MYP 4 Course overview 2024/2025 **PHYSICS**

Unit title	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
THE SCIENCE OF PHYSICS **Sep – Nov** **Special:** **CERN - community**	Communication	Form Evidence	Personal and cultural expression	Because of the necessary communication, the results of a scientific investigation should be presented using specific forms of expression, allowing evidence for all steps of the scientific method, including given precisions.	A ii B i, ii, iii, iv C i, ii, iii, iv, v D iii	**Communication** *Understand and use mathematical notation* *Structure information in reports* **Self-management** *Keep an organized notebook* *Meet deadlines* **Thinking** *Interpret data* *Draw reasonable conclusions and generalizations* **Research** *Collect, record and verify data* *Process data and report results*	**Disciplinary knowledge** *Physical quantities and measuring units and their symbols* *Measuring* *Power of ten shorthand and scientific notation* *Significant figures* *Applying statistics to data processing* *Scientific method* **Disciplinary skills** *Converting units* *Applying scientific method* *Data processing* *Writing scientific report* **Attitudes** *Performance in experiment*
FORCES **Nov - Feb** **Special:** **Black holes**	Relationships	Interaction Patterns	Scientific and technical innovation	Understanding interactions in nature and underlying mathematical patterns describing relevant relationships allows scientific and technical innovations.	A i, ii, iii B i, ii, iii, iv C i, ii, iii, iv, v	**Communication** *Understand and use mathematical notation* *Organize and depict information logically* **Thinking** *Interpret data* *Apply skills and knowledge in unfamiliar situations* **Research** *Collect, record and verify data* *Process data and report results* **Social** *Listen actively to other perspectives and ideas*	**Disciplinary knowledge** *Concept of force* *1st and 3rd Newton's law* *Examples of forces and their properties (gravity, weight, friction, elastic force)* *Adding and resolving forces* **Disciplinary skills** *Drawing and interpreting graphs and diagrams* *Applying knowledge on numerical and practical problems* **Attitudes** *Performance in experiment* *Connecting knowledge with everyday life*

MOTION **Feb - Apr** **Special:** **Motion in time**	Connections	Movement Patterns	Orientation in space and time	Movement implies orientation in space and time, for which the understanding of their connection patterns is essential.	A i, ii, iii	**Communication** *Understand and use mathematical language* **Thinking** *Apply skills and knowledge in unfamiliar situations* *Interpret data* *Draw reasonable conclusions and generalizations*	**Disciplinary knowledge** *Newton's laws* *Speed, velocity and acceleration* *Equations of motion* *2D motion* **Disciplinary skills** *Drawing and transforming motion graphs from one to another* *Applying different communication modes (text, graphs, formulae)* *Applying knowledge on numerical and practical problems* **Attitudes** *Connecting knowledge with everyday life* *Appreciating academic honesty*
WORK AND ENERGY **May - Jun**	Change	Energy Form	Globalization and sustainability	Many forms of energy can be changed into the form usable for us in everyday life, but we should be aware of sustainability.	D i, ii, iv	**Communication** *Understand and use mathematical language* *Structure information in essays* *Make inferences and draw conclusions* **Thinking** *Propose and evaluate a variety of solutions* **Research** *Seek a range of perspectives from multiple and varied sources* *Create references and citations, construct a bibliography according to recognized conventions* **Social** *Consider ethical, cultural and environmental implications*	**Disciplinary knowledge** *Concept of work and energy* *Potential and kinetic energy* **Disciplinary skills** *Applying knowledge on numerical and practical problems* **Attitudes** *Connecting knowledge with everyday life* *Responsibility and integrity*

MYP 5 Course overview 2024/2025 **PHYSICS**

Unit title	Key concept	Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
ENERGY, WORK AND POWER **Sep - Oct** **Special: Dark energy and antimatter**	Form	Energy Transformation	Globalization and sustainability	The total amount of energy in a closed system is conserved, though limited - it can only be a subject of transformation and change of form, so we have to seriously consider sustainability at the global level.	A i, ii, iii, iv D i, ii, iii, iv	**Communication** *Understand and use mathematical language* *Structure information in essays* *Make inferences and draw conclusions* **Thinking** *Propose and evaluate a variety of solutions* **Research** *Seek a range of perspectives from multiple and varied sources* *Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions* **Social** *Consider ethical, cultural and environmental implications*	**Disciplinary knowledge** *Energy in different systems* *Conservation laws* *Power and efficiency* **Disciplinary skills** *Applying knowledge on numerical and practical problems* **Attitudes** *Connecting knowledge with everyday life* *Responsibility and integrity*

