



# M/J Comprehensive Science 2, Advanced (#2002080)

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**Course Number:** 2002080

**Course Path:** **Section:** Grades PreK to 12 Education  
Courses > **Grade Group:** Grades 6 to 8 Education  
Courses > **Subject:** Science > **SubSubject:** General  
Sciences >

**Abbreviated Title:** M/J COMPRE SCI 2 ADV

**Course Length:** Year (Y)

**Course Attributes:**

- Class Size Core Required

**Course Level:** 3

**Course Status:** Course Approved

## GENERAL NOTES

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the middle school level, all students should have multiple opportunities every week to explore science laboratory investigations (labs). School laboratory investigations are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the middle school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (NRC 2006, p. 77; NSTA, 2007).

### Special Notes:

#### Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

1. Ensuring wide reading from complex text that varies in length.
2. Making close reading and rereading of texts central to lessons.
3. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.
4. Emphasizing students supporting answers based upon evidence from the text.
5. Providing extensive research and writing opportunities (claims and evidence).

#### Science and Engineering Practices (NRC Framework for K-12 Science Education, 2010)

- Asking questions (for science) and defining problems (for engineering).
- Developing and using models.
- Planning and carrying out investigations.
- Analyzing and interpreting data.
- Using mathematics, information and computer technology, and computational thinking.
- Constructing explanations (for science) and designing solutions (for engineering).
- Engaging in argument from evidence.
- Obtaining, evaluating, and communicating information.

#### English Language Development ELD Standards Special Notes Section:

Teachers are required to provide listening, speaking, reading and writing instruction that allows English language learners (ELL) to communicate information, ideas and concepts for academic success in the content area of Science. For the given level of English language proficiency and with visual, graphic, or interactive support, students will interact with grade level words, expressions, sentences and discourse to process or produce language necessary for academic success. The ELD standard should specify a relevant content area concept or topic of study chosen by curriculum developers and teachers which maximizes an ELL's need for communication and social skills. To access an ELL supporting document which delineates performance definitions and descriptors, please click on the following link:

<http://www.cpalms.org/uploads/docs/standards/eld/SC.pdf>

For additional information on the development and implementation of the ELD standards, please contact the Bureau of Student Achievement through Language Acquisition at [sala@fldoe.org](mailto:sala@fldoe.org).

#### Additional Instructional Resources:

A.V.E. for Success Collection is provided by the Florida Association of School Administrators: [http://www.fasa.net/4DCGI/cms/review.html?](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139)

[Action=CMS\\_Document&DocID=139](http://www.fasa.net/4DCGI/cms/review.html?Action=CMS_Document&DocID=139). Please be aware that these resources have not been reviewed by CPALMS and there may be a charge for the use of some of them in this collection.

## Course Standards

Integrate Florida Standards for Mathematical Practice (MP) as applicable.

- MAFS.K12.MP.1.1 Make sense of problems and persevere in solving them.
- MAFS.K12.MP.2.1 Reason abstractly and quantitatively.
- MAFS.K12.MP.3.1 Construct viable arguments and critique the reasoning of others.
- MAFS.K12.MP.4.1 Model with mathematics.
- MAFS.K12.MP.5.1 Use appropriate tools strategically.
- MAFS.K12.MP.6.1 Attend to precision.
- MAFS.K12.MP.7.1 Look for and make use of structure.
- MAFS.K12.MP.8.1 Look for and express regularity in repeated reasoning.

