



Sample Content Evaluation Checklist AP Physics

Physics Goal 1				
Goal 1 Skills And Processes				
The student will demonstrate ways of thinking and acting inherent in the practice of science. The student will use the language and instruments of science to collect, organize, interpret, calculate, and communicate information.				
Expectation 1.1 The student will explain why curiosity, honesty, openness, and skepticism are highly regarded in science.				
Indicator	Does Not Meet	Partially Meets	Meets	Comments
Indicator 1.1.1 The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.				
Indicator 1.1.2 The student will modify or affirm scientific ideas according to accumulated evidence.				
Indicator 1.1.3 The student will critique arguments that are based on faulty, misleading data or on the incomplete use of numbers.				
Indicator 1.1.4 The student will recognize data that are biased.				
Indicator 1.1.5 The student will explain factors that produce biased data.				
Expectation 1.2 The student will pose scientific questions and suggest experimental approaches to provide answers to questions.				
Indicator 1.2.1 The student will identify meaningful, answerable scientific questions.				
Indicator 1.2.2 The student will pose meaningful, answerable scientific questions. (NT)				
Indicator 1.2.3 The student will formulate a working hypothesis.				
Indicator 1.2.4 The student will test a working hypothesis. (NT)				
Indicator 1.2.5 The student will select appropriate instruments and materials to conduct an investigation.				



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<p>Indicator 1.2.6 The student will identify appropriate methods for conducting an investigation and affirm the need for proper controls in an experiment.</p>				
<p>Indicator 1.2.7 The student will use relationships discovered in the lab to explain phenomena observed outside the laboratory.</p>				
<p>Indicator 1.2.8 The student will defend the need for verifiable data.</p>				
<p>Expectation 1.3 The student will carry out scientific investigations effectively and employ the instruments, systems of measurement, and materials of science appropriately.</p>				
<p>Indicator 1.3.1 The student will develop and demonstrate skills in using lab and field equipment to perform investigative techniques. (NT)</p>				
<p>Indicator 1.3.2 The student will recognize safe laboratory procedures.</p>				
<p>Indicator 1.3.3 The student will demonstrate safe handling of the chemicals and materials of science. (NT)</p>				
<p>Indicator 1.3.4 The student will learn the use of new instruments and equipment by following instructions in a manual or from oral direction. (NT)</p>				
<p>Expectation 1.4 The student will demonstrate that data analysis is a vital aspect of the process of scientific inquiry and communication.</p>				
<p>Indicator 1.4.1 The student will organize data appropriately using techniques such as tables, graphs, and webs (for graphs: axes labeled with appropriate quantities, appropriate units on axes, axes labeled with appropriate intervals, independent and dependent variables on correct axes, appropriate title).</p>				
<p>Indicator 1.4.2 The student will analyze data to make predictions, decisions, or draw conclusions.</p>				
<p>Indicator 1.4.3 The student will use experimental data from various investigators to validate results.</p>				

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Indicator 1.4.4 The student will determine the relationships between quantities and develop the mathematical model that describes these relationships.				
Indicator 1.4.5 The student will check graphs to determine that they do not misrepresent results.				
Indicator 1.4.6 The student will describe trends revealed by data.				
Indicator 1.4.7 The student will determine the sources of error that limits the accuracy or precision of experimental results.				
Indicator 1.4.8 The student will use models and computer simulations to extend his/her understanding of scientific concepts. (NT)				
Indicator 1.4.9 The student will use analyzed data to confirm, modify, or reject an hypothesis.				
Expectation 1.5 The student will use appropriate methods for communicating in writing and orally the processes and results of scientific investigation.				
Indicator 1.5.1 The student will demonstrate the ability to summarize data (measurements/observations).				
Indicator 1.5.2 The student will explain scientific concepts and processes through drawing, writing, and/or oral communication.				
Indicator 1.5.3 The student will use computers and/or graphing calculators to produce the visual materials (tables, graphs, and spreadsheets) that will be used for communicating results. (NT)				
Indicator 1.5.4 The student will create and/or interpret graphics (scale drawings, photographs, digital images, etc.).				
Indicator 1.5.5 The student will use computers and/or graphing calculators to produce tables, graphs, and spreadsheet calculations.				
Indicator 1.5.6 The student will read a technical selection and interpret it appropriately.				



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<p>Indicator 1.5.7 The student will use, explain, and/or construct various classification systems.</p>				
<p>Indicator 1.5.8 The student will describe similarities and differences when explaining concepts and/or principles.</p>				
<p>Indicator 1.5.9 The student will communicate conclusions derived through a synthesis of ideas.</p>				
<p>Expectation 1.6 The student will use mathematical processes.</p>				
<p>Indicator 1.6.1 The student will use ratio and proportion in appropriate situations to solve problems.</p>				
<p>Indicator 1.6.2 The student will use computers and/or graphing calculators to perform calculations for tables, graphs, or spreadsheets. (NT)</p>				
<p>Indicator 1.6.3 The student will express and/or compare small and large quantities using scientific notation and relative order of magnitude.</p>				
<p>Indicator 1.6.4 The student will manipulate quantities and/or numerical values in algebraic equations.(NT)</p>				
<p>Indicator 1.6.5 The student will judge the reasonableness of an answer.</p>				
<p>Expectation 1.7 The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.</p>				
<p>Indicator 1.7.1 The student will apply the skills, processes, and concepts of biology, chemistry, physics, and earth science to societal issues.</p>				
<p>Indicator 1.7.2 The student will identify and evaluate the impact of scientific ideas and/or advancements in technology on society.</p>				
<p>Indicator 1.7.3 The student will describe the role of science in the development of literature, art, and music. (NT)</p>				



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Indicator 1.7.4 The student will recognize mathematics as an integral part of the scientific process. (NT)				
Indicator 1.7.5 The student will investigate career possibilities in the various areas of science. (NT)				
Indicator 1.7.6 The student will explain how development of scientific knowledge leads to the creation of new technology and how technological advances allow for additional scientific accomplishments.				
OTHER				
The labs in the course adequately illustrate the key concepts of the course.				
The models and simulations in the course adequately illustrate the key concepts in the course.				

