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|  AP Physics 2 | **Standards-Based EducationPriority Standards** |
| **12th Grade** |
| *Systems* |
| 1.A | The internal structure of a system determines many properties of the system. |
| 1.B | Electric charge is a property of an object or a system that affects its interactions with other objects or systems containing charge. |
| 1.C | Objects and systems have properties of inertial mass and gravitational mass that are experimentally verified to be the same and that satisfy conservation principles. |
| 1.D | Classical mechanics cannot describe all properties of objects. |
| 1.E | Materials have many macroscopic properties that result from the arrangement and interactions of the atoms and molecules that make up the material. |
| *Fields and Force Interactions* |
| 2.A | A field associates a value of some physical quantity with every point in space. Field models are useful for describing interactions that occur at a distance (long-range forces), as well as a variety of other physical phenomena. |
| 2.C | An electric field is caused by an object with electric charge |
| 2.D | A magnetic field is caused by a magnet or moving electrically charged object. Magnetic fields observed in nature always seem to be produced either by moving charged objects or by magnetic dipoles or combinations of dipoles and never by single poles. |
| 2.E | Physicists often construct a map of isolines connecting points of equal value for some quantity related to a field and use these maps to help visualize the field. |
| 3.A | All forces share certain common characteristics when considered by observers in inertial reference frames. |
| 3.B | Classically, the acceleration of an object interacting with other objects can be predicted by using a = net force / mass. |
| 3.C | At the macroscopic level, forces can be categorized as either long-range (action-at-a-distance) forces or contact forces. |
| 3.G | Certain types of forces are considered fundamental. |
| *Changes and Probability* |
| 4.C | Interactions with other objects or systems can change the total energy of a system. |
| 4.E | The electric and magnetic properties of a system can change in response to the presence of, or changes in, other objects or systems. |
| 7.A | The properties of an ideal gas can be explained in terms of a small number of macroscopic variables, including temperature and pressure. |
| 7.B | The tendency of isolated systems to move toward states with higher disorder is described by probability. |
| 7.C | At the quantum scale, matter is described by a wave function, which leads to a probabilistic description of the microscopic world. |
| *Conservation* |
| 5.B | The energy of a system is conserved. |
| 5.C | The electric charge of a system is conserved. |
| 5.D | The linear momentum of a system is conserved. |
| 5.F | Classically, the mass of a system is conserved. |
| 5.G | Nucleon number is conserved. |
| *Waves* |
| 6.A | A wave is a traveling disturbance that transfers energy and momentum. |
| 6.B | A periodic wave is one that repeats as a function of both time and position and can be described by its amplitude, frequency, wavelength, speed, and energy. |
| 6.C | Only waves exhibit interference and diffraction. |
| 6.E | The direction of propagation of a wave such as light may be changed when the wave encounters an interface between two media. |
| 6.F | Electromagnetic radiation can be modeled as waves or as fundamental particles. |
| 6.G | All matter can be modeled as waves or particles. |
| *Science Practices and Literacy* |
| Practice 1 | Modeling: The student can use representations and models to communicate scientific phenomena and solve scientific problems. |
| Practice 2 | Mathematical Routines: The student can use mathematics appropriately. |
| Practice 4 | Experimental Methods: The student can plan and implement data-collection strategies in relation to a particular scientific question. |
| Practice 5 | Data Analysis: The student can perform data analysis and evaluation of evidence. |
| Practice 6 | Argumentation: The student can work with scientific explanations and theories. |
| Practice 7 | Making Connections: The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains. |
| 11-12 RST.3 | Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. |
| 11-12 WHST.1 | Write arguments focused on discipline-specific content. |