Exam Board:	AQA
Subject:	Combined Science - Physics
Paper:	Physics Paper 2 (March)
Marks available:	70
Length of paper:	1 hour 15 minutes
Topics:	Forces, Waves, Magnetism and Electromagnetism

Exam Information, guidance and hints

Command words:

- Complete - Fill in gaps/add labels, finish diagrams or graphs
- Give - Recall a simple fact
- Draw - Draw a symbol, diagram or graph
- Describe - Give details about an event, idea or a process
- Explain - Give reasons for an event, idea or process (use because/so)
- Compare - Identify how things are similar/different
- Suggest - Use your own knowledge in an unfamiliar context
- Calculate - Use numbers in a formula
- Complete - Fill the gaps or add to a diagram
- Determine - Work out mathematically
- Evaluate - Compare the pros and cons then give a judgement

Online Resources

- Cognito past papers

Hints/tips: You need to be able to use the following calculations

- Distance = speed x time
- Acceleration = change in velocity / time
- Weight = mass x gravitational field strength
- Period = 1 / frequency
- Frequency = 1 / period
- Force = mass x acceleration
- Work done = force x distance moved
- Wave speed = frequency x wavelength
- Elastic potential energy = ½ x spring constant x extension^2
- How to calculate the change in x and y (on a graph)
- How to calculate a gradient (using a graph)
- Higher only
  - Force on a wire = magnetic flux density x current x length
  - V^2-U^2 = 2 x a x s
  - Momentum = mass x velocity

Foundation Example Papers and Markschemes			Higher Example Papers and Markschemes		
2018 H paper	Annotated P2	2018 MS	2018 F Paper	Annotated P2	2018 MS
2019 H Paper	Annotated P2	2019 MS	2019 F Paper	Annotated P2	2019 MS
2020 H Paper	Annotated P2	2020 MS	2020 F Paper	Annotated P2	2020 MS

PLC Combined Science: Physics Paper 2 - Mock 2

Topic	Key information related to topic	Sparx Code	Resources/Information related to topic	How well do you understand this topic? RAG		
				Red	Amber	Green
Forces	Describe scalar and vector quantities including examples.	R197	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.02			
Forces	Describe contact and non-contact forces including examples.	R853	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.01			
Forces	Explain how and why objects accelerate as they fall.	R893 R760	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Explain why objects reach terminal velocity	R112	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.06			
Forces	Calculate resultant forces through addition and subtraction	R893	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.05			
Forces	Describe the changes in motion of objects based on the forces applied to them	R744	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.02 https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	**HT: Use free body diagrams to calculate force**	R589	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.05			
Forces	**HT: Use vector diagrams to resolve forces into two components**	R589	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.05			
Forces	**HT: Use vector diagrams to find the resultant force**	R589	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.05			

Topic	Key information related to topic	Sparx Code	Resources/Information related to topic	How well do you understand this topic? RAG		
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Forces	Use Newton's first law to describe the motion of objects with different resultant forces (e.g, what happens to an object if the resultant force is 100N left or 0N?)	R744	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	**HT: Use Newton's first law to define inertia**	R597	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Explain changes in velocity using ideas about forces (thrust and air resistance)	R893 R760	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Apply ideas about forces and acceleration to explain terminal velocity	R112	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.06			
Forces	Interpret velocity time graphs to identify acceleration and constant speed	R176 R663	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.05			
Forces	Interpret velocity time graphs to calculate acceleration and distance **HT - also need to do instantaneous acceleration from a curve using a tangent**	R760 R176 R663	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.05			
Forces	Interpret distance time graphs to identify speed and periods where the object is stationary	R908	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.04			
Forces	Interpret distance time graphs to calculate speed	R908	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.04			
Forces	Calculate distance using distance = speed x time	R374 R908	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.04			
Forces	Recall average speeds for walking, running, cycling and driving	R374	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.01			

