

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT



Physics in the Universe

Board Approval Date: June 15, 2023	Course Length: 2 Semesters
Grading: A-F	Credits: 5 Credits per Semester
Proposed Grade Level(s): 10, 11, 12	Subject Area: Physical Science Elective Area (if applicable):
Prerequisite(s): Completion of or Concurrent enrollment in Integrated Math 1	Corequisite(s):
CTE Sector/Pathway:	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (d) Laboratory Science	
Graduation Requirement: Yes	
Course Intent: District Course Program (if applicable):	
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COURSE DESCRIPTION:

Physics in the Universe is a course in the California Next Generation Science Standards (CA NGSS) Three Course Model and includes the Disciplinary Core Ideas related to Physical Science and integrates a selection of the Earth and Space Science concepts. This course also incorporates the eight Science and Engineering Practices and seven Crosscutting Concepts related to the NGSS. In this course students will explore the following core ideas: forces and motion, energy transfers and conservation, the properties of waves, and the electromagnetic spectrum, and use these ideas to understand the processes that shape earth and space systems. Engineering Core Ideas are used to explore applications of Physics concepts.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Forces /Momentum	How are displacement, velocity, and acceleration related to the movement of an object? How do objects interact with their surroundings? How do forces change the motion of objects?	*Exit Tickets *Mastery Checks *Digital and/or Hands-On *Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	*Test *Project *Lab or other means of assessment
2. Energy	What is energy? How is energy transformed from one type to another? How can the conservation of energy be used to model and predict processes?	*Exit Tickets *Mastery Checks *Digital and/or Hands-On *Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	*Test *Project *Lab or other means of assessment
3.Nuclear Processes	What are the energy differences between nuclear and chemical reactions? How do forces determine the stability of an atomic nucleus? How do nuclear reactions provide evidence for Earth’s history?	*Exit Tickets *Mastery Checks *Digital and/or Hands-On *Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	*Test *Project *Lab or other means of assessment
4. Electromagnetism	How do forces behave at a distance? How are electricity and	*Exit Tickets *Mastery Checks *Digital and/or Hands-On	*Test *Project *Lab or other means of

	magnetism related? How is electromagnetism used by society?	*Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	assessment
5. Waves	How are frequency, wavelength and wave speed related? How do seismic waves reveal the interior structure of the Earth?	*Exit Tickets *Mastery Checks *Digital and/or Hands-On *Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	*Test *Project *Lab or other means of assessment
6. Cosmology	How does light reveal the structure and composition of the universe? What is the Big Bang Theory? How do stars generate energy over their life cycle?	*Exit Tickets *Mastery Checks *Digital and/or Hands-On *Lab Activities *Practice Problems *Class Discussions, *Simulations or other means of assessment	*Test *Project *Lab or other means of assessment

ESSENTIAL STANDARDS:

HS PS2-1: Analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

HS PS2-2: Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

HS PS3-2: Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).

HS PS2-5: Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

HS PS4-1: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

HS PS1-8: Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.

HS PS2-4(a): Use mathematical representations of Newton’s Law of Gravitation to describe and predict the gravitational forces between objects.

HS ESS1-2: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):

Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.

<https://learning.ccss.org/common-core-state-standards-initiative>

Link to Framework (if applicable):

Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

<https://www.nextgenscience.org/overview-dci>

Link to Subject Area Content Standards (if applicable):

Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.

Link to Program Content Area Standards (if applicable):

Program Content Area Standards apply to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

TEXTBOOKS AND RESOURCE MATERIALS:

Textbooks

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
Yes		<i>Physics in the Universe</i>	Michael A. DiSpezio	HMH Science Dimensions		1/1/2020

Other Resource Materials

PhET, Ted-Ed, Khan Academy, The Physics Classroom, Desmos

Supplemental Materials

Board approved supplemental materials (Including but not limited to: Film Clips, Digital Resources, Supplemental texts, DVDs, Programs (Pebble Creek, DBQ, etc.):
Gizmos