FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

Physics of the Universe

Board Approval Date: 6/20/24	**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): **IM3 concurrent or completed** **Highly Recommended: Chemistry or Honors Chemistry**	**Corequisite(s):**
CTE Sector/Pathway:	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (d) Laboratory Science	
Graduation Requirement: No	
Course Intent: Site Specific **Program (if applicable):**	

The Folsom Cordova Unified School District prohibits discrimination, intimidation, harassment (including sexual harassment) or bullying based on a person's actual or perceived ancestry, color, disability, race or ethnicity, religion, gender, gender identity or gender expression, immigration status, national origin, sex, sexual orientation, or association with a person or group with one or more of these actual or perceived characteristics. For concerns/questions or complaints, contact the Title IX Coordinator(s), Equity Compliance Officer(s) and Section 504 Coordinator(s) :

Donald Ogden, Associate Superintendent – Human Resources, Title IX Coordinator (Employees) & Equity Compliance Officer
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COURSE DESCRIPTION (Online Course at Innovations Academy):

This course provides a comprehensive survey of all key areas of physics in the universe: matter and energy, astronomy, earth processes, use of resources, forces, gravitation, momentum, energy, thermodynamics, waves, electricity, and magnetism, and it introduces students to modern physics topics such as quantum theory and the atomic nucleus. The course gives students a solid basis to move on to more advanced courses later in their academic careers. The program consists of online instruction, virtual laboratories, related assessments, reference guides, and an associated problem-solving book.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Matter and Energy	What is energy? What are the types of energy? How is energy transformed from one type to another? What is the relationship between matter & energy? How can the conservation of energy be used to model and predict processes?	*Online or paper-based worksheets and practice sets *Quizzes *Threaded discussions *Labs and lab reports *Simulations *Exit tickets	*Unit Test *Essays, research papers, and other writing assignments *Presentations *Project
2. Forces and 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?	*Online or paper-based worksheets and practice sets *Quizzes *Threaded discussions *Labs and lab reports *Simulations *Exit tickets	*Unit Test *Essays, research papers, and other writing assignments *Presentations *Project
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? What is fusion, fission, and radioactive decay of unstable nuclei?	*Online or paper-based worksheets and practice sets *Quizzes *Threaded discussions *Labs and lab reports *Simulations *Exit tickets	*Unit Test *Essays, research papers, and other writing assignments *Presentations *Project
4. Waves	How are frequency, wavelength and wave speed related? How do seismic	*Online or paper-based worksheets and practice sets *Quizzes	*Unit Test *Essays, research papers, and other writing

	waves reveal the interior structure of the Earth? What are the different types of waves? How do the different types of ways differ? How are they similar?	*Threaded discussions *Labs and lab reports *Simulations *Exit tickets	assignments *Presentations *Project
5. Electromagnetism	How do forces behave at a distance? How are electricity and magnetism related? How is electromagnetism used by society?	*Online or paper-based worksheets and practice sets *Quizzes *Threaded discussions *Labs and lab reports *Simulations *Exit tickets	*Unit Test *Essays, research papers, and other writing assignments *Presentations *Project
6. Astronomy and 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? What does a star life cycle look like?	*Online or paper-based worksheets and practice sets *Quizzes *Threaded discussions *Labs and lab reports *Simulations *Exit tickets	*Unit Test *Essays, research papers, and other writing assignments *Presentations *Project

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://www.cde.ca.gov/be/st/ss/documents/sciencestnd.pdfs/wlstandards.pdftandards.pdf

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.cde.ca.gov/ci/sc/cf/cascienceframework2016.aspchapter18.pdf.pdfpter16.pdfdfework.pdf

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.
https://docs.google.com/spreadsheets/d/1u99HAzOWV4AYWHeq15tt_jiaAS9XMv69/edit?usp=sharing&ouid=104956413096596664509&rtpof=true&sd=true

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		*Online Curriculum*	K12 Stride	K12 Stride		*1/1/2009*
Yes		*Physics: Problems and Solutions*	K12 Stride	K12 Stride		*1/1/2009*