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Forces	Recall the speed of sound	R374	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.01			
Forces	Define velocity and compare it to speed.	R639	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.01			
Forces	Calculate velocity using v = s x t	R639	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.01			
Forces	Calculate velocity using the equation for uniform acceleration (v^2-u^2 = 2as)	R799	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.02			
Forces	**HT:Explain how an object can have a changing velocity when its speed is constant**	R639	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.02			
Forces	Calculate acceleration using a = (v-u) / t	R760	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.02			
Forces	Calculate values using F = m x a	R138	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Explain how changing force and mass affect acceleration	R138	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	**HT: Use F = m x a to calculate inertial mass and explain its significance**	R597	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Describe how to investigate the relationship between force and acceleration using a trolley, pulley, light gates and masses	R149	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.07			
Forces	Use Newton's third law to describe force pairs (action and reaction forces)	R519	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.08			

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Forces	Describe factors affecting the gravitational force on an object	R590	https://www.youtube.com/watch?v=W2aBVbcHr_k&t=6s			
Forces	Describe how to measure mass and weight (not the same way!).	R590	https://www.youtube.com/watch?v=W2aBVbcHr_k&t=6s			
Forces	Calculate mass from weight and gravitational field strength	R590	https://www.youtube.com/watch?v=W2aBVbcHr_k			
Forces	Describe the relationship between weight, mass and gravitational field strength.	R590	https://www.youtube.com/watch?v=W2aBVbcHr_k			
Forces	Describe the relationship between weight and distance from the Earth	R590	https://www.youtube.com/watch?v=W2aBVbcHr_k			
Forces	Calculate force from mass and acceleration	R138	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.07			
Forces	Describe and calculate stopping distance	R823 R134 R107				
Forces	Explain how different factors affect stopping distance	R823 R134 R107	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.09			
Forces	Explain the relationship between braking force and stopping distance	R823 R134 R107	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.09			
Forces	Explain the dangers caused by large accelerations	R554 R870	https://www.youtube.com/watch?v=XL01aEducWE			

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Forces	Evaluate vehicles based on their stopping distances (which is best, worst, why?)	R823 R134 R107	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.09			
Forces	Explain how to calculate thinking distance from reaction time and velocity	R134	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.09			
Forces	State the typical reaction time for humans	R134	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.09			
Forces	Describe how to measure reaction time in humans	R134	https://www.youtube.com/results?search_query=free+science+lessons+reaction+time			
Forces	Describe work done as when a force is applied over a certain distance. Include examples of when work is done or identify work being done in given examples	R307	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_1.11			
Forces	Convert between Nm and joules	R307	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_1.11			
Forces	Describe the effect of doing work against frictional forces	R853	https://www.youtube.com/watch?v=xxK8N23nx9M			
Forces	Calculate work done using force and distance moved	R307	https://www.youtube.com/watch?v=PY80j_iNT9Y			
Forces	Describe different ways that objects can be deformed by applying forces	R337	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.08			
Forces	Compare elastic and inelastic deformation	R337	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.08			

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Forces	Explain the relationship between force and extension/compression in springs and other elastic objects.	R337 R598	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_1.06			
Forces	Explain the relationship between extension/compression in a spring and the energy stored in a spring	R337 R598 R353	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.08 https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.06			
Forces	Calculate elastic potential energy from extension and a spring constant	R494	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_1.06 https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.06			
Forces	Describe how to measure extension and compression in springs using original length	R353	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_2.08			
Forces	Describe how to investigate the relationship between force and extension in springs.	R353	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.06			
Forces	**HIGHER:** Calculate momentum	R980	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.11			
Forces	**Higher: Describe the principle of conservation of momentum**	R695	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.11			
Forces	**Higher: Use conservation of momentum to explain and calculate the changes in velocity during collisions.**	R695	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_3.11			
Waves	Describe waves (what do they transfer, what do they not transfer?)	R186 R103	https://www.youtube.com/watch?v=ITe6snlZBp8			
Waves	Compare transverse and longitudinal waves.	R186	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.01			

