

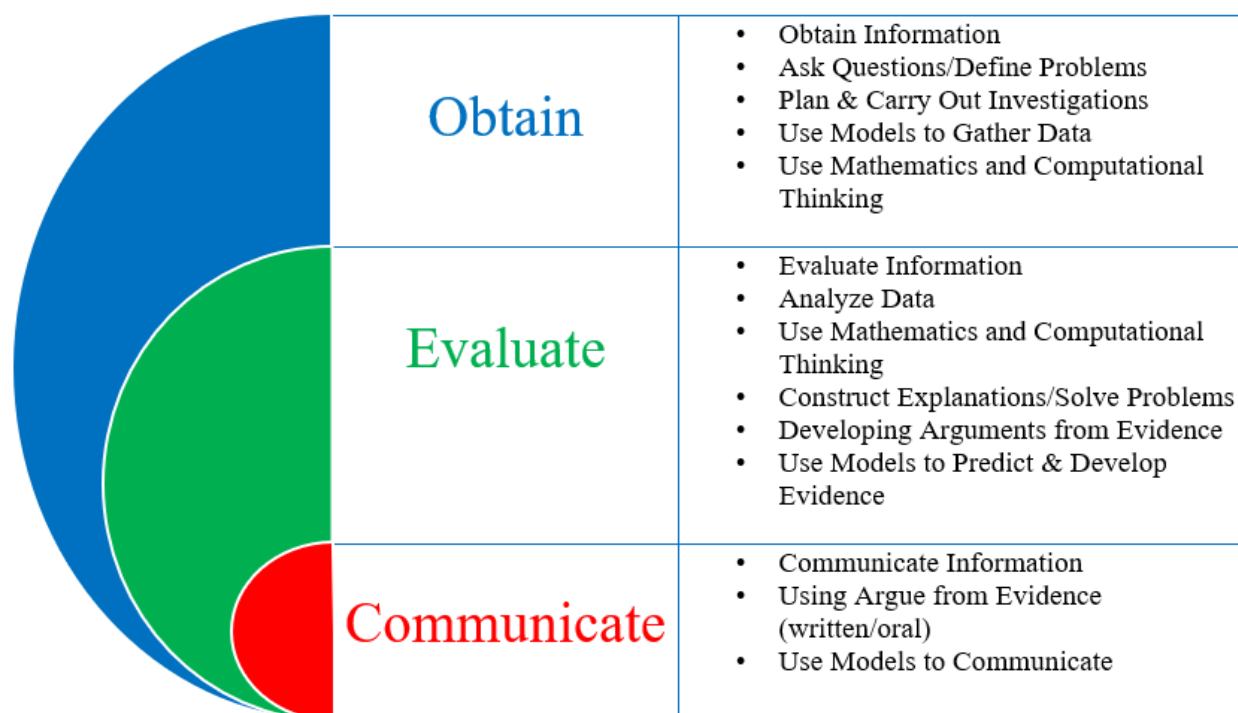
Color-coded Georgia Standards of Excellence

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.

Physical Science

S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.

- Develop and use a model** to compare and contrast pure substances (elements and compounds) and mixtures.
(*Clarification statement:* Include heterogeneous and homogeneous mixtures. Types of bonds and compounds will be addressed in high school physical science.)
- Develop and use models** to describe the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed.
- Plan and carry out investigations** to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling point) properties of matter.
- Construct an argument based on observational evidence** to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical.
(*Clarification statement:* Evidence could include ability to separate mixtures, development of a gas, formation of a precipitate, change in energy, color, and/or form.)
- Develop models** (e.g., atomic-level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, and electrons) and simple molecules.
- Construct an explanation based on evidence** to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants.
(*Clarification statement:* Evidence could include models such as balanced chemical equations.)

S8P2. Obtain, evaluate, and communicate information about the law of conservation of energy to develop arguments that energy can transform from one form to another within a system.

- Analyze and interpret data** to create graphical displays that illustrate the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object.
- Plan and carry out an investigation** to explain the transformation between kinetic and potential energy within a system (e.g., roller coasters, pendulums, rubber bands, etc.).
- Construct an argument to support a claim** about the type of energy transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light)].
- Plan and carry out investigations** on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or a gas (convection).

S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.

- Analyze and interpret data** to identify patterns in the relationships between speed and distance, and velocity and acceleration.
(*Clarification statement:* Students should be able to analyze motion graphs, but students should not be expected to calculate velocity or acceleration.)
- Construct an explanation** using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object.
- Construct an argument from evidence** to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia).

S8P4. Obtain, evaluate, and communicate information to support the claim that electromagnetic (light) waves behave differently than mechanical (sound) waves.

- a. **Ask questions to develop explanations** about the similarities and differences between electromagnetic and mechanical waves.
(*Clarification statement:* Include transverse and longitudinal waves and wave parts such as crest, trough, compressions, and rarefactions.)
- b. **Construct an explanation using data** to illustrate the relationship between the electromagnetic spectrum and energy.
- c. **Design a device to illustrate practical applications** of the electromagnetic spectrum (e.g., communication, medical, military).
- d. **Develop and use a model** to compare and contrast how light and sound waves are reflected, refracted, absorbed, diffracted or transmitted through various materials.
(*Clarification statement:* Include echo and how color is seen but do not cover interference and scattering.)
- e. **Analyze and interpret data** to predict patterns in the relationship between density of media and wave behavior (i.e., speed).
- f. **Develop and use a model** (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy.
- g. **Develop and use models** to demonstrate the effects that lenses have on light (i.e., formation an image) and their possible technological applications.

S8P5. Obtain, evaluate, and communicate information about gravity, electricity, and magnetism as major forces acting in nature.

- a. **Construct an argument using evidence** to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact.
- b. **Plan and carry out investigations** to demonstrate the distribution of charge in conductors and insulators.
(*Clarification statement:* Include conduction, induction, and friction.)
- c. **Plan and carry out investigations** to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces.
(*Clarification statement:* Including, but not limited to, generators or motors.)