


Environmental Studies in Agriscience


This course develops a basic understanding of the interrelationships between people, agriculture, and environmental issues. Emphasis is placed on management and maintenance of natural resources, biotic, abiotic, and social aspects of environmental stewardship, and current issues in environmental policies. Science, social studies, communication, and mathematical skills are reinforced in this course. Work-based learning strategies appropriate for this course are field trips and community projects. Supervised Agricultural Experience (SAE) programs and the FFA leadership activities are integral components of the course and provide many opportunities for practical application of instructional competencies.


Prerequisite: Agriscience I and Biology or enrolled simultaneously in Biology *Credits: 1*

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Environmental Studies in Agriscience	Content Guideline													
<p>Louisiana Agricultural Education Related Content Standards</p>  <p><i>*All benchmarks are not marked for all Agricultural courses.</i></p>	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues			
STRAND: Agricultural Literacy K-12														
Standard: All students will become aware of the characteristics and components of the food and fiber systems.														
c. Agricultural literacy grades 9-12														
1. Exploring the food, fiber, and natural resource system	•	•	•	•	•	•	•	•	•	•	•			
2. Discussing why agriculture is important in our lives	•													
3. Recognizing areas of science that are a part of agriculture (physics, chemistry, geology, meteorology, biology)	•	•	•	•	•	•	•	•	•	•	•			
4. Understanding the relationship between plants and animals				•										
5. Discussing jobs involved in agriculture	•	•												
6. Understanding how agriculture was, and is, necessary for the development of civilization	•										•			
STRAND: Personal Development														
Standard: AgEd/FFA students will develop the necessary interpersonal and communication skills to obtain a job and work effectively and safely in an interactive work environment.														
a. Agricultural communication	•	•	•	•	•	•	•	•	•	•	•			
b. Team work in agriculture	•	•	•	•	•	•	•	•	•	•	•			
c. Careers in agriculture	•	•	•	•	•	•	•	•	•	•	•			
STRAND: Biotechnology in Agriculture														
Standard: AgEd/FFA students will understand the concepts and principles of biotechnology and the relationships biotechnology has with the agricultural environment.														
a. Basic concepts and applications of biotechnology											•			
b. Impacts and public issues of biotechnology				•							•			

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c. Processes and applications affecting the plant systems															
d. Processes and applications affecting animal systems															
e. Microbial-biotechnology in agriculture					•						•				
STRAND: Animal Systems															
Standard: AgEd/FFA students will understand the concepts and principles of animal science.															
a. Selection of livestock, poultry, and other animals															
b. Anatomy and physiology of livestock, poultry, and other animals															
c. Reproduction of livestock, poultry, and other animals															
d. Nutrition of livestock, poultry, and other animals															
e. Environmental factors affecting livestock, poultry, and other animal systems					•			•	•		•				
f. Diseases and parasites of livestock, poultry, and other animals															
g. Ethical issues related to livestock, poultry, and other animal systems					•			•	•						
STRAND: Plant Systems															
Standard: AgEd/FFA students will understand the concepts and principles of plant science.															
a. Internal processes affecting plant growth and reproduction		•		•											
b. External environmental factors affecting plant growth and reproduction				•		•									
c. Soil fertility			•												
d. Plant production															
e. Landscaping and floriculture															
f. Crops of Louisiana															

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g. Horticultural crops of Louisiana															
h. Agribusiness relating to crop production															
<p>STRAND: Environmental Management Standard: AgEd/FFA students will develop an understanding of the interrelationship between people, agriculture, and the environment.</p>															
a. Universal impact of forestry				•							•				
b. Wildlife management and conservation				•							•				
c. Environmental quality		•	•	•	•	•	•	•	•		•				

Louisiana Science Grade Level Expectations	Content Guideline										
GLEs Grade 9-12	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues
Science as Inquiry											
The Abilities Necessary to Do Scientific Inquiry											
1. Write a testable question or hypothesis when given a topic (SI-H-A1).	•	•	•	•	•	•	•	•	•	•	•
2. Describe how investigations can be observation, description, literature survey, classification, or experimentation (SI-H-A2).	•	•	•	•	•	•	•	•	•	•	•
3. Plan and record step-by-step procedures for a valid investigation, select equipment and materials, and identify variables and controls (SI-H-A2).		•	•	•	•	•	•	•	•	•	•
4. Conduct an investigation that includes multiple trials and record, organize, and display data appropriately (SI-H-A2).		•	•	•	•	•	•	•	•	•	•
5. Utilize mathematics, organizational tools, and graphing skills to solve problems (SI-H-A3).		•	•	•	•	•	•	•	•	•	•
6. Use technology when appropriate to enhance laboratory investigations and presentations of findings (SI-H-A3).		•	•	•	•	•	•	•	•	•	•
7. Choose appropriate models to explain scientific knowledge or experimental results (e.g., objects, mathematical relationships, plans, schemes, examples, role-playing, computer simulations) (SI-H-A4).		•	•	•	•	•	•	•	•	•	•
8. Give an example of how new scientific data can cause an existing scientific explanation to be supported, revised, or rejected (SI-H-A5).		•	•	•	•	•	•	•	•	•	•
9. Write and defend a conclusion based on logical analysis of experimental data (SI-H-A6) (SI-H-A2).		•	•	•	•	•	•	•	•	•	•
10. Given a description of an experiment, identify appropriate safety measures (SI-H-A7).		•	•	•	•	•	•	•	•	•	•
Understanding Scientific Inquiry											
11. Evaluate selected theories based on supporting scientific evidence (SI-H-B1).		•	•	•	•	•	•	•	•	•	•
12. Cite evidence that scientific investigations are conducted for many different reasons (SI-H-B2).		•	•	•	•	•	•	•	•	•	•
13. Identify scientific evidence that has caused modifications in previously accepted theories (SI-H-B2).		•	•	•	•	•	•	•	•	•	•
14. Cite examples of scientific advances and emerging technologies and how they affect society (e.g., MRI, DNA in forensics) (SI-H-B3).		•	•	•	•	•	•	•	•	•	•
15. Analyze the conclusion from an investigation by using data to determine its validity (SI-H-B4).		•	•	•	•	•	•	•	•	•	•

