

High School Course Description: Physics

In middle school, GISB students receive a solid introduction to Newtonian Mechanics, Electric Circuit & Magnetism, and Geometrical Optics. Using this as a starting point, GISB's rigorous four-year high school physics curriculum addresses the topics listed below in depth. Labs are inquiry-based, and a definite emphasis is placed on conceptual and global understandings as well as on problem solving.

After grade 10, our students have mastered all content from the AP Physics 1 course. At the end of grade 12, our students have, in addition, mastered all content typically covered in an AP Physics 2 course as well as AP Physics: Mechanics and AP Physics: Electricity and Magnetism.

For a detailed list of what is covered each year in our intensive Physics curriculum, please see below.

Grade 9

The following content is covered during this course:

- Mechanics
 - Kinematics
 - Gravitation and Other Forces
 - Pressure
 - Newton's Laws of Motion
 - Work, Energy, and Power
 - Conservation of Energy
 - Impulse and Momentum
- Nuclear Physics
 - Formation of the Atomic Nuclei
 - Radioactivity
 - Nuclear Fission and its Applications

Grade 10

The following content is covered during this course:

- Mechanics II
 - Kinematics
 - Rotation
 - Angular Momentum
 - Oscillations
 - Mechanical Waves
- Nuclear Physics
 - Atomic Models
 - α , β , γ (Alpha, Beta, Gamma) Radiation
 - Decay Equations

Grade 11

The following content is covered during this course:

- Electricity and Magnetism
 - Electrostatics
 - Conductors, Capacitors, Dielectrics
 - Electric Force, Field, and Potential
 - Magnetic Fields and Electromagnetism
 - Electromagnetic Induction
- Moving Particles in Electric and Magnetic Fields
 - Mass Spectrometry
 - Particle Accelerators
- Oscillations
 - Harmonic Motions
 - LC Circuits and Radio Technology

Grade 12

The following content is covered during this course:

- Geometric and Physical Optics
 - Waves
 - Diffraction and Interference
 - Refraction, Reflection, and Absorption
 - Electromagnetic Waves
 - The Double-Slit Experiment
- Quantum, Atomic, and Nuclear Physics
 - Properties of Waves and Particles
 - Photoelectric Effect
 - Wave Function and Probability
 - Emission and Absorption of Energy
 - Energy in Radioactive Decay
 - Mass-Energy Equivalence
- Theory of Special Relativity
 - Time Dilation
 - Length Contraction

Textbook / Informational Text Reading Amount:

Reading and problems from either/both of the textbooks listed below are assigned for homework after every class.

- **Prisma Physik 7-10, Klett, Edition A, 2017**
- **Big Bang Physik, High School Level, Klett, Edition 1, 2019**

Types of Large Assessments in this Course:

- Unit tests, labs, quizzes, midterm exam, final exam, final project