

AP Physics 2 - Coconino High School

Weekly Learning Guide

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April 13-17: Types of Radioactivity

Review for AP Physics Exam

Course	AP Physics 2	Week Assigned	May 4-8
Lesson Title	Photoelectric Effect & Wave-Particle Duality		
Teacher(s), Email, & Other Contact Information	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	1.A.4.1: Construct representations of the energy-level structure of an electron in an atom, and relate this to the properties and scales of the systems being investigated.		
Learning Goal	Describe how light can behave as both a particle and wave. Perform simple calculations for light absorbed or emitted allowing electrons to go up or down in energy.		
Essential Questions	What is light...a particle, or a wave? How can the wavelength of light emitted or absorbed by an atom change an electron's energy level?		
Learning Activity	Wave Particle Duality reading Khan Academy Photoelectric Effect PhET Problem solving examples Quantum Problems		
Resources	Photoelectric Effect Reading PhET simulations: Photoelectric Effect Physics Text (Chapter 27& 28); Khan Academy - Photons, Atoms & Electrons, Quantum Numbers and Orbitals		
Extension & Enrichment	In honor of Star Wars Day - "May the 4th be with You!" Georgia Tech - The Science of Star Wars National Geographic - Real Science Inspired by Star Wars Science Friday - Create your own Tractor Beam Science Friday - How to make your own Lightsaber Science News - Like Tatooine, this planet has two suns Science News - Star Wars' cutest droids would get stuck on the beach		
Printable Materials	Wave-Particle Duality Reading Photoelectric PhET Quantum Problems		

Course	AP Physics 2	Week Assigned	April 27-May 1
Lesson Title	Atomic Models and Spectra		
Teacher(s), Email, & Other Contact Information	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	1.A.4.1: Construct representations of the energy-level structure of an electron in an atom, and relate this to the properties and scales of the systems being investigated.		
Learning Goal	1. Visualize different models of the hydrogen atom. 2. Explain the similarities for each model. 3. Explain what experimental predictions each model makes. 4. Explain why people believed in each model and why each historical model was inadequate. 5. Explain the difference between the physical picture of the orbits and the energy level diagram of an electron. 6. Gain a sense for how scientists build models & engage in model building. 7. Examine the relationship between atomic energy levels and the light emitted by the atom 8. Describe how scientists can determine what distant stars are made of.		
Essential Questions	How do different laboratory observations inform our knowledge of atomic structure? How do astronomers use atomic spectra to determine the composition of a distant star?		
Learning Activity	Introduction to Quantum Mechanics: Atomic Structure and Spectra		
Resources	PhET simulations: Models of the Hydrogen Atom ; Rutherford Scattering Neon Lights & Other Discharge Lamps Physics Text (Chapter 27); Khan Academy - The History of Atomic Chemistry Atomic Spectra Simulator		
Extension & Enrichment	The Gesture That Changed Human History ; Dance and Physics Collide in "Quantum" Seeing the Light ; Astronomical Pioneer ; Physics Gets Philosophical		
Printable Materials	Introduction to Quantum Mechanics		

Course	AP Physics 2	Week Assigned	April 20-24
Lesson Title	Nuclear Applications		
Teacher(s), Email, & Other Contact Information	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	5.C.1.1: Analyze electric charge conservation for nuclear and elementary particle reactions and make predictions related to such reactions based on		

	conservation of charge.
Learning Goal	Research and debate the pros and cons of nuclear physics.
Essential Questions	• What is the difference between nuclear fission and fusion? • What are some practical applications of nuclear physics? • What are the risks of nuclear radiation?
Learning Activity	• Fission & Fusion presentation • Nuclear Applications PhET • Nuclear Issues Research & Writing
Resources	Fission & Fusion Presentation (includes narration from Ms. Sapio) PhET simulations Physics Text (Chapter 30) Radiation Dose Calculator
Extension & Enrichment	Astronomers finally find the cosmic source of gold and silver Quake leaves destruction, fear 'Greener' energy needed now, group warns The Dogs Sniffing Hidden Cancer
Links to Printable Materials	Nuclear Applications PhET Nuclear Issues Writing Assignment

Course	AP Physics 2	Week Assigned	April 13-17
Lesson Title	Types of Radioactivity		
Teacher(s), Email, & Other Contact Information	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	5.C.1.1: Analyze electric charge conservation for nuclear and elementary particle reactions and make predictions related to such reactions based on conservation of charge.		

