

Twelfth Grade Science  
First Nine Weeks

**Environmental Science**

**Earth and Space Sciences**

**D.** Summarize the historical development of scientific theories and ideas and describe emerging issues in the study of Earth and space sciences.

**Life Sciences**

**B.** Explain how humans are connected to and impact natural systems.

**F.** Explain how human choices today will affect the quality and quantity of life on earth.

**Science and Technology**

**A 1** Explain how science often advances with the introduction of new technologies and how solving technological problems often results in new scientific knowledge.

**A 2** Describe how new technologies often extend the current levels of scientific understanding and introduce new areas of research.

**A 3.** Research how scientific inquiry is driven by the desire to understand the natural world and how technological design is driven by the need to meet human needs and solve human problems.

**A 4.** Explain why basic concepts and principles of science and technology should be a part of active debate about the economics, policies, politics and ethics of various science-related and technology-related challenges.

**Science Inquiry**

**A 1.** Formulate testable hypotheses. Develop and explain the appropriate procedures, controls and variables (dependent and independent) in scientific experimentation.

**A 4.** Create and clarify the method, procedures, controls and variables in complex scientific investigations.

**Scientific Ways of Knowing**

**A 1.** Give examples that show how science is a social endeavor in which scientists share their knowledge with the expectation that it will be challenged continuously by the scientific community and others.

**A 2.** Evaluate scientific investigations by reviewing current scientific knowledge and the experimental procedures used, examining the evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence and suggesting alternative explanations for the same observations.

**A 3.** Select a scientific model, concept or theory and explain how it has been revised over time based on new knowledge, perceptions or technology.

**A 4.** Analyze a set of data to derive a principle and then apply that principle to a similar phenomenon (e.g., predator-prey relationships and properties of semiconductors).

**A 5.** Describe how individuals and teams contribute to science and engineering at different levels of complexity (e.g., an individual may conduct basic field studies, hundreds of people may work together on major scientific questions or technical problem).

**C 6.** Explain that scientists may develop and apply ethical tests to evaluate the consequences of their research when appropriate.

**Scientific Ways of Knowing Cont.**

**C 7.** Describe the current and historical contributions of diverse peoples and cultures to science and technology and the scarcity and inaccessibility of information on some of these contributions.

**C 8.** Recognize that individuals and society must decide on proposals involving new research and the introduction of new technologies into society. Decisions involve assessment of alternatives, risks, costs and benefits and consideration of who benefits and who suffers, who pays and gains, and what the risks are and who bears them.

**C 9.** Recognize the appropriateness and value of basic questions "What can happen?" "What are the odds?" and "How do scientists and engineers know what will happen?"

**C 10.** Recognize that social issues and challenges can affect progress in science and technology (e.g., Funding priorities for specific health problems serve as example of ways that social issues influence science and technology.)

**C 11.** Research how advances in scientific knowledge have impacted society on a local, national or global level.

**Physics**

**Physical Sciences**

**D 5.** Use and apply the laws of motion to analyze, describe and predict the effects of forces on the motions of objects mathematically.

**E 14.** Use historical examples to explain how new ideas are limited by the context in which they are conceived; are often initially rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly through contributions from many different investigators (e.g., nuclear energy, quantum theory and theory of relativity).

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**Science Inquiry**

**A 2.** Derive simple mathematical relationships that have predictive power from experimental data (e.g., derive an equation from a graph and vice versa, determine whether a linear or exponential relationship exists among the data in a table).

**A 4.** Create and clarify the method, procedures, controls and variables in complex scientific investigations.

**A 5.** Use appropriate summary statistics to analyze and describe data.

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**Zoology**

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**A 1.** Recognize that information stored in DNA provides the instructions for assembling protein molecules used by the cells that determine the characteristics of the organism.

**A 2.** Explain why specialized cells/structures are useful to plants and animals (e.g., stoma, phloem, xylem, blood, nerve, muscle, egg and sperm).

**A 3.** Explain that the sun is essentially the primary source of energy for life. Plants capture energy by absorbing light and using it to form strong (covalent) chemical bonds between the atoms of carbon-containing (organic) molecules.

**A 4.** Explain that carbon-containing molecules can be used to assemble larger molecules with biological activity (including proteins, DNA, sugars and fats). In addition, the energy stored in bonds between the atoms (chemical energy) can be used as sources of energy for life processes.

**E 9.** Explain why and how living systems require a continuous input of energy to maintain their chemical and physical organization. Explain that with death and the cessation of energy input, living systems rapidly disintegrate toward more disorganized states.

**F.** Explain how human choices today will affect the quality and quantity of life on earth.

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**Chemistry**

**Earth and Space Sciences**

**A 1.** Explain how scientists obtain information about the universe by using technology to detect electromagnetic radiation that is emitted, reflected or absorbed by stars and other objects.

**Physical Sciences**

**A 1.** Explain how atoms join with one another in various combinations in distinct molecules or in repeating crystal patterns.

**C 13.** Explain how atoms and molecules can gain or lose energy in particular discrete amounts (quanta or packets); therefore they can only absorb or emit light at the wavelengths corresponding to these amounts.

**E 14.** Use historical examples to explain how new ideas are limited by the context in which they are conceived; are often initially rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly through contributions from many different investigators (e.g., nuclear energy, quantum theory and theory of relativity).

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**Science Inquiry**

**A 3.** Research and apply appropriate safety precautions when designing and/or conducting scientific investigations (e.g., OSHA<MSDS, eyewash, goggles and ventilation.

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