

**AP Physics 1, AP Physics 2, Physics, Intro to Physics  
Curriculum Map**

Revised  
June 2016

PA Anchor	Skill Number	Skill	AP Physics 1	AP Physics 2	Physics	Intro to Physics
<b>Concept 1: Scientific Inquiry</b>						
S11.C.3	1.01	Describe ways in which science distinguishes itself from other ways of knowing	X	X	X	X
S11.C.3	1.02	Explain that physical laws can be used to evaluate the validity of experimental data	X	X	X	X
S11.C.3	1.03	Explain how technology has improved the accuracy and efficiency of data gathering, analysis and	X	X	X	X
S11.C.3	1.04	Explain that from time to time, major shifts occur in the scientific view of how the world works	X	X	X	X
S11.C.3	1.05	Explain that scientists conduct investigations for a variety of reasons	X	X	X	X
<b>Concept 2: Science/Technology Processes</b>						
S11.C.3	2.01	Use graphing calculators to gather and manipulate data from experiments	X	X	X	
S11.C.3	2.02	Compare the accuracy and efficiency of data gathering and analysis with and without computer	X	X		
S11.C.3	2.03	Use data to discover mathematical relationships between any two quantities	X	X	X	X
S11.C.3	2.04	Use technology to understand and confirm the value of the accepted scientific constants	X	X	X	X
S11.C.3	2.05	Develop and test a new hypothesis based on results from a previous experiment	X	X	X	X
S11.C.3	2.06	Communicate results from a scientific experiment in a formal, written lab report	X	X		
<b>Concept 3: Scientific Notation</b>						
S11.C.3	3.01	Convert within the metric system using all prefixes	X	X		
S11.C.3	3.02	Represent large numbers in scientific notation	X	X		
<b>Concept 4: Kinematics</b>						
S11.C.3	4.01	State the definition of distance and the proper units in the metric system	X		X	X
S11.C.3	4.02	State the mathematical definition of velocity and the appropriate units in the metric system	X		X	X
S11.C.3	4.03	State the mathematical definition of acceleration and the appropriate units in the metric system	X		X	X
S11.C.3	4.04	Recognize the acceleration due to gravity is constant	X		X	X
S11.C.3	4.05	Recognize the formula for the distance traveled for an object moving at a constant velocity	X		X	X
S11.C.3	4.06	Recognize the formula for the distance traveled by an object moving at a constant acceleration	X		X	X
S11.C.3	4.07	State the definition of a projectile and recognize trajectory as the path of a projectile	X		X	X

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Concept 5: Dynamics						
S11.C.3	5.01	Describe and apply Newton's 1st law of motion	X		X	X
S11.C.3	5.02	Recognize that an object at rest or in constant velocity is obeying the 1st law of motion	X		X	X
S11.C.3	5.03	Describe and apply Newton's 2nd law of motion	X		X	X
S11.C.3	5.04	Explain the meaning of net force	X		X	X
S11.C.3	5.05	Calculate the resultant force when multiple forces act along a straight line	X		X	X
S11.C.3	5.06	Describe and apply Newton's 3rd law of motion	X		X	X
S11.C.3	5.07	Explain that mass is a measure of an object's inertia	X		X	X
S11.C.3	5.08	Explain that all non-zero forces produce an acceleration	X		X	X
S11.C.3	5.09	Recognize that an object either speeding up or slowing down has a net force acting on it	X		X	X
S11.C.3	5.10	Calculate the acceleration, net force or mass knowing any combination of variables	X		X	X
S11.C.3	5.11	Recognize that weight is a force	X		X	X
S11.C.3	5.12	Calculate weight using the correct units	X		X	
S11.C.3	5.13	Explain that all forces act in pairs and identify each force	X		X	X
S11.C.3	5.14	Define normal force	X		X	X
S11.C.3	5.15	Recognize that normal force affects the frictional force	X		X	X
S11.C.3	5.16	Explain the relationship between the coefficient of friction and the motion of an object	X		X	
S11.C.3	5.17	Explain that frictional forces always oppose motion	X		X	X
S11.C.3	5.18	Explain that force is dependent on mass and acceleration	X		X	X
Concept 6: Gravity						
S11.C.3	6.01	Apply Newton's universal law of gravitation	X			
S11.C.3	6.02	Calculate the gravitational force between two objects or a planet and the sun	X			
Concept 7: Circular Motion						
S11.C.3	7.01	Explain that an object in uniform circular motion completes each circle in the same amount of time	X		X	X
S11.C.3	7.02	Explain that the acceleration associated with uniform circular motion is always toward the center	X		X	X
S11.C.3	7.03	Calculate centripetal force	X		X	
S11.C.3	7.04	Use the centripetal acceleration equation to solve for a, v and r	X		X	

