



Earth and Space Science

1. NATURE OF SCIENCE

Standard 1.1: Understand the nature of scientific inquiry (*Understand and use the scientific method*)

- 1.1.1 Ask scientific questions
- 1.1.4 Implement and revise experimental procedures.
- 1.1.5 Collect and organize raw data
- 1.1.6 Process and present data.

Standard 1.2: Communicate scientific ideas and activities clearly

- 1.2.1 Compare results with published accepted values
- 1.2.2 State a justifiable conclusion.
- 1.2.3 Evaluate weaknesses and limitations and recommend improvements.
- 1.2.4 Explain how and why ethical consideration can limit scientific research

Standard 1.3: Investigate using appropriate tools and instruments to conduct scientific activities

- 1.3.1 Use technology and mathematics to perform accurate scientific investigations and communication
- 1.3.2 Choose/use scientific tools appropriately

Standard 1.4: Understand the nature of scientific knowledge and enterprise (*Understand why science is important*)

- 1.4.1 Recognize the dynamic nature of scientific knowledge.
- 1.4.2 Peer review and reflect on scientific questions

2. LIFE SCIENCES

Standard 2.2: Understand the structure and function of cells and organisms

- 2.2.1 Describe the structures and functions of the basic elements and molecules of living organisms

Standard 2.4: Understand the cycling of matter and the flow of energy through ecosystems

- 2.4.2 Describe and distinguish between energy flows and nutrient cycles
- 2.4.3 Discuss sources and sinks in matter and energy cycles
- 2.4.4 Describe the laws of thermodynamics and apply the principles to an ecosystem.

3. PHYSICAL SCIENCES

Standard 3.1: Understand the sources and properties of matter

- 3.1.3 Characterize the states of matter

Standard 3.2: Understand the sources and properties of energy

- 3.2.1 Know that energy and matter are interchangeable
- 3.2.2 Explain the conservation of energy and how it applies to energy transformation
- 3.2.4 Explain and apply the different forms of energy transfer

4. EARTH AND BEYOND

Standard 4.1 Understand the composition, structure and features of the geosphere, hydrosphere and atmosphere

- 4.2.1 Know that elements exist in fixed amounts and move through the solid Earth, oceans, atmosphere, and living things as part of geochemical cycles (e.g., carbon cycle, nitrogen cycle)
- 4.2.2 Determine the nutrient content and texture of soil and its effect on soil productivity
- 4.2.3 Explain how convection currents drive the process of plate tectonics and its impact on the earth's surface
- 4.2.4 Know methods used to estimate geological time.
- 4.2.5 Know the conditions on Earth that enable it to support life.
- 4.2.6 Know how heat and energy transfer in and out of the atmosphere influences ocean cycles, weather and climate.
- 4.2.7 Know the major sources of energy on Earth.



Earth and Space Science

Standard 4.2 Understand the composition and structure of the universe and the Earth's place in it

- 4.2.1 Explain the appearance, composition and life cycle of stars.
- 4.2.2 Describe the scientific accomplishments of astronomers, the historical and cultural context, and influence of their work.
- 4.2.3 Explain current scientific theory about the age, origin, and on-going evolution of the universe.
- 4.2.4 Describe the characteristics of planetary system.
- 4.2.5 Describe the technology used to explore the universe.

5. ENVIRONMENTAL SCIENCES

Standard 5.1 Understand atmospheric processes and cycles

- 5.1.1 Interpret biogeochemical cycles including hydrologic, nitrogen, oxygen and carbon cycles.
- 5.1.2 Recognize that energy is not recycled in ecosystems.
- 5.1.5 Distinguish between abiotic and biotic factors in an ecosystem and describe how matter and energy move between these.

Standard 5.2 Understand how society uses and conserves resources and energy

- 5.2.1 Identify and evaluate multiple uses of natural resources and how society is influence by the availability of these resources.
- 5.2.2 Assess how changes in the availability and use of natural resources will affect society and human activities
- 5.2.3 Describe the relationship of energy consumption and living standards of societies.

Standard 5.3 Identify, investigate and evaluate environmental problems and issues

- 5.3.1 Describe changes in the rates of human population growth in various societies and the factors associated with those changes related to economic and environmental sustainability.
- 5.3.2 Explain the concept of exported/imported pollution (e.g., Global Warming)

Standard 5.4 Develop an understanding and commitment to environmental responsibility

- 5.4.1 Predict population response to changes in environmental conditions.
- 5.4.2 Understand the risks of producing pollutants.