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Physical Science											
Measurement and Symbolic Representation											
1. Measure the physical properties of different forms of matter in metric system units (e.g., length, mass, volume, temperature) (PS-H-A1).						•		•			
2. Gather and organize data in charts, tables, and graphs (PS-H-A1).			•	•	•	•	•	•	•	•	•
The Structure and Properties of Matter											
Chemical Reactions											
23. Classify unknowns as acidic, basic, or neutral using indicators (PS-H-D2).		•	•					•			
Forces and Motion											
29. Differentiate between mass and weight (PS-H-E1).			•				•				

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Biology (Life Science)											
Biological Evolution											
18. Classify organisms from different kingdoms at several taxonomic levels, using a dichotomous key (LS-H-C4).			•	•							
22. Describe the role of viruses in causing diseases and conditions (e.g., AIDS, common colds, smallpox, influenza, warts) (LS-H-C7) (LS-H-G2).				•			•	•	•	•	•
Interdependence of Organisms											
26. Analyze the dynamics of a population with and without limiting factors (LS-H-D3).			•	•							
27. Analyze positive and negative effects of human actions on ecosystems (LS-H-D4) (SE-H-A7).	•	•	•	•	•	•	•	•	•	•	•

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Environmental Science											
Science and the Environment- Ecological Systems and Interactions											
4. Determine the effects of limiting factors on a population and describe the concept of carrying capacity (SE-H-A3).			•	•							
Resources and Resource Management											
13. Evaluate whether a resource is renewable by analyzing its relative regeneration time (SE-H-B1).			•	•						•	•
14. Analyze data to determine the effect of preservation practices compared to conservation practices for a sample species (SE-H-B2).			•	•							•
Environmental Awareness and Protection											
19. Determine the interrelationships of clean water, land, and air to the success of organisms in a given population (SE-H-C1).			•	•	•	•	•	•	•	•	•
20. Relate environmental quality to quality of life (SE-H-C2).			•	•	•	•	•	•	•	•	•
23. Describe the relationship between public support and the enforcement of environmental policies (SE-H-C5).			•	•	•	•	•	•	•	•	•
Personal Choices and Responsible Actions											
24. Identify the advantages and disadvantages of using disposable items versus reusable items (SE-H-D1).			•	•	•	•	•	•	•	•	•
Chemistry											
Chemical Reactions											
46. Give examples of common chemical reactions, including those found in biological systems (PS-H-D7).			•		•	•	•	•	•		

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	Reading and Responding										
1. Extend basic and technical vocabulary using a variety of strategies, including: use of context clues, use of knowledge of Greek and Latin roots and affixes, use of denotative and connotative meanings tracing etymology (ELA-1-H1).	•	•	•	•	•	•	•	•	•	•	•
4. Draw conclusions and make inferences in oral and written responses about ideas and information in texts, including: nonfiction works, short stories/novels, five-act plays, poetry/epics, film/visual texts, consumer/instructional materials, and public documents (ELA-1-H3).		•	•	•	•	•	•	•	•	•	•
5. Explain ways in which ideas and information in a variety of texts (e.g., scientific reports, technical guidelines, business memos, and literary texts) connect to real-life situations and other texts (ELA-1-H4).		•	•	•	•	•	•	•	•	•	•
11. Demonstrate understanding of information in grade-appropriate texts using a variety of strategies, including: summarizing and paraphrasing information and story elements, comparing and contrasting information in texts, including televised news, news magazines, documentaries, and online information, comparing and contrasting complex literary elements, devices, and ideas within and across texts, examining the sequence of information and procedures in order to critique the logic or development of ideas in texts, making inferences and drawing conclusions, and making predictions and generalizations (ELA-7-H1).		•	•	•	•	•	•	•	•	•	•
12. Solve problems using reasoning skills, including: using supporting evidence to verify solutions, analyzing the relationships between prior knowledge and life experiences and information in texts, and using technical information in specialized software programs, manuals, interviews, surveys, and access guides to Web sites (ELA-7-H2).		•	•	•	•	•	•	•	•	•	•
14. Analyze information within and across grade-appropriate texts using various reasoning skills, including: identifying cause-effect relationships, raising questions, reasoning inductively and deductively, generating a theory or hypothesis, and distinguishing facts from opinions and probability (ELA-7-H4).		•	•	•	•	•	•	•	•	•	•
Writing											

