Wesgreen International School | Inspiring Excellence, Empowering Global Minds

Programme of Study – Year 10 Physics 2023-24 (Edexcel)

International GCSE Physics specification (pearson.com)

	Theme	Overview of key learning to take place	How learning will be assessed
	TERM 1 **UNIT 1** **Forces and Motion**	**1.1** use the following units: metre/second (m/s), metre/second^2 (m/s^2), second (s) **1.3** plot and explain distance−time graphs **1.4** know and use the relationship between average speed, distance moved and time taken: average speed = distance moved/time taken **1.5** **practical: investigate the motion of everyday objects such as toy cars or tennis balls** **1.6** know and use the relationship between acceleration, change in velocity and time taken: acceleration = change in velocity/time taken **1.7** plot and explain velocity−time graphs **1.8** determine acceleration from the gradient of a velocity−time graph **1.9** determine the distance travelled from the area between a velocity−time graph and the time axis **1.10** use the relationship between final speed, initial speed, acceleration and distance moved: (final speed)^2 = (initial speed)^2 + (2 × acceleration × distance moved), v^2 = u^2 + (2 × a× s) **1.11** describe the effects of forces between bodies such as changes in speed, shape or direction **1.12** identify different types of force such as gravitational or electrostatic **1.13** understand how vector quantities differ from scalar quantities	 **Formative Assessment to be used this term:** • In class peer and self-assessment of extended answer questions • End of topic questions  **Summative assessment** • Baseline assessment • Mid-term assessment • End of term assessment

1.14 understand that force is a vector quantity

1.15 calculate the resultant force of forces that act along a line

1.16 know that friction is a force that opposes motion

1.22 **practical: investigate how extension varies with applied force for helical springs, metal wires and rubber bands**

1.23 know that the initial linear region of a force−extension graph is associated with Hooke's law

1.24 describe elastic behaviour as the ability of a material to recover its original shape after the forces causing deformation have been removed

1.17 know and use the relationship between unbalanced force, mass and acceleration: force = mass × acceleration, F = m × a

1.18 know and use the relationship between weight, mass and gravitational field strength: weight = mass × gravitational field strength, W = m × g

1.19 know that the stopping distance of a vehicle is made up of the sum of the thinking distance and the braking distance

1.20 describe the factors affecting vehicle stopping distance, including speed, mass, road condition and reaction time

1.21 describe the forces acting on falling objects (and explain why falling objects reach a terminal velocity)

1.25P know and use the relationship between momentum, mass and velocity: momentum = mass × velocity, p = m × v

1.26P use the idea of momentum to explain safety features

1.27P use the conservation of momentum to calculate the mass, velocity or momentum of objects

	UNIT 4 **Energy resources and energy transfers**	**1.28P** use the relationship between force, change in momentum and time taken: force = change in momentum/time taken **1.29P** demonstrate an understanding of Newton's third law **1.30P** know and use the relationship between the moment of a force and its perpendicular distance from the pivot: moment = force × perpendicular distance from the pivot **1.31P** know that the weight of a body acts through its centre of gravity **1.32P** use the principle of moments for a simple system of parallel forces acting in one plane **1.33P** understand how the upward forces on a light beam, supported at its ends, vary with the position of a heavy object placed on the beam **4.1** use the following units: kilogram (kg), joule (J), metre (m), metre/second (m/s), metre/second^2 (m/s^2), newton (N), second (s) and watt (W) **4.2** describe energy transfers involving energy stores: energy stores: chemical, kinetic, gravitational, elastic, thermal, magnetic, electrostatic, nuclear; energy transfers: mechanically, electrically, by heating, by radiation (light and sound) **4.3** use the principle of conservation of energy **4.4** know and use the relationship between efficiency, useful energy output and total energy output: efficiency = useful energy/total energy × 100% **4.5** describe a variety of everyday and scientific devices and situations, explaining the transfer of the input energy in terms of the above relationship, including their representation by Sankey diagrams **4.11** know and use the relationship between work done, force and distance moved in the direction of the force: work done = force × distance moved, W = F × d	**MID TERM 1 ASSESSMENT [TOPIC 1]**

		4.12 know that work done is equal to energy transferred **4.13** know and use the relationship between gravitational potential energy, mass, gravitational field strength and height: gravitational potential energy = mass × gravitational field strength × height, GPE = m × g × h **4.14** know and use the relationship: kinetic energy = ½ × m × v^2 **4.15** understand how conservation of energy produces a link between gravitational potential energy, kinetic energy and work **4.16** describe power as the rate of transfer of energy or the rate of doing work **4.17** use the relationship between power, work done (energy transferred) and time taken: power = work done/time taken, P = W/t **4.18P** describe the energy transfers involved in generating electricity using: wind, water, geothermal resources, solar heating systems, solar cells, fossil fuels, nuclear power **4.19P** describe the advantages and disadvantages of methods of large-scale electricity production from various renewable and non-renewable resource	 **Summative Assessment** **END OF TERM EXAMINATION**
	TERM 2 **UNIT 5** **Solids, liquids and gases**	**REVISION** …… **5.3** know and use the relationship between density, mass and volume: density = mass/volume, ρ = m/V **5.4** **practical: investigate density using direct measurements of mass and volume** **5.5** know and use the relationship between pressure, force and area: pressure = force/area, p = F/A	

