St Francis of Assisi
CATHOLIC COLLEGE

A Level Physics
OCR A
Year 12

Calendar	Theme & Big Question	Small Questions	Assessment Opportunities and Criteria. Teacher feedback point (TFP)	Homework
Year 12 **Autumn 1** OCR Module 2 Textbook Chapter 2	**Foundations of Physics** What are the basic concepts & maths skills needed for this A level Physics course?	1. What is a physical quantity? 2. What are the SI base quantities & their units? 3. What do different prefixes mean? 4. What is 'homogeneity' of equations? 5. How do you make estimates in unfamiliar situations? 6. What is the difference between accuracy & precision? 7. What do we mean by absolute uncertainty & percentage uncertainty? 8. How do we calculate uncertainties in raw data & in graph work? 9. How do we add scalar and vector quantities? 10. How do we use vector triangles to find the resultant of 2 coplanar vectors? 11. How do we resolve vectors into two perpendicular components?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 1** OCR Module 3.1 Textbook Chapter 3	**Kinematics** How can the motion of a moving object be determined?	1. What does the gradient of a distance-time graph tell us? 2. How is displacement different to distance & how is velocity different to speed? 3. What does the gradient of a displacement-time graph tell us? 4. What does the gradient of a velocity-time graph tell us? 5. What does the area under a velocity-time graph tell us? 6. How can we interpret displacement-time graphs? 7. How can we use a curved velocity-time graph to determine displacement? 8. How can we represent the motion of a bouncing ball, in graph form?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 1** OCR Module 3.1 Textbook Chapter 3	**Linear & Projectile Motion** How can we analyse the motion of objects, in both one & two dimensions?	1. What equations can we use when we consider linear motion of an object with constant acceleration? 2. What is the difference between thinking distance, braking distance & stopping distance? 3. How does reaction time effect the stopping distance of a vehicle? 4. How can we determine the acceleration due to freefall (g) in the laboratory? 5. What is projectile motion? 6. How do we do apply our equations of motion when an object is moving in two dimensions?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 1** OCR Module 3.2 Textbook Chapter 4	**Forces in Action** What is the relationship between force, mass and weight? How do we represent, analyse and calculate forces using free-body diagrams? What are drag and terminal velocity? How do we calculate moments?	1. What is the relationship between force, mass and acceleration? 2. What is the difference between mass and weight? 3. What is acceleration due to free fall? 4. What is the centre of mass? 5. What are different types of forces that may be relevant? 6. How do we represent forces in free-body diagrams? 7. How do you resolve forces on a slope? 8. What is drag and what affects the drag force? 9. What is terminal velocity and when does it occur? 10. How do you calculate drag and terminal velocity? 11. How do you calculate the moment of a force? 12. What is the principle of moments?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 1** OCR Module 3.2 Textbook Chapter 4	**Forces in Action cont…** What are couples and torques? What is the rule of the triangle of forces? How do you calculate density and pressure?	13. What is a couple? 14. What is a torque of a couple? 15. How do couples and torques work when an object is in equilibrium? 16. How do you deal with three forces acting on an object in equilibrium? 17. What is the rule of the triangle of forces? 18. What is density? 19. How is density calculated? 20. What is pressure? 21. How is pressure calculated? 22. How do we use p = hρg? 23. What is Archimedes' Principle?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 1** OCR Module 3.5 Textbook Chapter 7	**Laws of Motion & Momentum** What are Newton's three laws of motion? What happens during a collision?	1. What is Newton's 1st Law of motion? 2. What is Newton's 2nd Law of motion? 3. What is Newton's 3rd Law of motion? 4. How do you calculate impulse? 5. How do you find impulse from a force-time graph? 6. How does the principle of the conservation of momentum operate? 7. How do we calculate momentum for collisions in two dimensions?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 2** OCR Module 3.3 Textbook Chapter 5	**Work, Energy & Power** How is energy transferred and transformed in different systems?	1. What is work done & how does it relate to energy? 2. What is the principle of conservation of energy? 3. How do we draw / use Sankey diagrams to show energy transfer? 4. How is kinetic energy affected by mass/velocity of an object? 5. How is gravitational potential energy affected by mass and height? 6. How can KE and GPE be exchanged and unified? 