8th GRADE SCIENCE

Matter and Energy Interact in the Physical World

Priority Standards

- **Obtain information** about various properties of matter, **evaluate** how different materials' properties allow them to be used for particular functions in society, and **communicate** your findings.
- **Plan and conduct an investigation** and then **analyze and interpret** the **data** to identify patterns in changes in a substance's properties to determine whether a chemical reaction has occurred.
- **Obtain and evaluate information** to describe how synthetic materials come from natural resources, what their functions are, and how society uses these new materials.
- **Develop a model** that uses **computational thinking** to illustrate cause and effect relationships in particle motion, temperature, density, and state of a pure substance when heat energy is added or removed.
- **Design**, construct, and test a device that can affect the rate of a phase change. *Compare and identify the best characteristics of competing devices and modify them based on **data analysis** to improve the device to better meet the criteria for success.*

Supporting Standards

- **Develop a model** to describe the scale and proportion of atoms and molecules.
- **Develop a model** to describe how the total number of atoms does not change in a chemical reaction, indicating that matter is conserved.

Energy is Stored and Transferred in Physical Systems

Priority Standards

- **Use computational thinking to analyze data** about the relationship between the mass and speed of objects and the relative amount of kinetic energy of the objects.
- **Ask questions** about how the amount of potential energy varies as distance within the system changes. **Plan and conduct an investigation** to answer a question about potential energy.
- **Develop and use a model** to describe the structure of waves and how they are reflected, absorbed, or transmitted through various materials.
- **Obtain and evaluate information** to **communicate** the claim that the structure of digital signals are a more reliable way to store or transmit information than analog signals.

Supporting Standards

- **Engage in argument** to identify the strongest evidence that supports the claim that the kinetic energy of an object changes as energy is transferred to or from the object.
- **Use computational thinking** to describe a simple model for waves that shows the pattern of wave amplitude being related to wave energy.

Life Systems Store and Transfer Matter and Energy

Priority Standards

- **Plan and conduct an investigation** and use the evidence to **construct an explanation** of how photosynthetic organisms use energy to transform matter.
- **Develop a model** to describe how food is changed through chemical reactions to form new molecules that support growth and/or release energy as matter cycles through an organism.
- **Ask questions** to **obtain, evaluate, and communicate information** about how changes to an ecosystem affect the stability of cycling matter and the flow of energy among living and nonliving parts of an ecosystem.

Interactions with Natural Systems and Resources

Priority Standards

- **Engage in argument supported by evidence** about the effect of per-capita consumption of natural resources on Earth's systems.
- **Analyze and interpret data** on the factors that change global temperatures and their effects on regional climates.
- **Analyze and interpret** patterns of the occurrence of natural hazarads to forecast future catastrophic events, and investigate how data are used to develop technologies to mitigate their effects.

Supporting Standards

- **Construct a** scientific **explanation** based on evidence that shows that the uneven distribution of Earth's mineral, energy, and groundwater resources is caused by geological processes.
- **Design a solution** to monitor or mitigate the potential effects of the use of natural resources. **Evaluate** competing design solutions *using a systematic process to determine how well each solution meets the criteria and constraints of the problem.*