Physics Goal 5				
Goal 5 Concepts Of Physics				
The student will demonstrate the ability to use scientific skills and processes (Core Learning Goal 1) to explain and predict the outcome of certain interactions which occur between matter and energy.				
Expectation 5.1 The student will know and apply the laws of mechanics to explain the behavior of the physical world.				
Indicator	Does Not Meet	Partially Meets	Meets	Comments
Indicator 5.1.1 The student will use analytical techniques appropriate to the study of physics. EG: symbolically representing vector quantities, using signs to represent directions, selecting and using appropriate equipment for measuring and investigating, using appropriate units and applying dimensional analysis, manipulating equations.				
Indicator 5.1.2 The student will use algebraic and geometric concepts to describe an object's motion. EG: direction, position, distance/displacement, speed/velocity, motion with a constant acceleration, one and two dimensional motion, frames of reference.				

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<p>Indicator 5.1.3 The student will analyze and explain how changes in an object's motion are described by Newton's Laws. EG: balanced/unbalanced forces, inertia, acceleration, force, and mass, action/reaction</p>				
<p>Indicator 5.1.4 The student will analyze the behavior of forces. EG: recognize the four forces of nature, comparison of relative magnitude, inverse square, nature of gravitational and electromagnetic forces, nature of gravitational and electromagnetic forces, relation to work and energy.</p>				
<p>Indicator 5.1.5 The student will analyze systems with regard to the conservation laws. EG: conservation of momentum, conservation of energy</p>				
<p>Expectation 5.2 The student will know and apply the laws of electricity and magnetism and explain their significant role in nature and technology.</p>				
<p>Indicator 5.2.1 The student will describe the types of electric charges and the forces that exist between them. EG: magnitude, sign, Coulomb's Law.</p>				
<p>Indicator 5.2.2 The student will describe the sources and effects of electric and magnetic fields. EG: static charge, moving charges, simple circuits, permanent magnets.</p>				
<p>Indicator 5.2.3 The student will describe how different kinds of materials respond to electric and magnetic fields. EG: conductors, insulators, semiconductors, magnetic materials.</p>				
<p>Indicator 5.2.4 The student will explain the principle of electromagnetic induction and its applications. EG: motors, generators.</p>				
<p>Expectation 5.3 The student will recognize and relate the laws of thermodynamics to practical applications.</p>				

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<p>Indicator 5.3.1 The student will relate thermodynamics to the balance of energy in a system. EG: heat transfer, thermal equilibrium, entropy</p>				
<p>Expectation 5.4 The student will explain and demonstrate how vibrations and waves provide a model for our understanding of various physical phenomena.</p>				
<p>Indicator 5.4.1 The student will describe and demonstrate how waves can be used to transmit energy. EG: physical, electromagnetic</p>				
<p>Indicator 5.4.2 The student will compare the propagation of mechanical waves. EG: longitudinal, transverse.</p>				
<p>Indicator 5.4.3 The student will describe and mathematically calculate wave characteristics. EG: wavelength, frequency/period, velocity, amplitude.</p>				
<p>Indicator 5.4.4 The student will describe and demonstrate the general behavior of waves. EG: reflection, refraction, diffraction, superposition, interference, Doppler effect.</p>				
<p>Expectation 5.5 The student will relate the limitations of classical physics to the development of modern physics theories.</p>				
<p>Indicator 5.5.1 The student will cite evidence of the quantum nature of matter and its applications. EG: energy of light waves, photoelectric effect, wave/particle duality, applications (MRI, semiconductors, etc.).</p>				
<p>Indicator 5.5.2 The student will explain the processes associated with atomic energy and its applications. EG: atomic energy, radioactive decay, fission, fusion.</p>				
<p>Expectation 5.6 The student will investigate the impact of Physics on society.</p>				



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<p>Indicator 5.6.1 The student will investigate a social issue related to physics such as alternate energy sources, fiber optics in telecommunications, nuclear power, microwave technology, effect of power lines, etc.</p>				
<p>Indicator 5.6.2 The student will recognize data that are biased.</p>				
<p>Indicator 5.6.3 The student will recognize that real problems have more than one solution and decisions to accept one solution over another are made on the basis of many issues.</p>				
<p>Indicator 5.6.4 The student will use tables, graphs, and charts to display data in making arguments and claims in both written and oral communication.</p>				
<p>Expectation 5.7 The student will show that connections exist both within the various fields of science and among science and other disciplines including mathematics, social studies, language arts, fine arts, and technology.</p>				
<p>Indicator 5.7.1 The student will apply physics to the concepts of biology, chemistry, earth science, and environmental science.</p>				
<p>Indicator 5.7.2 The student will recognize the important role that mathematics serves when solving problems in physics.</p>				
<p>Indicator 5.7.3 The student will investigate the role of physics in all areas of human endeavor and achievement.</p>				