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	15. Develop organized, coherent paragraphs that include the following: topic sentences, logical sequence, transitional words and phrases, appropriate closing sentences, and parallel construction where appropriate (ELA-2-H1).		•	•	•	•	•	•	•	•	•
16. Develop multiparagraph compositions organized with the following: a clearly stated central idea or thesis statement, a clear, overall structure that includes an introduction, a body, and an appropriate conclusion, supporting paragraphs appropriate to the topic organized in a logical sequence (e.g., spatial order, order of importance, ascending/descending order, chronological order, parallel construction), and transitional words and phrases that unify throughout (ELA-2-H1).		•	•	•	•	•	•	•	•	•	•
17. Develop complex compositions on student- or teacher-selected topics that are suited to an identified audience and purpose and that include the following: word choices appropriate to the identified audience and/or purpose, vocabulary selected to clarify meaning, create images, and set a tone, information/ideas selected to engage the interest of the reader, clear voice (individual personality) (ELA-2-H2).		•	•	•	•	•	•	•	•	•	•
18. Develop complex compositions using writing processes, including: selecting topic and form (e.g., determining a purpose and audience), prewriting (e.g., brainstorming, clustering, outlining, generating main idea/thesis statements), drafting, conferencing (e.g., peer and teacher), revising for content and structure based on feedback, and proofreading/editing to improve conventions of language publishing using technology (ELA-2-H3).		•	•	•	•	•	•	•	•	•	•
19. Develop paragraphs and complex, multiparagraph compositions using all modes of writing (description, narration, exposition, and persuasion) emphasizing exposition and persuasion (ELA-2-H4).		•	•	•	•	•	•	•	•	•	•
Writing/Proofreading											
22. Apply standard rules of sentence formation, avoiding common errors, such as: fragments, run-on sentences, and syntax problems (ELA-3-H2).		•	•	•	•	•	•	•	•	•	•
23. Apply standard rules of usage, including: making subjects and verbs agree, using verbs in appropriate tenses, making pronouns agree with antecedents, using pronouns appropriately in nominative, objective, and possessive cases, using adjectives in comparative and superlative degrees and adverbs correctly, avoiding double negatives,		•	•	•	•	•	•	•	•	•	•

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and using all parts of speech appropriately (ELA-3-H2).											
24. Apply standard rules of mechanics, including: using commas to set off appositives or parenthetical phrases, using quotation marks to set off titles of short works, using colons preceding a list and after a salutation in a business letter, using standard capitalization for names of political and ethnic groups, religions, and continents (ELA-3-H2).		•	•	•	•	•	•	•	•	•	•
25. Use correct spelling conventions when writing and editing (ELA-3-H3).		•	•	•	•	•	•	•	•	•	•
26. Use a variety of resources, such as dictionaries, thesauruses, glossaries, technology, and textual features (e.g., definitional footnotes, sidebars) to verify word spellings (ELA-3-H3).		•	•	•	•	•	•	•	•	•	•
27. Use standard English grammar, diction, and syntax when responding to questions, participating in informal group discussions, and making presentations (ELA-4-H1).		•	•	•	•	•	•	•	•	•	•
28. Select language appropriate to specific purposes and audiences when speaking, including: delivering informational/book reports in class, conducting interviews/surveys of classmates or the general public, and participating in class discussions (ELA-4-H1).		•	•	•	•	•	•	•	•	•	•
29. Listen to oral instructions and presentations, speeches, discussions, and carry out procedures, including: taking accurate notes, writing summaries or responses, and forming groups (ELA-4-H2).		•	•	•	•	•	•	•	•	•	•
30. Organize and use precise language to deliver oral directions and instructions about general, technical, or scientific topics (ELA-4-H2).		•	•	•	•	•	•	•	•	•	•
31. Deliver oral presentations that include the following: phrasing, enunciation, voice modulation, verbal and nonverbal techniques, and inflection adjusted to stress important ideas and impact audience response, language choices selected to suit the content and context, and organization that includes an introduction, relevant details that develop the topic, and a conclusion (ELA-4-H3).		•	•	•	•	•	•	•	•	•	•
32. Use active listening strategies, including: monitoring messages for clarity, selecting and organizing essential information, noting cues such as changes in pace, and generating and asking questions concerning a speaker's content, delivery, and attitude toward the subject (ELA-4-H4).		•	•	•	•	•	•	•	•	•	•