Learning Goal	Describe what happens to atomic nuclei during alpha, beta, and gamma decay.
Essential Questions	What does the atomic number and atomic mass number of an atom represent? What are the three major types of radioactivity, and how can they be modeled with an equation? How does half-life describe the rate of decay, and how is it modeled graphically?
Learning Activity	Radioactivity Overview Presentation Alpha and Beta Simulations
Resources	Radioactivity Presentation (includes narration from Ms. Sapio) PhET simulations Physics Text (Chapter 30) Khan Academy
Extension & Enrichment	AP Radioactivity Problems AP Classroom - Nuclear Questions
Links to Printable Materials	Radioactivity Presentation Reference Sheet for Nuclear Physics AP Radioactivity Problems

Course	AP Physics 2	Week Assigned	April 6-10
Lesson Title	Half-Life		
Teacher(s), Email, & Other Contact Information	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	5.G.1.1: Make predictions about nuclear reactions and decays		
Learning Goal	Mathematically model atoms undergoing radioactive decay		

Essential Questions	What percentage of a sample remains after one half-life? What does the mathematical model for half-life look like? What are some applications of radioactive decay?
Learning Activity	Half-Life @ Home Lab
Resources	Khan Academy Physics Text
Extension & Enrichment	Science News for Students
Links to Printable Materials	Half-Life Lab

Course	AP Physics 2	Week Assigned	March 30-May 13
Lesson Title	Review for AP Physics Exam		
Teacher(s), Email, & Other Contact Info	Christine Sapio (csapio@fUSD1.org) Savannah Perez (student teacher) AP Physics 2 Google Classroom (access code he4425h)		
Target Standards	Units 1-5: 1. Fluids - hydrostatics forces, hydrodynamics, energy 2. Thermodynamics - heat transfer, gas laws, thermodynamic processes, Work, Internal		

	Energy, Heat 3. Electrostatics - electric forces, fields, potential, energy 4. Circuits - series & parallel, Kirchoff's Laws, circuits with resistors & capacitors 5. Magnetism - magnetic fields, forces on particles and wires, electromagnetic flux
Learning Goal	Practice problem-solving skills & review content to prepare for the May 13 AP Exam
Essential Information	• AP Physics 2 Exam is May 13 at 9:00 AM AZ Time ◦ Alternate Test Day is June 2 at 1 PM AZ Time ◦ <i>It's recommended that students take the exam in May and use the make up day for a fallback in case any technical issues occur during the exam.</i> • Exam is given online. Students can type responses or hand-write them and upload a picture (students must choose one format). • Students will be emailed information from the College Board - please check your email that you use for AP Classroom • Exam is 2 Free Response Questions ◦ Question 1: Qualitative/Quantitative (25 min + 5 min upload) ◦ Question 2: Short Paragraph (15 min + 5 min upload) • Students need to have an AP Physics 2 equation sheet available (laminated yellow sheets given to each student at the beginning of the year.) Other notes or resources, including a calculator are allowed. • Academic dishonesty and cheating will be dealt with harshly. Please read the information provided by the College Board.
Learning Activity	Progress Checks - AP Classroom Past AP Exam Problems - Google Classroom Help Sessions via Google - see Google Classroom for schedule
Resources	Review materials provided on Google Classroom AP Classroom & College Board Resources & Information about 2020 Exams Physics Text: 1. Fluids: Chapter 10 2. Thermodynamics: Chapter 13, 14, 15 3. Electrostatics: Chapter 16, 17 4. Circuits: Chapter 18, 19 5. Magnetism: Chapter 20, 21
Links to Printable Materials	Electricity & Magnetism Summary; Energy Summary; Forces Summary; Free Response Tips Kinematics in 1 dimension; Physics on One Page; Thermal Physics Summary