Name	Description
<a href="#">SC.7.E.6.1:</a>	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.
<a href="#">SC.7.E.6.2:</a>	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).
<a href="#">SC.7.E.6.2:</a>	<b>Remarks/Examples:</b> Florida Standards Connections: MAFS.K12.MP.7: Look for and make use of structure.
<a href="#">SC.7.E.6.3:</a>	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.
<a href="#">SC.7.E.6.4:</a>	Explain and give examples of how physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.
<a href="#">SC.7.E.6.5:</a>	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.
<a href="#">SC.7.E.6.6:</a>	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.
<a href="#">SC.7.E.6.7:</a>	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.
<a href="#">SC.7.L.15.1:</a>	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
<a href="#">SC.7.L.15.2:</a>	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
<a href="#">SC.7.L.15.3:</a>	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.
<a href="#">SC.7.L.16.1:</a>	Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.
<a href="#">SC.7.L.16.1:</a>	<b>Remarks/Examples:</b> Integrate <a href="#">HE.7.C.1.4</a> . Describe how <a href="#">heredity</a> can affect personal health.
<a href="#">SC.7.L.16.2:</a>	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.
<a href="#">SC.7.L.16.3:</a>	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.
<a href="#">SC.7.L.16.4:</a>	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.
<a href="#">SC.7.L.16.4:</a>	<b>Remarks/Examples:</b> Integrate <a href="#">HE.7.C.1.4</a> . Describe how <a href="#">heredity</a> can affect personal health.
<a href="#">SC.7.L.17.1:</a>	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
<a href="#">SC.7.L.17.2:</a>	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
<a href="#">SC.7.L.17.3:</a>	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.
<a href="#">SC.7.N.1.1:</a>	Define a problem from the seventh grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.
<a href="#">SC.7.N.1.1:</a>	<b>Remarks/Examples:</b> Florida Standards Connections: LAFS.68.RST.1.3. Follow precisely a multistep procedure when carrying out <a href="#">experiments</a> , taking measurements, or performing technical tasks.
<a href="#">SC.7.N.1.2:</a>	Differentiate replication (by others) from repetition (multiple trials).
<a href="#">SC.7.N.1.3:</a>	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.
<a href="#">SC.7.N.1.4:</a>	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.
<a href="#">SC.7.N.1.5:</a>	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.
<a href="#">SC.7.N.1.6:</a>	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.
<a href="#">SC.7.N.1.7:</a>	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.
<a href="#">SC.7.N.2.1:</a>	Identify an instance from the history of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.
<a href="#">SC.7.N.3.1:</a>	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.
<a href="#">SC.7.N.3.2:</a>	Identify the benefits and limitations of the use of scientific models.
<a href="#">SC.7.N.3.2:</a>	<b>Remarks/Examples:</b> Florida Standards Connections: MAFS.K12.MP.4: <a href="#">Model</a> with mathematics.
<a href="#">SC.7.P.10.1:</a>	Illustrate that the sun's energy arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.
<a href="#">SC.7.P.10.2:</a>	Observe and explain that light can be reflected, refracted, and/or absorbed.
<a href="#">SC.7.P.10.3:</a>	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.
<a href="#">SC.7.P.11.1:</a>	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.
<a href="#">SC.7.P.11.2:</a>	Investigate and describe the transformation of energy from one form to another.
<a href="#">SC.7.P.11.3:</a>	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.
<a href="#">SC.7.P.11.4:</a>	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.
	Describe and differentiate the layers of Earth and the interactions among them.

<a href="#">SC.912.E.6.1:</a>	<p><b>Remarks/Examples:</b> Recognize the importance of the study of seismic wave data and how it can be used to determine the internal structure, <u>density</u> variations, and dynamic processes between Earth's layers.</p>
	Connect surface features to surface processes that are responsible for their formation.
<a href="#">SC.912.E.6.2:</a>	<p><b>Remarks/Examples:</b> Identify various landforms (e.g. <u>dunes</u>, lakes, sinkholes, aquifers) and describe how they form (<u>erosion</u>, physical/chemical weathering, and <u>deposition</u>). Explain how sea level changes over time have exposed and inundated continental shelves, created and destroyed inland seas, and shaped the surface of the Earth.</p>
	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.
<a href="#">SC.912.E.6.3:</a>	<p><b>Remarks/Examples:</b> Discuss the development of plate tectonic theory, which is derived from the combination of two theories: continental drift and seafloor spreading. Compare and contrast the three primary types of plate boundaries (convergent, divergent, and transform). Explain the origin of geologic features and processes that result from plate tectonics (e.g. <u>earthquakes</u>, volcanoes, trenches, mid-ocean ridges, island arcs and chains, hot spots, <u>earthquake</u> distribution, tsunamis, mountain ranges).</p>
	Discuss distinguishing characteristics of the domains and kingdoms of living organisms.
<a href="#">SC.912.L.15.6:</a>	<p><b>Remarks/Examples:</b> Annually Assessed on Biology EOC. Also assesses <a href="#">SC.912.L.15.4</a> <a href="#">SC.912.L.15.5</a> <a href="#">SC.912.N.1.3</a> and <a href="#">SC.912.N.1.6</a>.</p>
	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
<a href="#">SC.912.L.15.13:</a>	<p><b>Remarks/Examples:</b> Annually assessed on Biology EOC. Also assesses <a href="#">SC.912.L.15.14</a>, <a href="#">SC.912.L.15.15</a>, and <a href="#">SC.912.N.1.3</a>.</p>
<a href="#">SC.912.L.16.2:</a>	Discuss observed inheritance patterns caused by various modes of inheritance, including dominant, recessive, codominant, sex-linked, polygenic, and multiple alleles.
<a href="#">SC.912.L.16.16:</a>	Describe the process of meiosis, including independent assortment and crossing over. Explain how reduction division results in the formation of haploid gametes or spores.
<a href="#">SC.912.L.17.6:</a>	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism.
	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
<a href="#">SC.912.L.17.9:</a>	<p><b>Remarks/Examples:</b> Annually assessed on Biology EOC. Also assesses <a href="#">SC.912.E.7.1</a>.</p>
	Differentiate among the various forms of energy and recognize that they can be transformed from one form to others.
<a href="#">SC.912.P.10.1:</a>	<p><b>Remarks/Examples:</b> Differentiate between kinetic and potential <u>energy</u>. Recognize that <u>energy</u> cannot be created or destroyed, only transformed. Identify examples of transformation of <u>energy</u>: <u>Heat</u> to <u>light</u> in incandescent electric <u>light</u> bulbs <u>Light</u> to <u>heat</u> in laser drills Electrical to sound in radios Sound to electrical in microphones Electrical to chemical in battery rechargers Chemical to electrical in dry <u>cells</u> Mechanical to electrical in generators [power plants] Nuclear to <u>heat</u> in nuclear reactors Gravitational potential <u>energy</u> of a falling object is converted to <u>kinetic energy</u> then to <u>heat</u> and sound <u>energy</u> when the object hits the ground.</p>
	Relate temperature to the average molecular kinetic energy.
<a href="#">SC.912.P.10.5:</a>	<p><b>Remarks/Examples:</b> Recognize that the internal energy of an object includes the energy of random <u>motion</u> of the object's <u>atoms</u> and <u>molecules</u>, often referred to as thermal energy.</p>
<a href="#">LAFS.68.RST.1.1:</a>	Cite specific textual evidence to support analysis of science and technical texts.
<a href="#">LAFS.68.RST.1.2:</a>	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
<a href="#">LAFS.68.RST.1.3:</a>	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
<a href="#">LAFS.68.RST.2.4:</a>	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
<a href="#">LAFS.68.RST.2.5:</a>	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.
<a href="#">LAFS.68.RST.2.6:</a>	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.
<a href="#">LAFS.68.RST.3.7:</a>	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
<a href="#">LAFS.68.RST.3.8:</a>	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
<a href="#">LAFS.68.RST.3.9:</a>	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
	Write arguments focused on discipline-specific content.
<a href="#">LAFS.68.WHST.1.1:</a>	<ol style="list-style-type: none"> <li>Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.</li> <li>Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.</li> <li>Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.</li> <li>Establish and maintain a formal style.</li> <li>Provide a concluding statement or section that follows from and supports the argument presented.</li> </ol>
	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
	<ol style="list-style-type: none"> <li>Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.</li> </ol>

