

Science Georgia Standards of Excellence

Epidemiology Standards

The Science Georgia Standards of Excellence are designed to provide foundational knowledge and skills for all students to develop proficiency in science. The Project 2061's *Benchmarks for Science Literacy* and the follow up work, *A Framework for K-12 Science Education* were used as the core of the standards to determine appropriate content and process skills for students. The Science Georgia Standards of Excellence focus on a limited number of core disciplinary ideas and crosscutting concepts which build from Kindergarten to high school. The standards are written with the core knowledge to be mastered integrated with the science and engineering practices needed to engage in scientific inquiry and engineering design. Crosscutting concepts are used to make connections across different science disciplines.

The Science Georgia Standards of Excellence drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphasis of instruction. The standards are a required minimum set of expectations that show proficiency in science. However, instruction can extend beyond these minimum expectations to meet student needs.

Science consists of a way of thinking and investigating, as well a growing body of knowledge about the natural world. To become literate in science, students need to possess sufficient understanding of fundamental science content knowledge, the ability to engage in the science and engineering practices, and to use scientific and technological information correctly. Technology should be infused into the curriculum and the safety of the student should always be foremost in instruction.

The Epidemiology Georgia Standards of Excellence are designed to extend student investigations that begin in biology. This curriculum is performance-based. It integrates scientific investigations using real world situations to find patterns and determine causation of pathological conditions. Instruction should focus on the design, implementation, and evaluation of studies to increase students' media literacy and their understanding of public health.

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Epidemiology

SEPI1. Obtain, evaluate, and communicate information to understand and analyze the disease process.

- a. Obtain, evaluate and communicate information about the history and uses of epidemiology.
(*Clarification statement:* This element is intended to include scientists, public health organizations and scientific breakthroughs.)
- b. Ask questions about diseases and pathogens that cause them.
- c. Construct an explanation of the body's defense mechanisms and how illness results when the mechanisms fail to maintain homeostasis.
- d. Construct an argument from evidence to explain how the rapid evolution of pathogens results in diseases that will continue to be a public health concern.
(*Clarification statement:* Instruction should include an emphasis on the importance of antibiotic resistance from both domestic and global perspectives).
- e. Develop and use models to explain the different modes of disease transmission and how timing of exposure during the disease process affects spread of disease.

SEPI2. Obtain, evaluate, and communicate information to identify and formulate hypotheses about patterns of health and disease.

- a. Analyze and interpret data focusing on the amount, distribution and patterns of disease within a population by person, place and time.
(*Clarification statement:* Instruction should focus on the amounts, distributions and patterns from local and global perspectives).
- b. Use models that are based on empirical evidence to identify patterns of health and disease to characterize a public health problem.
- c. Analyze and interpret data about the patterns of illness, including at least one chronic disease.
(*Clarification statement:* This element should include research on the top three epidemics in Georgia.)

SEPI3. Obtain, evaluate, and communicate information about the type and use of analytical epidemiology and study designs and associations.

- a. Develop and use models to explain basic epidemiologic study designs (e.g., cross-sectional, case-control, cohort, and randomized controlled trial).
(*Clarification statement:* Students should be able to compare and contrast various models and study designs. Each model has strengths and appropriate applications, but not every model is appropriate for each situation.)
- b. Plan and carryout investigations to determine if exposure and disease are associated and communicate the information, including the limits of the investigation.
- c. Ask questions to assess ethical issues in epidemiology and human trials.

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SEPI4. Obtain, evaluate, and communicate information to analyze associations and causations of health and disease.

- a. Use mathematical models to predict and explain the relationship between variables and the presence, nature, and impact of any confounding factors.
- b. Analyze and interpret epidemiological data as well as evidence from other scientific disciplines to determine if exposure to a variable causes a disease.

(Clarification statement: Students should understand the differences between confounding and associated variables when analyzing data.)

SEPI5. Obtain, evaluate, and communicate information about health-related messages in the media to make informed public health decisions and life goals.

- a. Construct an argument based on evidence to assess the impact of emergent technologies on health and disease.

(Clarification statement: Instruction should address the advantages and disadvantages of current technological advances such as gene therapy, etc.)

- b. Construct an argument based on evidence to assess the strengths and limitations of epidemiological reports.
- c. Develop and use models to analyze strategies that promote a healthy lifestyle in relation to eating habits and exercise.

(Clarification statement: Instruction can include various modes of exercise, nutrition and the elimination of certain life-style habits.)

- d. Obtain, evaluate and communicate information about various career paths in public health as well as the applications and benefits of public health for a healthy society.