

Environmental Science Science

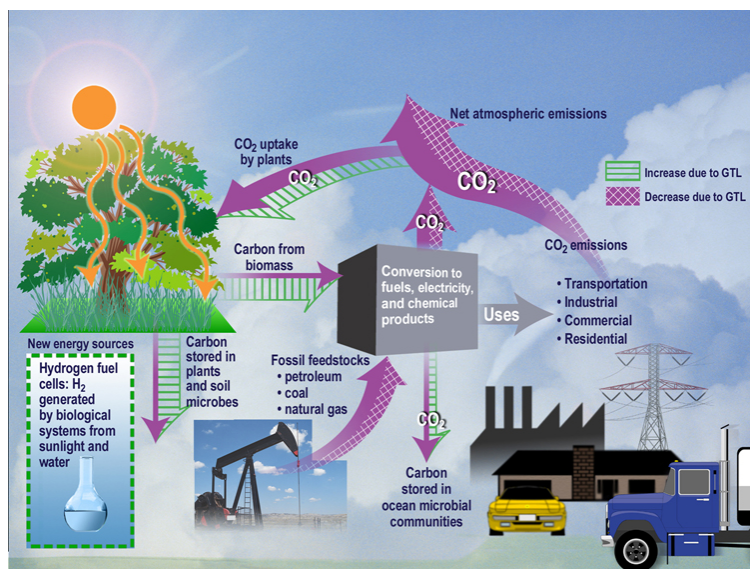
Key Instructional Activities

The Environmental Science Georgia Standards of Excellence are designed to continue the student investigations that began in grades K-8. These standards integrate the study of many components of our environment, including the human impact on our planet. Students investigate the flow of energy and cycling of matter within ecosystems, and evaluate types, availability, allocation, and sustainability of energy resources. Instruction should focus on student data collection and analysis from field and laboratory experiences. Some concepts are global; in those cases, interpretation of global data sets from scientific sources is strongly recommended. Chemistry, physics, mathematical, and technological concepts should be integrated throughout the course. Whenever possible, careers related to environmental science should be emphasized.



What resources are available for students and parents?

- ✓ Online Science Textbook
- ✓ Parent Portal
- ✓ Overview of Units and Pacing



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.

Environmental Science Course Overview

Unit 1: Biological Organization

Expected Dates: Beginning of School Year to Mid-August

Students will develop and use a model to compare and analyze the levels of biological organization including organisms, populations, communities, ecosystems, and biosphere.

Unit 2: Laws of Thermodynamics and Energy Transfer

Expected Dates: Beginning of School Year to Mid-August

Students will develop and use a model based on the Laws of Thermodynamics to predict energy transfers throughout an ecosystem (food chains, food webs, and trophic levels).

Unit 3: Biogeochemical Cycles

Expected Dates: End of August to Beginning of September

Students will analyze and interpret data to construct an argument of the necessity of biogeochemical cycles (hydrologic, nitrogen, phosphorus, oxygen, and carbon) to support a sustainable ecosystem.

Unit 4: Terrestrial Biomes: Physical Factors and Organismal Adaptations

Expected Dates: Second Week of September

Students will evaluate claims, evidence, and reasoning of the relationship between the physical factors (e.g., insolation, proximity to coastline, topography) and organismal adaptations within terrestrial biomes.

Unit 5: Aquatic Biomes: Chemical and Physical Properties

Expected Dates: Third Week of September

Students will plan and carry out an investigation of how chemical and physical properties impact aquatic biomes in Georgia.

Unit 6: Climate Change

Expected Dates: End of September to Mid-October

Students will analyze and interpret data related to short-term and long-term natural cyclic fluctuations associated with climate change.

Unit 7: Atmospheric Chemistry and Greenhouse Effect

Expected Dates: End of September to Mid-October

Students will analyze and interpret data to determine how changes in atmospheric chemistry (carbon dioxide and methane) impact the greenhouse effect.

Unit 8: Ecological Succession

Expected Dates: Mid-October to End of October

Students will construct an argument to predict changes in biomass, biodiversity, and complexity within ecosystems, in terms of ecological succession.

Unit 9: Biodiversity

Expected Dates: Mid-October to End of October

Students will construct an argument to support a claim about the value of biodiversity in ecosystem resilience including keystone, invasive, native, endemic, indicator, and endangered species.

Unit 10: Quality of Life and Human Impact

Expected Dates: First Week of November

Students will construct explanations about the relationship between the quality of life and human impact on the environment in terms of population growth, education, and gross national product.

