

Introduction to Science

Science for young children, birth through grade 3, is focused on developing habits of mind such as curiosity, questioning, openness to new ideas, and persistence. This is a time when children are experiencing the world around them and enthusiastically constructing knowledge. Science should be relevant, concrete, and at children's fingertips, allowing for understanding through their senses. Emphasis is on aspects of the natural world that can be explored. The younger the child, the more tangible the experience should be.

Within VELs, science is divided into the elements of physical, life, earth and space science, and engineering design. The indicators for each element provide clear descriptions of what children should know, understand and be able to do by the end of an age span/grade level. For kindergarten through grade three, the performance expectations from the Next Generation Science Standards (NGSS) are included as the indicators. These indicators thoughtfully weave together science and engineering practices, core ideas, and cross-cutting concepts. (For additional information about specific standards please go to the NGSS website at <http://www.nextgenscience.org/>.)

Children should experience science learning opportunities within a context of science engineering practices These practices include:

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument based on evidence
- Obtaining, evaluating and communicating information

The emphasis on practices reinforces the need for children to actively engage in investigations that enable them to construct an understanding of the natural world that surrounds them. Educators need the skills and knowledge to support young children's ways of thinking and investigating their world.

Additionally, cross-cutting concepts that are threaded throughout the physical, life, and earth/space sciences are considered learning goals necessary to achieve science literacy. They serve as "connective tissue" across the domains of science and allow children to develop coherent, predictable views of the natural world.

The cross-cutting concepts that need to be carefully woven into science experiences that are also rich with content and opportunities for children to work like scientists include:

- Patterns
- Cause-and-effect relationships
- Cycles, sustainability (stability and change)
- Scale/proportion/quantity systems
- Structure/function

In addition to quality science experiences, young children should be provided with engineering design challenges. Engineers ask questions; imagine possibilities; and then plan, design, and construct solutions. They revisit their work and make improvements.

Children are born engineers! They are fascinated by intriguing problems and delight in building, taking things apart, and investigating how things work.