

Lakeville ~ Session 2 (UE/MS/HS)

Teacher Guide – Components of an Ecosystem



INTRODUCTION: Session 2 introduces the ecosystem component for the Lakeville Unit or can be used as a stand-alone introduction to the components commonly found in a Florida freshwater habitat. Each student is given an opportunity to role-play (at least) six inhabitants of the ecosystem and contemplate the complex relationships found within its food web. Classification concepts are also practiced when students are asked to categorize their role(s) in the habitat as an aquatic, terrestrial, native, non-native, or invasive species and identify their positive and negative attributes.

KEY QUESTIONS:

1. What are the components of an ecosystem?
2. What are some of the factors that make ecosystems complex?

SUBJECTS: Science, Math, Social Studies, Language Arts (See list of suggested state standards at the end of this document.)

GRADE LEVEL: UE, MS, HS

CONCEPTS: ecosystems, keystone species, food web, disturbed areas, social and economic concerns and their effects on society, life cycle reproduction, animal life spans, plant uses and characteristics, nutrient uptake, alternative sources of energy, oxygen levels

TIME ESTIMATES: One 45-minute session

LEARNING STYLES: Visual and auditory

VOCABULARY: [Also see keywords chart and definitions] advocate, angler, aquatic plant, brackish, bulbs, cesspool, commerce, developer, ecological significance, ecosystem, economic importance, emerged, endangered species, floating-leaved, habitat, herbivore, invasive, keystone species, mangrove, native, non-native, noxious weed, poached, priority, pros and cons, regulation, rhizome, scavenge, spores, stolon, submersed, suburban, turion, terrestrial, tuberous, weed

SESSION SUMMARY: Students learn about native, non-native and invasive plants and animals found in Florida freshwater ecosystems by taking turns in role playing activities. Each student will practice representing three individual citizen roles (e.g., as a developer, restaurant owner, boater, angler, factory owner, farmer, etc.) and three different organism roles (plants or animals). Analytical skills are challenged when students are asked to analyze and identify, in writing and in class discussion, personal priorities they may have as a citizen in the community or an organism in the habitat.

STUDENT LEARNING OBJECTIVES: Students will be able to...

1. Identify different components of a Florida freshwater ecosystem.
2. Identify at least three **native, non-native** or **invasive** plants or animals that live in Florida and discuss their role in the habitat.
3. Describe some of the complexities and interconnectedness of an ecosystem.
4. Identify and express different points-of-view of the various stake-holders living in an ecosystem and the surrounding community



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MATERIALS: All of the following are available on our website: <http://plants.ifas.ufl.edu/education/>

1. Large habitat poster (or projected picture)



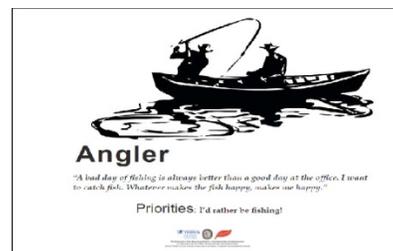
2. Organism Role Cards



Native Plants	Non-native Plants	Invasive Plants	Native Animals	Invasive Animals
<ol style="list-style-type: none"> 1. pickerelweed 2. duck potato 3. eel-grass 4. fragrant water lily 5. duckweed 6. poison ivy 7. cat-tails 	<ol style="list-style-type: none"> 1. coconut palm 2. hibiscus 3. Canadian water weed 4. orange tree 5. peanut plant 	<ol style="list-style-type: none"> 1. air potato 2. hydrilla 3. water hyacinth 4. Old World climbing fern 5. tuberous sword fern 6. wild taro 	<ol style="list-style-type: none"> 1. American alligator 2. gopher tortoise 3. manatee 4. snail kite 5. largemouth bass 	<ol style="list-style-type: none"> 1. fire ants 2. Gambian pouch rat 3. iguana 4. monk parakeet 5. Island apple snail 6. Burmese python 7. sailfin catfish

3. Citizen Role Cards

1. Angler
2. Boater
3. Developer
4. Farmer
5. Lake resource manager
6. Politician (City or County Commissioner)
7. Nature lover
8. Owner of a manufacturing company (aquatic products)
9. President of local jet ski or water ski club
10. Restaurant owner (business depends on recreational lake users)
11. Retiree
12. Wild card – student decides what role they want to play



4. Citizen Role Analysis Worksheet

5. Organism Role Analysis Worksheet



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ADVANCED PREPARATION:

1. Download materials from website <http://plants.ifas.ufl.edu/education/>
OR borrow Lakeville kit (email us at: caip-education@ufl.edu at least 2 weeks in advance)
2. Review materials in advance, including the vocabulary.
3. Post the large habitat scene in the classroom and prepare materials to distribute.