7. What is Power and how can we calculate it? 8. What affects efficiency & how can it be improved in different systems?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 2** OCR Module 3.4 Textbook Chapter 6	**Materials** How can the properties of different materials be described and investigated?	1. What is tensile & compressive deformation? 2. What is Hooke's Law & when does it apply to a stretched object? 3. How do we calculate the elastic potential energy of a spring? 4. How is energy transferred in a stretched object, from PE to KE? 5. What are loading and unloading curve and what do these look like for different materials? 6. Why do elastic materials transfer less energy when being unloaded compared to the elastic energy when being loaded? 7. What is meant by stress, strain & the Young modulus? 8. How can Young's modulus be determined experimentally?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Autumn 2** OCR Module 4.1 Textbook Chapter 8	**Charge & Current** What is electric current and how does it behave?	1. What do we mean by an electric current? 2. What do we mean when we say charge is 'quantised'? 3. What is a Coulomb? 4. What is the difference between electron flow and conventional current? 5. How are charge carriers different in metals and electrolytes? 6. What does Kirchhoff's first law say about charge and current? 7. What is meant by mean drift velocity and how can we calculate it? 8. What is electron number density (n)? 9. How do we use n to distinguish between conductors, semiconductors and insulators?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Spring 1** OCR Module 4.2 Textbook Chapter 9	**Energy, Power & Resistance** How can we explain the behaviour of different circuit components in terms of energy, resistance and power?	1. What is potential difference? 2. What is emf and how is it different to pd? 3. How do we use the equation W = VQ to define the Volt? 4. What is an electron gun & how does it work? 5. How can we write an equation linking the work done on an electron, to its gain in kinetic energy? 6. What is resistance and how can it be calculated? 7. What is Ohm's Law? 8. What is an I-V characteristic? 9. How can we sketch graphs to show the I-V characteristic of different circuit components? 10. What is resistivity & how is it different to resistance? 11. How can we calculate resistivity for a material? 12. What are the three equations to calculate power in an electrical circuit? 13. How can we calculate the energy transferred in J in a circuit in a given time? 14. Why are we charged for energy use by the kilowatt hour (kWh) and how are energy bills calculated?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Spring 1/2** OCR Module 4.3 Textbook Chapter 10	**Electrical Circuits** How can we apply our knowledge of electricity, to actual electrical circuits?	1. What is Kirchhoff's second law of electricity & how does it relate to conservation of energy? 2. How do we apply Kirchhoff's first & second laws in electrical circuits? 3. How do we analyse circuits with multiple e.m.f.s? 4. What is the total resistance if we connect multiple resistors in series? 5. What is the total resistance if we connect multiple resistors in parallel? 6. What is meant by the terms 'internal resistance', 'terminal p.d.' and 'lost volts'? 7. How can we determine the internal resistance of a cell? 8. What is a potential divider circuit & why are they useful? 9. Which equations help us solve problems where the p.d. is 'divided'?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Spring 1** OCR Module 4.4 Textbook Chapter 11	**Waves 1** How do waves interact with matter?	1. What is a progressive wave? 2. What are different properties of waves? 3. What does a wave profile show? 4. What does a displacement-time graph show? 5. What is reflection? 6. What is refraction? 7. What is polarisation? 8. What is diffraction? 9. What is intensity? 10. What is the relationship between intensity and distance? 11. What are the properties of electromagnetic waves? 12. What are the orders of magnitude of wavelengths of the principal radiations? 13. What is polarisation of electromagnetic waves? 14. What is the refractive index of a material? 15. What is total internal reflection? 16. What is the critical angle?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Spring 1/2** OCR Module 4.4 Textbook Chapter 12	**Waves 2** How do waves interact with each other?	1. What is superposition of a wave? 2. What are constructive and destructive interference? 3. What do interference patterns show? 4. How does two source interference work? 5. What is the Young double-slit experiment? 6. What are the properties of stationary waves? 7. How do stationary and progressive waves compare? 8. How can we describe the harmonic patterns of stationary waves? 9. How do stationary waves travel on plucked strings? 10. How do stationary waves travel in air columns?