



Science
 Course: Honors Science 7
 Middle School: Grade 7

Essential Course Information

- Course Revision
- Full Year
- Please see district requirements for Honors level

Course Overview

The course provides students opportunity build on the skills and knowledge of 6th grade as they continue their exploration life science, physical science and earth and space science. With each unit, students will use the NGSS Crosscutting Concepts to make sense of natural phenomena. Students analyze phenomena in terms of patterns, cause and effect, systems-thinking, structure and function, and stability and change. Students will further their understanding of the NGSS Disciplinary Core Ideas by engaging in the NGSS Science and Engineering Practices including but not limited to: engaging in argument from evidence, analyzing and interpreting data, designing and conducting explanations, constructing explanations, and modeling.

Unit	Estimated Class Time	Overview
Unit 1 Earth in Space	6 weeks	Students will understand the role that gravity plays in the motion of objects within our solar system and galaxy. Students will develop and use models of the Earth-sun-moon system, of gravity's role in the motions observed within galaxies and the solar system and for the behavior of waves that interact with varying types of matter. Students will analyze and interpret data to observe the concept of scale of objects within the solar system. In preparation for the performance based assessment, students will perform a series of simulations to explore the theory and practice of flight as well as solve a real-world problem that is part of the space program using creativity, cleverness, and scientific knowledge. This will lead to the final project where students will create a space travel brochure and map to scale highlighting notable characteristics such as atmospheric patterns, scenic views, navigation conditions, and suggested life supplies for each destination of the solar system.
Unit 2 Chemical Reactions and Matter	4 weeks	Students will move from a conceptual understanding of chemical reactions on an atomic level to a concrete and visual understanding. Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Activities include constructing a rocket powered by pressurized gas created from a chemical reaction between a solid and a liquid, developing a model showing how the matter in the system compares at a scale smaller than you can see, using predictive explanations for what happens to a bath bomb as it fizzes, and then applying their understanding to a series of related phenomena. In addition, students will discover conditions that make a reaction proceed faster or slower and demonstrate how increasing the surface area of a chemical increases its reaction rate. This leads to the final project whereby students 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.
Unit 3 Energy and Chemical Reactions	4 weeks	Chemical reactions release energy or store energy. Students will observe many chemical reactions. They will then design their own device/investigation that will either release or absorb thermal energy. Students will categorize this reaction as endothermic or exothermic. The emphasis is on design, controlling the transfer of energy to the environment and modifications of a device using factors such as type and concentration of substance. Students will design the device the chemical reaction while testing the device to make sure they are observing time, temperature and mass of substance. This device/investigation will involve a chemical reaction and students will observe the conservation of mass.
Unit 4 Metabolic Reactions	7 weeks	M'Kenna, a 13-year-old girl, seems to be really sick and we aren't sure why. We notice she has symptoms in all different parts of her body and some symptoms started before others. The unit will bring the students through a diagnosis of M'Kenna and the impact that the one system has on her whole body. This includes the structure and function of different systems in the body. This will include an emphasis on an understanding that cells form tissues and tissues form organs specialized for particular body functions. Students will investigate how the body goes through chemical reactions to sustain life in a living organism. In these investigations they will observe the breaking down of food for energy and growth and the conservation of mass that takes place inside a healthy body. They will observe healthy organs in the human body and compare the healthy organs to M'Kenna's unhealthy organs. Students will interact with healthcare workers to inquire about the process of a diagnosis to help them identify the illness that is changing M'Kenna's life.
Unit 5 Matter Cycling and Photosynthesis	6 weeks	Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. The class will have an emphasis on describing the conservation of matter and flow of energy into and out of various ecosystems as they construct scientific explanations for the cycling of matter. Students will observe organisms and interactions of organisms to obtain matter and energy from an ecosystem to survive and grow, including photosynthesis and respiration. They understand that sustaining life requires energy and matter inputs. Using a model of the food web of the familiar environment, it will provide the framework for understanding the cycling of matter and energy flow into and out of organisms. In various ecosystems students will be able to define the boundaries of a system as energy flows in and out.
Unit 6 Ecosystems and Biodiversity	4 weeks	Students build on their understanding of the transfer of matter and energy as they study patterns of interactions among organisms within an ecosystem. They consider biotic and abiotic factors in an ecosystem and the effects these factors have on a population. They construct explanations for the interactions in ecosystems and the scientific and social justifications used in making decisions about maintaining biodiversity in ecosystems. Activities include evaluating different engineering ideas that have been proposed using a systematic method to determine which solutions are most promising. They then apply scientific principles to design a method for monitoring and minimizing a human impact on the environment by preparing a conservation plan for an endangered species.

Content Continuum

6

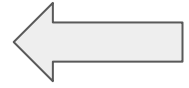
Honors Science 6

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Honors Science 7

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Honors Science 8



INSTRUCTIONAL / SUPPLEMENTAL MATERIALS

1. Open Sci Ed
2. Supplemental readings and online resources to enhance understanding of course content and skills
 - Unit PPT Slides
 - WOHS LMS Databases
 - PhET
 - Concord Consortium
 - and others

All existing resources will be evaluated for alignment to new curriculum.

KEY FEATURES OF REVISION

- Science curriculum was last revised in 2016.
- Course aligns with the NJSLA-Science 8th Grade test.
- Student access to digital resources has expanded greatly.
- Integration of performance based assessments and common writing tasks.
- Incorporation of engineering and design tasks throughout the units

LEP (Limited English Proficiency) and Special Education sections are offered.

Differentiation strategies will be included.

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