

# Science GSEs: 9th-12th Grade



## Standard: SEV1

- Investigate energy flow and ecosystem matter cycling
- Model bio systems organization (population, community, etc.)
- Use thermodynamics laws to predict energy transfers
- Argue the necessity of biogeochemical cycles in ecosystems
- Evaluate the relationship between physical factors and organismal adaptations in terrestrial biomes
- Learn how physical/chemical properties impact aquatic biomes

**Water activity to fulfill standard:** [See activity here](#)

## Standard: SEV2

- Explain stability and change in earth's ecosystems
- Analyze/interpret data related to short and long-term natural cyclic changes associated with climate change
- Determine how atmospheric chemical changes impact the greenhouse effect
- Predict changes in biomass, biodiversity, and ecosystem complexity in terms of ecological succession
- Support a claim of how biodiversity positively affects ecosystem resiliency. Include invasive, native, keystone, and other notable types of species in argument.

**Water activity to fulfill standard:** [See activity here](#)

## Standard: SEV3

- Evaluate types, availability, allocation, and sustainability of various energy resources
- Explain the origin of renewable and non-renewable energy
- Use the risks and benefits of different energy sources to construct an argument
- Predict the sustainability of each type of energy source
- Design and defend a sustainable energy plan based on scientific principles for your location

**Water activity to fulfill standard:** Have students select, research, and present the pros and cons of various renewable and non-renewable energy sources

## Standard: SEV4

- Analyze human impact on natural resources
- These impacts include: human activities include: pollution, agriculture, ranching, urbanization, mining, fishing, water use/treatment, desalination. Natural resources affected include: land, water, air, and organisms
- Design solutions to limit human impact on the environment such as ozone depletion, urbanization, and ocean acidification
- Argue how human population growth impacts food supply and demand

**Water activity to fulfill standard:** Discuss the above impacts and resources as a group



## Standard: SES3

- Explore the actions of water, ice, wind, and gravity as they relate to landscape change
- Investigate how surface and ground water impact physical and chemical weathering
- Model the hazards of sudden and gradual mass wasting
- Explain how past and present actions of ice, wind, and water impact landscape change and landscape distribution
- Relate the characteristics of sedimentary materials to the energy by which they were transported and deposited

**Water activity to fulfill standard:** Show students an area of geologic change. Have them compare that change to a video of mass wasting

## Standard: SES5

- Investigate the interaction of solar energy and earth's systems to produce climate and weather
- Model how latitude impacts differences in solar heating, air pressure, wind patterns, and currents that redistribute heat
- Demonstrate how air mass movement creates weather
- Predict weather patterns based on the interaction between topography, currents, and air masses
- Show how temperature and precipitation create climate zones
- Explain the conditions that create extreme weather events
- Relate climate change to atmospheric and earth-sun relationship changes

**Water activity to fulfill standard:** [See activity here](#)

## Standard: SES6

- Explain how life shapes and responds to Earth's systems
- Describe how life responds to major events in Earth's history through extinction, adaptation, or migration
- Explain how biological processes have caused changes in Earth's systems through geologic time
- Investigate how humans depend on Earth's water and land resources which are unevenly distributed around the planet
- Analyze and interpret data relating changes in global climate to natural and anthropogenic change of the atmosphere and oceans

**Water activity to fulfill standard:** [See activity here](#)

## Standard: SB5

- Assess interdependence of organisms and the environment
- Analyze data to support explanations of changing biodiversity and populations in ecosystems
- Model the flow of energy within ecosystems through photosynthesis and respiration
- Predict environmental change's impact on the ecosystem's sustainability
- Design a solution to reduce human impact on the environment
- Predict organisms' abilities to survive within changing environmental limits

**Water activity to fulfill standard:** [See activity here](#)

## Standard: SPS6

- Model the properties of solutions
- Investigate how temperature, surface area, and agitation affect dissolution rates in different solvents
- Use solubility curves to determine how temperature affects solubility
- Explain the relationship between the structure and properties of acids and bases (like the impact of  $H^+$  and  $OH^-$  on the function of substances)
- Investigate patterns to classify common house substances as acidic, basic, or neutral

**Water activity to fulfill standard:** Take students to a stream and have them perform water quality tests to draw conclusions about the health of the ecosystem and predict future health

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[Click here for Georgia's full earth systems standards](#)

[Click here for Georgia's full environmental science standards](#)

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