



# Somerville Public Schools

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Office of Curriculum, Instruction, and Technology

## Life Science

Grade 7

**Prerequisite: Earth Science**

### ABSTRACT

Life Science introduces an extensive inquiry approach to the study of the nature of living things. Students are provided with a comprehensive up-to-date approach to modern biological trends. Students are introduced to fundamental concepts of life science that form a scaffold upon which to build their science knowledge base preparing for high school courses, as well as the next course in the science sequence. The program provides students with the conceptual framework, factual knowledge, and analytical skills necessary to investigate and understand the composition and interactions of living things.

*Adopted by the Somerville Board of Education on July 18, 2006*



# SOMERVILLE PUBLIC SCHOOLS

## Life Science – Grade 7

Month/ Marking Period	September	October	November	December	January
<b>NJCCCS:</b>	5.1A1-4, 5.1B1-3, 5.1C1-2, 5.3A1, 5.3B1, 5.3C1, 5.3D1-3, 5.4A1, 5.4B1, 5.4C1, 5.5A1-2, 5.5B1-3, 5.5C1, 5.6A1-2	5.1A1-4, 5.1B1-3, 5.2A1-3, 5.2B1-2, 5.3C1, 5.3D1-4, 5.4C1, 5.5A1, 5.5B1-2, 5.7B1, 5.10A1, 5.10B1	5.2A1-3, 5.2B1-2, 5.4A1, 5.4B1, 5.5A2, 5.5B1, 5.7B2-4, 5.9A1-3	5.5A2, 5.6A1, 5.6A4	5.2A1-3, 5.3D1-4, 5.5A1-2, 5.5B1-2, 5.5C1, 5.6B1-4, 5.7B1-4
<b>Essential Question:</b>	What are the characteristics of all living things?	How are organisms related in nature?	How are the needs of the organism met?	What elements make up life?	How do things get in and out of cells?
<b>Content:</b>	Compare and Contrast Characteristics of Living Things from Non-Living Things	Life Cycles and Flow of Energy through Ecosystems	Prokaryotic and Eukaryotic Cells Structure and Function	The Importance of Water to Life on Earth	Cell Processes: Transport and Cell Division
<b>Skills and Topics:</b>	<ul style="list-style-type: none"> <li>practice safety in the laboratory</li> <li>apply the Scientific Method to experimentation</li> <li>convert between equivalent Scientific International units</li> <li>demonstrate how living things are studied</li> <li>differentiate between observation methods and inferences</li> <li>observe and document the life cycle of plants</li> </ul>	<ul style="list-style-type: none"> <li>apply scientific processes to real-world laboratory activities</li> <li>recognize the hypothesis and the negative hypothesis of an experiment</li> <li>replicate Redi's experiment disproving spontaneous generation</li> <li>recognize science as testing, collecting, and analyzing data</li> <li>investigate the role of human beings in the protection of the environment</li> <li>identify species of deciduous plants</li> <li>use a dichotomous key to classify an organism</li> <li>explore the use of binomial nomenclature (e.g., Homo sapiens)</li> </ul>	<ul style="list-style-type: none"> <li>develop the modern cell theory</li> <li>investigate the relationship between technology and exploration</li> <li>characterize viruses as the boundary between living and non-living things</li> <li>explain the structure and function of organelles in eukaryotic cells</li> <li>examine cells microscopically</li> <li>demonstrate correct microscopic techniques</li> </ul> <p>Note: during the month of November, journaling and predictions of the moon's position are infused due to the relationship in the fall sky</p>	<ul style="list-style-type: none"> <li>compare and contrast plant and animal cells</li> <li>differentiate between the different organelles and their functions in different types of cells</li> <li>explain how viruses interact with cells</li> <li>determine which cells of the immune system provide lines of defense against viral invasion</li> <li>analyze the composition of organisms</li> <li>demonstrate the changes involved in the water cycle</li> <li>discover the solubility of solids in liquids</li> <li>observe the formation of crystals</li> </ul>	<ul style="list-style-type: none"> <li>demonstrate the processes of diffusion and osmosis</li> <li>compare the movement of organic and inorganic substances</li> <li>compare and contrast active and passive transport</li> <li>summarize the steps of photosynthesis and cellular respiration</li> <li>trace energy through a food chain</li> <li>investigate factors that limit cell size</li> </ul>