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Concept 8: Work and Momentum						
S11.C.3	8.01	Identify the conditions under which work occurs	X		X	X
S11.C.3	8.02	Calculate work using the correct units	X		X	X
S11.C.3	8.03	Explain work due to friction and describe how it is usually dissipated	X		X	
S11.C.3	8.04	Calculate work due to friction	X			
S11.C.3	8.05	Define work, energy, momentum, and impulse	X		X	
S11.C.3	8.06	Apply the work-energy and impulse-momentum theorems to practical situations	X		X	
S11.C.3	8.07	Define power	X		X	X
S11.C.3	8.08	Calculate average power using correct units.	X		X	
Concept 9: Energy						
S11.C.3	9.01	Define energy	X		X	X
S11.C.3	9.02	Describe the two types of mechanical energy	X		X	X
S11.C.3	9.03	Explain potential energy	X		X	X
S11.C.3	9.04	Explain kinetic energy	X		X	X
S11.C.3	9.05	State the formulas for potential and kinetic energy	X		X	X
S11.C.3	9.06	Calculate potential and kinetic energy using the correct units	X		X	X
S11.C.3	9.07	Explain the relationship between work and energy	X		X	X
S11.C.3	9.08	Define a conservative system	X		X	
S11.C.3	9.09	Explain the transfer from potential to kinetic energy and back again in a conservative system	X		X	
S11.C.3	9.10	Calculate the energy in a conservative system	X		X	
S11.C.3	9.11	Define a non-conservative system	X		X	
S11.C.3	9.12	Explain the ways that energy is lost to a system	X		X	
Concept 10: Waves						
S11.C.3	10.01	Recognize waves as a method to transfer energy	X			X
S11.C.3	10.02	Describe the 2 types of waves	X			X
S11.C.3	10.03	Explain how energy in each type of wave is determined	X			X
S11.C.3	10.04	Describe the 2 types of mechanical waves	X			X
S11.C.3	10.05	Identify the parts of the wave	X			X
S11.C.3	10.06	Define frequency and period and state the relationship between the two	X			
S11.C.3	10.07	Recognize that the speed of a mechanical wave is determined by the material	X			
S11.C.3	10.08	Recognize the speed of electromagnetic waves in a vacuum to be "c"	X	X		X
S11.C.3	10.09	Use the correct units and symbols for frequency, period, wavelength and velocity of a wave	X			X
S11.C.3	10.10	Explain constructive and destructive interference	X			
S11.C.3	10.11	Describe reflection, refraction and diffraction	X			X

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Concept 11: Light						
S11.C.3	11.01	Describe the regions of the electromagnetic spectrum		X		X
S11.C.3	11.02	Describe colors in terms of wavelengths of light		X		
S11.C.3	11.03	Explain that the energy in electromagnetic waves is carried in packets called photons		X		
S11.C.3	11.04	State the primary colors of light		X		
S11.C.3	11.05	Describe how a prism or water vapor produces a rainbow		X		
Concept 12: Mirrors and Lenses						
S11.C.3	12.01	Describe the image of a flat mirror		X		X
S11.C.3	12.02	Sketch a concave and convex mirror		X		X
S11.C.3	12.03	Define radius of curvature and focal point		X		X
S11.C.3	12.04	Describe the difference between real and virtual image		X		X
S11.C.3	12.05	Draw a ray diagram for a concave mirror for an object beyond the focal point		X		X
S11.C.3	12.06	Draw a ray diagram for a concave mirror for an object between the focal point and mirror		X		X
S11.C.3	12.07	Draw a ray diagram for a convex mirror		X		X
S11.C.3	12.08	Draw a ray diagram for a convex lens with an object beyond the focal point		X		X
S11.C.3	12.09	Draw a ray diagram for a convex lens with an object between the focal point and the lens		X		X
S11.C.3	12.10	Draw a ray diagram for a concave lens		X		X
S11.C.3	12.11	Calculate height of image if the height of the object and the distance for each		X		
S11.C.3	12.12	Explain how a telescope and microscopes work		X		

