

## 2021-2022 Course Syllabus-8<sup>th</sup> Grade Science

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### Course Description:

In grade eight, the standards and performance indicators for the science and engineering practices and core science content, transition students to developing and planning controlled investigations to create more explicit and detailed models and explanations. The seven core concepts (patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change) are reinforced in the appropriate context of the core science content through hands-on instruction in the classroom. Science in the middle school provides students with the foundation to be successful in high school science courses, by providing a range of content in the life, earth, and physical sciences.

These academic standards and performance indicators establish the practices and core content that South Carolina's students should know and be able to do by the end of grade eight.

**The five core areas of the grade eight standards include:** • Forces and Motion • Waves • Earth's Place in the Universe • Earth Systems and Resources • Earth's History and Diversity of Life

The eight science and engineering practices describe how students should learn and demonstrate knowledge of the content outlined in the content standards. Engaging in these practices will help students become scientifically literate and astute consumers of scientific information.

Students should engage in scientific and engineering practices as a means to learn about the specific topics identified for their grade level. Students must demonstrate knowledge of the science and engineering practices and core content ideas in preparation for future science courses.

### Learning and Developmental Goals:

By the end of the eighth grade, the students should be able to:

1. Understand the process of life and how interactions of organisms with the environment usually result in adaptations and change over time.
2. Understand the process and interactions of earth and space systems and how they relate to the dynamics of our atmosphere, lithosphere, hydrosphere, and solar system.
3. Understand the nature and interactions of forces and matter which determine the motions of bodies and how these interactions influence daily life and our perception of the world and its place in the solar system.
4. Understand the history of life on Earth, the applications of science and technology, and how human activity impacts our world and the things living in it.
5. Understand and use process skills such as observation, classification, measurement, inferring, and presenting data.
6. Understand engineering skills such as problem solving, drawing, testing, and re-evaluating design.
7. Design, conduct, and evaluate investigations using scientific equipment and terminology and demonstrating scientific reasoning and logic.

### Evaluation:

Tests/Major Projects

100 pts (Around 4) = 400

Labs/Quizzes

50 pts (Around 8) = 400

Homework/Classwork

10 pts (Around 20) = 200 Total pts = 1000 at end of the quarter

Our primary goal is to maximize student achievement. The teacher reserves the right to add, delete, or substitute materials and topics as deemed necessary for optimum student learning. Every effort is made to accommodate individual needs, academic levels, and learning styles of each student throughout the year as opportunities arise. Standards can be found at:

[http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Science\\_8thSupport.pdf](http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Science_8thSupport.pdf)

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### 1st Quarter

<b>Science and Engineering Practices</b>	<b>Standard 8.S.1</b>	<b>Standard Covered</b>
Ask questions to generate hypothesis, refine models or designs, and challenge claims.		8.S.1A.1
Develop, use, and refine models to understand or represent phenomena, processes, and relationships, test devices or solutions, or communicate ideas to others.		8.S.1A.2
Plan and conduct controlled scientific investigations.		8.S.1A.3
Analyze and interpret data from informational texts, observations, measurements, or investigations.		8.S.1A.4
Use mathematical thinking and computational thinking to use and manipulate appropriate metric units, collect and analyze data, express relationships between variables for models and investigations, or use statistics to analyze data.		8.S.1A.5
Construct explanations of phenomena using primary or secondary scientific evidence and models, conclusions from scientific investigations, predictions based on observations and measurements, or data communicated in graphs, tables, or diagrams.		8.S.1A.6
Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.		8.S.1A.7
Obtain and evaluate scientific information to answer questions, explain or describe phenomena, develop models, evaluate hypotheses, explanations, claims, or designs or identify and/or fill gaps in knowledge. Evaluate primary or secondary scientific literature.		8.S.1A.8
Construct devices or design solutions using scientific knowledge to solve problems or needs.		8.S.1B.1
<b>Forces and Motion</b>	<b>Standard 8.P.2</b>	<b>Standard Covered</b>
Plan and conduct controlled scientific investigations to test how varying the amount of force of mass of an object affects the motion (speed and direction), shape, or orientation of an object.		8.P.2A.1
Develop and use models to compare and predict the resulting effect of balanced and unbalanced forces on an object's motion in terms of magnitude and direction.		8.P.2A.2
Construct explanations for the relationship between the mass of an object and the concept of inertia (Newton's First Law of Motion).		8.P.2A.3
Analyze and interpret data to support claims that for every force exerted on an object there is an equal force exerted in the opposite direction (Newton's Third Law of Motion).		8.P.2A.4
Analyze and interpret data to describe and predict the effects of forces (including gravitational and friction) on the speed and direction of an object.		8.P.2A.5
Use mathematical and computational thinking to generate graphs that represent the motion of an object's position and speed as a function of time.		8.P.2A.6
Use mathematical and computational thinking to describe the relationship between the speed and velocity (including positive and negative expression of direction) of an object in determining average speed ( $v=d/t$ ).		8.P.2A.7
<b>Waves</b>	<b>Standard 8.P.3</b>	<b>Standard Covered</b>
Construct explanations of the relationship between matter and energy based on the characteristics of mechanical and light waves.		8.P.3A.1
Develop and use models to exemplify the basic properties of waves (including frequency, amplitude, wavelength, and speed).		8.P.3A.2
Analyze and interpret data to describe the behavior of waves (including refraction, reflection, transmission, and absorption) as they interact with various materials.		8.P.3A.3
Analyze and interpret data to describe the behavior of mechanical waves as they intersect.		8.P.3A.4
Construct explanations for how humans see color as a result of the transmission, absorption, and reflection of light waves by various materials.		8.P.3A.5
Obtain and communicate information about how various instruments are used to extend human senses by transmitting and detecting waves (such as radio, television, cell phones, and wireless computer networks) to exemplify how technological advancements and designs meet human needs.		8.P.3A.6

