

## NEW JERSEY CORE CURRICULUM CONTENT STANDARDS – SCIENCE K-12

**5.1 Science Practices:** All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.

- A. Understand Scientific Explanations:** Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.
- B. Generate Scientific Evidence Through Active Investigations:** Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.
- C. Reflect on Scientific Knowledge:** Scientific knowledge builds on itself over time.
- D. Participate Productively in Science:** The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms.

**5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

- A. Properties of Matter:** All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.
- B. Changes in Matter:** Substances can undergo physical or chemical changes to form new substances. Each change involves energy.
- C. Forms of Energy:** Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.
- D. Energy Transfer and Conservation:** The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.
- E. Forces and Motion:** It takes energy to change the motion of objects. The energy change is understood in terms of forces.

**5.3 Life Science:** All students will understand that life science principles are powerful conceptual tools for making sense of the complexity, diversity, and interconnectedness of life on Earth. Order in natural systems arises in accordance with rules that govern the physical world, and the order of natural systems can be modeled and predicted through the use of mathematics.

- A. Organization and Development:** Living organisms are composed of cellular units (structures) that carry out functions required for life. Cellular units are composed of molecules, which also carry out biological functions.
- B. Matter and Energy Transformations:** Food is required for energy and building cellular materials. Organisms in an ecosystem have different ways of obtaining food, and some organisms obtain their food directly from other organisms.
- C. Interdependence:** All animals and most plants depend on both other organisms and their environment to meet their basic needs.

- D. Heredity and Reproduction:** Organisms reproduce, develop, and have predictable life cycles. Organisms contain genetic information that influences their traits, and they pass this on to their offspring during reproduction.
- E. Evolution and Diversity:** Sometimes, differences between organisms of the same kind provide advantages for surviving and reproducing in different environments. These selective differences may lead to dramatic changes in characteristics of organisms in a population over extremely long periods of time.

**5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

- A. Objects in the Universe:** Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.
- B. History of Earth:** From the time that Earth formed from a nebula 4.6 billion years ago, it has been evolving as a result of geologic, biological, physical, and chemical processes.
- C. Properties of Earth Materials:** Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.
- D. Tectonics:** The theory of plate tectonics provides a framework for understanding the dynamic processes within and on Earth.
- E. Energy in Earth Systems:** Internal and external sources of energy drive Earth systems.
- F. Climate and Weather:** Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.
- G. Bio-geochemical Cycles:** The bio-geochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity.