

## 12 into 13 Remote Learning Plan Summer Term 2020

### Physics

By the beginning of September, we will have studied...

	AS and A level Biology Specification page reference
<b>3.5 Electricity</b>	<b>Pg 29</b>
3.5.1.2 Potential dividers  3.5.1.6 Electromotive force and internal resistance	Further details of content are all found on page 29 of the specification. See link below. Screen shot of the specification is also below.
<b>3.6.1 Periodic motion (A level)</b>	<b>Pg 30-31</b>
3.6.1.1 Circular motion 3.6.1.2 Simple harmonic motion 3.6.1.3 Simple Harmonic motion systems	Further details of content are all found on page 30 of the specification. See link below. Screen shot of the specification is also below.
<b>3.8.1 radioactivity</b>	<b>Pg 39 and 40</b>
3.8.1.1 Rutherford Scattering 3.8.1.2 Alpha, beta and gamma radiation 3.8.1.4 Nuclear Instability	Further details of content are all found on page 39 of the specification. See link below. Screen shot of the specification is also below.

Detail for each topic can be found in the specification on the referenced pages.

It is anticipated that a combination of set tasks, online lessons/ powerpoints and some face to face sessions in College will be used to deliver this content.

Link to specification:

<https://filestore.aqa.org.uk/resources/physics/specifications/AQA-7407-7408-SP-2015.PDF>

Screenshots of AQA Specification:

### 3.5.1.5 Potential divider

Content	Opportunities for skills development
<p>The potential divider used to supply constant or variable potential difference from a power supply.</p> <p>The use of the potentiometer as a measuring instrument is not required.</p> <p>Examples should include the use of variable resistors, thermistors, and light dependent resistors (LDR) in the potential divider.</p>	<p><b>MS 3.2 / PS 4.1 / AT f</b></p> <p>Students can investigate the behaviour of a potential divider circuit.</p> <p><b>MS 3.2 / AT g</b></p> <p>Students should design and construct potential divider circuits to achieve various outcomes.</p>

### 3.5.1.6 Electromotive force and internal resistance

Content	Opportunities for skills development
<p><math>\varepsilon = \frac{E}{Q}, \varepsilon = I(R + r)</math></p> <p>Terminal pd; emf</p> <p>Students will be expected to understand and perform calculations for circuits in which the internal resistance of the supply is not negligible.</p>	

### 3.6.1.1 Circular motion (A-level only)

Content	Opportunities for skills development
<p>Motion in a circular path at constant speed implies there is an acceleration and requires a centripetal force.</p> <p>Magnitude of angular speed <math>\omega = \frac{v}{r} = 2\pi f</math></p> <p>Radian measure of angle.</p> <p>Direction of angular velocity will not be considered.</p> <p>Centripetal acceleration <math>a = \frac{v^2}{r} = \omega^2 r</math></p> <p>The derivation of the centripetal acceleration formula will not be examined.</p> <p>Centripetal force <math>F = \frac{mv^2}{r} = m\omega^2 r</math></p>	<p><b>MS 0.4</b></p> <p>Estimate the acceleration and centripetal force in situations that involve rotation.</p>

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### 3.8.1.1 Rutherford scattering (A-level only)

Content	Opportunities for skills development
<p>Qualitative study of Rutherford scattering.</p> <p>Appreciation of how knowledge and understanding of the structure of the nucleus has changed over time.</p>	

### 3.8.1.2 $\alpha$ , $\beta$ and $\gamma$ radiation (A-level only)

Content	Opportunities for skills development
<p>Their properties and experimental identification using simple absorption experiments; applications eg to relative hazards of exposure to humans.</p> <p>Applications also include thickness measurements of aluminium foil paper and steel.</p> <p>Inverse-square law for <math>\gamma</math> radiation: <math>I = \frac{k}{x^2}</math></p> <p>Experimental verification of inverse-square law.</p> <p>Applications eg to safe handling of radioactive sources.</p> <p>Background radiation; examples of its origins and experimental elimination from calculations.</p> <p>Appreciation of balance between risk and benefits in the uses of radiation in medicine.</p>	

### 3.8.1.4 Nuclear instability (A-level only)

Content	Opportunities for skills development
<p>Graph of <math>N</math> against <math>Z</math> for stable nuclei.</p> <p>Possible decay modes of unstable nuclei including <math>\alpha</math>, <math>\beta^+</math>, <math>\beta^-</math> and electron capture.</p> <p>Changes in <math>N</math> and <math>Z</math> caused by radioactive decay and representation in simple decay equations.</p> <p>Questions may use nuclear energy level diagrams.</p> <p>Existence of nuclear excited states; <math>\gamma</math> ray emission; application eg use of technetium-99m as a <math>\gamma</math> source in medical diagnosis.</p>	