Unit 11: Global Patterns

Expected Dates: Second Week of November

Students will analyze and interpret data on global patterns of population growth (fertility and mortality rates) and demographic transitions in developing and developed countries.

Unit 12: Human Innovations

Expected Dates: Third Week of November

Students will construct an argument from evidence regarding the ecological effects of human innovations (Agricultural, Industrial, Medical, and Technological Revolutions) on global ecosystems.

Unit 13: Personal Choices and Environmental Impacts

Expected Dates: Beginning of December to Mid-December

Students will design and defend a sustainability plan to reduce your individual contribution to environmental impacts, taking into account how market forces and societal demands (including political, legal, social, and economic) influence personal choices.

Unit 14: Human Impact

Expected Dates: Beginning of January to Beginning of February

Students will construct and revise a claim based on evidence on the effects of human activities on natural resources. 1) Human Activities: agriculture, forestry, ranching, mining, urbanization, fishing, water use, pollution, desalination and waste water treatment 2) Natural Resources: land, water, air and organisms.

Unit 15: Solutions to Reduce Human Impact

Expected Dates: Beginning of February to Beginning of March

Students will design, evaluate, and refine solutions to reduce human impact on the environment including, but not limited to, smog, ozone depletion, urbanization, and ocean acidification.

Unit 16: Food Supply and Demand

Expected Dates: Beginning of March to Mid-March

Students will construct an argument to evaluate how human population growth affects food demand and food supply (GMOs, monocultures, desertification, Green Revolution).

Unit 17: Renewable and Nonrenewable Energy Sources

Expected Dates: Mid-March to End of March

Students will analyze and interpret data to communicate information on the origin and consumption of renewable forms of energy (wind, solar, geothermal, biofuel, and tidal) and non-renewable energy sources (fossil fuels and nuclear energy).

Unit 18: Risks and Benefits

Expected Dates: Beginning of April to Mid-April

Students will construct an argument based on data about the risks and benefits of renewable and nonrenewable energy sources.

Unit 19: Sustainability

Expected Dates: Mid-April to Beginning of May

Students will obtain, evaluate, and communicate data to predict the sustainability potential of renewable and non-renewable energy resources. Students will design and defend a sustainable energy plan based on scientific principles for your location.

Culminating Environmental Science Project

Expected Dates: Beginning of May to Mid-May

Students will complete an environmental science project.

Helpful Tips for Parents and Guardians

Believe that every child can be successful in science.

Science has led to the discovery of everything from gravity to medicine. Science is a way of understanding the world, a perspective, and a pattern of thinking that begins in the very early years. That is why parent involvement is so important in a child's science education.

Tips to Help Children Learn Science

Explore, explore, explore. See science everywhere. Always encourage your child to question their surroundings, and then discuss. Parents can take opportunities to ask, "What would happen if ...?" questions or present brainteasers to encourage children to be inquisitive and seek out answers.

Lead family discussions on science-related topics. Dinnertime might be an ideal time for your family to have discussions about news stories that are science based, like space shuttle missions, severe weather conditions, or new medical breakthroughs. Over time, children will develop a better understanding of science and how it affects many facets of our lives. Movies and TV shows with science-related storylines are also great topics for discussion.

Encourage girls and boys equally. Many fathers might be inclined to fix a problem for a daughter without challenging her to find the solution on her own. Many girls are left out of challenging activities simply because of their gender. Be aware that both girls and boys need to be encouraged and exposed to a variety of subjects at a very early age.

Do science together. Children, especially elementary-age children, learn better by investigating and experimenting. Simple investigations done together in the home can bolster what your child is learning in the classroom. Check with your child's teacher on what your child is currently learning in class and what activities you can explore at home. There are also many books on the market and numerous websites that present ideas for investigations.

In addition to exploring and communicating as a family, it is important to invest in your child's willingness to learn. There are many programs available that are fun and interactive, helping them build a solid foundation in science.

From life sciences to environmental science, physical science to earth science, when children express interests in these subjects, encourage them and learn with them.

How You Can Support Your Child's Success?

Although Georgia's approach to teaching and learning K-12 science is different than the past, you can still actively support your child's success in the classroom.

1. Speak to your child's teacher(s) about how these important changes affect your school.
2. Ask your child's teacher thoughtful questions based on the information provided in this brochure.
3. Learn how you can help the teacher(s) reinforce classroom instruction at home.
4. Visit www.georgiastandards.org for more information.