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Concept 13: Electricity						
S11.C.3	13.01	Explain the fundamental makeup of the atom and why most objects are electrically neutral	X	X		X
S11.C.3	13.02	Recognize charge as a fundamental force and use the correct units for charge	X	X		X
S11.C.3	13.03	State Coulomb's law and recognize it as an inverse square law		X		
S11.C.3	13.04	Explain the difference between static and current electricity	X	X		X
S11.C.3	13.05	Explain conductors, insulators, and semi-conductors	X	X		X
S11.C.3	13.06	Describe current and use the appropriate units and describe the conditions for a circuit	X	X		X
S11.C.3	13.07	Explain voltage and use the appropriate units	X	X		X
S11.C.3	13.08	Describe resistance and use the appropriate units	X	X		X
S11.C.3	13.09	Diagram resistors in series and parallel	X	X		X
S11.C.3	13.10	State Ohm's law	X	X		X
S11.C.3	13.11	Calculate current, resistance or voltage using any combination of variables	X	X		X
S11.C.3	13.12	Describe capacitance and use the correct units		X		
S11.C.3	13.13	Calculate capacitance and recognize its effect in circuits		X		
S11.C.3	13.14	Explain RC circuits and evaluate circuit diagrams		X		
Concept 14: Magnetism						
S11.C.3	14.01	Explain that moving electrical charges produce a magnetic field		X		
S11.C.3	14.02	Recognize that there are 2 magnetic poles and that like poles repel and unlike poles attract		X		X
S11.C.3	14.03	Diagram the magnetic field of a single bar magnet		X		
S11.C.3	14.04	Diagram the magnetic field of 2 bar magnets with the north and south poles facing each other		X		
S11.C.3	14.05	Apply Faraday's Law to electromagnetism		X		
S11.C.3	14.06	Recognize the earth as a large magnet producing its own magnet field		X		X

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Concept 15: Fluids						
S11.C.3	15.01	Define density		X		X
S11.C.3	15.02	Calculate density using the correct units		X		
S11.C.3	15.03	Recognize that pressure is the ratio of force and area		X		X
S11.C.3	15.04	Calculate pressure using the relationship $P=F/A$ and use the units of $N/m^2$		X		
S11.C.3	15.05	Explain that pressure in a fluid is dependent on the depth		X		
S11.C.3	15.06	Calculate the pressure for water at any depth		X		
S11.C.3	15.07	Explain that the pressure at any depth is the same in all directions		X		
S11.C.3	15.08	Apply Pascal's principle		X		X
S11.C.3	15.09	Calculate forces or areas necessary for equilibrium using Pascal's principle		X		
S11.C.3	15.10	State Archimede's principle		X		X
S11.C.3	15.11	Explain buoyant force		X		
S11.C.3	15.12	Calculate buoyant force		X		
S11.C.3	15.13	Determine the behavior of substances in liquid based on their fluid properties		X		
S11.C.3	15.14	State Bernoulli's principle		X		X
S11.C.3	15.15	Describe how the design of an air foil affects the pressure on it as it moves through a fluid		X		
Concept 16: Thermodynamics						
S11.C.3	16.01	Define temperature, heat, and thermal energy		X		X
S11.C.3	16.02	Describe linear thermal expansion		X		X
S11.C.3	16.03	Perform calorimetry calculations using specific heat		X		
S11.C.3	16.04	Define and perform calculations using the ideal gas law		X		
S11.C.3	16.05	Describe the Laws of Thermodynamics		X		
S11.C.3	16.06	Using the Thermodynamic Processes, identify the behavior of gases		X		
Concept 17: Modern Physics						
S11.C.3	17.01	Describe the photoelectric effect		X		
S11.C.3	17.02	Analyze electron energy level diagrams		X		
S11.C.3	17.03	Apply Einstein's $E = mc^2$ equation		X		
S11.C.3	17.04	Differentiate between nuclear fusion and fission		X		X
S11.C.3	17.05	Differentiate between the various forms of radioactive decay		X		X
S11.C.3	17.06	Identify the form of radioactive decay using nuclear notation		X		

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