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Spring 2** OCR Module 4.5 Textbook Chapter 13	**Quantum Physics** How do we demonstrate the particulate nature of EM radiation?	1. What is a photon? 2. How do we calculate the energy of a photon? 3. What is the electronvolt? 4. What is the photoelectric effect and its demonstration? 5. What is the interaction between one photon and one surface electron? 6. What is the work function? 7. How does conservation of energy work in the photoelectric effect? 8. What is the relationship between maximum kinetic energy and incident frequency? 9. What is electron diffraction? 10. What is the de Broglie equation?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Summer 1** OCR Module 5.5 Textbook Chapter 19	**Stars** How do we analyse stars?	1. How do we classify the different objects in the universe e.g. planets, stars? 2. How do stars form? 3. How is evolution of a small star, like our Sun different to the evolution of a massive star? 4. What is electron degeneracy pressure & the Chandrasekhar limit? 5. What does the Hertzsprung-Russell diagram show? 6. How do we use to identify the different stages of star evolution? 7. What do we mean by energy levels of electrons? 8. Why do they have negative values? 9. How can we explain the emission spectra we get from hot gases? 10. Why are absortion spectra useful when we study stars? 11. What are the different types of spectra - continuous, emission line and absorption line? 12. How can we determine the wavelength of starlight using a transmission diffraction grating? 13. What is Wein's displacement law and how do we apply it? 14. What is Stefan's law and how do we apply it? 15. How can we use these laws together to estimate the radius of a star?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Summer 1** OCR Module Textbook Chapter 14	**Thermal Physics** What is thermal equilibrium and how do we measure temperature? What happens at different states of matter? How do we determine the specific heat capacity and the specific latent heat of materials?	1. What is the absolute scale of temperature? 2. What is the Zeroth (0th) Law of Thermodynamics? 3. How do you convert from °C to K? 4. How are the particles of a solid, liquid and gas arranged? 5. What does Brownian motion show us? 6. What is the difference between work and heat? 7. How is internal energy calculated? 8. How does internal energy change as a substance changes phase? 9. What is the specific heat capacity of a substance? 10. How would we calculate specific heat capacity? 11. What experiment could be used to determine the specific heat capacity of a substance? 12. What is the specific latent heat of a substance? 13. How would we calculate specific latent heat?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Summer 1** OCR Module Textbook Chapter 14	**Thermal Physics cont…** What is an ideal gas and how do we calculate their various properties?	15. What is Avogadro's Constant? 16. What is Boyle's Law? 17. What is the model of kinetic theory of gasses? 18. How do you calculate pressure under this model? 19. What is the equation of state of an ideal gas? 20. How do you calculate root mean square (r.m.s.) speed? 21. What is the Boltzmann Constant? 22. How do you calculate internal energy of an ideal gas?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Summer 2** OCR Module 5.5 Textbook Chapter 20	**Cosmology** What is the scientific evidence which supports the Big Bang Theory and how has the universe evolved since?	1. What do we mean by the astronomical units of light year and parsec? 2. What is stellar parallax and how do we use it to measure distance (in parsecs)? 3. What is the cosmological principle? 4. What is the Doppler effect, red-shift and blue-shift? 5. How can we use star spectra to determine the relative motion of galaxies? 6. What is Hubble's law? 7. What is the evidence for the Big Bang theory? 8. How can we estimate the age of the universe? 9. How has the universe evolved since the Big Bang? 10. What is dark energy and dark matter?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 12 **Summer 2** OCR Module 5.1 Textbook Chapter 15	**Ideal Gases** How can kinetic particle theory of be applied to gases?	1. What is a mole in physics? 2. What does Avogadro's number tell us? 3. What is an 'ideal gas' and what assumptions do we make about them? 4. What equation can be used to link pressure, volume and temperature? 5. How does Boyle's law relate to pressure and volume? 6. What is absolute zero & how can we estimate it? 7. What so we mean by root mean square (r.m.s.) speed? 8. How does r.m.s/ speed relate to pressure & volume? 9. How do we apply the Boltzmann constant to ideal gases? 10. What is meant by the 'internal energy' of an ideal gas?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Autumn 1** OCR Module 5.2 Textbook Chapter 16	**Circular Motion** How can the motion of a circular path be explained and determined?	