Next Generation Science Standards as related to gardening and life sciences

In elementary school, students begin by recognizing patterns and formulating answers to questions about the world around them. By the end of fifth grade, students are able to demonstrate proficiency in gathering, describing, and using information about the natural and designed world(s).

Science and Engineering Practices, students are expected to demonstrate grade-appropriate proficiency:

- Ask questions
- Develop and Use Models
- Plan and conduct investigations
- Analyze and interpret data
- Construct Explanations and Design Solutions
- Obtain, Evaluating, and Communicating Information
- Engage in Argument from Evidence (grade 4)
- Use mathematics and computational thinking (grade 5).

Kindergarten: Page 6
The performance expectations in kindergarten help students formulate answers to questions such as:
Where do animals live and why do they live there?

Students are also expected to develop an understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live.

First Grade: Page10
What happens when there is no light?
What are some ways plants and animals meet their needs so that they can survive and grow?

Students are expected to develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how behaviors of parents and offspring help the offspring survive. The understanding is developed that young plants and animals are like, but not exactly the same as, their parents.

Second Grade: Page 14
What do plants need to grow?
How many types of living things live in a place?

Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change.

Third Grade: Pages 19, 20
How do organisms vary in their traits?
How are plants, animals, and environments of the past similar or different from current plants, animals, and environments?
What happens to organisms when their environment changes?

Students are expected to develop an understanding of the similarities and differences of organisms' life cycles. An understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, is acquired by students at this level. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments. Third graders are expected to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

Fourth Grade: Page 25
How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?

Students are expected to develop understanding of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

Fourth graders are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Fifth Grade: Page 29
Where does the energy in food come from and what is it used for?
Can new substances be created by combining other substances?
How much water can be found in different places on Earth?
How does matter cycle through ecosystems?

Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth.
Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun.

Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

<u>Concepts of patterns,</u> organizing concepts for these disciplinary core ideas;

- cause and effect
- systems and system models
- interdependence of science, engineering, and technology
- influence of engineering, technology, and science on society and the natural world
- structure and function
- energy and matter
- stability and change
- scale, proportion, and quantity
- Use mathematics and computational thinking (grade 5).