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| AP Physics 1 | | **Standards-Based Education Priority 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.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 Waves* | | |
| 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.B | A gravitational field is caused by an object with mass. | |
| 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.D | Interference and superposition lead to standing waves and beats. | |
| *Force Interactions* | | |
| 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.D | A force exerted on an object can change the momentum of the object. | |
| 3.E | A force exerted on an object can change the kinetic energy of the object. | |
| 3.F | A force exerted on an object can cause a torque on that object. | |
| 3.G | Certain types of forces are considered fundamental. | |
| *Change* | | |
| 4.A | The acceleration of the center of mass of a system is related to the net force exerted on the system, where a = net force / mass. | |
| 4.B | Interactions with other objects or systems can change the total linear momentum of a system. | |
| 4.C | Interactions with other objects or systems can change the total energy of a system. | |
| 4.D | A net torque exerted on a system by other objects or systems will change the angular momentum of the system. | |
| *Conservation* | | |
| 5.A | Certain quantities are conserved, in the sense that the changes of those quantities in a given system are always equal to the transfer of that quantity to or from the system by all possible interactions with other systems. | |
| 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.E | The angular momentum of a system is conserved. | |
| *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. | |