

Competencies and Performance Indicators: 8th Grade Science

Vision of a Graduate: The WLC Graduate will be an effective communicator, a strong collaborator, a creative problem solver, a self-directed learner, and a responsible citizen.

1. Competency: Apply recurring science concepts

- Matter and Energy
- Patterns
- Scale, proportion and quantity
- Cause and effect
- Structure and function
- Stability and change
- Systems and system models

2. Competency: Apply scientific inquiry to solve authentic problems and demonstrate science literacy

Performance Indicators:

- Develop a model to explain how a non-observable process occurs.
- Critique a model for strengths and weaknesses.
- Develop a list of questions that are answerable through experimentation, observation, modeling and inference, in response to an observed phenomenon.
- Design an investigation which includes controlled variables, and appropriately considers the number of trials necessary, to answer a scientific question.
- Critique an already designed procedure/experiment, identifying problems with the method, order, time-span, consistency, and variables.
- Ask scientific questions in response to an observed phenomenon.
- Use evidence and reasoning to argue a scientific claim.
- Analyze data to find patterns and draw conclusions.
- Use mathematics and computational thinking to analyze data.

3. Competency: Apply evidence based on the concepts of Forces and Motion

Performance Indicators:

- Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
- Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
- Construct a model to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

- Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

4. Competency: Apply evidence based on the concepts of Energy

Performance Indicators:

- Create a model that displays the characteristics of a wave; both quantitative and qualitative.
- Investigate and create a model of how waves can be used for communication purposes.
- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

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5. Competency: Apply evidence based on the concepts of Ecosystem Dynamics

Performance Indicators:

- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- Construct an argument supported by evidence for how increases in human population and consumption of natural resources impact Earth's systems.
- MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
- **Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. MS**

6. Apply evidence based on the concepts of Matter and its Interactions

Performance Indicators:

- Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
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7. Apply evidence based on the concepts of Earth's Place in the Universe

Performance Indicators:

- Develop a model of the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- Construct an explanation of the role of gravity in the motions within galaxies and the solar system. MS-ESS1-2
- Analyze and interpret data to determine scale properties.
- Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. MS-ESS1-
- **Analyze and interpret data to determine scale properties of objects in the solar system. ESS2-1**
- **Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.**
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8. Apply evidence based on the concepts of Heredity

Performance Indicators:

- Construct an explanation for how environmental and genetic factors influence the growth of organisms.
- Develop a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and result in harmful, beneficial, or neutral effects to the structure and function of an organism.

- Create a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.