

8th Grade Science

2024-2025

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I. Course Narrative:

8th grade has one Life, Physical, and Earth Science unit (fall, winter, spring). We start the year learning about ecosystems with a particular focus on the local ecosystem outside of the classroom. We end the year with a look at global Earth systems as we analyze climate data. Between these two units our focus is essential scientific knowledge about matter and chemistry, to gain understanding about how our world works. Students will be assessed through formative work on practice tests, labs, and activities to build weekly projects/reflections.

Students will practice scientific skills:

- Models: Students will construct and use models as effective ways to explain complex phenomena.
- Data analysis: Organize, collect, and graph to interpret evidence during investigations.
- Scientific explanations: to communication explanations from evidence
- Habits of digital & collaborative learning: Self-Directed & Responsible and Involved learners

II. Major Units:

Life Science - systems, ecosystems, natural selection, heredity, growth, and development

- Overarching Concept: Species influence ecosystems and can lead to shifts in population over time.
- Major Learning Outcomes:
 - Part 1 - Ecosystems -
 - Students will be able to construct an explanation that predicts patterns of interactions among organisms within an ecosystem.
 - Students will be able to create solutions for maintaining biodiversity and ecosystem services, evaluate competing designs, and design and defend a management plan.

- Part 2 and 3 - Natural Selection and Heredity, Growth, and Development
 - Students will be able to use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
 - Students will be able to 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.
 - Students will be able to construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
 - Students will be able to gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
 - Students will be able to 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.
 - Students will be able to 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.

Physical Science - Properties of matter and chemical reactions

- Overarching Concept: The conservation of matter and how it relates to chemical reactions.
- Major Learning Outcomes:
 - Students will be able to develop models to describe the atomic composition of simple molecules and extended structures.
 - Students will be able to 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.
 - Students will be able to analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

- Students will be able to 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.
- Students will be able to undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Earth Science - Systems, weather, and climate

- Overarching Concept: The physical and chemical aspects of our Earth and our use of resources affect climate change.
- Major Learning Outcomes:
 - Students will be able to develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
 - Students will be able to collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
 - Students will be able to 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.
 - Students will be able to ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
 - Students will be able to apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
 - Students will be able to construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

III. Communication:

- Formative assessments will be posted within a week on PowerSchool
 - redos possible within a week of feedback
- Summative work at the end of each unit will be posted on PowerSchool
 - redos possible within a week of feedback

- Major Assessments will be have common grading guides/rubrics between crews
- Week in Preview newsletter with plans for the upcoming week

IV. Resources:

Google classroom, digital resources, and labs/simulations.