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	33. Deliver clear, coherent, and concise oral presentations about information and ideas in texts (ELA-4-H4).		•	•	•	•	•	•	•	•	•
34. Analyze media information in oral and written responses, including: summarizing the coverage of a media event, and comparing messages from different media (ELA-4-H5).		•	•	•	•	•	•	•	•	•	•
Information Resources											
36. Identify and use organizational features to locate relevant information for research projects using a variety of resources, including: print resources (e.g., prefaces, appendices, annotations, citations, bibliographic references) and electronic texts (e.g., database keyword searches, search engines, e-mail addresses) (ELA-5-H1).		•	•	•	•	•	•	•	•	•	•
37. Locate, analyze, and synthesize information from a variety of grade-appropriate resources, including: multiple printed texts (e.g., encyclopedias, atlases, library catalogs, specialized dictionaries, almanacs, technical encyclopedias, and periodicals), electronic sources (e.g., Web sites, databases), other media sources (e.g., community and government data, television and radio resources, and other audio and visual materials) (ELA-5-H2).		•	•	•	•	•	•	•	•	•	•
38. Analyze the usefulness and accuracy of sources by determining their validity (e.g., authority, accuracy, objectivity, publication date, and coverage) (ELA-5-H2).		•	•	•	•	•	•	•	•	•	•
39. Access information and conduct research using various grade-appropriate, data-gathering strategies/tools, including: formulating clear research questions, gathering evidence from primary and secondary sources, using graphic organizers (e.g., outlining, charts, timelines, webs), and compiling and organizing information to support the central ideas, concepts, and themes of formal papers or presentations (ELA-5-H3).		•	•	•	•	•	•	•	•	•	•
41. Use word processing and/or other technology (e.g., illustration, page-layout, Web-design programs) to draft, revise, and publish various works, including research reports documented with parenthetical citations and bibliographies or works cited lists (ELA-5-H4).		•	•	•	•	•	•	•	•	•	•

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GLEs Grade 10	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues
	Reading and Responding										
1. Extend basic and technical vocabulary using a variety of strategies, including: use of context clues, use of knowledge of Greek and Latin roots and affixes, use of denotative and connotative meanings, and tracing etymology (ELA-1-H1).	•	•	•	•	•	•	•	•	•	•	•
4. Draw conclusions and make inferences about ideas and information in grade-appropriate texts in oral and written responses, including: short stories/novels, nonfiction works, five-act plays, poetry/epics, film/visual texts, consumer/instructional materials, and public documents (ELA-1-H3).		•	•	•	•	•	•	•	•	•	•
5. Analyze ways in which ideas and information in texts, such as almanacs, microfiche, news sources, technical documents, Internet sources, and literary texts, connect to real-life situations and other texts or represent a view or comment on life (ELA-1-H4).		•	•	•	•	•	•	•	•	•	•
11. Demonstrate understanding of information in grade-appropriate texts using a variety of reasoning strategies, including: summarizing and paraphrasing information and story elements, comparing and contrasting information in various texts (e.g., televised news, news magazines, documentaries, online information), comparing and contrasting complex literary elements, devices, and ideas within and across texts, examining the sequence of information and procedures in order to critique the logic or development of ideas in texts, making inferences and drawing conclusions, and making predictions and generalizations (ELA-7-H1).		•	•	•	•	•	•	•	•	•	•
12. Solve problems using reasoning skills, including: using supporting evidence to verify solutions, analyzing the relationships between prior knowledge and life experiences and information in texts, and using technical information in specialized software programs, manuals, interviews, surveys, and access guides to Web sites (ELA-7-H2).		•	•	•	•	•	•	•	•	•	•
15. Analyze information within and across grade-appropriate texts using various reasoning skills, including: identifying cause-effect relationships, raising questions, reasoning inductively and deductively, generating a theory or hypothesis, and distinguishing facts from opinions and probability (ELA-7-H4).		•	•	•	•	•	•	•	•	•	•
Writing											

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	16. Develop organized, coherent paragraphs that include the following: topic sentences, logical sequence, transitional words and phrases, appropriate closing sentences, and parallel construction where appropriate (ELA-2-H1).		•	•	•	•	•	•	•	•	•
17. Develop multiparagraph compositions organized with the following: a clearly stated central idea/thesis statement, a clear, overall structure that includes an introduction, a body, and an appropriate conclusion, supporting paragraphs appropriate to the topic organized in a logical sequence (e.g., spatial order, order of importance, ascending/descending order, chronological order, parallel construction), and transitional words and phrases that unify throughout (ELA-2-H1).		•	•	•	•	•	•	•	•	•	•
18. Develop complex compositions on student- or teacher-selected topics that are suited to an identified audience and purpose and that include the following: word choices appropriate to the identified audience and/or purpose, vocabulary selected to clarify meaning, create images, and set a tone, information/ideas selected to engage the interest of the reader, and clear voice (individual personality) (ELA-2-H2).		•	•	•	•	•	•	•	•	•	•
19. Develop complex compositions using writing processes, including: selecting topic and form, determining purpose and audience, prewriting (e.g., brainstorming, clustering, outlining, generating main idea/thesis statements), drafting, conferencing (e.g., with peers and teachers), revising for content and structure based on feedback, proofreading/editing to improve conventions of language, and publishing using technology (ELA-2-H3).		•	•	•	•	•	•	•	•	•	•
21. Use all modes to write complex compositions, including: comparison/contrast of ideas and information in reading materials or current issues, literary analyses that compare and contrast multiple texts, and editorials on current affairs (ELA-2-H4).		•	•	•	•	•	•	•	•	•	•
24. Write for various purposes, including: formal and business letters, such as letters of complaint and requests for information, letters to the editor, job applications, and text-supported interpretations that connect life experiences to works of literature (ELA-2-H6).		•	•	•	•	•	•	•	•	•	•
Writing/Proofreading											
25. Apply standard rules of sentence formation, avoiding common errors, such as: fragments, run-on sentences, and syntax problems (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•	•

