



LINCOLN-WOODSTOCK COOPERATIVE SCHOOL DISTRICT COURSE SYLLABUS

Course Name: Physics (Early College)

Length: Full Year

Teacher: Dave Webster

Course Description:

This collegiate-level course provides a comprehensive introduction to the fundamental principles and concepts of Physics, with a primary emphasis on their practical applications within daily life. By contextualizing mathematical frameworks through real-world scenarios, students will cultivate and refine their quantitative reasoning and analytical skills.

Competencies or Standards Assessed:

Course Learning Outcomes/Competencies:

To complete this course, students must demonstrate proficiency in the following competencies. These objectives are designed to align with the Next Generation Science Standards (NGSS) for High School Physical Science, emphasizing both disciplinary core ideas and scientific practices.

Proficiency is established through consistent performance across formative and summative assessments, including laboratory practicums, analytical reports, and examinations.

I. Scientific Literacy and Communication

CLO 1: Technical Communication. Maintain a high standard of professional communication by consistently utilizing correct grammar, syntax, and paragraph structure in all technical reports and assessments.

CLO 2: Scientific Terminology. Demonstrate fluency in the lexicon of physics, applying course-specific vocabulary accurately in both oral discourse and written documentation.

CLO 3: Nature of Science. Articulate the fundamental principles of the scientific method, including the development of hypotheses, variable control, and the iterative nature of theory building.

CLO 4: Societal Impact. Evaluate and defend the role of physics in modern society, recognizing its influence on technology, ethics, and global problem-solving (NGSS HS-PS4-5).

II. Laboratory Mastery and Safety

CLO 5: Laboratory Safety and Ethics. Internalize and execute rigorous safety protocols with foresight, ensuring a secure environment for self and peers.

CLO 6: Experimental Execution. Precisely implement complex experimental procedures, ensuring the integrity of data collection and the thoroughness of qualitative observations.

CLO 7: Quantitative Analysis. Apply mathematical and computational thinking to analyze scientific data, deriving valid conclusions that account for

experimental error and statistical significance (NGSS HS-PS1-7).

CLO 8: Technical Proficiency. Demonstrate the proper calibration and usage of physics-specific laboratory instrumentation.

III. Core Physics Content and NGSS Alignment

Upon completion of this course, students will demonstrate mastery of the following physical domains:

Competency	Learning Objective	NGSS Standard Alignment
Mechanics	Analyze the relationships between force, mass, and acceleration to predict the motion of macroscopic objects.	HS-PS2-1: Newton's Second Law
Matter	Demonstrate an understanding of the structure and properties of matter at both the bulk and atomic scales.	HS-PS1-1: Valence electrons & Properties
Energy & Transfers	Model and calculate the transfer of energy within systems, including the conversion between kinetic, potential, and thermal energy.	HS-PS3-1: Energy Change in Systems
Relativity	Examine the conceptual foundations of special and general relativity and their implications for time and space.	HS-PS2-5: Field forces & interactions
Universal Structure	Synthesize knowledge of gravitational forces and nuclear processes to explain the formation and evolution of the universe.	HS-ESS1-2: Big Bang & Light Special Theory

Mastery Requirement

Each competency listed above is satisfied by the student's ability to routinely perform the associated action correctly and appropriately. Progress is tracked through a portfolio of work, including evidence-based laboratory reports, computational problem sets, and comprehensive examinations.

Anchor Texts or Major Curriculum:

All content will be accessed and delivered in the Google Classroom course utilizing the following: OER Textbook: [CK12 Flexbook Interactive Physics](#).

Routine access to Google Classroom

Course Outline (major units of study):

Unit Title	Essential Question or Overarching Understanding
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COURSE SYLLABUS

Intro to Physics	How do we use the language of mathematics and measurement to describe the physical laws of the universe?
1D Motion	How can we predict where an object will be in the future based on its current motion in a straight line?
2D Motion	How does the independence of horizontal and vertical components allow us to model complex paths, like projectiles?
Forces and Newton's Laws	Why do objects move the way they do, and what causes a change in that motion?
Work and Energy	How is energy "the currency of the universe," and why is it never truly lost, only spent or stored?
Momentum and Collisions	How do the interactions between objects dictate the outcome of an impact, and why is "follow-through" so important?
Circular Motion and Gravitation	What invisible "tethers" keep the planets in orbit and passengers in their seats on a roller coaster?
Fluid Mechanics	How do pressure and buoyancy allow massive ships to float and hydraulic systems to multiply human strength?
Heat and Thermodynamics	How does the microscopic "jiggling" of atoms manifest as the macroscopic experience of temperature and phase changes?
Waves and Vibrations	How does energy travel through a medium without the permanent transfer of matter?
Light and Reflection	Is light a particle, a wave, or something else entirely—and how does it reveal the world to our eyes?
Electric Forces and Fields	How do invisible charges exert influence over a distance, and what dictates the strength of that "push"?
Circuits	How do we manipulate the flow of electrons to do useful work and power our modern

	world?
Magnetism	How are moving charges and magnetic fields fundamentally linked to create motors, generators, and the Earth's shield?
Atomic Physics	How does the behavior of electrons in discrete energy levels define the identity and light signature of every element?
Subatomic Physics	What are the fundamental "building blocks" of reality, and what forces hold the nucleus together against all odds?
Spacetime Relativity	How do gravity, speed, and time intertwine to prove that our "common sense" observations are often illusions?