PROCEDURE AND DISCUSSION:

PART 1 ~ Discuss the meaning of ECOSYSTEM (5 minutes)

Ecosystem – an integrated unit of a biological community, its physical environment and interactions

1. Display the large habitat scene, which has been created for this activity. Ask students what they see in the habitat (a body of water, meadow, wooded area etc.) Explain that it is picture of an ecosystem—without any of the inhabitants visible. Their job is to make decisions as to which plants and/or animals will live in the ecosystem.
2. Discuss the components of the ecosystem including the physical features and the biological community we would expect to find here (i.e. plants, animals, humans, bacteria, etc).
3. Discuss characteristics of human residents and the roles they have in the ecosystem and the food web.

PART 2 ~ Introduction to Organism Roles (20 minutes)

Thirty plant/animal Organism Role Cards have been developed for this activity. Available on-line: <http://plants.ifas.ufl.edu/education/lakeville-session-2>. Recommendation: Students work in pairs.

1. Distribute **Organism Role Cards**. Explain that each card contains information about an organism one might find in a Florida freshwater ecosystem. Familiarize students with the location of key information on the card (common and scientific name and status as a native, non-native or invasive species). Students will use the information to learn about their anticipated behavior in an ecosystem.
2. As part of a class discussion, ask each student to read the name of their species and classify it as... a plant or animal / aquatic or terrestrial / native, non-native or invasive.
3. Distribute **Organism Role Analysis Worksheets**. Explain that in a minute, they will be asked to list three positive and three negative attributes (i.e., the pros and cons) each organism may have based on the information on their role card.
4. As an example, read through one **Organism Role Card** as a class. While reading the organism's information to the class, ask the students to take note of the pros and cons that may be associated that organism. As a class identify the pros and cons for the sample organism and record the information on the **Organism Role Analysis Worksheet**, under Organism #1.
5. Ask Students to trade the **Organism Role Cards** with the group next to them (one card per pair of students). With their new card, allow 4-5 minutes for students to read the card and record the positive and negative attributes on the **Organism Role Analysis Worksheet**.
6. Ask students to switch information cards AGAIN so that every student pair has a different card. With this new card, students once again read, role-play and record the positive/negative attributes.



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7. In a class discussion, allow each student to share the traits of at least one organism. This way, all of the students become aware of all the potential organisms in the habitat.
8. Collect **Organism Role Cards**.

PART 3 ~ Introduction to Citizen Roles (15 minutes) There are 12 citizen roles provided for this activity. See list on page 2. If students require additional background information, pass out the Citizen Role Definitions sheet along with the Citizen Role Cards. Recommendation: Students work in pairs.

1. Distribute **Citizen Role Cards**. Explain that each card contains the name of a citizen role one might find in a community (e.g., angler, developer, farmer, retiree, etc.). Next, point out that each card also contains a brief description of the priorities this citizen may have.
2. As a class discussion, ask students to take turns reading the brief description of each role and the priority provided on the card. Be sure to mention that the priorities listed certainly don't apply to all anglers, farmers, developers, etc. They are only a starting point for discussion.
3. Distribute **Citizen Role Analysis Worksheets**. Explain that in a minute, they will be asked to list three things they do want or do not want in their ecosystem, based on the priorities given on their role card and also based on their own knowledge about the citizen role.
4. Teacher — Choose a **Citizen Role Card** as an example and read citizen's priority. As a class, brainstorm a list of what that citizen may or may not want in their local habitat. Ask students to record their information on their **Citizen Role Analysis Worksheet** under Citizen Role #1.
5. Ask students to trade **Citizen Role Cards** with the group next to them. With their new cards, allow students two minutes to brainstorm ideas and record what they may or may not want in their habitat. Ask them to record their analysis in the space provided on **Citizen Role Analysis Worksheet**, under **Citizen Role #2**. Remember: priorities provided on the cards are simply a starting point for discussion. Students may change the priorities associated with their role but they need to be clear and consistent in their discussion and writing activities and be able to justify their responses.
6. Redistribute **Citizen Role Cards** AGAIN, so everyone has a different card and repeat the brainstorming and recording of ideas on their **Citizen Role Analysis Worksheets**. This way, each student experiences three different citizen personalities in their local community.
7. As part of a class discussion, ask each student to share at least one citizen role, along with their point-of-view by stating one thing they may or may not want in their environment and why. Allow each student to share at least one citizen's opinion (time permitting).
8. Collect **Citizen Role Cards**.