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	26. Apply standard rules of usage, including: making subjects and verbs agree, using verbs in appropriate tenses, making pronouns agree with antecedents, using pronouns in appropriate cases (e.g., nominative and objective), using adjectives in comparative and superlative degrees, using adverbs correctly, and avoiding double negatives (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•
27. Apply standard rules of mechanics, including: using commas to set off appositives or parenthetical phrases, using quotation marks to set off titles of short works, using colons preceding a list and after a salutation in a business letter, and using appropriate capitalization, including names of political and ethnic groups, religions, and continents (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•	•
28. Use correct spelling conventions when writing and editing (ELA-3-H3).	•	•	•	•	•	•	•	•	•	•	•
29. Use a variety of resources, such as dictionaries, thesauruses, glossaries, technology, and textual features (e.g., definitional footnotes, sidebars), to verify word spellings (ELA-3-H3).	•	•	•	•	•	•	•	•	•	•	•
Speaking and Listening											
30. Use standard English grammar, diction, and syntax when speaking in formal presentations and informal group discussions (ELA-4-H1).	•	•	•	•	•	•	•	•	•	•	•
31. Select language appropriate to specific purposes and audiences, including: delivering informational/book reports in class, conducting interviews/surveys of classmates or the general public, and participating in class discussions (ELA-4-H1).	•	•	•	•	•	•	•	•	•	•	•
32. Listen to detailed oral instructions and presentations and carry out complex procedures, including: taking accurate notes, writing summaries or responses, and forming groups (ELA-4-H2).	•	•	•	•	•	•	•	•	•	•	•
33. Organize and use precise language to deliver oral directions and instructions about general, technical, or scientific topics (ELA-4-H2).			•	•	•	•	•	•	•	•	•
34. Deliver oral presentations that include the following: volume, phrasing, enunciation, voice modulation, and inflection adjusted to stress important ideas and impact audience response, language choices adjusted to suit the content and context, and organization that includes an introduction, selected details, and a conclusion arranged to impact an			•	•	•	•	•	•	•	•	•

Louisiana English Language Arts Grade Level Expectations	Content Guideline										
GLEs Grade 10	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues
	audience (ELA-4-H3).										
36. Deliver clear, coherent, and concise oral presentations and responses about information and ideas in a variety of texts (ELA-4-H4).			•	•	•	•	•	•	•	•	•
37. Analyze media information in oral and written responses, including: comparing and contrasting the ways in which print and broadcast media cover the same event, evaluating media messages for clarity, quality, effectiveness, motive, and coherence, and listening to and critiquing audio/video presentations (ELA-4-H5).		•	•	•	•	•	•	•	•	•	•
38. Participate in group and panel discussions, including: identifying the strengths and talents of other participants, acting as facilitator, recorder, leader, listener, or mediator, and evaluating the effectiveness of participants' performances (ELA-4-H6).			•	•	•	•	•	•	•	•	•
Information Resources											
39. Select and evaluate relevant information for a research project using the organizational features of a variety of resources, including: print texts such as prefaces, appendices, annotations, citations, bibliographic references, and endnotes, and electronic texts such as database keyword searches, search engines, and e-mail addresses (ELA-5-H1).	•	•	•	•	•	•	•	•	•	•	•
40. Locate, analyze, and synthesize information from grade-appropriate resources, including: multiple printed texts (e.g., encyclopedias, atlases, library catalogs, specialized dictionaries, almanacs, technical encyclopedias, and periodicals), electronic sources (e.g., Web sites and databases), and other media sources (e.g., community and government data, television and radio resources, and other audio and visual materials) (ELA-5-H2).	•	•	•	•	•	•	•	•	•	•	•
41. Analyze the usefulness and accuracy of sources by determining their validity (e.g., authority, accuracy, objectivity, publication date, coverage) (ELA-5-H2).			•	•	•	•	•	•	•	•	•
42. Access information and conduct research using various grade-appropriate data-gathering strategies/tools, including: formulating clear research questions, using research methods to gather evidence from primary and secondary sources, using graphic organizers (e.g., outlining, charts, timelines, webs), and compiling and organizing information to support the central ideas, concepts, and themes of a formal paper or presentation (ELA-5-H3).			•	•	•	•	•	•	•	•	•

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	44. Use word processing and/or technology to draft, revise, and publish various works, including research reports documented with parenthetical citations and bibliographies or works cited lists (ELA-5-H4).		•	•	•	•	•	•	•	•	•
46. Analyze information found in complex graphic organizers, including detailed maps, comparative charts, extended tables, graphs, diagrams, cutaways, overlays, and sidebars to determine usefulness for research (ELA-5-H6).			•	•	•	•	•	•	•	•	•

