



Science
Course: Science 8
Middle School: Grade 8

Essential Course Information

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

Course Overview

The course increases the depth of understanding of life science, physical science, and earth and space science and prepares students for high school 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 <u>Contact Forces</u>	6 weeks	This unit on contact forces identifies the factors that contribute to damage occurring in some collisions and not others, to explore and examine forces, friction and how mass and speed affect the amount of kinetic energy in an object. Students plan and carry out investigations, analyze and interpret data to determine the relationship between potential and kinetic energy. Students will develop and use system models to support explanations for how contact forces, including friction and air resistance, cause energy to be transferred from one part of the system to another before, during, and after a collision.
Unit 2 <u>Sound</u>	4 weeks	Students engage in model-based reasoning, argumentation, and computational and mathematical reasoning to develop models to explain how sounds are made, received and move. By investigating factors including loudness and pitch, students develop a model of vibration that captures important ideas about how changes in the frequency and amplitude of the vibrations can explain these different characteristics of sounds. Students use this model of vibration to answer their initial questions about what causes different sounds. Students will also test various types of materials to figure out how sound travels from one location to another by causing sequences of vibrations through matter. By reasoning with the models they have developed, students also figure out how sounds can be absorbed and transmitted. This knowledge base permits students to tackle the performance task of improving the sound quality for stakeholders in the school building.
Unit 3 <u>Forces at a Distance</u>	4 weeks	Students will explore forces at a distance by experimenting with electromagnets, magnetic forces, and speakers. Students investigate each of the parts in a speaker system to figure out how they work together. Through manipulation of the various parts (e.g., changing the strength of the magnet, number of coils, current direction) students will identify how this technology could be modified to apply to systems in very different contexts, like MagLev trains, junkyard magnets, and electric motors.
Unit 4 <u>Genetics</u>	6 weeks	Throughout the course of the unit students will explore how gene mutations and asexual vs sexual reproduction contributes to genetic variation. Students will understand how genetic factors determine the growth of an individual organism. They will demonstrate understanding of how heredity explains why offspring resemble, but are not identical to, their parents and is a unifying biological principle. Students will grapple with the benefits and risks of modern gene editing techniques and weigh the ethical concerns of how humans have influenced the inheritance of desired traits in organisms in the past and could in the future.
Unit 5 <u>Natural Selection and Common Ancestry</u>	6 weeks	In this unit of study, students analyze graphical displays and gather evidence from multiple sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors. Students construct explanations based on evidence to support fundamental understandings of natural selection and evolution. They will use ideas of genetic variation in a population to make sense of how organisms survive and reproduce, thus passing on the traits of the species. The crosscutting concepts of cause and effect, patterns, and structure and function are called out as organizing concepts for these disciplinary core ideas.
Unit 6 <u>Natural Resources and Human Impact</u>	8 weeks	In this unit of study students analyze and interpret data and design solutions to build on their understanding of the ways that human activities affect Earth's systems. The emphasis of this unit is the significant and complex issues surrounding human uses of land, energy, mineral, and water resources and the resulting impacts of these uses. Students define a problem by precisely specifying criteria and constraints for solutions as well as potential impacts on society and the natural environment; systematically evaluate alternative solutions; analyze data from tests of different solutions; combining the best ideas into an improved solution; and develop, test, and improve their model to reach the best solution. Students are also expected to use these practices to demonstrate understanding of the core ideas and how to mitigate human impact on Earth's systems.

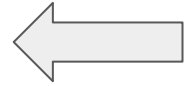
Content Continuum

7

Science 7

8

Science 8



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Biology

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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