1. What is a radian & how do we convert angle measurements from degrees to radians? 2. Why does an object moving in a circular path accelerate, even if it moves with constant speed? 3. What is angular velocity? 4. How can we describe the forces acting on a body that is in in circular motion? 5. How do we calculate the acceleration of an object with a circular path? 6. How do we calculate centripetal force? 7. How can we apply our knowledge of circular motion to systems such as objects on strings, vehicles turning or planets / satellites in orbit? 8. How do we resolve vectors of objects which rotate around a conical pendulum?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Autumn 1** OCR Module 5.3 Textbook Chapter 17	**Oscillations / Simple Harmonic Motion** How can the oscillatory motion of an object be explained and determined?	1. What is meant by oscillating motion? 2. What is the amplitude and displacement of an oscillation? 3. What is meant by angular frequency & how do we calculate it? 4. What is meant by simple harmonic motion (S.H.M) and what is an isochronous oscillator? 5. How can we calculate the acceleration of a body in S.H.M. 6. How can we determine the period & frequency of an oscillator by experiment? 7. How is the maximum velocity of an oscillator calculated? 8. How can we graphically represent changes in displacement, velocity & acceleration during S.H.M? 9. When do we use the sine or cosine equations for S.H.M? 10. How do we describe the energy changes of an oscillator? 11. What is 'damping' & what is its effect on an oscillator? 12. What is natural frequency and resonance?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Autumn 2** OCR Module 6.1 Textbook Chapter 21	**Capacitors** How are capacitors used in electrical circuits?	1. How do we define capacitance and what is it's unit? 2. How do capacitors charge & discharge? 3. What happens to the total capacitance if we add capacitors i) in parallel? ii) in series? 4. How can we calculate the energy stored by capacitors? 5. What happens to the current, voltage & charge when we discharge a capacitor through a resistor? 6. And what do these discharge graphs look like, plotted against time? 7. What is the time constant of a capacitor-resistor circuit? 8. What happens to the current, voltage & charge when we charge a capacitor through a resistor & what do graphs of these look like, plotted against time? 9. How is the capacitor charging equation different to the capacitor discharging equation?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Autumn 1/2** OCR Module 5.4 Textbook Chapter 18	**Gravitational Fields** Why do some objects in space orbit other objects in space?	1. What causes a gravitational field? 2. How can the strength of a gravitational field be determined? 3. What is Newton's law of gravitation for the force between 2 masses? 4. What is an inverse square law? 5. Why does the equation for Newton's law of gravitation includes a minus (-) sign? 6. How can we calculate the gravitational field strength for a point mass? 7. What are Kepler's 3 laws of planetary motion? 8. How is the time period of an object in orbit linked to the radius of its orbit? 9. What is meant by a geostationary orbit and when are these useful to us? 10. What is gravitational potential? 11. How is gravitational potential energy different to gravitational potential? 12. How can we find the work done on an object from a graph of Force against distance, when a spherical object moves in a gravitational field? 13. What is meant by escape velocity & how can it be calculated for any object on any planet?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

Calendar	Theme & Big Question	Small Questions	Assessment Opportunities and Criteria. Teacher feedback point (TFP)	Homework
Year 13 **Autumn 2** OCR Module 6.2 Textbook Chapter 22	**Electric Fields** How can electric fields affect charged particles and other electric fields?	1. What is an electric field and how can we map them out? 2. What are radial and uniform electric fields and how are they produced? 3. How can we calculate electric field strength? 4. What is Coulomb's law and how can we apply it to 2 charges? 5. How can we calculate the electric field strength of a point charge? 6. How are electrical and gravitational fields similar? 7. How can we calculate the electric field strength of a uniform field, between parallel plates? 8. What factors determine the capacitance of a capacitor? 9. How can electric fields affect charged particles and other electric fields? 10. How do charged particles move in a uniform electric field & why do they accelerate? 11. What is electric potential energy and how can it be calculated? 12. Why can an isolated sphere be classed as a capacitor and how do we calculate its capacitance?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Spring 1** OCR Module 6.3 Textbook Chapter 23	**Magnetic Fields** What are magnetic fields & electromagnets and how do we use these in the production and transmission of electricity?	