Louisiana English Language Arts Grade Level Expectations	Content Guideline										
GLEs Grade 11-12	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues
Reading and Responding											
1. Extend basic and technical vocabulary using a variety of strategies, including: analysis of an author’s word choice, use of related forms of words, and analysis of analogous statements (ELA-1-H1).	•	•	•	•	•	•	•	•	•	•	•
4. Evaluate ways in which the main idea, rationale or thesis, and information in complex texts, including consumer, workplace, public, and historical documents, represent a view or comment on life (ELA-1-H4).		•	•	•	•	•	•	•	•	•	•
10. Identify, gather, and evaluate appropriate sources and relevant information to solve problems using multiple sources, including: school library catalogs, online databases, electronic resources, and Internet-based resources (ELA-7-H2).		•	•	•	•	•	•	•	•	•	•
13. Analyze information within and across grade-appropriate print and nonprint texts using various reasoning skills, including: identifying cause-effect relationships, raising questions, reasoning inductively and deductively, generating a theory or hypothesis, skimming/scanning, and distinguishing facts from opinions and probability (ELA-7-H4).		•	•	•	•	•	•	•	•	•	•
Writing											
14. Develop complex compositions, essays, and reports that include the following: a clearly stated central idea/thesis statement, a clear, overall structure (e.g., introduction, body, appropriate conclusion), supporting paragraphs organized in a logical sequence (e.g., spatial order, order of importance, ascending/descending order, chronological order, parallel construction), and transitional words, phrases, and devices that unify throughout (ELA-2-H1).	•	•	•	•	•	•	•	•	•	•	•
15. Develop complex compositions on student- or teacher-selected topics that are suited to an identified audience and purpose and that include the following: word choices appropriate to the identified audience and/or purpose, vocabulary selected to clarify meaning, create images, and set a tone, information/ideas selected to engage the interest of the reader, and clear voice (individual personality) (ELA-2-H2).	•	•	•	•	•	•	•	•	•	•	•

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GLEs Grade 11-12	Orientation to the Agriscience Program	Introduction to Environmental Science	Soil Conservation	Forestry and Wildlife	Management of Waste	Land Use, Regulations, and Ordinances	Chemicals and the Environment	Water Quality	Air Quality	Alternative Energy	Current Environmental Issues
16. Develop complex compositions using writing processes such as the following: selecting topic and form (e.g., determining a purpose and audience), prewriting (e.g., brainstorming, clustering, outlining, generating main idea/thesis statements), drafting, conferencing with peers and teachers, revising for content and structure based on feedback, proofreading/editing to improve conventions of language, and publishing using available technology (ELA-2-H3).	•	•	•	•	•	•	•	•	•	•	•
Writing/Proofreading											
21. Apply standard rules of sentence formation, including parallel structure (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•	•
22. Apply standard rules of usage, for example: avoid splitting infinitives, use the subjunctive mood appropriately (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•	•
23. Apply standard rules of mechanics and punctuation, including: parentheses, brackets, dashes, commas after introductory adverb clauses and long, introductory phrases, quotation marks for secondary quotations, internal capitalization, manuscript form (ELA-3-H2).	•	•	•	•	•	•	•	•	•	•	•
24. Use a variety of resources (e.g., dictionaries, thesauruses, glossaries, technology) and textual features, (e.g., definitional footnotes, sidebars) to verify word spellings (ELA-3-H3).	•	•	•	•	•	•	•	•	•	•	•
Speaking and Listening											
25. Use standard English grammar, diction, and syntax when speaking in formal presentations and informal group discussions (ELA-4-H1).	•	•	•	•	•	•	•	•	•	•	•
26. Select language appropriate to specific purposes and audiences for speaking, including: delivering informational/book reports in class, conducting interviews/surveys of classmates or the general public, participating in class discussions (ELA-4-H1).	•	•	•	•	•	•	•	•	•	•	•
27. Listen to detailed oral instructions and presentations and carry out complex procedures, including: reading and questioning, writing responses, forming groups, taking accurate, detailed notes (ELA-4-H2).	•	•	•	•	•	•	•	•	•	•	•
28. Organize and use precise language to deliver complex oral directions or instructions about general, technical, or scientific topics (ELA-4-H2).	•	•	•	•	•	•	•	•	•	•	•

