**USD 312 CURRICULAR STANDARDS FOR SCIENCE**

***CHECKLIST*:** ***High School Physical Science***

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| **Standard** | **Dates Taught** | **Notes** |
|  **Matter and its Interactions** |
| **HS-PS1-1:** Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. |  |  |  |  |  |
| **HS-PS1-2:** Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. |  |  |  |  |  |
| **HS-PS1-3:** Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. |  |  |  |  |  |
| **HS-PS1-4:** Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. |  |  |  |  |  |
| **HS-PS1-5:** Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. |  |  |  |  |  |
| **HS-PS1-6:** Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.\* |  |  |  |  |  |
| **HS-PS1-7:** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. |  |  |  |  |  |
| **HS-PS1-8:** Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. |  |  |  |  |  |

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| **Motion and Stability: Froces and Interactions** |
| **HS-PS2-1:** Analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. |  |  |  |  |  |
| **HS-PS2-2:** Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. |  |  |  |  |  |
| **HS-PS2-3:** Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.\* |  |  |  |  |  |
| **HS-PS2-4:** Use mathematical representations of Newton’s Law of Gravitation and Coulomb’s Law to describe and predict the gravitational and electrostatic forces between objects**.**  |  |  |  |  |  |
| **HS-PS2-5:** Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current**.**  |  |  |  |  |  |
| **HS-PS2-6:** Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.\* |  |  |  |  |  |

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| **Energy** |
| **HS-PS3-1**: Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other components and energy flows in and out of the system are known. |  |  |  |  |  |
| **HS-PS3-2:** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects). |  |  |  |  |  |
| **HS-PS3-3:** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. |  |  |  |  |  |
| **HS-PS3-4:** Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). |  |  |  |  |  |
| **HS-PS3-5:** Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. |  |  |  |  |  |

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| **Waves and Their Applications in Technologies for Information Transfer** |
| **HS-PS4-1**: Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. |  |  |  |  |  |
| **HS-PS4-2:** Evaluate questions about the advantages of using a digital transmission and storage of information. |  |  |  |  |  |
| **HS-PS4-3:** Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. |  |  |  |  |  |
| **HS-PS4-4:** Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. |  |  |  |  |  |
| **HS-PS4-5:** Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.\* |  |  |  |  |  |