SKJ Education

LC HL PHYSICS

FOUNDATION PROGRAM

+353 85 8457951
www.skjeducation.co
steven@skjeducation.com

1 Overview of 8-week LC HL Physics Program

LC HL Physics - Foundation Program

Do vectors, forces, and electricity formulas seem like a foreign language? This 8-week Physics Foundation Program is designed to translate Physics into clear, understandable concepts and build your problem-solving confidence. We don't just give you formulas; we teach you how to think like a physicist. Through a science-based metacognition approach, you'll learn to visualise problems, break them down into logical steps, and apply the fundamental laws that govern the universe. This isn't about rote learning; it's about developing a powerful analytical toolkit. In just 8 weeks, you'll gain the mathematical skills, conceptual understanding, and exam techniques needed to excel in Leaving Cert Physics. Your transformation starts here.

Here are links to extra questions and resources on StudyClix for this 8-week program, should you wish to use them.

Links	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Topic 1	Vectors & Scalars	Forces & Motion	Work, Energy & Power	States of Matter	Electricity	Waves & Sound	Light & Reflection	Molecular Physics
Topic 2	Definitions (Q5's)	Speed & Velocity	Momentum	Heat Transfer	Resistance	Wave Motion	Mirrors	The Electron
Experiment	YT Video "All of Physics"	Exp. Qs. - Mechanics	Exp. Qs. - Mechanics	Exp. Qs. - Mechanics	Exp. Qs. - Electricity	Exp. Qs. - Sound	Exp. Qs. - Light	Exp. Qs (all)

The program is structured in two 4-week blocks, designed to install a foundational öperating systemfor physics.

- **Block 1 (Weeks 1-4): The Core Principles of Mechanics.** Master the language of physics—vectors, units, and the fundamental laws of motion and energy that form the bedrock of the entire subject.
- **Block 2 (Weeks 5-8): The Applied Principles.** Extend these core concepts to understand waves, light, electricity, and modern physics, building the toolkit needed to solve any problem the exam presents.
- **Interleaved Revision:** From Week 2 onwards, every worksheet intentionally integrates concepts from previous weeks. This is a deliberate design feature to combat the forgetting curve and build the interconnected, flexible knowledge essential for Physics.

2 Sample Study Plan

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Review Key Terms & LO's. Watch video *(30 mins)*	Finish Ex. Work sheet + Online Lesson *(90 mins)*	Rest and Reflect, Correct Work sheet. *(20 mins)*	Experiment Exercise Work sheet *(50 mins)*	Error Analysis Exercise *(40 mins)*	Exam Q Assessment *(60 mins)*	Self-Correct & Prep Day *(30 mins)*

3 Weekly Study Resources

1. **Key Terms:** Key vocabulary, definitions and formulae required for the worksheets (i.e., a cheat sheet/quick guide to this topic).
2. **Learning Objectives & Indicative Content (aligned LC HL Maths curriculum & specification):** Clear, quantifiable, achievable **goals** for the coming week.
3. **Exercise Worksheet:** Your main learning tool. It contains clear notes, worked examples, and key questions to solidify your understanding. This can be used for 1-4 study sessions in a given week (takes 90-120 minutes to complete).
4. ***Students have an online lesson after the exercise worksheet is completed***
5. **Error-Based Analysis Exercise:** A unique exercise where you'll find and fix common mistakes, training yourself to think like an examiner.
6. **Exam Question Assessment:** A short exam-style test to check your progress and get comfortable with the format of the real thing.
7. **Self-Correction & Progress Tracking Protocol:** see below.

4 Self-Correction & Progress Tracking Protocol

(This is the MOST IMPORTANT task of the week – complete this on Sunday, then immediately plan the following week's study to guarantee consistency).

