SCILLSS Classroom Science Assessment Workshop

# Grade 8 Completed Unpacking Tool – Activity Answer Key

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| **Grade:** | 8 |  |  | |
| **NGSS Performance Expectation****: MS-PS3-1.** Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. | | | | |
|  | **Science and Engineering Practices (SEP)** | **Disciplinary Core Ideas (DCI)** | **Crosscutting Concepts (CCC)** | |
| **SEP:** **Analyzing and Interpreting Data**  Construct and interpret graphical displays of data to identify linear and nonlinear relationships. | **DCI:** **PS3.A: Definitions of Energy**  Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. | **CCC:** **Scale, Proportion, and Quantity**  Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. | |
| **Key Aspects** | * Graphing, analyzing, and interpreting data. * Use graphical displays of data to identify linear relationships. * Use graphical displays of data to identify nonlinear relationships. * Use large data sets to identify linear relationships. * Use large data sets to identify nonlinear relationships. * Analyze and interpret data to make sense of phenomena, using logical   reasoning, mathematics, and/or computation.   * Analyze data to refine a problem statement or the design of a proposed object, tool, or process. | * The kinetic energy of an object is proportional to its mass. * When an object is in motion, the energy it contains is called kinetic energy. * The kinetic energy of an object increases if either the mass or the speed of the object increases or if both increase. * The relationship between kinetic energy and mass is a linear proportional relationship. * The relationship between kinetic energy and speed is a nonlinear (square) proportional relationship. * The kinetic energy of an object grows with the square of its speed. * Kinetic energy is associated with the speed and the mass of an object. * The potential energy objects have is dependent on their relative positions. * The proportional relationship between kinetic energy and the mass and speed of an object. | * Speed is the ratio of distance traveled to time taken. * Ratio and proportionality provide information about the magnitude of properties. * Ratio and proportionality provide information about the magnitude of processes. | |
| **Prior Knowledge** | * Create and read graphs. * Analyze and interpret data to provide   evidence for phenomena.   * Represent data in tables and/or various graphical displays (bar graphs, pictographs and/or pie   charts) to reveal patterns that indicate relationships.   * Compare and contrast data collected by different groups in order to discuss similarities and differences   in their findings. | * Objects have mass. * Objects in motion contain energy. * Motion is the change in an object’s location over time. * Unbalanced forces, like pushes and pulls, make objects move. * Objects can change motion, slow, stop, or change direction. * Force causes change in the motion or direction of an object. * Massive objects require more force to move than lighter objects. * Lighter objects require less energy to move than heavy objects. * The motion of an object is dependent on the force applied to it. * The motion energy (kinetic energy) of an object increases as it travels faster. | **Relationships to SEPs** | * Taking measurements of structures and phenomena are usually obtained, analyzed, and interpreted quantitatively. * Mathematics is essential in both science and engineering. |

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