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	29. Deliver presentations that include the following: language, diction, and syntax selected to suit a purpose and impact an audience, delivery techniques including repetition, eye contact, and appeal to emotion suited to a purpose and audience, an organization that includes an introduction, relevant examples, and/or anecdotes, and a conclusion arranged to impact an audience (ELA-4-H3).		•	•	•	•	•	•	•	•	•
30. Use active listening strategies, including: monitoring messages for clarity, selecting and organizing information, noting cues such as changes in pace (ELA-4-H4).	•	•	•	•	•	•	•	•	•	•	•
31. Deliver oral presentations, including: speeches that use appropriate rhetorical strategies, responses that analyze information in texts and media, persuasive arguments that clarify or defend positions (ELA-4-H4).		•	•	•	•	•	•	•	•	•	•
32. Give oral and written analyses of media information, including: identifying logical fallacies (e.g., attack ad hominem, false causality, overgeneralization, bandwagon effect) used in oral addresses, analyzing the techniques used in media messages for a particular audience, critiquing a speaker's diction and syntax in relation to the purpose of an oral presentation, critiquing strategies (e.g., advertisements, propaganda techniques, visual representations, special effects) used by the media to inform, persuade, entertain, and transmit culture (ELA-4-H5).		•	•	•	•	•	•	•	•	•	•
Information Resources											
34. Select and critique relevant information for a research project using the organizational features of a variety of resources, including: print texts (e.g., prefaces, appendices, annotations, citations, bibliographic references), electronic texts (e.g., database keyword searches, search engines, e-mail addresses) (ELA-5-H1).		•	•	•	•	•	•	•	•	•	•
35. Locate, analyze, and synthesize information from a variety of complex resources, including: multiple print texts (e.g., encyclopedias, atlases, library catalogs, specialized dictionaries, almanacs, technical encyclopedias, and periodicals), electronic sources (e.g., Web sites or databases), other media (e.g., community and government data, television and radio resources, and audio and visual materials) (ELA-5-H2).		•	•	•	•	•	•	•	•	•	•
36. Analyze the usefulness and accuracy of sources by determining their validity (e.g., authority, accuracy, objectivity, publication date, coverage) (ELA-5-H2).		•	•	•	•	•	•	•	•	•	•

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	37. Access information and conduct research using various grade-appropriate data-gathering strategies/tools, including: formulating clear research questions, evaluating the validity and/or reliability of primary and/or secondary sources, using graphic organizers (e.g., outlining, charts, timelines, webs, compiling and organizing information to support the central ideas, concepts, and themes of a formal paper or presentation, preparing annotated bibliographies and anecdotal scripts (ELA-5-H3).		•	•	•	•	•	•	•	•	•
39. Use word processing and/or technology to draft, revise, and publish various works, including: functional documents (e.g., requests for information, resumes, letters of complaint, memos, proposals), using formatting techniques that make the document user friendly, analytical reports that include databases, graphics, and spreadsheets, research reports on high-interest and literary topics (ELA-5-H4).		•	•	•	•	•	•	•	•	•	•
40. Use selected style guides to produce complex reports that include the following: credit for sources (e.g., appropriate parenthetical documentation and notes), standard formatting for source acknowledgment (ELA-5-H5).		•	•	•	•	•	•	•	•	•	•
41. Analyze and synthesize information found in various complex graphic organizers, including detailed maps, comparative charts, extended tables, graphs, diagrams, cutaways, overlays, and sidebars (ELA-5-H6).		•	•	•	•	•	•	•	•	•	•

Environmental Studies in Agriscience

Content Guidelines

(The student will be able to. . .)

Unit One

Orientation to the Agriscience Program

1. Investigate and summarize the scope of agriscience.
2. Survey and distinguish among the variety of career opportunities available in the field of agriculture, especially those relating to the environment.
3. Describe the components of a total Agriscience program.
 - a. Classroom/laboratory instruction
 - b. Student Leadership Development (FFA)
 - c. Supervised Agricultural Experience program (SAE)
4. Develop a personal plan of activities for participation in FFA.
5. Plan and develop an individualized SAE program.

Unit Two

Introduction to Environmental Science

1. Develop an understanding of the concept of “natural resources.”
2. Describe the flow of energy and the roles of the carbon and nitrogen cycles.
3. Examine the roles of the carbon and nitrogen cycles.
4. Analyze current environmental issues from political and scientific perspectives.
5. Appraise the interdependence of humans and their environment.
6. Review the consequences of human alterations to an ecosystem.
7. Analyze the impact of agriculture practices on the environment.
8. Distinguish between conservation, preservation, and multiple use management practices.
9. Differentiate between agricultural practices that lead to environmental improvement from those that deteriorate environmental quality.

Unit Three

Soil Conservation

1. Define *soil*. Explain its function and how it is developed.
2. Specify the characteristics of a soil profile.
3. Describe the physical properties of soil.
 - a. Composition of soil
 - b. Soil properties such as color, texture, structure, porosity, and slope
4. Specify the origins of soil parent material.
5. Define wetland.
6. Explain how soil can be used as a filter for pollutants.
7. Determine ways human activities and land use affect soil.
8. Identify the factors that affect soil erosion.

9. Assess human and natural causes of Louisiana coastal erosion.
10. Describe causes of subsidence and provide methods of control.
11. Evaluate methods of soil erosion control.

Unit Four

Forestry and Wildlife

1. Identify common Louisiana trees, with and without a key.
2. Describe how wildlife habitat relates to forest ecology.
3. Explain basic forest management practice, including the multiple use concept.
4. Compare the importance of trees in rural, suburban, and urban areas and note factors important to their health.
5. Discuss what is meant by sustainable forestry.
6. List common introduced species of plants and animals and describe how they interact with native species.
7. Identify common wildlife species, their biofacts (hair, fur, feathers, gnaw marks, etc.), and tracks.
8. Describe specific adaptation of wildlife species to their habitats and identify their niche in the ecosystem.
9. Give examples of the predator – prey relationship.
10. Differentiate between food chains, food webs, and food pyramids.
11. Evaluate a given habitat for the suitability of a specific species, given a description of the species' needs.
12. Describe factors that limit or enhance population growth, including discussion of carrying capacity and limiting factors.
13. Identify ways that wildlife populations are protected, conserved, managed, or enhanced.
14. Specify factors affecting threatened or endangered species and methods used to improve their populations.
15. Discuss some basic tools of wildlife managers, including the laws that protect our resources.