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<b>*Assessments:</b>	Laboratory reports: <ul style="list-style-type: none"> <li>○ Architectural models</li> <li>○ Measurement activities</li> <li>○ Density laboratory</li> <li>○ Grab bag laboratory</li> <li>○ Tree observation</li> <li>○ Cultivation of impatiens plants</li> </ul> View and discuss the “Secrets of Life” video Assessments Chapter outlines Notebook tests Presentations Project: characteristics of life poster	Laboratory reports: <ul style="list-style-type: none"> <li>○ Classification laboratory</li> <li>○ Wisconsin fast plants</li> <li>○ Impatiens cultivation</li> <li>○ Tree change observations</li> <li>○ Owl pellets</li> </ul> Field trip to Fairview Environmental Education Center exploring: <ul style="list-style-type: none"> <li>○ Dominant eye in archery</li> <li>○ Eutrophication of the lake</li> <li>○ Stream studies</li> <li>○ Cidering techniques (fermentation)-sexual and asexual reproduction in trees</li> <li>○ Ridge hike-geology, life cycles, and sound</li> </ul> Assessments Chapter outlines Notebook tests Presentations Projects	Laboratory reports: <ul style="list-style-type: none"> <li>○ Pizza microscope drawing</li> </ul> Quiz: parts and techniques of microscope usage Assessments Chapter outlines Foldables Notebook tests Presentations Project: cell model-build a cell Begin journaling the progressive stages of the moon  Note: Laboratory experiments on life cycles continue.	Laboratory reports: <ul style="list-style-type: none"> <li>○ Plant versus animal cell laboratory</li> <li>○ Examining cell structure</li> <li>○ Epsom salt crystallization</li> <li>○ Molecular modeling</li> </ul> Quiz: cell parts Assessments Chapter outlines Notebook tests Presentations Projects	Laboratory reports: <ul style="list-style-type: none"> <li>○ Osmosis in vegetables</li> <li>○ Observing osmosis under different H<sub>2</sub>O concentrations</li> <li>○ Toxic Jello</li> <li>○ Fast and furious fermentation</li> </ul> Assessments Chapter outlines Notebook tests Presentations Projects Alternative assessment: songs to reinforce the steps of the processes studied
<b>Resources:</b>	Book A: <i>Life’s Structure and Function</i> . (2002). Glencoe Life Sciences.	Book E: <i>Ecology</i> . (2002). Glencoe Life Sciences. “Secrets of Life” video	Book A: <i>Life’s Structure and Function</i> . (2002). Glencoe Life Sciences.	Book A: <i>Life’s Structure and Function</i> . (2002). Glencoe Life Sciences.	Book A: <i>Life’s Structure and Function</i> . (2002). Glencoe Life Sciences.

\*Laboratory experiments and reports include, but are not limited to, the above list.



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<b>Technology:</b>	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.eurekascience.com">www.eurekascience.com</a> <a href="http://www.rothamsted.bbsrc.ac.uk">www.rothamsted.bbsrc.ac.uk</a> Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.accessexcellence.com">www.accessexcellence.com</a> <a href="http://www.fairviewlake.org">www.fairviewlake.org</a> Digital camera Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.cellsalive.com">www.cellsalive.com</a> <a href="http://tycho.usno.navy.mil/vphase">http://tycho.usno.navy.mil/vphase</a> Video microscope Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.cnas.smsu.edu">www.cnas.smsu.edu</a> Online quiz Internet Wireless laptop computers SMART Boards
<b>Writing:</b>	Open-ended responses Laboratory report analysis and conclusions Project presentations	Open-ended responses Laboratory report analysis and conclusions Project presentations	Open-ended responses Laboratory report analysis and conclusions Project presentations	Open-ended responses Laboratory report analysis and conclusions Project presentations	Open-ended responses Laboratory report analysis and conclusions Project presentations
<b>Careers:</b>	Applicable career options are discussed as they arise throughout the course. Career options include, but are not limited to, bioengineers, cytologists, forensic specialists, and the tiered options within the medical arena.				