Portrait of a Learner

Independent Learner

I make thoughtful plans and do my best to reach personal goals using feedback to work through challenges.

Responsible Collaborator

I work with others to achieve shared goals by listening actively, contributing ideas, and managing conflict.

Critical Thinker

I analyze information, ask thoughtful questions, and apply reasoning skills to solve problems and make decisions.

Effective Communicator

I express ideas clearly, adapting strategies based on the audience, setting, and/or purpose.

Global Citizen

I show that I care and take responsibility by helping in my community and the world around me.

Additional Classroom Expectations:

Your success in this or any course begins with attending each class period and working hard outside of class to complete all assignments and reading associated with the course. You are expected to be present for each lecture and exam. You are expected to behave in a respectful manner and participate in class discussions or group work.

Attendance Policy: Attendance is recorded at the beginning of every class period. All students will follow the LW Handbook Policy. In the event of an absence, the student retains full responsibility for the acquisition of missed instructional materials.



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- Peer Collaboration: Students are expected to coordinate with classmates to obtain lecture notes, handouts, and primary information regarding missed classroom discourse.
- Instructional Continuity: Missing a session does not exempt a student from upcoming deadlines or the responsibility to remain current with the course progression.

Policy on Make-up and Late Work:

Adherence to the established course schedule is mandatory. Due to the accelerated pace of the curriculum, timely completion of all assignments is essential for maintaining academic standing and ensuring mastery of sequential concepts.

- Submission Deadlines: To be eligible for maximum point allocation, all assignments must be submitted by the specified date and time.
- Impact of Delays: Submissions received after the deadline may be subject to grade depreciation or may not be accepted, depending on the specific criteria outlined in the course grading rubric.

Academic Integrity, Cheating, and Plagiarism

Honesty is expected of all LW students. In academic matters, this includes the submission of work that clearly indicates its sources. Dishonest acts include cheating and plagiarism, as well as other forms of academic misconduct.

Cheating is defined as copying or otherwise using material from others or using sources not approved by the faculty.

Plagiarism is defined as using the work (ideas, words, artwork, etc.) of another person as one's own. The failure to cite sources or the extensive use of others' work in written material are the most common types of plagiarism.

Cheating, plagiarism, and other forms of academic misconduct are considered serious disciplinary matters and are subject to the same penalties and procedures as other LW disciplinary matters. Students should be aware that penalties levied in substantiated cases of cheating or plagiarism may include, but are not limited to, the issuance of a grade of F. *Refer to the Academic Honesty Policy in the Student Handbook.*

Electronics in the Classroom: New Hampshire state law (HB2/SB 206) mandates a "bell-to-bell" ban on the use of personal cell phones and electronic devices in all public and chartered schools.

Unsafe lab practices will cause your dismissal from that day's lab exercise, and you will not be allowed to make up the missed work.

Check your student email and Google Classroom frequently! Updates, schedule changes, and other important announcements will be posted on Google Classroom and sometimes emailed. It is your responsibility to stay current with any announcements or changes posted.

HELPFUL HINTS

- Don't Panic: Physics is a journey of problem-solving. Stay calm and take it one step at a time.
- Find Your Tribe: Join a study group immediately. They are your most valuable resource. If your current group isn't clicking or stays off-task, don't hesitate to find a new one that better supports your learning.
- The "Pre-Game" Strategy: Always pre-read the textbook and lab manual before you walk into class. Lectures are designed to reinforce and clarify what you've already encountered, not to introduce it for the very first time.
- Mindset Matters: Maintain a positive outlook. Physics can be challenging, but don't let negative self-talk stall your progress.
- Open Communication: If you're struggling or need a different explanation, tell me! I can only adapt to your learning style if I know what you need.
- Teach to Learn: The best way to master a concept is to explain it to someone else. Teach your classmates, or go home and explain a concept to your friends and family.
- Maximize Your Textbook: * Focus on the summaries at the beginning and end of chapters.
 - Analyze the diagrams and visuals—physics is a highly visual science!
 - Remember: Anything in the assigned reading is "fair game" for exams, even if we didn't cover it in detail during class.

I reserve the right to change these policies if necessary, given unexpected or unusual circumstances – please see Google Classroom for announcements of changes and posted revisions