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| **Science – Grade 11 Physical Science** |
| **SC.HS.1 Forces and Interactions** | **Access Points** |
| **Standard / Indicator** | **Extension** |
| SC.HS.1.1 Gather, analyze, and communicate evidence of forces and interactions. |  | **A** | **B** | **C** |
| SC.HS.1.1.A **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. Assessment is limited to one dimensional motion and to macroscopic objects moving at non-relativistic speeds. | Use observations to identify the relationship of mass and speed to produce the force of an object. | Use observations to identify the relationship of mass and speed to produce the force of an object. | Identify that mass or force influence speed. | Recognize that an object with a large mass is more difficult to move than an object with a smaller mass. |
| SC.HS.1.1.B **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. Assessment is limited to systems of two macroscopic bodies moving in one dimension. | Use a model to determine the result of two objects colliding.  | Describe the result of two objects with the same mass or with the same speed colliding.  | Identify the result of two objects with the same mass but different speeds colliding.  | Recognize the result of two objects with the same speed but different masses colliding. |
| SC.HS.1.1.C **Apply science and engineering ideas to design, evaluate, and refine** a device that minimizes the force on a macroscopic objectduring a collision. Assessment is limited to qualitative evaluations and/or algebraicmanipulations. | Evaluate a design that minimizes a force of an object during a collision. | Use evidence to explain why a design minimizes the force of an object during a collision. | Identify the design that would minimize the force of an object during a collision. | Given the results, recognize the design that minimized the force of an object during a collision. |

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| **Science – Grade 11 Physical Science** |
| **SC.HS.3 Structure and Properties of Matter** | **Access Points** |
| **Standard / Indicator** | **Extension** |
| SC.HS.3.3 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter. |  | **A** | **B** | **C** |
| SC.HS.3.3.B **Plan and conduct an investigation** to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles. Assessment does not include Raoult’s law calculations of vapor pressure. | Use models to compare the spacing of particles in solids, liquids, and gases. | Use a model to determine whether the spacing of particles represents a solid, liquid, or gas. | Identify the relationship between the spacing of particles in a solid or liquid. | Recognize that objects are made of particles. |
| SC.HS.3.3.D **Communicate scientific and technical information** about why the molecular-level structure is important in the functioning of designed materials. Assessment is limited to provided molecular structures of specific designed materials. | Identify the differences between metals and nonmetals in allowing heat and energy to pass through. Ensure that SC.5.3.1.C is extended at grade level. | Identify the differences between metals and nonmetals (e.g., fabric, wood, plastic) in allowing heat and energy to pass through. | Recognize that metals allow heat or electricity to pass through. | Recognize a metal from a nonmetal. |

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| **Science – Grade 11 Physical Science** |
| **SC.HS.4 Energy** | **Access Points** |
| **Standard / Indicator** | **Extension** |
| SC.HS.4.4 Gather, analyze, and communicate evidence of the interactions of energy. |  | **A** | **B** | **C** |
| SC.HS.4.4.A **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 component(s) and energy flows in and out of the system are known. Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields. | Energy can be converted into heat, light, or sound.  | Predict whether electrical energy will be converted into heat, light, or sound energy. | Identify examples of electrical energy being converted into heat and/or light energy. | Recognize the evidence that electrical energy was transferred (e.g., light is coming from a bulb, a pan is warm). |
| SC.HS.4.4.E **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). Assessment is limited to investigations based on materials and tools provided to students. | Evaluate appropriate methods and/or tools to use in a thermal energy investigation. | Using evidence, explain which object (e.g., thermos, lunch box, paper bag) retains thermal energy for a fixed amount of time. | Identify the tool used to measure a change in thermal energy. | Recognize a tool used to measure thermal energy. |

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| **Science – Grade 11 Physical Science** |
| **SC.HS.5 Chemical Reactions** | **Access Points** |
| **Standard / Indicator** | **Extension** |
| SC.HS.5.5 Gather, analyze, and communicate evidence of chemical reactions. |  | **A** | **B** | **C** |
| SC.HS.5.5.C **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. Assessment is limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature. | Describe that a change in a reactant affects the rate at which the reaction occurs. | Identify that changing temperature affects the rate of a reaction. | Identify that an increase in temperature results in a faster reaction (e.g., soak one glow stick in warm water and one glow stick in cold water and then snap the glow sticks and observe the brightness). | Recognize a chemical reaction (e.g., fizzing antacid tablet in water). |
| SC.HS.5.5.D **Refine the design** of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. Assessment is limited to specifying the change in only one variable at a time. Assessment does not include calculating equilibrium constants and concentrations. | Evaluate how changes in the amount of reactants result in an increased amount of product. | Distinguish between multiple models and identify which model results in the greatest amount of product. | Identify that an increase in reactants results in an increase in product. | Recognize an increase in a product. |
| SC.HS.5.5.E **Design a solution** to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. | Evaluate an applicable life skill task that requires a solution. | Identify up to three steps, in the correct order, to solve a problem. | Identify one step to solve a problem. | Recognize that a problem exists. |
| SC.HS.5.5.F **Use mathematical representations** to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Assessment does not include complex chemical reactions. | Use models to determine that weight does not change during a chemical reaction. | Using numerical data in a graph, identify whether there was a change in weight during a chemical reaction. | Recognize that weight does not change in a chemical reaction. | Recognize that matter has weight. |