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Waves	Describe the properties of waves including frequency, amplitude, wavelength and period. Where appropriate, identify these on diagrams. (including peaks, troughs, compressions and rarefactions)	R186 R103	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.01			
Waves	State the speed of sound in air and the speed of light in a vacuum.	R103 R452	https://www.youtube.com/watch?v=ITe6snlZBp8&t=2s			
Waves	Describe how to measure the speed of sound	R803	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.03			
Waves	Describe how to measure the speed of water waves on water	R452	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.08			
Waves	Describe how to investigate the properties of waves in a ripple tank	R625	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.08			
Waves	Describe how to investigate the properties of waves on a string	R625	https://www.youtube.com/watch?v=ZXAmiRC0GBo&t=33s			
Waves	Interpret wave diagrams to identify different frequencies and wavelengths	R103	https://www.youtube.com/watch?v=3qCmEHRFRH8			
Waves	Calculate periods from a frequency	R103	https://www.youtube.com/watch?v=3qCmEHRFRH8			
Waves	Describe the electromagnetic spectrum and the properties of its waves	R288	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.05			
Waves	Identify the uses of different electromagnetic waves	R993	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.05			

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Waves	Identify the dangers of different electromagnetic waves	R919	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.05 https://www.youtube.com/watch?v=u5vkYjV1V1A&t=3s			
Waves	State the unit of dose for radiation and explain its significance	R919	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.09			
Waves	Calculate wavelength from frequency and wave speed	R569	https://www.youtube.com/watch?v=Aucu7YshyQ0			
Waves	Describe the relationship between wavelength and colour in visible light	R233 R288	https://www.youtube.com/watch?v=u5vkYjV1V1A			
Waves	**HT: Describe how the wavelength of EM waves can change when absorbed, reflected or transmitted.**	R992	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.04			
Waves	**HT: Explain how refraction occurs using wavefront diagrams**	R992	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.04			
Waves	**HIGHER: Explain how radio waves are produced, transmitted and received**	R556	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_4.06			
Waves	Describe how to Investigate the amount of infrared absorbed and radiated by different surfaces	R699	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_10.1			
Magnetism and Electromagnetism	Describe magnetic fields including which direction the field lines go	R847	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.01			
Magnetism and Electromagnetism	Describe how to use iron filings and plotting compasses to demonstrate and draw magnetic field lines	R847 R882	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.01			

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Magnetism and Electromagnetism	Draw diagrams to show magnetic fields	R847	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.01			
Magnetism and Electromagnetism	Identify magnetic materials and describe what happens to them when near a magnet	R847	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.01 https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.02			
Magnetism and Electromagnetism	Describe how to construct an electromagnet	R344	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.03			
Magnetism and Electromagnetism	Explain how to increase the strength of an electromagnet	R344	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.03			
Magnetism and Electromagnetism	**HIGHER: Identify the direction of a force on a wire using the left hand rule**	R766 R206	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.04 https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.05			
Magnetism and Electromagnetism	**HIGHER: Calculate the magnetic flux density using the equation F = B x I x L**	R206	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.04			
Magnetism and Electromagnetism	**HIGHER: Explain how to change the size and direction of an electromagnetic field using current, polarity and magnetic field strength.**	R766 R344	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.03			
Magnetism and Electromagnetism	**HIGHER: Explain how a motor works using the motor effect**	R931	https://cognitoedu.org/coursesubtopic/p2-gcse-aqa-h-c_6.04			

Topic	Key information related to topic	Sparx Code	Resources/Information related to topic	How well do you understand this topic? RAG		
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Scientific Skills	Calculate the gradient of a graph	X	https://www.youtube.com/watch?v=zVSq5b3PPfY&t=237s			
Scientific Skills	Plot a graph from data in a table	X	Constructing a line graph - Obtaining, analysing and evaluating results – WJEC - GCSE Physics (Single Science) Revision - WJEC - BBC Bitesize			
Scientific Skills	Describe the relationships shown by graphs as linear, non-linear or directly proportional	X	Constructing a line graph - Obtaining, analysing and evaluating results			
Scientific Skills	Convert units from base units (e.g mm → km)	X	https://www.youtube.com/watch?v=qSKGl-0sf3w			
Scientific Skills	Identify independent, dependent and control variables	X	GCSE Science Revision "Independent Variable, Dependent Variable, Control Variables"			