



# 8th Grade Essential Learnings

## Quarter View

Our district is committed to providing a guaranteed and viable curriculum for all students. A guaranteed curriculum ensures all students have the opportunity to learn the same essential learnings. A viable curriculum ensures it is possible for all students to learn in the allotted time. The quarter view below lists the essential learnings (EL's) students will be taught and assessed during each nine (9) week quarter. The goal is for every student to become proficient in every essential learning by the end of the school year.

### Quarter 1

#### **EL #1: The Water Cycle and Weather:**

Description of Proficiency:

**MS-ESS2-4:** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

##### **Success Criteria:**

- Model how water changes its state as it moves through the multiple pathways of the hydrologic cycle.
- Create models that are conceptual or physical.
- Can model how water changes its state as it moves through the multiple pathways of the hydrologic cycle.

**MS-ESS2-5:** Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

##### **Success Criteria:**

- Explain how air masses flow from regions of high pressure to low pressure, causing weather at a fixed location to change over time.
- Model how sudden changes in weather can result when different air masses collide.
- Use ranges from data to predict the weather.

**MS-ESS2-6:** 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.

##### **Success Criteria:**

- Analyze patterns on Earth by latitude, altitude, and geographic land distribution.

- Describe how atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds
- Model how ocean circulation transfers heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents.
- Explain how unequal heating occurs on Earth.

## **EL #2: Human Impact on the Environment**

*Description of Proficiency:*

### **MS-ETS1-1: Engineering Design**

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

#### **Success Criteria:**

- Apply scientific principles to project constraints and criteria
- Brainstorm solutions to problems
- Work with others to ensure a successful solution

**MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

#### **Success Criteria:**

- Use the design process to examine current human environmental impacts and assess possible solutions.
- Design and evaluate possible solutions that could reduce impact on the environment.

**MS-ESS3-4:** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

#### **Success Criteria:**

- Construct an argument supported by evidence for how Earth's systems are impacted by increases in human population and consumption of natural resources.
- Describe how humans using fossil fuels leads to increased pollution.

**MS-ESS3-5:** Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over time.

**Success Criteria:**

- Identify factors from both human activities and natural processes that contribute to polluting the natural environment.
- Examine evidence to analyze how atmospheric levels of gases and the rates of human activities impact the planet.
- Synthesize the major role that human activities play in causing the rise in global temperatures.

Quarter 2

**EL #3: Physical Science - Chemistry--Matter and Its Interactions**

*Description of Proficiency:*

**MS-PS1-2:** Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

**Success Criteria:**

- Analyze and interpret data on the properties of substances before and after a chemical reaction has happened.
- Describe the physical properties of substances.
- Describe the chemical properties of substances.

**MS-PS1-4:** 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.

**Success Criteria:**

- Model the atoms of a pure substance to show changes in particle motion, temperature, and state when thermal energy is added or removed.
- Describe how particles move by the amount of kinetic energy present.

#### **EL #4: Physical Science - Chemistry--Chemical Reactions**

*Description of Proficiency:*

**MS-PS1-1:** Develop models to describe the atomic composition of simple molecules and extended structures.

**Success Criteria: :**

- Make models of simple molecules and extended structures like polymers
- Differentiate between homogenous and heterogenous solutions
- Model substances in different states of matter.
- Describe how the behavior of bulk substances depends on their structures at atomic and molecular levels, which are too small to see.

**MS-PS1-5:** Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

**Success Criteria:**

- Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- Apply the law of conservation of mass to balance a chemical equation to show how the total number of atoms for each element does not change in a chemical reaction.
- Develop a model to show the number and types of molecules which make up the reactants and products.

#### **EL #5: Life Science - Heredity**

*Description of Proficiency:*

**MS-LS1-5:** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

**Success Criteria:**

- Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

**MS-LS3-1:** Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

**Success Criteria:**

- Develop and use a model to describe why structural changes to genes located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
- Model the structure of DNA.
- Determine the structure of a specific set of proteins.
- Describe how mutations may result in observable effects in the organism.
- Create a model of chromatin, a chromosome, chromatids, a gene, an allele and DNA.
- Explain the role of a chromosome.

**MS-LS3-2:** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

**Success Criteria:**

- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Compare & contrast the transmission of genetic information in sexual reproduction and asexual reproduction.
- Explain how genetic information is passed from parent to offspring.
- Explain that as organisms grow they increase in complexity (develop).
- Create & analyze Punnett squares to predict the probability of specific traits being passed from parents to offspring.
- Identify the patterns of inheritance created by the use of a Punnett square.

Quarter 4

**EL #6: Life Science - Biological Evolution: Unity & Diversity**

*Description of Proficiency:*

**MS-LS4-1:** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

**Success Criteria:**

- Explain how competition increases or decreases a species' ability to survive and reproduce.
- Explain how genetic variations due to asexual and/or sexual reproduction, increase or decrease a species' ability to survive and reproduce.
- Explain how environmental changes increase or decrease a species' ability to survive and reproduce.
- Explain how overproduction increases or decreases a species' ability to survive and reproduce.

**MS-LS4-2:** Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

**Success Criteria:**

- Identify the taxonomic levels in which organisms are classified based on shared characteristics.
- Explain the process by which organisms are named based on shared characteristics.

**MS-LS4-3:** Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy

**Success Criteria:**

- Explore the evolutionary relationships between species.
- Predict the evolutionary relationships between species by looking at the anatomical differences between modern and fossil organisms.

**MS-LS4-4:** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

**Success Criteria:**

- Identify traits of individuals within a species that give them an advantage to survival.
- Identify traits of individuals within a species that give them an advantage to reproduction.

- Identify traits of individuals within a species that give them a disadvantage to survival.

**MS-LS4-5:** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

**Success Criteria:**

- Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.