PART 4 ~ Wrap Up!

- To wrap up the activities and further reinforce comprehension of the complexity of an ecosystem, ask students to discuss and write a response to the following question:

“How did this activity help you to better understand the definition of an ecosystem? Give specific examples.”



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BACKGROUND INFORMATION:

1. **Teaching Points** about native, non-native and invasive plants are available on the *Resource* section of our website.
2. The National Invasive Species Council published an official “White Paper” with clear and concise definitions of the terms “non-native” and “invasive” species, along with many examples of the damage being done by invasive species. See *ISAC Definitions White Paper* at <http://www.invasivespecies.gov/>
3. Additional information about invasive plants in aquatic ecosystems: <http://plants.ifas.ufl.edu/manage/why-manage-plants/non-native-invasive-plants-an-introduction>

ASSESSMENT SUGGESTIONS:

1. Collect and review the Citizen Role Analysis Worksheets and Organism Role Analysis Worksheets (Objectives #1, #2 and #3)
2. Students create their own Citizen or Organism Role Card, writing and presenting a ‘biography’ of a *native*, *non-native*, or *invasive* plant or animal—or a local citizen—and providing the following information (see text box): (Objectives 1, 2, 3, 4)

- Aquatic or terrestrial
- Native, non-native, or non-native invasive
- Origin of plant or animal
- Ecological significance (or impact)
- Economic significance (or current uses)
- Associated wildlife (food, shelter)
- Diet: what it eats and what eats it
- Life history: where it grows, how it reproduces, ancient uses, etc.

LITERATURE / RESOURCES / REFERENCES: available at <http://plants.ifas.ufl.edu/education/resource>

1. Understanding Invasive Aquatic Plants – Florida Edition (Activity Book)
2. Aquatic Plants: The Underwater Forests of Lakes and Rivers – A stand alone activity book about freshwater ecology:
3. Images and information on plants, see <http://plants.ifas.ufl.edu>



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Next Generation Sunshine State Standards

Grade 4

- SC.4.N.1.2: Compare observations made by different groups using multiple tools; seek reasons to explain difference across groups.
- SC.4.N.2.1: Explain that science focuses solely on the natural world.
- SC.4.N.3.1: Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.
- SC.4.E.6.3: Recognize humans need resources found on Earth and that these are either renewable or non-renewable.
- SC.4.E.6.6: Identify resources available in Florida (i.e. water, phosphate, oil, limestone, silicon, wind, and solar energy)
- SC.4.P.9.1: Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.
- SC.4.L.16.1: Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.
- SC.4.L.16.2: Explain although characteristics of plants and animals are inherited, some characteristics can be affected by environment.
- SC.4.L.16.4: Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and nonflowering seed-bearing plants.
- SC.4.L.17.1: Compare the seasonal changes in Florida plants and animals to those in other regions of the country.
- SC.4.L.17.4: Recognize ways plants and animals, including humans, can impact the environment.
- SS.4.C.2.1: Discuss public issues in Florida that impact the daily lives of its citizens.
- SS.4.C.2.2: Identify ways citizens work together to influence government and help solve community and state problems.
- SS.4.A.8.2: Describe how and why immigration impacts Florida today.