		5.6 understand how the pressure at a point in a gas or liquid at rest acts equally in all directions **5.7** know and use the relationship for pressure difference: pressure difference = height × density × gravitational field strength, p = h × ρ × g **5.8P** explain why heating a system will change the energy stored within the system and raise its temperature or produce changes of state **5.9P** describe the changes that occur when a solid melts to form a liquid, and when a liquid evaporates or boils to form a gas **5.10P** describe the arrangement and motion of particles in solids, liquids and Gases **5.11P practical: obtain a temperature–time graph to show the constant temperature during a change of state** **5.15** explain how molecules in a gas have random motion and that they exert a force and hence a pressure on the walls of a container **5.16** understand why there is an absolute zero of temperature which is –273 °C **5.17** describe the Kelvin scale of temperature and be able to convert between the Kelvin and Celsius scales **5.18** understand why an increase in temperature results in an increase in the average speed of gas molecules **5.19** know that the Kelvin temperature of a gas is proportional to the average kinetic energy of its molecules **4.6** describe how thermal energy transfer may take place by conduction, convection and radiation **4.7** explain the role of convection in everyday phenomena **4.8** explain how emission and absorption of radiation are related to surface	

		and temperature **4.9 practical: investigate thermal energy transfer by conduction, convection and radiation** **4.10** explain ways of reducing unwanted energy transfer, such as insulation **5.20** explain, for a fixed amount of gas, the qualitative relationship between: pressure and volume at constant temperature; pressure and Kelvin temperature at constant volume **5.21** use the relationship between the pressure and Kelvin temperature of a fixed mass of gas at constant volume: p1/T1 = p2/T2 **5.12P** know that specific heat capacity is the energy required to change the temperature of an object by one degree Celsius per kilogram of mass (J/kg °C) **5.13P** use the equation: change in thermal energy = mass × specific heat capacity × change in temperature, ΔQ = m× c× ΔT **5.14P practical: investigate the specific heat capacity of materials including water and some solids** **3 Waves**	 **END OF TERM 1 ASSESSMENT** **[TOPIC 1 and 2]**
	UNIT 3 **Waves**	**3.1** use the following units: degree (°), hertz (Hz), metre (m), metre/second (m/s) and second (s) **3.2** explain the difference between longitudinal and transverse waves **3.3** know the definitions of amplitude, wavefront, frequency, wavelength and period of a wave **3.4** know that waves transfer energy and information without transferring matter **3.5** know and use the relationship between the speed, frequency and	

		wavelength of a wave: wave speed = frequency × wavelength, v = f × λ **3.6** use the relationship between frequency and time period: frequency = 1/T **3.10** know that light is part of a continuous electromagnetic spectrum that includes radio, microwave, infrared, visible, ultraviolet, x-ray and gamma ray radiations and that all these waves travel at the same speed in free space **3.11** know the order of the electromagnetic spectrum in terms of decreasing wavelength and increasing frequency, including the colours of the visible spectrum **3.12** explain some of the uses of electromagnetic radiations, including: radio waves: broadcasting and communications; microwaves: cooking and satellite transmissions; infrared: heaters and night vision equipment; visible light: optical fibres and photography; ultraviolet: fluorescent lamps; x-rays: observing the internal structure of objects and materials, including for medical applications; gamma rays: sterilising food and medical equipment **3.13** explain the detrimental effects of excessive exposure of the human body to electromagnetic waves, including: microwaves: internal heating of body tissue; infrared: skin burns; ultraviolet: damage to surface cells and blindness; gamma rays: cancer, mutation, and describe simple protective measures against the risks	**Formative Assessment to be used this term:** • In class peer and self-assessment of extended answer questions • End of topic questions
	TERM 3 **UNIT 3** **WAVES: Light and Sound**	**Light** **3.14** know that light waves are transverse waves and that they can be reflected and refracted **3.15** use the law of reflection (the angle of incidence equals the angle of reflection) **3.16** draw ray diagrams to illustrate reflection and refraction **3.17 practical: investigate the refraction of light, using rectangular**	**Summative assessment** **END OF TERM 2 ASSESSMENT [TOPIC 4]**

		blocks, semi-circular blocks and triangular prisms **3.18** know and use the relationship between refractive index, angle of incidence and angle of refraction: n = sin i/sin r **3.19** **practical: investigate the refractive index of glass, using a glass block** **3.20** describe the role of total internal reflection in transmitting information along optical fibres and in prisms **3.21** explain the meaning of critical angle c **3.22** know and use the relationship between critical angle and refractive index: sin c = 1/n **3.23** know that sound waves are longitudinal waves which can be reflected and refracted **3.24P** know that the frequency range for human hearing is 20–20 000 Hz **3.25P practical: investigate the speed of sound in air** **3.26P** understand how an oscilloscope and microphone can be used to display a sound wave **3.27P** practical: investigate the frequency of a sound wave using an oscilloscope **3.28P** understand how the pitch of a sound relates to the frequency of vibration of the source **3.29P** understand how the loudness of a sound relates to the amplitude of vibration of the source **REVISION**	 **Summative Assessment** **Topic 3**  **Summative assessment** **END OF YEAR ASSESSMENT [TOPIC1,3, 4 and 5]**