

# A-Level Physics - AQA, Specification 7408 (A-Level)

The following tasks will require substantial research and independent study. It is essential that you complete the tasks within this transition document and present them to your class teacher in your first lesson at the start of the new academic year. These tasks will support your understanding of key concepts that you will be tested on in the induction assessments, taken within the first 3 weeks, that ultimately decide if you are suitable to continue on this course.

Units/Topics	Supporting Links	Reading
Particles & Radiation (Topic 3.2)  Waves (Topic 3.3)	Topic Specification: <a href="#">Click here for topic specification</a>  Topic Specification: <a href="#">Click here for topic specification</a>	Specification, Practical Skills Handbook, and Study Notes to support tasks 1-3: <a href="#">Click here for your study materials, course specification and practical skills handbook</a>
<b>TASK 1:</b> What are the four fundamental forces in physics? Describe and explain their characteristics in terms of the ‘Standard Model’. Include in your description and explanation the elementary particles, how they are classified, and how they interact via these fundamental forces.	<b>TASK 2:</b> a) Compare and contrast ‘Newtonian’ (Classical) physics and quantum mechanics b) Explain the key historical discoveries and experimental observations which led to the development of quantum theory	<b>TASK 3:</b> Any wave can be described mathematically in terms of the following equation: $y(x,t) = y_m \sin(kx - \omega t)$ Explain, step by step how this mathematical description of a wave is constructed from first principles, and how we can derive the “wave equation” you learned in GCSE physics ( $v = f\lambda$ ) from this equation.

Know your why –  
Why Physics?

<https://www.iop.org/careers-physics>

Please prepare your work for tasks 1, 2 and 3 in the form of an electronic document (e.g. .doc, .docx, .ppt, etc.) and submit this via email to [mahmed@raynespark.merton.sch.uk](mailto:mahmed@raynespark.merton.sch.uk) **NOTE: You must not plagiarise – your work must be entirely your own, and you must provide references/links for any secondary sources of information (e.g., URL’s for webpages or images) you use to produce your work!**

Further Research  	<a href="#">Radioactivity</a>  <a href="#">Further Reading (OpenStax Physics 2 Textbook)</a>	Further Listening  	<a href="#">Particles &amp; Radiation – Physics Podcast</a>  <a href="#">Sean Carroll Podcast – The Many Worlds Interpretation</a>  <a href="#">Harry Cliff – Physics &amp; The Large Hadron Collider (Lex Fridman Podcast)</a>	Further Watching  	<a href="#">Horizon – Dancing in the Dark (Dark Matter &amp; Dark Energy Documentary)</a>
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