Southeastern Forests and Climate Change

Correlations to
Next Generation Sunshine State Standards (NGSSS) for Science

Understanding and Using the Southeastern Forests and Climate Change Correlations Grid:

Focus:

The standards listed on the grid are Florida Next Generation Sunshine State Standards for Science (NGSSS for Science), and have been related to those national Next Generation Science Standards (NGSS) that teach activity concepts and ideas, as well as require demonstration of the practice. This enables depth of learning for and higher levels of cognitive demand on students, thereby resulting in higher performance expectations.

Grades:

Standards highlighted in gray target middle school grades (6, 7 and 8). Standards with no highlighting target high school grades (9,10, 11 and 12).

Applicability of Standards to Activities:

Applicability of a standard to a *Southeastern Forests and Climate Change* activity (A1, A2, A3, etc.) is noted by an "X"; standards that do not apply to a particular activity are noted by an "O" for the activity as it is written. Modification and enrichments as noted in the *Southeastern Forests and Climate Change* guide, as well as in C-Palms connections, could result in the applicability of standards not listed.

An asterisk (*) in the A14 column indicates that the standards will vary based upon the service learning project selected.

C-Palms Links:

Each standard is hot linked to C-Palms. There are substantial resources to support *Southeastern Forests and Climate Change* lessons on C-Palms. Included are items such as, but are not limited to:

- **Access Points** – Expectations written for students with significant cognitive disabilities to access the general education curriculum, which reflect the core intent of the Standards with reduced levels of complexity. Each standard is broken down into Independent, Supported, and Participatory elements.
- **Related Resources** – Numerous resources to facilitate teaching and learning are available for every Benchmark. Below are a few examples:
    - o **Teaching Ideas and Lesson Plans** – Many of these facilitate extension of *Southeastern Forests and Climate Change* lessons. For example, SC.912.E.7.3 provides a lesson plan entitled "Albedo and Climate Change" that expands the concept of albedo that is introduced in Lesson 2.
    - o **Professional Developments –** For those educators who want more information about incorporating specific content or skills development into their lessons, websites and other resources are offered. For example, SC.912.L.12.11, offers a Professional Development entitled "Volcano Power" that is designed to help teachers integrate literacy skills within their science curriculum. This tutorial is useful not only with *Southeastern Forests and Climate Change*, but other Project Learning Tree curricula as well.
    - o **Video/Audio Animations, Images/Photographs, Educational Games, Presentations/Slide Shows, Worksheets, Center Ideas**, and other teaching tools – Numerous standards provide tools to support or expand *Southeastern Forests and Climate Change* lessons. For example: SC.7.L.13.3 provides a video entitled "Fire and the Carbon Cycle" that supports Lessons 4, 5, and 6.
- **STEM Lessons** – Many Benchmarks offer STEM lessons, most of which require C-Palms membership to access. The majority of the lessons are model-eliciting activities (MEAs), which encourage students to invent and test models.
- **Student Resources** – Mini-lessons intended for student use. For example, SC.912.L.17.8 offers a "Biodiversity and Non-native Species" audio/visual lesson that support Lessons 3, 4, 5 and 6, and is Florida specific.
- **Parent Resources** – Numerous resources for parents and homeschool educators are available. For example, SC.5.E.6.6 provides a video called "Isotopes and Paleoclimates" that extends lessons 1 and 2, and helps students understand "big picture" climate change. This video is also appropriate for classroom use.

Acknowledgements:

Standard (Each standard is hyperlinked to C-Palms)	Description	A1 – Stepping through Climate Science	A2- Clearing the Air	A3 – Atlas of Change	A4 – The Changing Forests	A5 – Managing Forests for Change	A6 – Mapping Seed Sources	A7 – Carbon on the Move	A8 – Counting Carbon	A9 – The Real Cost	A 10 – Adventures in Life Cycle Assessment	A 11 – The Cycle Assessment Debate	A 12 – The Carbon Puzzle	A 13 – Future of Our Forests	A 14 – Starting a Climate Service-Learning Project
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.	O	O	X	O	X	O	O	O	O	X	X	O	O	X
SC.6.N.3.4	Identify the role of models in the context of the sixth grade science benchmarks.	O	O	O	O	O	O	X	O	O	X	O	O	O	*
SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.	X	X	O	O	O	O	O	X	X	O	X	X	X	X
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.	O	O	O	O	O	X	O	O	O	O	O	O	O	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.	O	O	O	O	O	X	O	O	O	O	O	O	O	*
SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.	O	O	O	O	O	X	O	O	O	O	O	O	O	*
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.	O	O	O	O	X	X	X	O	X	O	X	O	O	*
SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.	O	O	X	O	O	O	O	O	O	O	O	O	O	*
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.	O	X	O	O	O	O	O	O	O	O	O	O	O	*
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.	O	O	X	X	O	O	X	O	O	O	O	O	O	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles of light, carbon dioxide, water and chlorophyll; production of food; release of oxygen.	O	O	O	O	O	O	X	X	O	O	O	O	O	*
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.	O	O	O	O	O	O	X	X	O	O	O	O	O	*
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.	O	O	O	O	O	O	X	X	O	O	O	O	O	*
SC.8.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.	O	X	O	O	O	O	O	O	O	O	O	O	O	*
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.	O	X	O	O	O	O	O	O	O	O	O	O	O	*
SC.68.CS-CP.2.1	Develop problem solutions using visual representations of problem states, structures and data.	O	O	O	O	X	O	O	X	X	O	O	O	O	X
SC.68.CS-CS.1.3	Evaluate what kinds of real-world problems can be solved using modeling and simulation.	O	O	O	X	X	O	X	O	X	X	O	O	X	*
SC.68.CS-CS.2.1	Create, modify, and use a database (e.g., define field formats, adding new records, manipulate data) to analyze data and propose solutions for a task/problem, individually and collaboratively.	O	O	O	O	O	X	O	X	O	X	O	O	O	X
SC.68.CS-PC.3.1	Answer research questions using digital information resources.	O	O	X	O	O	O	O	O	O	O	O	O	X	X

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.E.7.1	Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.	O	O	O	O	O	O	X	X	O	X	X	X	O	*
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.	X	O	O	O	O	O	X	O	O	X	O	X	O	*
SC.912.E.7.4	Summarize the conditions that contribute to the climate of a geographic area, including the relationships to lakes and oceans.	O	O	X	O	O	O	O	X	O	O	O	O	O	*
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.	O	O	X	O	O	O	O	O	O	O	O	O	O	*
SC.912.E.7.9	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon, and water.	O	O	O	O	O	O	X	O	O	O	O	O	O	*
SC.912.L.15.3	Describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.	O	O	O	O	O	X	O	O	O	O	O	O	O	*
SC.912.L.15.13	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.	O	O	O	O	O	X	O	O	O	O	O	O	O	*
SC.912.L.15.14	Discuss mechanisms of evolutionary change other than natural selection such as genetic drift and gene flow.	O	O	O	O	O	X	O	O	O	O	O	O	O	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.L.15.15	Describe how mutation and genetic recombination increase genetic variation	O	O	O	O	O	X	O	O	O	O	O	O	O	*
SC.912.L.17.1	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.	O	O	X	X	X	X	O	X	O	O	O	O	O	*
SC.912.L.17.4	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.	O	O	X	X	X	X	O	X	O	O	O	O	O	*
SC.912.L.17.8	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.	O	O	X	X	X	X	O	X	O	O	X	X	O	*
SC.912.L.17.10	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.	O	O	O	O	O	O	X	O	O	X	O	O	O	*
SC.912.L.17.11	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.	O	O	O	O	O	O	X	X	X	X	X	X	X	*
SC.912.L.17.12	Discuss the political, social, and environmental consequences of sustainable use of land.	X	X	O	X	O	O	O	X	X	X	O	X	X	*
SC.912.L.17.13	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	X	X	O	X	X	O	O	O	X	O	O	X	X	*
SC.912.L.17.15	Discuss the effects of technology on environmental quality.	X	X	O	O	O	O	O	O	O	X	O	O	O	*
SC.912.L.17.16	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.	X	X	O	O	O	O	O	O	X	X	O	X	O	*
SC.912.L.17.17	Assess the effectiveness of innovative methods of protecting the environment.	O	X	O	O	O	O	O	O	O	O	O	O	X	X

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.L.17.18	Describe how human population size and resource use relate to environmental quality.	X	X	O	O	X	O	O	O	X	X	X	X	O	*
SC.912.L.17.19	Describe how different natural resources are produced and how their rates of use and renewal limit availability.	O	O	O	O	X	O	O	O	X	X	X	X	O	*
SC.912.L.17.20	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.	X	O	O	O	O	O	O	O	X	X	X	X	O	*
SC.912.L.18.7	Identify the reactants, products, and basic functions of photosynthesis.	O	O	O	O	O	O	X	X	O	O	O	X	O	*
SC.912.L.18.9	Explain the interrelated nature of photosynthesis and cellular respiration.	O	O	O	O	O	O	X	X	O	O	O	X	O	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.N.1.1	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: 1. Pose questions about the natural world, 2. Conduct systematic observations, 3. Examine books and other sources of information to see what is already known, 4. Review what is known in light of empirical evidence, 5. Plan investigations, 6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs), 7. Pose answers, explanations, or descriptions of events, 8. Generate explanations that explicate or describe natural phenomena (inferences), 9. Use appropriate evidence and reasoning to justify these explanations to others, 10. Communicate results of scientific investigations, and 11. Evaluate the merits of the explanations produced by others.	O	O	X	O	X	O	O	X	X	X	X	X	X	X