<a href="#">LAFS.68.WHST.1.2:</a>	<p>b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.</p> <p>c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.</p> <p>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.</p> <p>e. Establish and maintain a formal style and objective tone.</p> <p>f. Provide a concluding statement or section that follows from and supports the information or explanation presented.</p>
<a href="#">LAFS.68.WHST.2.4:</a>	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
<a href="#">LAFS.68.WHST.2.5:</a>	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
<a href="#">LAFS.68.WHST.2.6:</a>	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
<a href="#">LAFS.68.WHST.3.7:</a>	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
<a href="#">LAFS.68.WHST.3.8:</a>	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
<a href="#">LAFS.68.WHST.3.9:</a>	Draw evidence from informational texts to support analysis, reflection, and research.
<a href="#">LAFS.68.WHST.4.10:</a>	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.
<a href="#">LAFS.7.SL.1.2:</a>	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
<a href="#">LAFS.7.SL.1.3:</a>	<b>Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.</b>
<a href="#">LAFS.7.SL.2.4:</a>	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
<a href="#">LAFS.7.SL.2.5:</a>	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
<a href="#">MAFS.7.SP.2.4:</a>	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
<a href="#">MAFS.7.SP.3.5:</a>	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
<a href="#">MAFS.8.SP.1.4:</a>	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?
<a href="#">ELD.K12.ELL.SC.1:</a>	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.
<a href="#">ELD.K12.ELL.SI.1:</a>	English language learners communicate for social and instructional purposes within the school setting.
<a href="#">HE.7.C.1.3:</a>	Analyze how environmental factors affect personal health. <div style="border: 1px solid black; padding: 5px;"> <p><b>Remarks/Examples:</b> Food refrigeration, appropriate home heating and cooling, air/water quality, and garbage/trash collection.</p> </div>
<a href="#">HE.7.C.1.7:</a>	Describe how heredity can affect personal health. <div style="border: 1px solid black; padding: 5px;"> <p><b>Remarks/Examples:</b> Sickle-cell anemia, diabetes, and acne.</p> </div>

## Related Certifications

<a href="#">Science (Secondary Grades 7-12)</a>
<a href="#">Middle Grades Integrated Curriculum (Middle Grades 5-9)</a>
<a href="#">Physics (Grades 6-12)</a>
<a href="#">Earth/Space Science (Grades 6-12)</a>
<a href="#">Middle Grades General Science (Middle Grades 5-9)</a>
<a href="#">Chemistry (Grades 6-12)</a>
<a href="#">Biology (Grades 6-12)</a>

There are more than 1148 related instructional/educational resources available for this on CPALMS. Click on the following link to access them: <http://www.cpalms.org/Public/PreviewCourse/Preview/13073>