SUBJECT AS Physics — Year 12 LP 5

This half term: Skills, Knowledge and Understanding to be developed:

- **Skills (students will be able to by the end of the Learning Programme):** carry out calculations using the equation associated with Young's double slit experiment and derive and use the diffraction grating equation. Interpret diagrams showing stationary waves.
- **Knowledge (students will know by the end of the Learning Programme**): the historical importance of Young's Double Slit experiment, what is meant by a progressive wave and a stationary wave and the difference between them.
- **Understanding (students will demonstrate their understanding):** by answering a range of AS level exam questions relating to the Nature and Properties of Waves and Stationary Waves.

Key Terms/Words: **diffraction, interference, superposition, coherent, monochromatic, stationary wave, internodal distance, , amplitude, frequency propagation, plane waves,**

LP 5 – Week 1 & 2 Learning Outcomes: 1. Students will know how two source interference occurs 2. Students will know the historical importance of Young's experiment 3. Students will know the principle of superposition, giving appropriate sketch graphs 4. Students will know the path difference rules for constructive and destructive interference between waves from in phase sources 5. Students will be able to use the equation $\lambda = a\Delta y/D$ 6. Students will know how to determine the wavelength of light using Young's double slits experiment.		**Success criteria:** 1. Describe how interference occurs. 2. Calculate λ using data from Young's double slit experiment.	**Homework: LP 5** AS Level standard questions
LP 5 – Week 3 & 4 Learning Outcomes: 7. Students will be able to derive and use the equation $d\sin\theta = n\lambda$ for a diffraction grating 8. Students will know the idea that for a diffraction grating a very small d makes beams ("orders") much further apart than in Young's experiment, and that the large number of slits makes the bright beams much sharper 9. Students will know how to determine the wavelength of light using a diffraction grating. **Students will apply and demonstrate new knowledge and skills in a CDG ASSESSMENT.**	Assessment CDG 1 Grade:	**Success criteria:** 3. Derive and use the equation for a diffraction grating.	**Homework: LP 5** Prepare for CDG Assessment
LP 5 – Week 5 & 6 Learning Outcomes: 1. Students will know the differences between stationary and progressive waves 2. Students will understand the idea that a stationary wave can be regarded as a superposition of two progressive waves of equal amplitude and frequency, travelling in opposite directions, and that the internodal distance is λ/2 3. Students will know how to determine the speed of sound using stationary waves. **Students will apply and demonstrate new knowledge and skills in a CDG ASSESSMENT.**	Assessment CDG 2 Grade:	**Success criteria:** 1. Describe the conditions necessary for stationary waves. 2. Interpret diagrams of stationary waves and calculate λ.	**Homework: LP 5** Prepare for CDG Assessment
LP 5 – Week 7 Learning Outcomes: 1. Students will know that the refractive index, n, of a medium is defined as c/v in which v is the speed of light in the medium and c is the speed of light in a vacuum. 2. Students will be able to use the equations: $n_1v_1=n_2v_2$ and $n_1\sin\theta_1=n_2\sin\theta_2$ (regarded as Snell's law) **3.** Students will know how Snell's law relates to the wave model of light propagation and for diagrams of plane waves approaching a plane boundary obliquely, and being refracted		4. Calculate the refractive index of a material. 5. Use of Snell's Law.	