

**NEXT GENERATION SCIENCE STANDARDS**  
**TOPICS BY GRADE LEVEL**  
**LIFE SCIENCE**  
**GRADE 7**

**STRUCTURE, FUNCTION AND INFORMATION PROCESSING**

- Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
- Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
- Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

**MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS**

- Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and release energy as this matter moves through an organism.
- Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

**INTERDEPENDENT RELATIONSHIPS IN ECOSYSTEMS**

- Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

**GROWTH, DEVELOPMENT AND REPRODUCTION OF ORGANISMS**

- Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

- Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

## **NATURAL SELECTION AND ADAPTIONS**

- Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
- Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

## **ENGINEERING DESIGN**

- Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

\*\*Go to [www.nextgenscience.org](http://www.nextgenscience.org) for Clarification Statements, Science and Engineering Practices, Disciplinary Core Ideas and Cross Cutting Concepts for each topic listed above. You will also find all of the connections to the Common Core for both ELA/Literacy and Mathematics.