Grade 5

- SC.5.N.1.6: Recognize and explain the difference between personal opinion/interpretation and verified observation.
- SC.5.E.7.5: Recognize that some of the weather-related differences, such as temperature and humidity, among different environments, such as swamps, deserts, and mountains.
- SC.5.L.14.2: Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support-- some with internal skeletons others with exoskeletons— while some plants have stems for support.
- SC.5.L.15.1: Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while other die or move to new locations.
- SC.5.L.17.1: Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycle variations, animal behavior, and physical characteristics.
- SS.5.C.2.4: Evaluate the importance of civic responsibilities in American democracy.
- SS.5.C.2.5: Identify ways good citizens go beyond basic civic and political responsibilities to improve government and society.
- SS.5.G.4.1: Use geographic knowledge and skills when discussing current events.
- SS.5.G.4.2: Use geography concepts and skills such as recognizing patterns, mapping, graphing to find solutions for local, state, or national problems.

Grade 6

- SC.6.N.1.4: Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.
- SC.6.N.2.1: Distinguish science from other activities involving thought.
- SC.6.N.2.2: Explain scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.
- SC.6.N.2.3: Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.
- SC.6.N.3.4: Identify the role of models in the context of the 6th Grade Science benchmarks.
- SC.6.E.6.2: Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
- SC.6.E.7.7: Investigate how natural disasters have affected human life in Florida.
- SC.6.L.15.1: Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.
- SS.6.G.3: Understand the relationships between the Earth's ecosystems and the populations that dwell within them.
- SS.6.G.5: Understand how human actions can impact the environment.
- SS.6.C.2: Evaluate the roles, rights, and responsibilities of United States citizens, and determine methods of active participation in society, government, and the political system.



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Grade 7

- SC.7.N.3.2: Identify the benefits and limitations of the use of scientific models.
- 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.
- 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.
- SC.7.I.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.
- SC.7.L.17.1: Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web
- SC.7.L.17.2: Compare/contrast relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.
- SC.7.L.17.3: Describe and investigate various limiting factors in a local ecosystem and their impact on native populations including food, shelter, water, space, disease, parasitism, and nesting sites.
- SS.7.C.2.13: Examine multiple perspectives on public and current issues.
- SS.7.C.2.3: Experience the responsibilities of citizens at the local, state, or federal levels.
- SS.7.C.2.10: Examine impact of media, individuals, and interest groups on monitoring and influencing government.
- SS.7.C.2.11: Analyze media and political communications (bias, symbolism, propaganda).
- SS.7.C.2.13: Examine multiple perspectives on public and current issues. (SS.7.C.2.13)

Grade 8

- SC.8.N.1.6: Understand scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.
- SC.8.N.3.1: Select models useful in relating the results of their own investigations.
- SC.8.N.4.1: Explain that science is one of the processes that can be used to inform decision making at the community, state, national and international levels.
- SC.8.N.4.2: Explain how political, social and economic concerns can affect science and vice versa.
- SS.8.G.5.2: Describe impact of human modifications on physical environment and ecosystems of United States throughout history.
- SS.8.G.3: Understand the relationships between the Earth's ecosystems and the populations that dwell within them.
- SS.8.G.3.2: Use geographic terms and tools to explain differing perspectives on the use of renewable and non-renewable resources in the United States and Florida over time.
- SS.8.G.5: Understand how human actions can impact the environment.
- SS.8.G.5.1: Describe human dependence on the physical environment and natural resources to satisfy basic needs in local environments in the United States.
- SS.8.G.5.2: Describe impact of human modifications on physical environment and ecosystems of the United States throughout history.

Grade 9-12

- SC.912.N.1.1: Define a problem based on a specific body of knowledge (i.e. biology) and do the following (pose questions, conduct systematic observations, examine books and other sources to see what is known, plan investigations, use tools to gather, analyze and interpret data, pose answers and explanations, use evidence, communicate results.
- SC.912.N.1.6: Describe how scientific inferences are drawn from scientific observations, provide examples from content being studied.
- SC.912.N.3.5: Describe the function of models in science and identify the wide range of models used in science.
- SC.912.N.4.1: Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making.
- 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.
- SC.912.E.7.8: Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
- SC.912.L.14.6: Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspective of both individual and public health.
- SC.912.L.14.10: Discuss the relationship between the evolution of land plants and their anatomy.
- SC.912.L.14.53: Discuss basic classification and characteristics of plants, Identify bryophytes, pteridophytes, gymnosperms, angiosperms.
- SC.912.L.15.3: Describe how biological diversity is increased by the origin of a new species and how it is decreased by the natural process of extinction.
- SC.912.L.17.1: Discuss characteristics of populations, such as number of individuals, age structure, density and pattern of distribution.



