KS5 Physics (OCR A) – Upper 6th Michaelmas Term 1/2 Learning Program: Teacher 3, Module 5

Topic/Content	Objectives/Skills	Homework	Assessment	Success Criteria (A* - E at KS5)	Stretch & Challenge
5.2.1 Kinematics of Circular Motion **a** the radian as a measure of angle **b** period and frequency of an object in circular motion **c** angular velocity ω, $\omega = \frac{2\pi}{T}$ or $\omega = 2\pi f$	Demonstrate knowledge, understanding, and application of: • the radian as a measure of angle • the period and frequency of an object in circular motion • angular velocity ω, $\omega = \frac{2\pi}{T}$ or $\omega = 2\pi f$.	Textbook (pg 302-4) read and attempt summary questions Update checklist	Self-assess using textbook answers Review at end of topic	Assessments & tests assigned a grade score based on previous national exam year boundaries. Raw %-correct score assigned a grade A-U (A-E, U) at lower 6th; A* not awarded / achievable until upper 6th. PAGs are assessed "pass / fail" on skills list associated with each PAG. Class tracker updated after each PAG. By end of U6th must have at least one pass in every skill for a **Pass** in Practical Endorsement.	Kerboodle: 16 Calculation: Angular Velocity 16 Maths Skills: Circular Motion
5.2.2 Centripetal Force **a** a constant net force perpendicular to the velocity of an object causes it to travel in a circular path **b** constant speed in a circle; $v = \omega r$	Demonstrate knowledge, understanding, and application of: • a constant net force perpendicular to the velocity of an object, which causes it to travel in a circular path • constant speed in a circle; $v = \omega r$	Textbook (pg 305-313) read and attempt summary questions Prepare / revise for topic test Update checklist	Self-assess using textbook answers Topic test Review at end of topic		Kerboodle: 16 Calculation: Centripetal Force and Acceleration

c centripetal acceleration; $a = \frac{v^2}{r}; a = \omega^2 r$ **d i** centripetal force; $F = \frac{mv^2}{r}; F = m\omega^2 r$ **ii** techniques and procedures used to investigate circular motion using a whirling bung.	• centripetal acceleration; $a = \frac{v^2}{r}; a = \omega^2 r.$ Demonstrate knowledge, understanding, and application of: • centripetal force; $F = \frac{mv^2}{r}; F = m\omega^2 r$ • techniques and procedures used to investigate circular motion.				

KS5 Physics (OCR A) – Upper 6th Michaelmas Term 1/2 Learning Program: Teacher 4, Module 6

Topic/Content	Objectives/Skills	Homework	Assessment	Success Criteria (A* - E at KS5)	Stretch & Challenge
6.1.1 Capacitors **a** capacitance; $C = Q/V$; the unit farad **b** charging and discharging of a capacitor or capacitor plates with reference to the flow of electrons **c** total capacitance of two or more capacitors in series; $1/C = 1/C_1 + 1/C_2 + \ldots$ **d** total capacitance of two or more capacitors in parallel; $C = C_1 + C_2 + \ldots$ **e i** analysis of circuits containing capacitors, including resistors **ii** techniques and procedures used	Demonstrate knowledge, understanding, and application of: • capacitance; $C = Q/V$; • the unit farad • charging and discharging of capacitors in terms of the flow of electrons. • total capacitance of two or more capacitors in series; $1/C = 1/C_1 + 1/C_2 + \ldots$ • total capacitance of two or more capacitors in parallel; $C = C_1 + C_2 + \ldots$ • analysis of circuits containing capacitors • investigation of circuits containing capacitors.	Textbook (pg 406-11) read and attempt summary questions	Self-assess using textbook answers	Assessments & tests assigned a grade score based on previous national exam year boundaries. Raw %-correct score assigned a grade A-U (A-E, U) at lower 6th; A* not awarded / achievable until upper 6th. PAGs are assessed "pass / fail" on skills list associated with each PAG. Class tracker updated after each PAG. By end of U6th must have at least one pass in every skill for a **Pass** in Practical Endorsement.	Kerboodle Resources: 21 Calculation Capacitance 21 Maths Skills: Capacitors

to investigate capacitors in both series and parallel combinations using ammeters and voltmeters.					
6.1.2 Energy **a** p.d. – charge graph for a capacitor; energy stored is area under graph **b** energy stored by capacitor; $W = ½QV$, $W = ½Q^2/C$, $W = ½ V^2C$ **c** uses of capacitors as storage of energy	Demonstrate knowledge, understanding, and application of: • p.d. – charge graph for a capacitor • energy stored by capacitors • $W = ½QV$, $W = ½Q^2/C$, $W = ½ V^2C$. • use of capacitors to store energy.	Textbook (pg 412-14, 422-23) read and attempt summary questions	Self-assess using textbook answers		
6.1.3 Charging and Discharging Capacitors **a i** discharging capacitor through a resistor **ii** techniques and procedures to investigate the charge and discharge of a capacitor using	Demonstrate knowledge, understanding, and application of: • discharging capacitor through a resistor • investigating the charge and discharge of a capacitor • time constant *CR* of a capacitor–	Textbook (pg 415-21) read and attempt summary questions *Complete PAG analysis / conclusion / evaluation*	Self-assess using textbook answers PAG 9.1 Investigating Charging / Discharging a capacitor		21 Support: Capacitance Graphs 21.4 Stretch and Challenge: Investigating an electronic flash

both meters and data-loggers **b** time constant of a capacitor–resistor circuit; $\tau = CR$ **c** equations of the form $x = x_0e^{-t/CR}$ and $x = x_0(1 - e^{-t/CR})$ for capacitor–resistor circuits **d** graphical methods and spreadsheet modelling of the equation $\Delta Q/\Delta t = -Q/CR$ for a discharging capacitor **e** exponential decay graph; constant-ratio property of such a graph	resistor circuit • $x = x_0e^{-t/CR}$ and $x = x_0(1 - e^{-t/CR})$ for capacitor–resistor circuits • modelling of the equation $\Delta Q/\Delta t = -Q/CR$ for a discharging capacitor • exponential decay and the constant-ratio property of decay graphs.	Prepare / revise for a topic test	Topic test		