WLA Physics Vision

Physics is the fundamental driver of scientific advancement, technological innovation, and societal progress. Its role is to understand the universe and address global challenges. At WLA, we highlight physics as a source of inspiration, knowledge, and a catalyst for positive change. This vision includes fostering a collaborative and inclusive community, promoting ethical responsibility, and ensuring we all develop a deeper understanding of the principles of Physics to help us make a better world.

Year 13

Capacitance and Electric Fields – explain how the internal lights in a car work.
Gravitational Fields – analyse the motion of the planets in the Solar System or planets in extrasolar planetary systems.
Astrophysics and Cosmology – explore the early universe in more depth.
Nuclear Physics – fully explain how nuclear power works including relevant calculations, expand this to fusion reactors.
Medical Imaging – investigate one aspect of medical imaging in more depth and create a presentation on it for the class.
Electromagnetism – use Lenz's and Faraday's Law to explain how a transformer works.

Year 12

Motion – use understanding of motion to numerically solve problems about projectile motion, extend understanding to projectiles through air.
Forces and Energy — when watching a tennis match, explain what happens during the impact between the ball and the racket, extend understanding to crash test dummies.
Materials – by understanding stress and strain, explore the materials used to make large structures and design a structure such as a bridge or skyscraper.
Waves and Quantum Physics – investigate how forensic scientists identify unknown substances.
Electrical Charge and Circuits – explain how circuits are designed for solar powered road signs.
Thermal Physics – develop a full explanation of what the energy input into a kettle does throughout the boiling process.
Circular and Oscillations – examine how skyscrapers use circular motion and oscillations to combat issues due to resonance.

Year 11

(TRIPLE ONLY) Space Physics – create a presentation of the limits of our understanding of the universe, investigate the current and future missions designed to explore the universe.
Magnetism and Electromagnetism – use everything we have learned about magnetism and electromagnetism to create a flow diagram for the national grid.
Forces – investigate force couples and apply the understanding to how bridges are designed.
(TRIPLE ONLY) Reflection and Refraction – investigate how reflecting and refracting telescopes work, explore what is meant by refractive index and the effect it has on the amount that light will refract.
(TRIPLE ONLY) Pressure – expand understanding of the gas laws to the first law of thermodynamics, investigate what is meant by an ideal gas and how it differs from a real gas, explore the general gas law.

Year 10

Measuring Waves – investigate advanced wave phenomena like superposition and diffraction gratings.
Motion Graphs – design a trip and create the associated motion graphs for every stage.
Nuclear Physics – apply understanding of nuclear radiation to complete the Uranium decay series.
Using Electricity – after completing one IV experiment, design and run the other two experiments without support.
Thermal Physics – design and complete an experiment into the specific latent heat of fusion and vaporisation of water.
Electromagnetic Spectrum – research and create a podcast or presentation on the electromagnetic spectrum, investigate the astronomical research into each member of the electromagnetic spectrum.

Year 9

Waves – explore the electromagnetic spectrum and create a graphic organiser to show all of the uses of each wavelength.
Magnetism and Electromagnetism – investigate the motor effect, create a mini-generator using magnets and copper wires.
Particle Model – design a submarine that can transport humans to the deepest level of the oceans.
Electric Charge Carriers – more advanced calculations, apply understanding of charge and conservation of energy to explain complex circuits, develop an understanding of potential dividers and switching circuits.
Energy Stores – design a roller coaster with full calculations of all of the energy transformations involved.

Year 8

Motion – creating the story of a journey from a distance-time graph, creating a distance-time graph of a journey based on a story, stretching understanding to speed-time graphs and acceleration.
Light and Refraction – solving mirror mazes, creating a mirror maze for someone else to solve, creating a shadow theatre, and creating and designing the lighting for a show.
More Circuits – developing more complex circuits, and exploring more advanced concepts like resistance.
More about Force - investigating the principle of moments, creating a storyboard for a journey around the Solar System, and designing and making a bridge that can hold the most mass.
Floating and Sinking – making and explaining Cartesian divers, designing and making a boat that can hold the most mass before sinking, and investigating submarines.

Year 7

Forces – resolving forces in new contexts and designing products to either increase or decrease friction.
Sound – investigations into the uses of ultrasound and infrasound.
Space – designing a space mission with detailed itinerary, budget and usefulness; investigating a planet in the Solar System in more detail; and design an exoplanet.
Simple circuits – applying understanding in new contexts including designing stadium or arena lighting and finding or predicting faults in circuits.
Heat and temperature – explaining how vacuum flasks are designed to reduce heat loss and designing an experiment for paper saucepans.