

De Lisle College Curriculum

“Rooted and grounded in Love”.

Physics



Intent – ‘Rooted and grounded in Love’

Intent – Rooted

Science is a body of knowledge that all students should have, so they have the power to understand the world they share and make informed decisions

Science (from the Latin word *scientia*, meaning "knowledge") is a set of ideas about the material world. The science curriculum at De Lisle aims to equip students with the knowledge and skills to apply the insights of science to the wonders of the universe.

Everything we know about the universe, from how plants reproduce to how the Universe itself came into existence, is the result of scientific research and experiment. Human progress throughout history has largely rested on advances in science. From our knowledge of gravity to the development of cutting-edge medicines, scientists have shaped our modern world for the better.

De Lisle students are surrounded by technology and the products of science every day. Government decisions that affect every aspect of our lives, both now and in the future, are based in scientific evidence. The solutions to problems facing our world, such as climate change, plastic pollution and antibiotic resistance, require the contributions of scientists. As De Lisle students grow up in an increasingly technologically and scientifically advanced world, they need to be scientifically literate to succeed.

Studying science is not just about accruing a series of facts: it is also a style of thinking. Science involves generating and testing ideas, gathering valid evidence – including by making observations, carrying out investigations and modelling, and communicating and debating with others – in order to develop scientific knowledge, understanding, and explanations. Scientific progress comes from logical, systematic work and from creative insight, built on a foundation of respect for evidence. By learning to use scientific method De Lisle students are taught how to think, learn, solve problems and make informed decisions. These skills are integral to every aspect of our students’ education and life, supporting them in making an informed and positive contributions to society now and in the future.

In the Science Department we work to inform, enthuse and inspire our students



Physics

Year 12

Curriculum Outline

Link to Catholic Social Teaching:

Physics is about understanding the beauty, vastness and elegant nature of the world we live in. Advances in physics have helped us to develop new clean ways of producing energy (Stewardship and care for God's creation), new medical applications (the fundamental right to life) and improvements in the quality of life through medical and technological improvements (life and dignity of the human person).

Advent 1	Higher faster stronger, mechanics framed around sports science / The sound of music, waves and the nature of sound and light	Advent 2	Technology in space, electricity framed around satellites
Description	Uniformly accelerated motion in one direction, graphs of motion. Motion in 2 directions. Vector and scalar quantities, resolving vectors and free body diagrams. Newton's laws of motion, momentum, work, force and energy, Power and efficiency Transverse and longitudinal waves, phase difference, electromagnetic radiation and wave – particle duality. Atomic line spectra. Standing waves and laser outputs.	Description	Solar cells and spacecraft power systems, conservation of energy and charge in dc electric circuits, power, circuit sensors, electromotive force and internal resistance. The photoelectric effect, the electron volt, wave – particle duality.
Lent 1	Good enough to eat, materials science framed around the food industry	Lent 2	Digging up the past, potential dividers and diffraction themed around archaeological techniques
Description	Density, viscosity, laminar and turbulent flow. Drag forces and terminal velocity. Stiffness, stress and strain of materials, refraction of light, polarisation and refractometry.	Description	Resistivity and resistivity surveying, X-ray imaging and diffraction, Grating equations and Huygens construct, wave – particle duality of electrons, De Broglie wavelength. Potential dividers.

Pentecost 1	Spare part surgery, materials and lenses themed around biomechanical engineering	Pentecost 2	Probing the heart of matter, circular motion and the standard model
Description	Mechanical properties (stress/strain) of bone and replacement materials, converging and diverging lenses and magnification, optical system of the eye, ultrasound imaging.	Description	Alpha scattering and the model of the atom, accelerating particles to high energies, detecting and interpreting interactions between particles, the standard quark – lepton model of matter. Motion in a circle, interaction between charges, electric fields, mass-energy conservation, particle decay equations.

Physics

Year 13

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Advent 1	Transport on track, capacitors, magnetic fields and electromagnetic induction	Advent 2	Medium is the message, electrical fields
Description	Track circuits and signalling, mechanical braking, regenerative and eddy current braking. Impulse, momentum, capacitance, electromagnetic induction and the motor effect, Fleming and Lenz's law, root mean squared currents and potential difference.	Description	Electric field and magnetic fields, capacitors, CDD imaging, liquid crystal displays
Lent 1	Build or bust, simple harmonic motion	Lent 2	Reach for the stars, molecular chemical theory, big bang, radioactive decay and gravitational theory
Description	Specific latent heat and specific heat capacity. Circular motion, simple harmonic motion, pendulums, springs, free and forced oscillations, resonance and damping. Deformation of materials.	Description	Internal energy, gas laws, radioactivity, distances of stars, star formation and life cycles, Hertzsprung-Russell diagrams, red shift, gravitational fields and gravitational potentials.
Pentecost 1	Revision	Pentecost 2	Revision and exams
Description	Reteach topics by paper. Assessment and feedback	Description	Exams