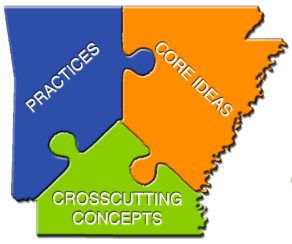


ARKANSAS
K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

Fundamental Science Content
6th Grade

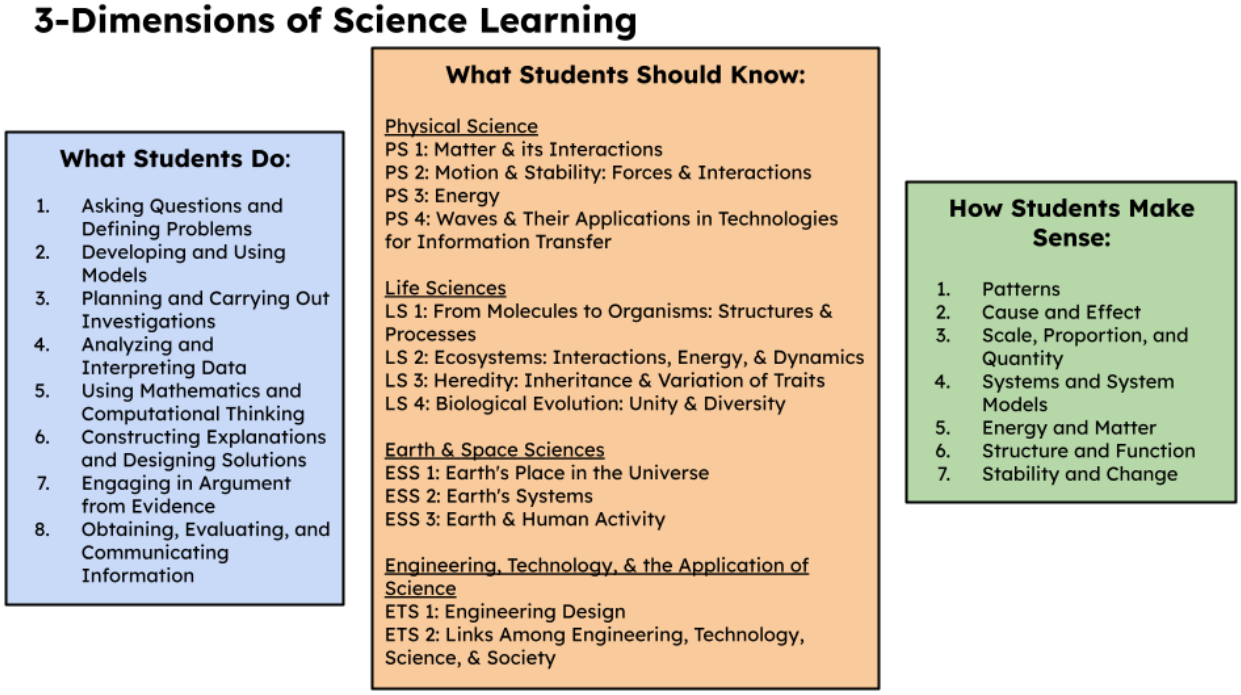
2023

The Arkansas K-12 Science Standards are available here. The standards are three-dimensional, consisting of a Science and Engineering Practice (SEP), a Disciplinary Core Idea (DCI), and a Cross Cutting Concept (CCC). By the end of the grade level, students should be able to demonstrate the full scope of the standard. Example:

The focus of this document is specifically on the science core ideas in 6th grade. In Arkansas K-12 Science Standards, science content is found in the DCI portion of each standard. Three-dimensional learning and assessment best prepares students for success so that students have the opportunity to demonstrate both what they know *and* can do in science. Refer to the full standards document to find the corresponding science and engineering practice and cross cutting concept for each standard. The core ideas are organized into the following domains of science:

- Physical Science
- Life Science
- Earth & Space Science
- Engineering Technology & Applications of Science

Each domain contains core ideas organized into component ideas. By the end of 6th grade, students are expected to know the bulleted information under each component idea. Standards that address the bulleted information are included in parentheses and those with an asterisk include an engineering component.



Physical Science

*Asterisks indicate best opportunities to integrate ETS performance expectations into content.

Energy
Definitions of Energy
• Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (6-PS3-3*, 6-PS3-4)
Conservation & Transfer of Energy
• When the motion energy of an object changes, there is some other change in energy at the same time. (6-PS3-5)
• The amount of energy transfer needed to change the temperature of a matter sample depends on the nature of the matter, the size of the sample, and the environment. (6-PS3-4)
• Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (6-PS3-3*)

Life Science

Molecules to Organisms
Structure & Function
• All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (6-LS1-1)
• Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (6-LS1-2)
• In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (6-LS1-3)
Growth & Development
• Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (6-LS3-2)
• Animals engage in characteristic behaviors that increase the odds of reproduction. (6-LS1-4)
• Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (6-LS1-4)
• Genetic factors as well as local conditions affect the growth of the adult plant. (6-LS1-5)
• Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (6-LS3-2)
Information Processing

• Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (6-LS1-8)
Heredity & Variation of Traits
Variation of Traits
• In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (6-LS3-2)

Earth & Space Science

*Asterisks indicate best opportunities to integrate ETS performance expectations into content.

Earth's Systems
Roles of Water on Earth's Processes
• Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (6-ESS2-4)
• Global movements of water and its changes in form are propelled by sunlight and gravity. (6-ESS2-4)
• The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (6-ESS2-5)
• Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (6-ESS2-6)
Weather and Climate
• Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (6-ESS2-6)
• Because these patterns are so complex, weather can only be predicted probabilistically. (6-ESS2-5)
• The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (6-ESS2-6)
Earth and Human Activity
Human Impacts on Earth Systems
• Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (6-ESS3-3*)
• Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (6-ESS3-3*, 6-ESS3-4)

Global Climate Change
• Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (6-ESS3-5)

Engineering, Technology, and Applications of Science

Engineering Design
Defining Engineering Problems
• The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (6-ETS1-1)
Developing Possible Solutions
• A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (6-ETS1-4)
• There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (6-ETS1-2, 6-ETS1-3)
• Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (6-ETS1-3)
• Models of all kinds are important for testing solutions. (6-ETS1-4)
Optimizing the Design Solution
• Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process, some of those characteristics may be incorporated into the new design. (6-ETS1-3)
• The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (6-ETS1-4)