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.
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| **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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