

Eleventh Grade Science
First Nine Weeks

Environmental Science

Earth and Space Sciences

- A 1.** Describe how the early Earth was different from the planet we live on today, and explain the formation of the sun, Earth and the rest of the solar system from a nebular cloud of dust and gas approximately 4.5 billion years ago.
- B 2.** Analyze how the regular and predictable motions of Earth, sun and moon explain phenomena on Earth (e.g., seasons, tides, eclipses and phases of the moon).
- B 3.** Explain heat and energy transfers in and out of the atmosphere and its involvement in weather and climate (radiation, conduction, convection and advection).
- B 4.** Explain the impact of oceanic and atmospheric currents on weather and climate.
- B 5.** Use appropriate data to analyze and predict upcoming trends in global weather patterns (e.g., el Niño and la Niña, melting glaciers and icecaps and changes in ocean surface temperatures).
- B 6.** Explain how interactions among Earth's lithosphere, hydrosphere, atmosphere and biosphere have resulted in the ongoing changes of Earth's system.
- B 7.** Describe the effects of particulates and gases in the atmosphere including those originating from volcanic activity.
- B 8.** Describe the normal adjustments of Earth, which may be hazardous for humans. Recognize that humans live at the interface between the atmosphere driven by solar energy and the upper mantle where convection creates changes in Earth's solid crust. Realize that as societies have grown, become stable and come to value aspects of the environment, vulnerability to natural processes of change has increased.

Earth and Space Sciences Cont.

- B 9.** Interpret weather maps and their symbols to predict changing weather conditions worldwide (e.g., monsoons, hurricanes and cyclones).
- B 10.** Interpret weather maps and their symbols to predict changing weather conditions worldwide (e.g., monsoons, hurricanes and cyclones).
- D 15.** Use historical examples to show how new ideas are limited by the context in which they are conceived; are often reflected by the social establishment: sometimes spring from unexpected findings; usually grow slowly through contributions from many different investigators (e.g., global warming, Heliocentric Theory and Theory of Continental Drift)
- D 16.** Describe advances in Earth and space science that have important long-lasting effects on science and society (e.g., global warming, Heliocentric Theory and Plate Tectonics Theory).

Life Sciences

- D 12.** Recognize that ecosystems change when significant climate changes occur or when one or more new species appear as a result of immigration or speciation.
- D 14.** Describe how geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Recognize that current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.
- E 6.** Predict some possible impacts on an ecosystem with the introduction of a non-native species.

Science and Technology

- A 1.** Identify that science and technology are essential social enterprises but alone they can only indicate what can happen, not what should happen. Realize the latter involves human decisions about the use of knowledge.
- A 2** Predict how decisions regarding the implementation of technologies involve the weighing of trade-offs between predicted positive and negative effects on the environment and and/or humans.

Scientific Ways of Knowing

- A 1.** Analyze a set of data to derive a hypothesis and apply that hypothesis to a similar phenomenon (e.g., biome data).
- A 2.** Apply scientific inquiry to evaluate results of scientific investigations, observations, theoretical models and the explanations proposed by other scientists.
- A 3.** Demonstrate that scientific explanations adhere to established criteria, for example a proposed explanation must be logically consistent, it must abide by the rules of evidence and it must be open to questions and modifications.
- A 4.** Explain why scientists can assume that the universe is a vast single system in which the basic rules are the same everywhere.
- A 7.** Explain how theories are judged by how well they fit with other theories, the range of included observations, how well they explain observations and how effective they are in predicting new findings.
- B 5.** Recognize that bias affects outcomes. People tend to ignore evidence that challenges their beliefs but accept evidence that supports their beliefs. Scientists attempt to avoid bias in their work.

Scientific Ways of Knowing Cont.

- B 6.** Describe the strongly held traditions

- of science that serve to keep scientists within the bounds of ethical professional behavior.
- C 8.** Explain that the decision to develop a new technology is influenced by societal opinions and demands and by cost benefit considerations.
- C 9.** Explain how natural and human-induced hazards present the need for humans to assess potential danger and risk. Many changes in the environment designed by humans bring benefits to society as well as cause risks.
- C 10.** Describe costs and trade-offs of various hazards – ranging from those with minor risk to a few people, to major catastrophes with major risk to many people. The scale of events and the accuracy with which scientists and engineers can (and cannot) predict events are important considerations.
- C 11.** Research the role of science and technology in careers that students plan to pursue.

Physical Science

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Zoology

Life Sciences

A 1. Describe how the maintenance of a relatively stable internal environment is required for the continuation of life, and explain how stability is challenged by changing physical, chemical and environmental conditions as well as the presence of pathogens.

A 2. Recognize that chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken and new compounds with lower energy bonds are formed. Some of this energy is released as thermal energy.

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Chemistry

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Physical Sciences

A 1. Explain that elements with the same number of protons may or may not have the same mass and those with different masses (different numbers of neutrons) are called isotopes. Some of these are radioactive.

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