletons	inside bones
			hardness testing
			friction
		thrills	bearings
			shock absorbers
d 8	energy transfers – potential / kinetic	thrills	ejection seat
d 9	thermal energy transfer	fragrance	heating and cooling
Unit 3: Science at work			
2	making a chemical product	fragrance	make a deodorant
		skeletons	inside bones
3	assemble and test an electric / electronic device	bikes	a motion analyser
		robots	robot sensors
			robot actuators
			build a robot
		sails	a model tilt sensor
		television	a microphone

TABLE 12: WJEC

- **Additional Applied Science**

topic		practical activities	
Unit 1: Developing scientific skills			
2.1	following standard procedures	all activities	
2.2	handling scientific equipment and materials		
2.3	recording and analysing scientific data		
3	comparing surface friction	skeletons	friction
	hardness and wear resistance		hardness testing
	absorbency and elasticity of materials	sails	making sails
5	testing for bacteria; aseptic techniques	water	a water filter
Unit 2: Science at work			
sports equipment			
1	elasticity and absorbancy of cloth	sails	making sails*
2	surface friction	skeletons	friction*
4	strength of metals	bikes	tube strength
			fatigue
	extension and compression of springs	thrills	shock absorbers*
	hardness	skeletons	hardness testing*
			** adapt to appropriate scenarios*

TABLE 13: SQA STANDARD GRADE PHYSICS (Credit learning outcomes in **bold**)

unit		topic			practical activities	
		learning objective		relevance		
1.2	communication using cables	4, 8 & 9	investigating the frequency response of a microphone using a CRO	√	television	a microphone
3.3	light and sight	5, 7 & 13	image formation in convex lens (of the eye)	√	television	cameras
4.1	electronics overview	1	extension activity: a practical electronic system incorporating input, process and output devices	√	sails	a model tilt sensor
4.2	electronics: output devices	1, 2 & **7**	electric motor as output device	√√	robots	robot actuators
			extension activity	√	robots	build a robot
		3, 4, 5, **8** & **9**	LED as output device	√√	bikes	a motion analyser
4.3	electronics: input devices	2,3 & **6**	thermistor, LDR and switch as input sensors; voltage divider circuits	√√	robots	robot sensors
			extension activity	√	robots	build a robot
		2	extension activity: the variation of the resistance of an LDR with light intensity	√	television	studio lights
4.4	digital processes	1, 2, 3, 4 & **15**	simple transistor switching circuits	√√	robots	robot actuators
		10, **18** & **19**	clock circuits	√√	bikes	a motion analyser
5.1	on the move	1,2,3, **9** & **10**	measuring average and 'instantaneous speeds'	√√	sails	a model land yacht
		6 & 7	drawing and interpreting speed-time graphs	√√	sails	a model land yacht
5.2	forces at work	3 & 4	relationship between mass and weight	√√	water	lifting water
		5 & 6, and **12** & **13**	friction	√√	skeletons	friction: part 1
			extension activity	√	skeletons	friction: part 2
		6	extension activity: reducing friction	√	thrills	bearings
		7, 8 & 10	description of motion in terms of Newton's 1st and 2nd laws	√√	sails	a model land yacht
		10	extension activity: application of Newton's 2nd Law	√	thrills	ejection seat
5.3	movement means energy	2, 3 & 4	calculations of work done (energy transferred) and power	√√	water	lifting water

TABLE 14: SQA INTERMEDIATE 2 PHYSICS

unit		topic			practical activities	
		learning objective		relevance		
1.1	kinematics	1 - 4	measuring average and 'instantaneous speeds'	√√	sails	a model land yacht
		10 & 11	drawing and interpreting velocity-time graphs	√√	sails	a model land yacht
1.2	dynamics	1 & 11	effect of unbalanced force on the speed of an object	√√	sails	a model land yacht
			extension activity		sails	a model tilt sensor
		3 – 6	relationship between mass and weight	√√	skeletons	friction: part 1
		6	calculations involving F = Mg	√√	water	lifting water
		7 & 8	friction	√√	skeletons	friction: part 1
		8	extension activity: ways of reducing friction	√	thrills	bearings
		14, 15 & 17	extension activity: analysis of forces using free body diagram	√	thrills	ejection seat
1.3	momentum and energy	7, 8 & 9	calculations of work done (energy transferred) and power	√√	water	lifting water
2.1	circuits	16 & 17	potential divider circuits	√√	robots	robot sensors
2.4	electronic components	2,3,4 & 5	LED as output device	√√	bikes	a motion analyser
		6 & 7	microphone as an input device	√	television	a microphone
		6,7,8 & 9	thermistor and LDR as input devices	√√	robots	robot sensors
		9 & 10	extension activity: the variation of the resistance of an LDR with light intensity	√	television	studio lights
		13 & 14	transistor switching circuits	√√	robots	robot actuators
			extension activity	√	robots	build a robot
3.3	refraction	5 & 6	image formation in convex lenses	√	television	cameras

TABLE 15: SQA INTERMEDIATE 1 PHYSICS

unit		topic			practical activities	
		learning objective		relevance		
1.5	telephone	5 & 7	function of a microphone	√	television	a microphone
4.1	sound waves	6	using a CRO to investigate frequency and amplitude of sound waves	√	television	a microphone
5.1	forces	2 & 3	relationship between mass and weight	√√	skeletons	friction: part 1
		4, 5,& 6	friction	√√	skeletons	friction: part 1
		6	ways of reducing friction	√	thrills	bearings
		10 & 12	extension activity: effect of unbalanced forces on speed / direction of motion	√	thrills	ejection seat
		11	effect of unbalanced force on the speed of an object	√	sails	a model land yacht
5.2	speed and acceleration	1 – 3	measuring average and 'instantaneous speeds'	√√	sails	a model land yacht
6.1	input, process and output	4, 6 & 7	thermistor, LDR and switch as input devices	√√	robots	robot sensors
		7	extension activity: the variation of the resistance of an LDR with light intensity	√	television	studio lights
		10	LED as output device	√	bikes	a motion analyser