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<b>2<sup>nd</sup> Quarter</b>	<b>Earth's Place in the Universe</b>	<b>Standard 8.E.4</b>	<b>Standard</b>	<b>Covered</b>
	Obtain and communicate information to model the position of the Sun in the universe, the shapes and composition of galaxies, and the measurement unit needed to identify star and galaxy locations.		8.E.4A.1	
	Construct and analyze scientific arguments to support claims that the universe began with a period of extreme and rapid expansion using evidence from the composition of stars and gases and the motion of galaxies in the universe.		8.E.4A.2	
	Obtain and communicate information to model and compare the characteristics and movements of objects in the solar system including planets, moons, asteroids, comets, and meteors).		8.E.4B.1	
	Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth.		8.E.4B.2	
	Develop and use models to explain how seasons, caused by the tilt of Earth's axis as it orbits the Sun, affects the length of the day and the amount of heating on Earth's surface.		8.E.4B.3	
	Develop and use models to explain how motions within the Sun-Earth-Moon system cause Earth phenomena (including day and year, moon phases, solar and lunar eclipses, and tides).		8.E.4B.4	
	Obtain and communicate information to describe how data from technologies (including telescopes, spectrometers, satellites, space probes) provide information about objects in the solar system and the universe.		8.E.4B.5	
	Analyze and interpret data from the surface features of the Sun (including photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth.		8.E.4B.6	
<b>3<sup>rd</sup> Quarter</b>	<b>Earth Systems and Resources</b>	<b>Standard 8.E.5</b>	<b>Standard</b>	<b>Covered</b>
	Develop and use models to explain how the processes of weathering, erosion, and deposition change surface features in the environment.		8.E.5A.1	
	Use the rock cycle model to describe the relationship between the processes and forces that create igneous, sedimentary, and metamorphic rocks.		8.E.5A.2	
	Obtain and communicate information about the relative position, density, and composition of Earth's layers to describe the crust, mantle, and core.		8.E.5A.3	
	Construct explanations for how the theory of plate tectonics accounts for the motion of lithospheric plates, the geologic activities at plate boundaries, and the changes in landform areas over geologic time.		8.E.5A.4	
	Construct and analyze scientific arguments to support claims that plate tectonics accounts for the distribution of fossils on different continents, the occurrence of earthquakes, and continental and ocean floor features (including mountains, volcanoes, faults and trenches).		8.E.5A.5	
	Analyze and interpret data to describe patterns in the location of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hot spots.		8.E.5B.1	
	Construct explanations of how forces inside Earth result in earthquakes and volcanoes.		8.E.5B.2	
	Define problems that may be caused by a catastrophic event resulting from plate movements and design possible devices or solutions to minimize the effects of that event on Earth's surface and /or human structures.		8.E.5B.3	
	Obtain and communicate information regarding the physical and chemical properties of minerals, ores, and fossil fuels to describe their importance as Earth's resources.		8.E.5C.1	
<b>4<sup>th</sup> Quarter</b>	<b>History and Diversity of Life</b>	<b>Standard 8.E.6</b>	<b>Standard</b>	<b>Covered</b>
	Develop and use models to organize Earth's history (including era, period, and epoch) according to the geologic time scale using evidence from rock layers.		8.E.6A.1	
	Analyze and interpret data from index fossil records and the ordering of rock layers to infer the relative age of rocks and fossils.		8.E.6A.2	
	Construct explanations from evidence for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.		8.E.6A.3	
	Construct and analyze scientific arguments to support claims that different types of fossils provide evidence of the diversity of life that has been present on Earth, relationships between past and existing life forms, and environmental changes that have occurred during Earth's history.		8.E.6A.4	
	Construct explanations for why most individual organisms, as well as some entire taxonomic groups of organisms, that lived in the past were never fossilized.		8.E.6A.5	
	Construct explanations for how biological adaptations and genetic variations of traits in a population enhance the probability of survival in a particular environment.		8.E.6B.1	
	Obtain and communicate information to support claims that natural and human-made factors can contribute to the extinction of species.		8.E.6B.2	