

**Course Description**

Students in grade 7 focus on systems and cycles using their understanding of structures and functions, connections and relationships in systems, and flow of matter and energy developed in earlier grades. A focus on systems requires students to apply concepts and skills across disciplines, since most natural and designed systems and cycles are complex and interactive. They gain experience with plate tectonics, interactions of humans and Earth processes, organism systems to support and propagate life, ecosystem dynamics, motion and energy systems, and key technological systems used by society. Through grade 7, students begin a process of moving from a more concrete to an abstract perspective, since many of the systems and cycles studied are not directly observable or experienced. This also creates a foundation for exploring cause and effect relationships in more depth in grade 8.

In seventh grade, students acquire the skills and abilities in the six domains of Science and engineering to:

Science and Engineering Practices:

- Ask questions and define problems
- Develop and use models
- Plan and carry out investigations
- Analyze and interpret data
- Use mathematics and computational thinking
- Construct explanations and design solution
- Engage in argument from evidence
- Obtain, evaluate, and communicate information

Nature of Science and Crosscutting Concepts

- Recognize that scientific knowledge results from the efforts of men and women from different races, cultures, and time periods.

Content Standards

[Grade 7 Massachusetts Curriculum Framework - Science](#)



Subject: 7th Grade Science

Units	Essential Questions	Key Activities May Include
TERM 1 Physical Science Potential and Kinetic Energy MA Standards: 7.MS-PS3-2 7.MS-PS3-5 7.MS-PS3-7	<ul style="list-style-type: none"> What is the difference between kinetic and potential energy? What does kinetic energy depend upon? What does potential energy depend upon? 	<ul style="list-style-type: none"> Ball Lab. Stretched Rubber band Lab. Virtual Roller Coaster Simulation Lab. Kinetic and Potential Energy Webquest. Generation Genius: kinetic and potential energy.
Physical Science Energy Transfer in Temperature MA Standards: 7.MS-PS3-3 7.MS-PS3-4 7.MS-PS3-6	<ul style="list-style-type: none"> What is the relationship between temperature and thermal energy? What is the difference between conduction, convection, and radiation? What factors affect the amount of energy transfer needed to change the temperature of matter? 	<ul style="list-style-type: none"> PHET simulation: Energy and the many forms of energy. Popcorn Lab: Conduction, Convection, and Radiation.
Physical Science Magnetism and Electricity MA Standards: 7.MS-PS2-3 7.MS-PS2-5	<ul style="list-style-type: none"> What types of forces exist in our world? How can forces impact objects without directly touching them? 	<ul style="list-style-type: none"> Introduction to Magnetic Fields Lab Build a Circuit Lab. Poster on electricity and electric circuits. Generation Genius: Electricity and Circuits.
TERM 2 Life Science Ecological Relationships MA Standards: 7.MS-LS1-4	<ul style="list-style-type: none"> What characteristics do plants and animals have to increase reproduction? (Nest Building, Vocalization, Asexual Vs Sexual Reproduction) 	<ul style="list-style-type: none"> Value of Biodiversity jigsaw assignment. Physical and Behavioral Adaptation activity.



Units	Essential Questions	Key Activities May Include
Life Science Biodiversity and Ecological Relationships MA Standards: 7.MS-LS2-2 7.MS-LS2-1	<ul style="list-style-type: none"> What factors can influence an organism's survival in an ecosystem? What are some limited resources that can affect an organism's growth or population increase? How can competitive, predatory, and mutually beneficial relationships affect organisms? What do food webs demonstrate? 	<ul style="list-style-type: none"> Carrying Capacity activity: webquest and slideshow presentation. Graphing activities on carrying capacity and limiting factors: kaibab deer, fox and owl populations.
Life Science Biodiversity MA Standards: 7.MS-LS2-4 7.MS-LS2-5 7.MS-LS2-6	<ul style="list-style-type: none"> How can changes in biodiversity influence humans? 	<ul style="list-style-type: none"> Human Impact on Ecosystems project. Ecological Energy Pyramid activity. Ecology Lab: Predator Prey interactions. Generation Genius: Food Webs and the Flow of Energy. Symbiotic Relationships and Competition investigation.
TERM 3 Earth Science Geological Events in History MA Standards: 7.MS-ESS2-2 7.MS-ESS3-2	<ul style="list-style-type: none"> Do Earth's processes occur quickly or slowly? How does water change the land? How can scientists predict the likelihood of natural hazards? What is the difference between large scale and small scale processes? 	<ul style="list-style-type: none"> Subduction and Mountain-building Modeling investigation. Weathering and Erosion activity. Earthquake Triangulation Epicenter Prediction activity. Earthquake Research Project.
Earth Science Geological Events and Human Activities MA Standards: 7.MS-ESS3-4	<ul style="list-style-type: none"> What are some positive and negative ways that humans alter the environment? What are some solutions to the negative impact of humans on the environment? 	<ul style="list-style-type: none"> PBS : Population Growth and Consumption. Habitat Fragmentation Lab - types of birds. Populations graphic organizer.
Engineering/ Technology System Design MA Standards: 7.MS-ETS1 7.MS-ETS3	<ul style="list-style-type: none"> What are the components of a structural, transportation, or communication system? How do these components interact to make up the system as a whole? What are the inputs, processes, outputs, and feedback of the system? <ul style="list-style-type: none"> How can you model the system to better understand how the system functions? 	<ul style="list-style-type: none"> Generation Genius: Engineering Design Process.