

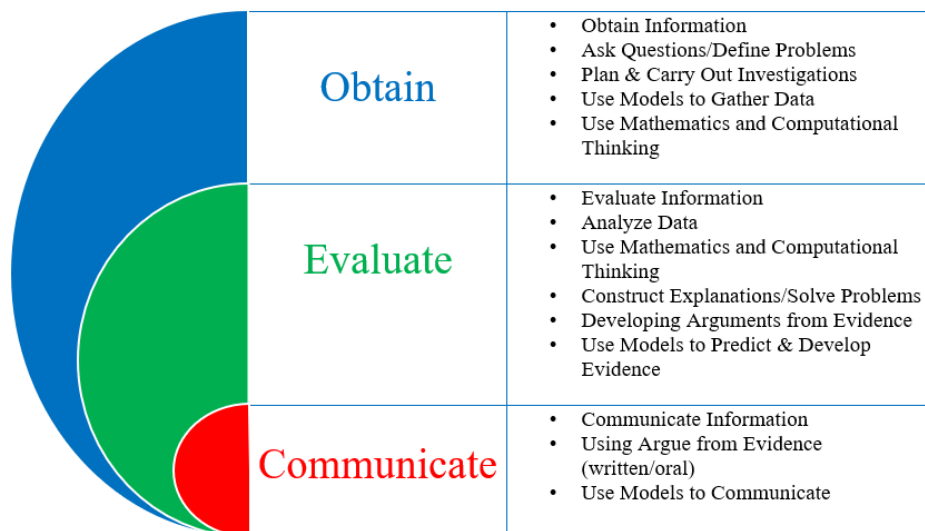
Color-coded Georgia Standards of Excellence

Each standard in K-12 science courses begin with “Obtain, evaluate, and communicate...” The common language was intended by writers to provide consistency throughout courses, highlight the science practices, and incorporate scientific literacy. Simply put, it is what scientists do.

Science and engineering practices:

- Asking questions (science) and defining problems (engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics, information and computer technology, and computational thinking
- Constructing explanations (science) and designing solutions (engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

The color-coded standards are a visual of how the specific elements of science standards engage *students* in obtaining, evaluating, and communicating information.



Various practices require students to obtain, evaluate, and communicate information simultaneously; see the following example of 7th grade life science:

S7L4c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.

The first part of the science practice involves *evaluating* information as students analyze and interpret data; in addition, since they are providing evidence, this practice also requires students to *communicate* their findings and analysis.

Life Science

S7L1. Obtain, evaluate, and communicate information to investigate the diversity of living organisms and how they can be compared scientifically.

- Develop and defend a model** that categorizes organisms based on common characteristics.
- Evaluate historical models** of how organisms were classified based on physical characteristics and how that led to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals).
(*Clarification statement:* This includes common examples and characteristics such as, but not limited to, prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures. Modern classification will be addressed in high school.)

S7L2. Obtain, evaluate, and communicate information to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms.

- Develop a model and construct an explanation** of how **cell structures** (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste.
(*Clarification statement:* The intent is for students to demonstrate how the component structures of the cell interact and work together to allow the cell as a whole to carry out various processes. Additional structures, beyond those listed, will be addressed in high school Biology.)
- Develop and use a conceptual model** of how **cells** are organized into tissues, tissues into organs, organs into systems, and systems into organisms.
- Construct an argument** that systems of the body (Cardiovascular, Excretory, Digestive, Respiratory, Muscular, Nervous, and Immune) interact with one another to carry out life processes.
(*Clarification statement:* The emphasis is not on learning individual structures and functions associated with each system, but on how systems interact to support life processes.)

S7L3. Obtain, evaluate, and communicate information to explain how organisms reproduce either sexually or asexually and transfer genetic information to determine the traits of their offspring.

- Construct an explanation** supported with scientific evidence of the role of genes and chromosomes in the process of inheriting a specific trait.
- Develop and use a model** to describe how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation.
(*Clarification statement:* Models could include, but are not limited to, the use of monohybrid Punnett squares to demonstrate the heritability of genes and the resulting genetic variation, identification of heterozygous and homozygous, and comparison of genotype vs. phenotype.)
- Ask questions to gather and synthesize information** about the ways humans influence the inheritance of desired traits in organisms through selective breeding.
(*Clarification statement:* The element specifically addresses artificial selection and the ways in which it is fundamentally different from natural selection.)

S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.

- Construct an explanation** for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem.

(*Clarification statement:* The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)

- b. **Develop a model** to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem.

(*Clarification statement:* Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.)

- c. **Analyze and interpret data to provide evidence** for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.
- d. **Ask questions to gather and synthesize information** from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rain forest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine).

(*Clarification statement:* Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)

57L5. Obtain, evaluate, and communicate information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics.

- a. **Use mathematical representations to evaluate** explanations of how natural selection leads to changes in specific traits of populations over successive generations.

(*Clarification statement:* Referencing data should be obtained from multiple sources including, but not limited to, existing research and simulations. Students should be able to calculate means, represent this data in a table or graph, and reference it when explaining the principles of natural selection.)

- b. **Construct an explanation** based on evidence that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species.
- c. **Analyze and interpret data** for patterns in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms.

(*Clarification statement:* Evidence of evolution found in comparisons of current/modern organisms such as homologous structures, DNA, and fetal development will be addressed in high school.)