PRESSURE **Oct - Jan**	Development	Evidence Transformation	Scientific and technical innovation	Evidence can be provided that development through scientific and technical inovation can cause the transformation of the society.	A i, ii, iii B i, ii, iii, iv C i, ii, iii, iv, v D iii	**Communication** *Understand and use mathematical notation* *Structure information in reports* **Thinking** *Apply skills and knowledge in unfamiliar situations* **Research** *Collect, record and verify data* *Process data and report results*	**Disciplinary knowledge and understanding** *Pressure* *Atmospheric, hydrostatic and hydraulic pressure* *Buoyancy, floating and sinking* *Simple hydrodynamics* **Disciplinary skills** *Applying knowledge on numerical and practical problems* **Attitudes** *Performance in experiment* *Connecting knowledge to everyday life*
HEAT AND THERMAL EFFECTS **Jan – Mar** **Special:** **Least energa, least action and least order – it is not our fault**	Relationships	Consequences Development	Scientific and technical innovation	Understanding of relationships among relevant variables may have huge consequences on modernisation, industrialization and development of the whole world.	A i, ii, iii B i, ii, iii, iv C i, ii, iii, iv, v	**Communication** *Organize and depict information logically* **Thinking** *Draw reasonable conclusions and generalizations* **Research** *Collect and analyse data to identify solutions* **Social** *Consider ethical, cultural and environmental implications*	**Disciplinary knowledge and understanding** *Internal energy, temperature and heat* *Heat transfer* *The gas laws* *Laws of thermodynamics* *Cyclic processes and heat engine* **Disciplinary skills** *Transforming graphs* *Applying different communication modes (text, sketches, graphs, formulae)* *Applying knowledge on numerical and practical problems* **Attitudes** *Connecting knowledge to everyday life* *Responsibility and integrity*

WAVES **Mar – May** **Special: Waves and quantum mechanics**	Perspective	Patterns Evidence	Scientific and technical innovations	The innovative scientific idea that the same patterns of behaviour can be evident for apparently different phenomena has opened the new perspectives in science and allowed the same phenomenon to be looked at from different perpectives.	A i, ii, iii D i, ii, iii, iv	**Communication** *Understand and use mathematical language and various communication modes* *Find information for disciplinary and interdisciplinary inquiries, using a variety of media* *Structure information in essays* **Thinking** *Practise observing carefully* *Draw reasonable conclusions and generalizations* *Make connections between subject groups and disciplines* **Research** *Locate, organize, analyse, evaluate, synthesize and ethically use information from a variety of sources and media*	**Disciplinary knowledge and understanding** *Origin and propagation of waves* *Describing waves: wavelength and frequency* *Reflection and refraction* *Diffraction and interference* ***Light as a wave*** ***The Magic of Sound:*** *Properties of sound (light) waves* *Speed of sound (light)* *Level of intensity of sound (light)* *Acoustics (geometrical optics)* *Standing waves and resonance (wave optics)* *Musical instruments (optical instruments)* **Disciplinary skills** *Visualisation of physical phenomena using mathematical techniques* *Applying knowledge on numerical and practical problems* **Attitudes** *Connecting knowledge to everyday life* *Realizing the identity between mathematical and physical models*
ELECTRICITY AND ELECTRO-MAGNETISM **May – Jun** **Special:**	Development	Consequences Environment	Globalization and sustainability	Development has deeply changed our lives, having good and bad consequences on ourselves and our sustainable natural and social environment.	D i, ii, iii, iv	**Communication** *Make inferences and draw conclusions* **Thinking** *Practise observing carefully*	**Disciplinary knowledge and understanding** *Electric charge, potential and field* *Voltage, current and electric circuits* *Electric energy and power* *Magnets and magnetic fields*

Positive and negative, left and right						*Draw reasonable conclusions and generalizations* **Research** *Locate, organize, analyse, evaluate, synthesize and ethically use information from a variety of sources and media*	*Magnetic effect of a current and electromagnetic induction* *Electric motors and generators* **Disciplinary skills** *Applying knowledge on practical problems* **Attitudes** *Connecting knowledge with everyday life* *Responsibility and integrity*

DIFFERENTIATION

- sitting in the first row
- frequent checking if the student is concentrated on the work
- asking questions to support concentration
- creating summary sheets if needed (help lessons)
- allowing writing longer texts using a keyboard
- anouncing orals
- performing orals in the first part of the period (day), divided in smaller parts
- questions and enough space for answers should be on the same page
- enclose a paper with more strongly printed lines or squares
- allowing longer time for finishing a task if needed
- reducing the number of tasks in the test (for example 7-8 level tasks on the next occasion when needed)
- allowing the usage of tables with formulae
- printing numbers and textual parts in bigger font or bold
- being sure that the student understands tasks and correctly decoded numbers and mathematical symbols
- giving short and clear instructions
- tolerating writing and copying mistakes
- if the levels for the same task are given after oral or written check, the better result should be considered