

Physics - Transition Tasks

We are delighted to have you studying Physics A-level with us. To help with a smooth transition from GCSE science to A-level Physics, please ensure that you complete the following bridging tasks.

Subject Content for this course can be found here...

<https://www.ocr.org.uk/qualifications/as-and-a-level/physics-a-h156-h556-from-2015/>

Task 1 – Système Internationale (S.I.) base quantities and their units

Understanding S.I. units is an important foundation for understanding Physics. Your task is to research all the S.I. units and how their value is determined. A good place to start is: <https://www.npl.co.uk/getmedia/b097a52d-8043-46e0-aa0c-14e64b56d95b/NPL-Schools-poster--7-SI-BASE-UNITS-v12-HR-NC.pdf>. All other units are derived from these base units. Can you write the following in terms of their S.I. units? Momentum, velocity and density.

Task 2 – Forces and motion.

Watch the following clip on 'the monkey in a tree' experiment. Can you describe both the horizontal and vertical components on the forces that are acting on the 'monkey' and the 'bullet'. Explain why the 'bullet' will always hit the 'monkey' (Assuming the hunters aim is good!): https://www.youtube.com/watch?v=z8S0_SHqoeY

Task 3 – Mathematical skills : Circular motion and space physics.

Can you complete the question below?

A geostationary satellite with a mass of 2200kg is about to be launched into a synchronous orbit. The orbit will have an orbital radius of 42,200km about the centre of the Earth. The earth has a mass of 5.97×10^{24} kg. Can you calculate the minimum speed the satellite needs to travel at to maintain its orbital radius?

Use the equations $F = \frac{mv^2}{r}$ and $F = -\frac{GMm}{r^2}$ Where F is force (N) m = mass (kg) r = radius (m) G = 6.67×10^{-11} v = velocity (ms^{-1})

Task 4 - Quantum Physics

Watch the following clip on wave particle duality:

https://www.ted.com/talks/colm_kelleher_is_light_a_particle_or_a_wave?language=en#t-243002 This a brief introduction to some ideas behind quantum physics. Using this clip as a starting point – conduct some research investigating wave particle duality and the photoelectric effect. What experiments were carried out? By whom? How does the photoelectric effect support the idea that light is a particle?

Task 5 – Wider reading

Read at least one copy of New Scientist over the summer holidays. Select one Physics-related article and summarise the content for your peers. This should be at least 500-750 words long and you may do additional research on the topic in order to improve your understanding and the written content you produce.

An excellent short book to read over the summer! https://www.amazon.co.uk/Brief-Answers-Big-Questions-Stephen/dp/1473695988/ref=sr_1_1?keywords=brief+answers+to+the+big+questions&qid=1582546017&sr=8-1

Special mention: Isaac Physics

Isaac physics is fantastic website for all things physics. They have excellent resources for GCSE to A-level transition which can be found here: https://isaacphysics.org/pages/pre_made_gameboards?stage=all#gcse_to_alevel (You need to create an account 100% free) and this gives you access to many more resources and lessons which you can access throughout the A-level physics course.