1. **Mark your work.** Use a different colour pen.
2. **For each question, categorise your result:**
   - **Fluent:** I got it right and knew why.
   - **Lucky:** I got it right but was guessing/doubtful. I could not fully explain why this is the answer/how I got it.
   - **Error:** I got it wrong.
3. **For each Error, complete this sentence:**

   "The root cause of this was: I _____."
   (e.g., "I confused the formula for displacement with distance," or "I forgot to convert units.")
4. **For each Lucky answer, mark with a highlighter for later revision tests.**
5. **Action Plan:** Based on your analysis, what is **one specific thing** you will do before next week's lesson? (e.g., "Create a flashcards for function properties," "Redo the error-analysis exercise," "Watch a video on integration steps").
6. **Confidence Rating:** On a scale of 1-5, how confident do you now feel with this week's core concepts? (1 = Not at all, 5 = Rock Solid). Go through every Learning Objective and rank them. Continue this at the end of every week.

5 Why This System Works

- **Smarter Learning, Not More Learning:** My materials are designed using proven learning science to help you understand and retain information more effectively.
- **Build Confidence Through Mastery:** Start with the absolute essentials, ensuring you have a rock-solid foundation before moving on. No gaps, no confusion. Ask as many questions as you can.
- **You Learn How to Learn:** This program will teach you how to review your work, spot your own mistakes, and identify what you need to focus on. This is a skill that helps you in every walk of life.
- **Focus on Weaknesses:** By directing most of your time to analysing mistakes and revising difficult topics, you are forcing your brain to grow rapidly.

6 Weekly Learning Objectives

Week 1: Introduction to Physics

- **1.1:** Recall of fundamental physical quantities and their SI units.
- **1.2:** Distinction between fundamental and derived units.
- **1.3:** Use of scientific notation and prefixes.
- **1.4:** Understanding of the nature of scalar and vector quantities.
- **1.5:** Use of key formulae in physics and correct significant figures and units.

Week 2: Forces & Motion

- **2.1:** State and apply Newton's Three Laws of Motion to real-world scenarios.
- **2.2:** Use the equations of motion (UVATS) to solve problems involving constant acceleration in a straight line.
- **2.3:** Resolve vectors into trigonometric components and apply this to analyse projectile motion.
- **2.4:** Draw and interpret free-body diagrams to represent forces acting on an object.

Week 3: Work, Energy & Power

- **3.1:** Define and calculate work done, kinetic energy, and potential energy.
- **3.2:** Apply the Principle of Conservation of Energy to solve problems involving energy transformations.
- **3.3:** Define power and perform calculations involving force, velocity, work and power.
- **3.4:** Define momentum and apply the Principle of Conservation of Momentum to collisions.

Week 4: States of Matter

- **4.1:** Explain pressure in fluids and the factors affecting buoyancy (Archimedes' Principle).
- **4.2:** Use the four Ideal Gas Laws (Boyle, Charles, Avogadro, Gay-Lussac) to solve problems involving gases.
- **4.3:** Define specific heat capacity and latent heat and perform calculations involving energy transfer.
- **4.4:** State the four laws of thermodynamics and describe state of matter.

****Students will have a "Reading Week" between Weeks 4 and 5.****

Week 5: Electricity

- **5.1:** Define current, potential difference, and resistance, and apply Ohm's Law.
- **5.2:** Use the formula for resistivity to solve problems.
- **5.3:** Analyse series and parallel circuits to calculate current, voltage, and resistance.
- **5.4:** Define capacitance and describe how capacitors store charge.

Week 6: Waves & Sound

- **6.1:** Describe wave motion using key terms: displacement, amplitude, wavelength, frequency, period, and velocity.
- **6.2:** Use the wave equation (v = f) to perform calculations.
- **6.3:** Explain the difference between transverse and longitudinal waves, identifying sound as longitudinal.
- **6.4:** Describe the factors that affect the speed of sound.

Week 7: Light & Reflection

- **7.1:** State the laws of reflection and refraction.
- **7.2:** Use Snell's Law to calculate refractive index and critical angle.
- **7.3:** Explain total internal reflection and its applications (e.g., fibre optics).
- **7.4:** Draw ray diagrams to show image formation in plane mirrors and converging lenses.

Week 8: Molecular Physics

- **8.1:** Describe the structure of the atom, including the nucleus and electron energy levels.
- **8.2:** Differentiate between the three main types of radioactive emission (alpha, beta, gamma) in terms of nature, penetration, and ionising power.
- **8.3:** Balance nuclear equations for alpha and beta decay.
- **8.4:** Describe the quark structure of protons and neutrons.