

MYP 4 Course overview 2021/2022

PHYSICS

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

<p>MOTION</p> <p>Feb - Apr</p> <p>Special: Motion in time</p>	<p>Time, place and space</p>	<p>Movement Patterns Consequences</p>	<p>Orientation in space and time</p>	<p>If we know the forces acting on a body we can exactly predict its consequent motion patterns, meaning how its position (place), speed and acceleration vary in time and space.</p>	<p>A i, ii, iii</p> <p>D i, ii, iii, iv</p>	<p>Communication Use appropriate forms of writing for different purposes and audiences Understand and use mathematical language Structure information in essays</p> <p>Thinking Apply skills and knowledge in unfamiliar situations</p> <p>Research Understand and implement intellectual property rights</p>	<p>Disciplinary knowledge Newton's laws Speed, velocity and acceleration Equations of motion 2D motion</p> <p>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</p> <p>Attitudes Connecting knowledge with everyday life Appreciating academic honesty</p>
<p>ENERGY, WORK AND POWER</p> <p>May - Jun</p> <p>Special: Dark energy and antimatter</p>	<p>Change</p>	<p>Energy Transformation</p>	<p>Globalization and sustainability</p>	<p>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.</p>	<p>A i, ii, iii, iv</p> <p>D i, ii, iii, iv</p>	<p>Communication Understand and use mathematical language Structure information in essays Make inferences and draw conclusions</p> <p>Thinking Propose and evaluate a variety of solutions</p> <p>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</p> <p>Social Consider ethical, cultural and environmental implications</p>	<p>Disciplinary knowledge Concept of energy, work and power Potential and kinetic energy Energy in different systems Efficiency Conservation laws</p> <p>Disciplinary skills Applying knowledge on numerical and practical problems</p> <p>Attitudes Connecting knowledge with everyday life Responsibility and integrity</p>

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PRESSURE Sep - Nov	Relationships	Consequences Evidence	Identities and relationships	Evidence can be found that change of pressure in and around our body has positive and negative consequences, so it exists a strong relationship between different aspects of pressure and our individual health and general well-being.	A i, ii, iii B i, ii, iii, iv C i, ii, iii, iv, v D iii	Communication <i>Understand and use mathematical notation</i> <i>Structure information in reports</i> Thinking <i>Apply skills and knowledge in unfamiliar situations</i> Research <i>Collect, record and verify data</i> <i>Process data and report results</i>	Disciplinary knowledge and understanding <i>Pressure</i> <i>Atmospheric, hydrostatic and hydraulic pressure</i> <i>Buoyancy, floating and sinking</i> <i>Simple hydrodynamics</i> Disciplinary skills <i>Applying knowledge on numerical and practical problems</i> Attitudes <i>Performance in experiment</i> <i>Connecting knowledge to everyday life</i>
HEAT AND THERMAL EFFECTS Dec - Feb	Relationships	Consequences Development	Scientific and technical innovation	Understanding the relationships among the state variables of a gas and relationships among different forms of thermodynamic energies and work, leads to revolutionary technical innovations and consequent social development (industrial revolution).	A i, ii, iii B i, ii, iii, iv C i, ii, iii, iv, v	Communication <i>Organize and depict information logically</i> Thinking <i>Draw reasonable conclusions and generalizations</i> Research <i>Collect and analyse data to identify solutions</i> Social <i>Consider ethical, cultural and environmental implications</i>	Disciplinary knowledge and understanding <i>Internal energy, temperature and heat</i> <i>Heat transfer</i> <i>The gas laws</i> <i>Laws of thermodynamics</i> <i>Cyclic processes and heat engine</i> Disciplinary skills <i>Transforming graphs</i> <i>Applying different communication modes (text, sketches, graphs, formulae)</i> <i>Applying knowledge on numerical and practical problems</i> Attitudes

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WAVES Mar - May	Connections	Patterns Form	Scientific and technical innovations	The innovative scientific idea that equal patterns of reflection, refraction, diffraction and interference connect all mechanical and electromagnetic waves as different forms of the same phenomenon, has opened the new era in physics.	A i, ii, iii D i, ii, iii, iv	<p><u>Communication</u> <i>Understand and use mathematical language and various communication modes</i> <i>Find information for disciplinary and interdisciplinary inquiries, using a variety of media</i> <i>Structure information in essays</i></p> <p><u>Thinking</u> <i>Practise observing carefully</i> <i>Draw reasonable conclusions and generalizations</i> <i>Make connections between subject groups and disciplines</i></p> <p><u>Research</u> <i>Locate, organize, analyse, evaluate, synthesize and ethically use information from a variety of sources and media</i></p>	<p><u>Disciplinary knowledge and understanding</u> <i>Origin and propagation of waves</i> <i>Describing waves: wavelength and frequency</i> <i>Reflection and refraction</i> <i>Diffraction and interference</i> <i>Light as a wave</i> <i>The Magic of Sound:</i> <i>Properties of sound (light) waves</i> <i>Speed of sound (light)</i> <i>Level of intensity of sound (light)</i> <i>Acoustics (geometrical optics)</i> <i>Standing waves and resonance (wave optics)</i> <i>Musical instruments (optical instruments)</i></p> <p><u>Disciplinary skills</u> <i>Visualisation of physical phenomena using mathematical techniques</i> <i>Applying knowledge on numerical and practical problems</i></p> <p><u>Attitudes</u> <i>Connecting knowledge to everyday life</i> <i>Realizing the identity between mathematical and physical models</i></p>
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<p>ELECTRICITY AND ELECTRO-MAGNETISM</p> <p>May - Jun</p>	<p>Change</p>	<p>Development Consequences Environment</p>	<p>Globalization and sustainability</p>	<p>Development towards globalization based on electricity and elm has deeply changed our lives, having good and bad consequences on ourselves and our sustainable natural and social environment.</p>	<p>D i, ii, iii, iv</p>	<p><u>Communication</u> <i>Make inferences and draw conclusions</i></p> <p><u>Thinking</u> <i>Practise observing carefully Draw reasonable conclusions and generalizations</i></p> <p><u>Research</u> <i>Locate, organize, analyse, evaluate, synthesize and ethically use information from a variety of sources and media</i></p>	<p><u>Disciplinary knowledge and understanding</u> <i>Electric charge, potential and field Voltage, current and electric circuits Electric energy and power Magnets and magnetic fields Magnetic effect of a current and electromagnetic induction Electric motors and generators</i></p> <p><u>Disciplinary skills</u> <i>Applying knowledge on practical problems</i></p> <p><u>Attitudes</u> <i>Connecting knowledge with everyday life Responsibility and integrity</i></p>
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DIFFERENTIATION

For students with

dyslexia and dysgraphia

- bigger font in Sarif, bigger space between rows
- dividing text in tests, practise sheets and instruction papers in smaller sections
- more time for reading, checking if the text/questions are understood
- tolerating writing mistakes
- questions and space for answers should be on the same page
- allowing longer time for finishing a task if needed
- working in a pair or a team with peers

ADHD

- bigger font and space between rows
- shorter paragraphs
- avoiding tables if possible
- frequent checking if a student is concentrated on the work
- instead of complex questions with a, b, c..., separate questions
- questions and enough space for answers should be on the same page
- work in pairs or small teams (up to four)
- creating summary sheets if needed (help lessons)
- encouraging students to participate in class discussions
- commending student on progress
- regularly making notes about progress in e-dnevnik
- allowing the student to leave the classroom for a short time during the lesson if needed