

**Course Description**

Grade 8 students use more robust abstract thinking skills to explain causes of complex phenomena and systems. Many causes are not immediately or physically visible to students. An understanding of cause and effect of key natural phenomena and designed processes allows students to explain patterns and make predictions about future events. In grade 8 these include, for example, causes of seasons and tides; causes of plate tectonics and weather or climate; the role of genetics in reproduction, heredity, and artificial selection; and how atoms and molecules interact to explain the substances that make up the world and how materials change. Being able to analyze phenomena for evidence of causes and processes that often cannot be seen, and being able to conceptualize and describe those, is a significant outcome for grade 8 students.

In grade 8, student scientists:

- Persist when engaging with meaningful scientific tasks
- Use information from observations to construct an evidence based account for natural phenomena
- Construct explanations using multiple sources of evidence
- Revise models to predict abstract phenomena
- Ask questions that challenge the premise(s) of an argument or the interpretation of data
- Actively incorporate others into discussions about scientific ideas
- Analyze observations to distinguish between correlation and causation
- Reflect on how they are progressing toward goals
- Demonstrate learning in multiple ways
- Engage in challenging learning tasks regardless of learning needs

Content Standards

[Grade 8 Massachusetts Curriculum Framework - Science](#)



Subject: 8th Grade Science

Term 1 – Units	Essential Questions	Key Activities May Include:
Physical Science Matter and Its Interactions MA Standards: 8.MS-PS1	- What is all matter made of? - What is the difference between physical and chemical properties? - What happens to atoms in chemical reactions? - Describe the law of conservation of mass.	- Stations Activity: Investigating Elements vs. Compounds vs. Mixtures. - Exploring Density Lab. - Endothermic vs. Exothermic Chemical Reactions Lab.
Motion and Stability: Forces and Interactions MA Standards: 8.MS-PS2	- What is motion? - How can motion change? - What forces exist in our world?	- Newton's Laws stations (each law has its own set). - Newton's Laws Comic Strip Project. - Distance vs. Time Graph activity.

Term 2 – Units	Essential Questions	Key Activities May Include:
Life Science From Molecules to Organisms: Structures and Processes MA Standards: 8.MS-LS1	- What can evidence tell us for how environmental and genetic factors influence the growth of organisms? - How do food molecules break down and rearrange through chemical reactions to form new molecules for cell growth and energy?	- Generation Genius: "Competition in Ecosystems". - Generation Genius: "Food Webs: Cycling of Matter and Flow of Energy".
Heredity: Inheritance and Variation of Traits MA Standards: 8.MS-LS3	- What causes mutations? - How are traits passed to offspring? - What are examples of beneficial, harmful, and neutral mutations? - What are advantages and disadvantages to sexual and asexual reproduction?	- Trait Inventory. - Punnett Square Monster Babies. - Punnett Square matching activity. - Blue Fugates Pedigree activity. - Learn.Genetics: "Sexual vs. Asexual Reproduction" activity. - DNA One-pager Poster.
Biological Evolution: Unity and Diversity MA Standards: 8.MS-LS4	- How do populations change over time? - How do adaptations relate to natural selection? - What is the difference between natural selection and artificial selection? - What types of people can selectively breed organisms?	- Natural Selection simulation. - Recipe for Genetics Artificial Selection activity. - Moth Adaptation simulation.



Term 3 – Units	Essential Questions	Key Activities May Include:
Earth Science Earth's Place in the Universe MA Standards: 8.MS-ESS1	- How do Earth's tilt and the Sun's Intensity explain the cyclical pattern of seasons on different areas of the Earth? - How does gravity affect tides, orbital motions of planets and all objects in our solar system?	- Tides Graphing Activity. - Seasons/Tides Diagrams. - Generation Genius: "Gravitational Forces of Objects" and "Causes of Seasons".
Earth's Systems MA Standards: 8.MS-ESS2	- Where does the energy that supplies Earth's processes come from? - Do Earth's processes occur quickly or slowly? - What processes cause the cycling of Earth's materials? - What causes changes in weather conditions? How does the ocean influence weather and climate? - What forces drive the movement of water? - What factors determine local weather patterns?	- Plate Tectonics Research Project. - Air Masses and Weather Fronts stations. - Weather Forecast Project. - NOAA Webquest. - Generation Genius: "Climate Zones and Ocean Currents".
Earth and Human Activity MA Standards: 8.MS-ESS3	- What activities increase the global temperature? - How does consumption of resources alter Earth's climate? - Why are natural resources unevenly distributed on Earth?	- Earth's Resources Activity. - Earth and Human Activity Project. - Generation Genius: "Natural Resource Distribution".
Engineering/Technology Materials, Tools, and Manufacturing MA Standards: 8.MS-ETS2	- How do materials maintain their composition under various kinds of physical processing? - How can a product be created using basic processes in manufacturing systems?	Changing Properties of a Material Lab: Turning Iron into a Magnet.