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- SC.912.L.17.2: Explain general distribution of life in aquatic systems as a function of chemistry, geography, light, depth, salinity, and temperature.
- SC.912.L.17.3: Discuss how various oceanic and freshwater processes, such as currents tides, and waves, affect the abundance of aquatic organisms.
- SC.912.L.17.4: Describe changes in ecosystems resulting from seasonal variations, climate change and succession
- SC.912.L.17.5: Analyze how population size is determined by births, deaths, immigration, emigration, and
- SC.912.L.17.6: Compare and contrast the relationships among organisms including predation, parasitism, competition, commensalism and mutualism.
- SC.912.L.17.7: Characterize biotic and abiotic components that define freshwater systems, marine systems and terrestrial systems
- SC.912.L.17.8: Recognize the consequence of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.
- SC.912.L.17.10: Diagram and explain biogeochemical cycles of ecosystem, including water, carbon, nitrogen cycle.
- SC.912.L.17.11: Evaluate the costs and benefits of renewable and non-renewable resources, such as water, energy, fossil fuels, wildlife, forests.
- SC.912.L.17.12: Discuss the political, social, environment consequences of sustainable use of land.
- SC.912.L.17.15: Discuss the effects of technology on environmental quality
- SC.912.L.17.16: Discuss the large scale environmental impacts resulting from human activity including, waste spills, oil spills, run-off, greenhouse gases, ozone depletion, and surface and groundwater pollution.
- SC.912.L.17.17: Assess the effectiveness of innovative methods of protecting the environment
- SC.912.L.17.18: Describe how human population size and resource use relate to environmental quality.
- SC.912.L.17.19: Describe how different natural resources are produced and how their rates of use and renewal limit availability.
- SC.912.L.17.20: Predict impact of individuals on environmental systems and exam how human lifestyles affect sustainability.
- SC.912.L.18.9: Explain the interrelated nature of photosynthesis and cellular respiration.
- SS.912.C.2.4: Evaluate, take, and defend positions on issues that cause government to balance interests of individuals with public good
- SS.912.C.2.11: Analyze public policy solutions or courses of action to resolve a local, state, or federal issue.
- SS.912.G.5.4: Analyze case studies of how humans impact the diversity and productivity of ecosystems.
- SS.912.G.5.6: Analyze case studies to predict how a change to an environmental factor can affect an ecosystem.
- SS.912.G.2.4: Use geographic terms and tools to analyze case studies of how selected regions change over time.
- SS.912.G.2.5: Use geographic terms and tools to analyze case studies of debates over how human actions modify a selected region.
- SS.912.G.3: Understand the relationships between Earth's ecosystems and the populations that dwell within them.
- SS.912.G.3.2: Use geographic terms and tools to explain how weather and climate influence natural character of a place.
- SS.912.G.3.3: Use geographic terms and tools to explain differing perspectives on the use of renewable and non-renewable resources in Florida your state, the United States, and the world.

Common Core State Standards

4th Grade

Common Core Code	FL Common Core Code	Common Core Standard
RI.4.1	LAFS.4.RI.1.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.2	LAFS.4.RI.1.2	Determine the main idea of a text and explain how it is supported by key details; summarize the text.
RI.4.3	LAFS.4.RI.1.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
RI.4.4	LAFS.4.RI.2.4	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
RI.4.5	LAFS.4.RI.2.5	Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.
RI.4.9	LAFS.4.RI.3.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
RF.4.3	LAFS.4.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding words.