1. What is magnetic flux density? 2. How can we describe the magnetic effect of an electrical current? 3. How can we determine the direction of magnetic force when a current carrying wire is placed in an external magnetic field? 4. How can calculate the magnitude of this force? 5. What happens to a charged particle when it enters a magnetic field? 6. What is a velocity selector and how do they work? 7. What is electromagnetic induction and how is it used? 8. What is magnetic flux & magnetic flux linkage? 9. What is Faraday's Law & Lenz's Law? 10. How do simple AC generators work? 11. What are step-up and step-down transformers? 12. How do we perform calculations for current & voltage for ideal transformers?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Spring 2** OCR Module 6.4 Textbook Chapter 24	**Particle Physics** How has the model of the atom and subatomic particles changed over time, with new evidence?	1. What is the alpha scattering experiment and what conclusions can we draw from it? 2. How can we determine the size of a nucleus from this experiment? 3. What is the nuclear model of the atom that we use today and how do we denote this. 4. How can we determine the size and density of a nucleus? 5. What is meant by the strong nuclear force? 6. What are the 4 fundamental forces and how do they compare? 7. What do we mean by antiparticles / antimatter? 8. What are hadrons, leptons and quarks? 9. What is beta-minus and beta-positive decay? 10. How can we describe these decays using quark transformation equations?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Spring 2** OCR Module 6.4 Textbook Chapter 25	**Radioactivity** Why are some atoms radioactive & what exactly is 'radioactivity'?	1. What are alpha, beta & gamma radiations and what are their range in air? 2. How can we investigate the absorption / penetrating powers of each radiation type? 3. How can we represent nuclear decay as balanced nuclear transformation equations? 4. What is meant by the activity and decay constant of a radioactive source? 5. What is the half-life of a radioactive isotope? 6. How could we determine half-life by experiment? 7. How can we calculate the half-life of a radionuclide? 8. What is radioactive dating (carbon-dating)?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Spring 2** OCR Module 6.4 Textbook Chapter 26	**Nuclear Physics** What is nuclear power?	1. What do we mean by mass-energy equivalence? 2. What equation describes this idea? 3. What do we mean by the terms ‘mass defect’ & ‘binding energy’? 4. What is a chain reaction? 5. What is the environmental impact of nuclear waste? 6. What is the difference between nuclear fission & nuclear fusion? 7. What is the difference between nuclear fission & nuclear fusion?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.

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Year 13 **Spring 2** OCR Module 6.5 Textbook Chapter 27	**Medical Physics** What is the physics behind modern medical imaging techniques: X-rays & CAT scans, gamma cameras & PET scans and ultrasound scans.	1. What is the structure of an x-ray tube? 2. How do they produce x-ray photons? 3. How can we calculate the wavelength and frequency of these x-ray photons? 4. What is attenuation and the attenuation coefficient? 5. By what 4 mechanisms can x-rays be attenuated? 6. How can we calculate the intensity of an x-ray? 7. What is CAT scanning & what components are needed? 8. What are the advantages of using CAT scans over X-rays? 9. What do we mean by a medical tracer & what substances are used for this? 10. What are the components of a gamma camera? 11. What is a PET scan? 12. What are the advantages & disadvantages of PET scans? 13. What is the piezoelectric effect & how is it used in ultrasound scanners? 14. What is the difference between ultrasound A-scans and B-scans? 15. What is meant by acoustic impedance? 16. What is impedance (or acoustic) matching? 17. How can the Doppler effect be used in Ultrasound scans to measure the speed of blood inside the body?	Each module consists of testing phases within knowledge booklets, using past exam questions for each submodule. There is also an End of Topic CAT test. Students self-assess booklet testing phases, guided through the mark schemes by the teacher. Mark schemes are also in the booklet for students to refer to during revision. End of Topic CAT tests will be marked by the teacher who will provide a feedback to students, supply mark schemes and teacher notes on exam questions. Results are recorded on a tracking sheet.	40-50 marks of homework work booklet/past exam qns. Also, Isaac Physics questions set online - this is run by the Institute of Physics & offers support knowledge and videos for each sub-topic. Students' written HW is modelled by the teacher & self assessed / corrected by the student in green pen.