Unit Five

Management of Waste

1. Define *waste* and give examples of waste found in the environment.
2. Discuss the difference between waste in the natural environment and human waste.
3. Identify sources of solid waste in the United States.
4. Use given criteria for classifying materials as “hazardous,” and discuss health and safety risks of improper hazardous waste disposal.
5. Explain and assess methods for preventing and reducing solid wastes.
6. Describe environmentally sound methods of solid waste disposal.
7. Evaluate the use of biotechnology in waste disposal.
8. Explain benefits of manure for improving soil and identify potential environmental problems.
9. Describe environmentally sound manure storage and treatment systems.

Unit Six

Land Uses, Regulations, and Ordinances

1. Explain and give reasons for land use planning.
2. Determine how soils affect land use.
3. Evaluate land use issues.
4. Recognize the rights and responsibilities of landowners.
5. Investigate how land use laws are passed.

Unit Seven

Chemicals and the Environment

1. Define *chemical*.
2. Identify the importance of chemicals in our lives.
3. Determine the implications of banning chemical use in society.
4. Assess safe handling and application practices of chemicals.
 - a. Commercial storage and handling
 - b. Home storage and handling
5. Outline and discuss the developmental and regulatory process of chemicals.
6. Analyze the benefit versus the potential adverse effects of chemicals.
7. Identify federal regulations governing the disposal of industrial and chemical wastes.

Unit Eight

Water Quality

1. Determine the properties of water that enable it to be used for different purposes.
2. Identify and describe factors affecting water quality, including point and non-point source pollution.
3. Describe how water is processed in the hydrologic cycle.
4. Discover possible contaminants that influence water quality, and the cumulative effect on the environment.
5. Analyze the importance of groundwater storage and recharging, along with the processes that contaminate it.
6. Analyze the role of wetlands and watershed on water quality. Know steps that might be taken to preserve them.
7. Determine the physical, chemical, and biological methods used to ensure water quality.
8. Predict human activities that can improve and maintain the quality of water.
9. Explain the importance to human health of the Safe Drinking Water Act and the Clean Water Act.
10. Determine some basic water quality parameters and know which equipment is used to obtain them.
 - a. pH
 - b. Turbidity
 - c. Aquatic invertebrates
 - d. Dissolved oxygen
 - e. Toxic chemicals
11. Outline steps used to conserve water at the individual and governmental levels.

Unit Nine

Air Quality

1. Describe effects of major air pollutants on people, animals, plants, and material objects.
2. Select ways that noise pollution damages humans and animals.
3. Link the sources of air pollution with the pollutants involved.
4. Review the cost/benefit analysis in economics to compare the benefits of controlling air pollution versus the cost.
5. Explain what greenhouse gases are, their sources, and environmental impact.
6. Recognize possible sources of air pollution that cause acid rain.
7. Describe how major air pollutants are regulated and controlled.
8. Generate a list of governmental regulations and monetary costs associated with maintaining air quality.

Unit Ten

Alternative Energy

1. Compare/contrast traditional uses of energy.
 - a. Petroleum
 - b. Natural gas
 - c. Coal
 - d. Nuclear
 - e. Hydroelectric power
2. Outline production strategies for traditional fuels and the scope of use.
3. Assess the environmental impact of each type of fuel.
4. Assess the feasibility and applications of emerging renewable energy resources.
 - a. Solar
 - b. Wind generation
 - c. Biomass
 - d. Ethanol/methanol
 - e. Bio-diesel
 - f. Hydrogen
 - g. Geothermal
 - h. Tidal generation

Unit Eleven

Current Environmental Issues

1. Appraise the current environmental issues, their causes, concerns to human health, biodiversity, economic development, and measures taken to prevent or control their effects.
 - a. Climatic changes (global warming)
 - b. Water use rights
 - c. Air pollution resulting in acid rain
 - d. Carbon emissions from burning fossil fuels
 - e. Water pollution from fertilizer and pesticide runoff

- f. Desertification
- g. Endangered species

Resources

Camp, William, Ph.D. and Donahue, Roy L., Ph.D. (2000). *Environmental Science for Agriculture and the Life Science*. Clifton Park, New York: Delmar Publishers.

National Council for Agricultural Education (1996). *Applied Environmental Science*. Indianapolis, Indiana: National FFA Foundation.

Porter, Lynn, et al (1997). *Environmental Science and Technology*. Danville, Illinois: Interstate Publishers.

Project WET: Water Education for Teachers (1998). Bozeman, Montana: The Watercourse and the Council for Environmental Education.

Internet Sites

<http://www.educationindex.com/environ/> (2003). Environmental Science.

<http://www.epa.gov> (2003). Environmental Protection Agency.

<http://www.library.thinkquest.org/11353/ecosystems.html> (2003). Ecosystems.

<http://www.wga.org> (2003). Water Quality Association.