Physics Course Overview

Content Area: **English**
Course(s):
Time Period:
Length:
Status: **Published**

School Mission Statement

The mission of Chartertech is to provide artists the opportunity to blend principles of artistic expression with cutting-edge technology, so artists will excel in academic, career, and civic pursuits and contribute to the harmony and productivity of the 21" century.

Artistic integration: Performing arts will be accessible to all artists as a skill and content area and will serve as a vehicle for imparting, enlivening, and motivating excellence in all academic topics, as well as providing a platform for learning multicultural appreciation and empathy, not just tolerance.

Technological integration: Technology will serve as the foundation for instructional delivery systems leading to knowledge acquisition, concept understanding, and skill mastery in all academic subjects. Technology will not be studied as a separate entity but infused into the very fabric of educational pursuits, exactly as it occurs in the business world. Artists will be prepared to compete in the modern workplace or post-secondary institution.

"Education has always been torn between vocational and utilitarian purposes on one hand and creative and holistic purposes on the other... We are rapidly entering a world that is hard to imagine. By developing the problem-solving skills, creativity, and discipline required in the arts, artists can prepare for life in the 21st century."

From Understanding How the Arts Contribute to Excellent Education

National Endowment for the Arts, 1991

School Goals

Goals for Arts Education:

Artists will learn the knowledge, skills, and abilities necessary to turn their passions and gifts in the arts into vocations or serious avocations.

Objective 1: Each year, each artist will take two semesters (10 credits) of career-oriented training (80 minutes per day) in their artistic major.
Objective 2: Each marking period, each artist will perform or produce frequently, in diverse settings and for diverse audiences.

Objective 3**:** Artistic instruction will be integrated into the study of all academic subjects.
Objective 4: Each year, each artist will complete at least twenty after-school "lab" hours in their artistic major. These will constitute career-oriented service to the school and/or community, and demonstrate accomplishment of the NJCCCS crosscutting workplace readiness standards.

Goal for Technology:
Chartertech will model the technology-intense workplace and artists will be able to compete successfully and perform well in a technology-intense workplace.

Objective 5: Each artist will routinely use technology in a workplace-like manner to acquire, analyze, communicate, and present information in every subject.
Objective 6: Each artist will have access to a computer every day, every class so that automated sources will be the main conduit for educational content.
Objective 7: All administrative and instructional functions of the school will be supported by the most modern technology available.

Goals for Academic Achievement:
Artists will apply themselves in the serious pursuit of knowledge and skills, especially skills in critical thinking, problem solving, decision making, and communication.

Objective 8: Each year, and to be promoted to the next grade each artist will pass five credits in English, Health, Social Studies, Science, Mathematics, and PE/Health. Between grades 9-12 artists will also complete 1year of Spanish.

Objective 9: In each academic subject, each year, each artist will complete a significant project that involves critical thinking, problem solving, decision making, and communication skills, and which demonstrates cross-content workplace readiness skills.

Objective 10: Each year artists will develop a artist resume to guide his/her academic and artistic studies and to document his/her academic and artistic accomplishments. This work will be done under the mentorship of the faculty in the artist's artistic major.

Objective 11: Academic instruction in all subjects will be highly cross-curricular, in accordance with curricula design and continuously improved by teachers, in compliance with the New Jersey Artist Learning Standards.

Course Description

Course Title:	Physics
Department:	Science
Prerequisite:	8th Grade Science.
Number of Credits:	5
Grade Level(s):	10

Standards:	NJSLA Science Standards
Description of Course	This course is comprised of Mechanics, and Electricity and Magnetism, which In Mechanics, students will take an Algebra-Based approach to solving problems in Kinematics, Dynamics, Universal Gravitation, Uniform Circular Motion, Work and Energy, and Momentum. In Electricity in Magnetism, students will take an algebra-based approach to solving problems in Electric Force and Field, Electric Current and Circuits, and Magnetic Induction. The order of the topics has been geared to use and reinforce the mathematics that the students are studying. For this reason, this full year course is geared towards reinforcing skills in algebra and requires no trigonometry. This is accomplished by restricting the first-year course to problems that can be simplified to one-dimensional form. Connections are also developed between the analysis of motion and graphical analysis, collision problems and the solving of systems of equations, etc. Throughout the year, students will be involved in problem-solving activities on an individual, small group and large group basis. Through this process, the ability to read and understand problems, break them down into their component parts and then create and present solutions will be developed.

Overview & Pacing

Unit #	Major Content	Expected Time
Unit 1: Motion	a. distance vs displacement b. speed vs velocity c. acceleration d. the kinematic equations	25 instructional days
Unit 2: Dynamics	a. Newton's 3 laws of motion Force Diagrams Net Force Normal Force Friction Force Tension Force b. Uniform Circular Motion Period Frequency centripetal acceleration centripetal net force c. Gravitational Acceleration and Force	25 instructional days
Unit 3: Momentum	a. Momentum formula b. Conservation of Momentum	25 instructional days
Unit 4: Energy	a. Conservation of Energy b. GPE	25 instructional days

	c. KE d. EPE	
Unit 5: Electrostatics	a. Review of the atomic structure and ions b. Statics c. Coulombs Law d. Electric Field Vs Electric Force e. Circuits Ohm's Law Parallel VS Series Circuits.	25 instructional days
Unit 6: Magnetism	a. Anatomy of a magnet b. The Right Hand Rule and Magnetism c. Magnetic Flux d. EMF and Induced Current	25 instructional days
Unit 7: Waves	a. Anatomy of a wave b. Period vs frequency c. Velocity of a wave d. Interference (constructive and destructive) e. Sound waves	25 instructional days