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## Life Science – Grade 7

Month/ Marking Period	February	March	April	May	June
<b>NJCCCS:</b>	5.2A1-3, 5.2B1-2, 5.4A1, 5.5B3, 5.5C1	5.1A2-3, 5.2A1-3, 5.3A1, 5.3D1, 5.5A2, 5.5B1-3, 5.5C1	5.1A2-4, 5.2A1-3, 5.2B1-2, 5.5B1-3, 5.5C1, 5.8A2-3, 5.8C2, 5.9B1, 5.10A1	5.1A1-4, 5.1B1-3, 5.2B1-2, 5.3A1, 5.3B1, 5.3D1-4, 5.4B1, 5.5A1, 5.5B1-3	5.3C1, 5.3D1-4, 5.5A1-2
<b>Essential Question:</b>	How do cells divide?	How are traits handed down?	How do living things change in response to a changing environment?	How does alcohol affect the nervous system?	How do body organs work together as a system?
<b>Content:</b>	Mitosis and Meiosis	Inheritance Patterns	Evolution	Alcohol and the Brain	Human Body Systems
<b>Skills and Topics:</b>	<ul style="list-style-type: none"> <li>distinguish between sexual and asexual reproduction</li> <li>recognize the cell cycle and the stages of mitosis</li> <li>compare and contrast the stages of mitosis and meiosis</li> <li>explore the structure of deoxyribonucleic acid (DNA) and ribonucleic acid (RNA)</li> <li>evaluate base pairing in both DNA and RNA and resultant errors causing mutations</li> <li>describe the role of RNA translation in protein synthesis</li> </ul>	<ul style="list-style-type: none"> <li>describe and analyze Mendelian inheritance of traits using Punnett squares</li> <li>compare and contrast patterns of inheritance using through sex-linkage, incomplete dominance, and the codominance theory</li> <li>explore probabilities and predict expected phenotypes and genotypes</li> <li>analyze a pedigree tracing predecessors' genotypes</li> </ul>	<ul style="list-style-type: none"> <li>delineate the evolutionary timeline of the creation of our universe</li> <li>discover the environmental effects that cause change over time</li> <li>distinguish between the theories of Lamarck and Darwin</li> <li>explain variation within a population as the mechanism of natural selection</li> <li>investigate primate evolution</li> </ul>	<ul style="list-style-type: none"> <li>investigate and analyze the relationship between blood alcohol levels' response time</li> <li>explore environmental impact (<i>e.g.</i>, peer pressure, availability, probability resulting from genetic inheritance)</li> <li>recognize operational nervous system structures affected by alcohol consumption</li> </ul>	<ul style="list-style-type: none"> <li>evaluate the characteristics of different types of muscle tissue</li> <li>differentiate between the different types and locations of bone in the skeletal system</li> <li>analyze the different components of blood</li> <li>describe the function of the heart</li> <li>distinguish between systemic and pulmonary circulation systems</li> <li>distinguish between the lungs and the kidneys as excretory organs</li> <li>extend excretion to the organs and functions of the digestive system</li> <li>categorize skin and liver as excretory versus detoxification organs</li> </ul>



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<b>*Assessments:</b>	Laboratory reports: ○ Onion root tip slides Assessments Chapter outlines Notebook tests Projects Presentations	Laboratory reports: ○ A matter of control ○ Build an animal Assessments Chapter outlines Notebook tests Presentations Project and presentation: cell analogy	Laboratory reports Assessments Chapter outlines Notebook tests Presentations Project: tadpole development- life cycle Project: awesome adaptations Tree journals observing spring changes	Report: Bioethics Assessments Chapter outlines Notebook tests Presentation: oral debate supporting group decisions Project: Internet research of ethical legal positions pertaining to alcohol use	Laboratory reports: ○ Owl pellet laboratory- compare rodent to human skeletons ○ Heart rate laboratory- resting versus active heart rate ○ Blood-typing laboratory Project: culminating human body project-model/poster/ story comparing and contrasting two body systems working in unison
<b>Resources:</b>	Book A: <i>Life's Structure and Function</i> . (2002). Glencoe Life Sciences. Chapter 1	Book A: <i>Life's Structure and Function</i> . (2002). Glencoe Life Sciences. Chapters 2, 3, and 4	Book A: <i>Evolution: Adaptations over Time</i> . (2002). Glencoe Life Sciences. Chapter 6	Book A: <i>Life's Structure and Function</i> . (2002). Glencoe Life Sciences. Chapter 5	Book D: <i>The Human Body</i> . (2002). Glencoe Life Sciences. Chapters 1, 3, 4, and 5
<b>Technology:</b>	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.johnkyrk.com">www.johnkyrk.com</a> <a href="http://www.biology.arizona.edu">www.biology.arizona.edu</a> <a href="http://www.cellsalive.com">www.cellsalive.com</a> Online quiz Video microscope Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.cellsalive.com">www.cellsalive.com</a> <a href="http://www.usoe.k12.ut.us">www.usoe.k12.ut.us</a> <a href="http://www.stalban.pta.school.za">www.stalban.pta.school.za</a> <a href="http://www.gslc.genetics.utah.edu">www.gslc.genetics.utah.edu</a> Online quiz Video microscope Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.fastplants.org">www.fastplants.org</a> Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.science.education.nih.gov">www.science.education.nih.gov</a> <a href="http://www.thecoolspot.gov">www.thecoolspot.gov</a> Online quiz Internet Wireless laptop computers SMART Boards	<a href="http://www.glencoe.com/sec/science">www.glencoe.com/sec/science</a> <a href="http://www.worldclimate.com">www.worldclimate.com</a> <a href="http://www.amnh.org/education">www.amnh.org/education</a> Online quiz Internet Wireless laptop computers SMART Boards
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