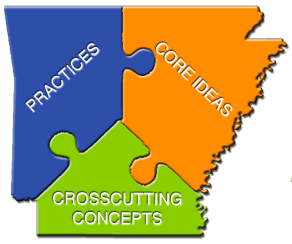


ARKANSAS
K-12 SCIENCE STANDARDS

EDUCATION FOR A NEW GENERATION

Fundamental Science Content

5th Grade

2023

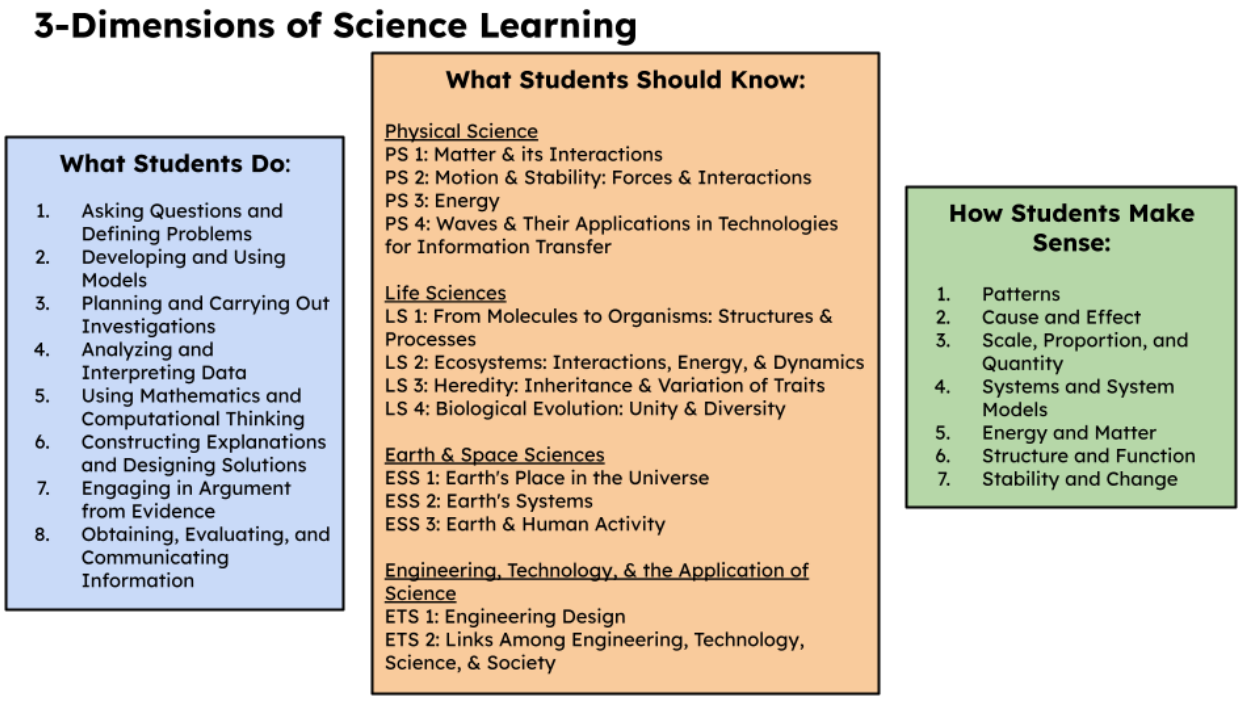
The Arkansas K-12 Science Standards are available here. The standards are three-dimensional, consisting of a Science and Engineering Practice (SEP), a Disciplinary Core Idea (DCI), and a Cross Cutting Concept (CCC). By the end of the grade level, students should be able to demonstrate the full scope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

SEP CCC DCI
5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

The focus of this document is specifically on the science core ideas in 5th 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 5th grade, students are expected to know the bulleted information under each component idea. Standards that address the bulleted information are included in parentheses



Physical Science

Matter
Structure & Properties of Matter
• Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. (5-PS1-1)
• The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)
• Measurements of a variety of properties can be used to identify materials. (5-PS1-3)
Chemical Reactions
• When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)
• No matter what reaction or change in properties occurs, the total weight of the substances does not change. (5-PS1-2)
Motion & Stability
Types of Interactions
• The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)
Energy
Energy in Everyday Life
• The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter *(from air and water)*. (5-PS3-1)

Life Science

Molecules to Organisms
Organization of Matter & Energy Flow
• Plants acquire their material for growth chiefly from air and water. (5-LS1-1)
• Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)
Ecosystems
Interdependent Relationships
• The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and

animals) and therefore operate as “decomposers.” Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. (5-LS2-1)
• A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

Earth & Space Science

Earth’s Place in the Universe
The Universe and its Stars
• The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)
Earth and the Solar System
• The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)
Earth’s Systems
Earth’s Materials
• Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)
The Role of Water on Earth’s Processes
• Nearly all of Earth’s available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)
Earth and Human Activity
Human Impacts on Earth Systems
• Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments. (5-ESS3-1)

Engineering, Technology, and Applications of Science

Engineering Design
Defining Engineering Problems
• Possible solutions to a problem are limited by criteria and constraints. Solutions can be compared on the basis of how well each one meets criteria for success and takes constraints into account. (5-ETS1-1)
Developing Possible Solutions
• Solutions to problems require research. Testing a solution involves investigating how well it solves the problem or fulfills the need. (5-ETS1-2)
• Communicating with peers about proposed solutions is a critical component of the design process, and shared ideas can lead to improved designs. (5-ETS1-2)
• Tests can be designed to reveal failure points or difficulties that indicate areas for improvement of the design (5-ETS1-3)
Optimizing the Design Solution
• Multiple solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (5-ETS1-3)