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RF.4.3a	LAFS.4.RF.3.3a	Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
RF.4.4	LAFS.4.RF.4.4	Read with sufficient accuracy and fluency to support comprehension.
RF.4.4a	LAFS.4.RF.4.4a	Read grade-level text with purpose and understanding.
RF.4.4c	LAFS.4.RF.4.4c	Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
W.4.1	LAFS.4.W.1.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
W.4.1b	LAFS.4.W.1.1b	Provide reasons that are supported by facts and details.
W.4.2	LAFS.4.W.1.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
W.4.2b	LAFS.4.W.1.2b	Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
W.4.2d	LAFS.4.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.4.4	LAFS.4.W.2.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
SL.4.1	LAFS.4.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
SL.4.4	LAFS.4.SL.2.4	Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
L.4.3	LAFS.4.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.4.3a	LAFS.4.L.2.3a	Choose words and phrases to convey ideas precisely.
L.4.4a	LAFS.4.L.3.4a	Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
L.4.4b	LAFS.4.L.3.4b	Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., telegraph, photograph, autograph).
L.4.6	LAFS.4.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

5th Grade

RI.5.1	LAFS.5.RI.1.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.3	LAFS.5.RI.1.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
RI.5.4	LAFS.5.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
RF.5.3	LAFS.5.RF.3.3	Know and apply grade-level phonics and word analysis skills in decoding words.
RF.5.3a	LAFS.5.RF.3.3a	Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.
RF.5.4	LAFS.5.RF.4.4	Read with sufficient accuracy and fluency to support comprehension.
RF.5.4a	LAFS.5.RF.4.4a	Read grade-level text with purpose and understanding.
RF.5.4c	LAFS.5.RF.4.4c	Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
W.5.1	LAFS.5.W.1.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
W.5.1b	LAFS.5.W.1.1b	Provide logically ordered reasons that are supported by facts and details.
W.5.2	LAFS.5.W.1.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
W.5.2b	LAFS.5.W.1.2b	Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
W.5.2d	LAFS.5.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.



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W.5.4	LAFS.5.W.2.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
SL.5.1	LAFS.5.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.
SL.5.4	LAFS.5.SL.2.4	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
L.5.3	LAFS.5.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.5.3a	LAFS.5.L.2.3a	Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.
L.5.4a	LAFS.5.L.3.4a	Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.
L.5.4b	LAFS.5.L.3.4b	Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., photograph, photosynthesis).
L.5.6	LAFS.5.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

6th Grade

RI.6.1	LAFS.6.RI.1.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.6.4	LAFS.6.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
RI.6.6	LAFS.6.RI.2.6	Determine an author's point of view or purpose in a text and explain how it is conveyed in the text.
RI.6.8	LAFS.6.RI.3.8	Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.
W.6.1	LAFS.6.W.1.1	Write arguments to support claims with clear reasons and relevant evidence.
W.6.1a	LAFS.6.W.1.1a	Introduce claim(s) and organize the reasons and evidence clearly.
W.6.1b	LAFS.6.W.1.1b	Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.
W.6.2d	LAFS.6.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.6.4	LAFS.6.W.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SL.6.1	LAFS.6.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.6.4	LAFS.6.SL.2.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
L.6.3	LAFS.6.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.6.4	LAFS.6.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.
L.6.4a	LAFS.6.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.6.4b	LAFS.6.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).
L.6.6	LAFS.6.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.



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RST.6-8.8	LAFS.68.RST.3.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
WHST.6-8.1	LAFS.68.WHST.1.1	Write arguments focused on discipline-specific content.
WHST.6-8.1b	LAFS.68.WHST.1.1 b	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
WHST.6-8.2b	LAFS.68.WHST.1.2 b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
WHST.6-8.2d	LAFS.68.WHST.1.2 d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
WHST.6-8.4	LAFS.68.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.6-8.9	LAFS.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.

7th Grade

RI.7.1	LAFS.7.RI.1.1	Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.7.4	LAFS.7.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
RI.7.8	LAFS.7.RI.3.8	Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.
W.7.1	LAFS.7.W.1.1	Write arguments to support claims with clear reasons and relevant evidence.
W.7.1a	LAFS.7.W.1.1a	Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.
W.7.1b	LAFS.7.W.1.1b	Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
W.7.2d	LAFS.7.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.7.4	LAFS.7.W.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SL.7.1	LAFS.7.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.7.4	LAFS.7.SL.2.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
L.7.3	LAFS.7.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.7.4	LAFS.7.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.
L.7.4a	LAFS.7.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.7.4b	LAFS.7.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., belligerent, bellicose, rebel).
L.7.6	LAFS.7.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
RST.6-8.8	LAFS.68.RST.3.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
WHST.6-8.1	LAFS.68.WHST.1.1	Write arguments focused on discipline-specific content.
WHST.6-8.1b	LAFS.68.WHST.1.1b	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.