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.N.1.3	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.	O	X	O	O	O	O	O	O	O	X	X	X	X	*
SC.912.N.1.7	Recognize the role of creativity in constructing scientific questions, methods and explanations	O	O	X	O	X	O	O	O	O	X	X	X	O	*
SC.912.N.2.1	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria for science).	O	X	O	O	O	O	O	O	O	O	O	O	O	*
SC.912.N.2.4	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because it is often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examinations, scientific knowledge becomes stronger, leading to its durability.	O	O	X	X	O	O	O	O	O	O	O	O	O	*
SC.912.N.3.5	Describe the function of models in science, and identify the wide range of models used in science.	O	O	X	X	O	O	X	O	O	O	O	O	O	*
SC.912.N.4.1	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making	X	X	O	X	O	X	O	X	X	X	X	O	X	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.N.4.2	Weigh the merits of alternative strategies for solving a specific societal problem by comparing a number of different costs and benefits, such as human, economic, and environmental.	O	X	O	O	X	O	O	X	X	X	X	X	X	X
SC.912.P.8.12	Describe the properties of the carbon atom that make the diversity of carbon compounds possible.	O	O	O	O	O	O	X	X	O	O	O	O	O	*
SC.912.P.8.13	Identify selected functional groups and relate how they contribute to properties of carbon compounds.	O	O	O	O	O	O	X	X	O	X	O	O	O	*
SC.912.CS-CC.1.1	Evaluate modes of communication and collaboration.	O	X	O	O	O	O	O	O	O	O	X	X	O	X
SC.912.CS-CP.1.3	Analyze and manipulate data collected by a variety of data collection techniques to support a hypothesis.	O	O	X	O	O	O	O	X	X	X	X	X	X	*
SC.912.CS-CS.1.1	Analyze data and identify real-world patterns through modeling and simulation.	O	O	X	O	O	O	X	O	X	X	X	X	X	*
SC.912.CS-CS.1.2	Formulate, refine, and test scientific hypotheses using models and simulations.	O	O	X	O	O	O	O	O	X	X	O	O		*
SC.912.CS-CS.1.3	Explain how data analysis is used to enhance the understanding of complex natural and human systems.	O	X	X	X	X	O	O	X	X	X	O	X	X	*
SC.912.CS-CS.1.5.	Represent and understand natural phenomena using modeling and simulation.	O	O	X	O	X	O	X	O	O	O	O	O	O	*
SC.912.CS-CS.2.6	Evaluate various data types and data structures.	O	O	X	O	O	O	O	X	X	X	X	X	O	*
SC.912.CS-CS.2.9	Evaluate ways to characterize how well algorithms perform and that two algorithms can perform differently for the same task.	O	O	X	O	O	O	O	O	O	O	O	O	O	*

Standard	Description	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14
SC.912.CS-CS.2.10	Design and implement a simple simulation algorithm to analyze, represent, and understand natural phenomena.	O	O	O	O	X	O	O	O	O	X	O	O	O	*
SC.912.CS-PC.2.9	Explain how societal and economic factors are affected by access to critical information.	X	X	O	O	O	O	O	O	X	X	X	X	X	*
SC.912.CS-PC.2.3	Discuss and analyze the impact of values and points of view that are presented in media messages (e.g., racial, gender, and political).	O	X	O	O	O	O	O	O	O	O	O	O	O	*
SC.912.CS-PC.3.1	Evaluate the quality of digital resources for reliability (i.e., currency, relevancy, authority, accuracy, and purpose of digital information).	O	O	O	X	O	O	O	O	O	O	O	O	O	*
SC.912.CS-PC.3.2	Evaluate the accuracy, relevance, comprehensiveness, appropriateness, and bias of electronic information resources.	O	X	O	X	O	O	O	O	O	O	O	O	O	*
SC.912.CS-PC.3.4	Analyze and evaluate public/government resources and describe how using these resources for communication can affect change.	O	O	O	X	O	O	O	X	O	O	O	O	X	*