

## Physics (Openstax) – High School

This course uses the OpenStax High School Physics textbook, a comprehensive and widely respected resource designed to build a strong foundation in physics.

This textbook is best suited for middle to high school students (Grades 7–10) who are ready to develop a deeper understanding of how the physical world works. It is particularly beneficial for students who are preparing for advanced science courses, academic competitions, or future studies in STEM fields such as engineering, physics, and technology.

Through this curriculum, students explore key areas of physics, including motion, forces, energy, waves, electricity and magnetism, and modern physics concepts. The content is structured to guide students step by step from fundamental principles to more advanced applications, helping them build both conceptual understanding and problem-solving skills.

One of the strengths of this textbook is its emphasis on real-world applications. Students learn not only the theory behind physical laws but also how these principles explain everyday phenomena—from how objects move to how electricity powers modern devices.

By studying this material, students will develop critical thinking, analytical reasoning, and the ability to approach complex problems systematically. These skills are essential not only for success in physics but also for overall academic achievement and future career pathways.

This course is ideal for students who are curious, motivated, and ready to challenge themselves academically while building a strong and lasting foundation in science.

While the full OpenStax Physics curriculum typically requires over 100 hours of study, this course is carefully designed to cover the most essential and high-impact topics in a structured 40-hour program, allowing students to build a strong foundation efficiently.

**Our Physics I/II program** is a structured and comprehensive two-part course designed to build a strong foundation in physics while developing students' analytical thinking and problem-solving skills.

**The program is divided into two parts, with each part consisting of 30 lessons (1 hour per lesson), for a total of 60 hours of guided instruction.** The course is carefully designed to focus on the most essential and high-impact topics from a full high school physics curriculum, allowing students to develop a deep understanding in an efficient and structured way.

**Part I (30 lessons / 30 hours)** focuses on building a solid foundation in classical physics.



Students begin with measurement and uncertainty, learning how to work with physical quantities accurately and understand experimental data. The course then moves into mechanics, including motion (kinematics), forces, Newton's laws, energy, work, power, momentum, and circular motion.

Students will also explore thermal physics, including temperature, heat, and energy transfer, followed by an introduction to waves, covering wave properties and sound. The first part concludes with foundational topics in electricity and magnetism, including electric fields, current, resistance, and basic circuits.

Main Focus:

- Understanding how objects move and interact (mechanics)
- Building strong problem-solving skills using equations and models
- Developing clear conceptual understanding of energy and forces
- Establishing a foundation for advanced physics topics

**Part II (30 lessons / 30 hours)** builds on the foundation and introduces more advanced and modern physics concepts.

Students study atomic, nuclear, and particle physics, including atomic structure, radioactive decay, and nuclear reactions such as fission and fusion. The course also explores energy production and its environmental impact, helping students connect physics concepts to real-world applications.

In addition, students investigate advanced wave phenomena such as interference, diffraction, and standing waves, and are introduced to key ideas in modern physics, including wave-particle duality and basic quantum concepts.

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The program continues with deeper exploration of electricity and magnetism, including electromagnetic induction, transformers, and AC circuits, as well as gravitational and electric fields. The course concludes with a comprehensive review and problem-solving practice.

Main Focus:

- Understanding modern physics and real-world applications
- Strengthening analytical and multi-step problem-solving skills
- Connecting physics concepts across different topics
- Preparing for advanced science courses and exams

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