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WHST.6-8.2b	LAFS.68.WHST.1.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
WHST.6-8.2d	LAFS.68.WHST.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
WHST.6-8.4	LAFS.68.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.6-8.9	LAFS.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.

8th Grade

RI.8.1	LAFS.8.RI.1.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
RI.8.4	LAFS.8.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
RI.8.8	LAFS.8.RI.3.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.
W.8.1	LAFS.8.W.1.1	Write arguments to support claims with clear reasons and relevant evidence.
W.8.1a	LAFS.8.W.1.1a	Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
W.8.1b	LAFS.8.W.1.1b	Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
W.8.2d	LAFS.8.W.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
W.8.4	LAFS.8.W.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SL.8.1	LAFS.8.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.
SL.8.4	LAFS.8.SL.2.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
L.8.3	LAFS.8.L.2.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
L.8.4	LAFS.8.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.
L.8.4a	LAFS.8.L.3.4a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.8.4b	LAFS.8.L.3.4b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., precede, recede, secede).
L.8.6	LAFS.8.L.3.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
RST.6-8.1	LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.4	LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.
RST.6-8.8	LAFS.68.RST.3.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
WHST.6-8.1	LAFS.68.WHST.1.1	Write arguments focused on discipline-specific content.
WHST.6-8.1b	LAFS.68.WHST.1.1b	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.
WHST.6-8.2b	LAFS.68.WHST.1.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.
WHST.6-8.2d	LAFS.68.WHST.1.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.
WHST.6-8.4	LAFS.68.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.



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WHST.6-8.9	LAFS.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.
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9th – 10th Grade

RI.9-10.1	LAFS.910.RI.1.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
RI.9-10.4	LAFS.910.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
RI.9-10.8	LAFS.910.RI.3.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning.
W.9-10.1	LAFS.910.W.1.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.9-10.2	LAFS.910.W.1.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
W.9-10.2b	LAFS.910.W.1.2b	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
W.9-10.2d	LAFS.910.W.1.2d	Use precise language and domain-specific vocabulary to manage the complexity of the topic.
W.9-10.4	LAFS.910.W.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SL.9-10.1	LAFS.910.SL.1.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
SL.9-10.4	LAFS.910.SL.2.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
L.9-10.4	LAFS.910.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.
L.9-10.4a	LAFS.910.L.3.4a	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.9-10.6	LAFS.910.L.3.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression
RST.9-10.1	LAFS.910.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.
RST.9-10.4	LAFS.910.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
WHST.9-10.2d	LAFS.910.WHST.1.2d	Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.
WHST.9-10.4	LAFS.910.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-10.9	LAFS.910.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.



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11th – 12th Grade

RI.11-12.1	LAFS.1112.RI.1.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
RI.11-12.4	LAFS.1112.RI.2.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text (e.g., how Madison defines faction in Federalist No. 10).
W.11-12.1	LAFS.1112.W.1.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
W.11-12.2	LAFS.1112.W.1.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
W.11-12.2b	LAFS.1112.W.1.2b	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
W.11-12.4	LAFS.1112.W.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
SL.11-12.1	LAFS.1112.SL.1.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
SL.11-12.4	LAFS.1112.SL.2.4	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range or formal and informal tasks.
L.11-12.4	LAFS.1112.L.3.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.
L.11-12.4a	LAFS.1112.L.3.4a	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
L.11-12.6	LAFS.1112.L.3.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
RST.11-12.1	LAFS.1112.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
RST.11-12.4	LAFS.1112.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
WHST.11-12.2d	LAFS.1112.WHST.1.2d	Use precise language, domain-specific vocabulary and techniques such as metaphor, simile, and analogy to manage the complexity of the topic; convey a knowledgeable stance in a style that responds to the discipline and context as well as to the expertise of likely readers.
WHST.11-12.4	LAFS.1112.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.11-12.9	LAFS.1112.WHST.3.9	Draw evidence from informational texts to support analysis, reflection, and research.

