APS DISTRICT HIGH SCHOOL SCIENCE CURRICULUM FRAMEWORK

Course Title: Eco-Biology (Formerly Environmental Science/Studies) **Course Number:** SEE BELOW

Department: Science **ADS Number:** SEE BELOW

Prerequisites: None

Length of Course: One Year **Credit/PRI Area:** .50 per Sem/Science **Grade Level(s):** 9 - 12

COURSE AND ADS NUMBERS:

Eco-Biology	41131	17114144
Eco-Biology Bilingual	4113B	17118144
Eco-Biology	060MF	17112144
Eco-Biology	061MF	17112144
Eco-Biology	062MF	17112144

Important Notes:

COURSE DESCRIPTION: This laboratory course* is designed to teach the student the interrelationships between life and the physical environment over the life span of the Earth. The student is introduced to cell structure and function, biochemistry, genetics, ecology, evolution, taxonomy, and certain aspects of Earth science using a complex system approach. Literacy strategies are integrated throughout the curriculum. Field trips occur as opportunities arise and resources allow.

*Lab Courses: A minimum of 250 minutes per week of directed class activity for 36 weeks, 40% of which must be lab oriented, for a total of 150 clock hours (90 hours of class plus 60 hours of lab) shall be required for one (1) unit of credit, excluding passing period. [APS Procedural Directives, Section I – Instruction, Basis for offering credit].

References in parentheses following each performance standard refer to and align with the State of New Mexico Science Standards (NM), the Albuquerque Public Schools Mathematics Standards (APS – MA), and the Albuquerque Public Schools Language Arts Standards (APS - LA).

STRATEGIES:
The "Illustrations" column in the *Program of Studies* provides exemplars of the performance standards, strategies, and best practices suggested by the science teachers in the Albuquerque Public Schools (APS).

ASSESSMENTS:
Assessments may include the following: authentic and performance-based assessment, cooperative learning, teacher observations, checklists, tests and exams, formal and informal writing, small group and full class discussions, oral and multimedia presentations, projects, demonstrations, and portfolios. Assessments are based on appropriate rubrics.

SUGGESTED TEXTBOOKS AND INSTRUCTIONAL MATERIALS:
- Current state adopted textbooks
- Microscopes
- Stereomicroscopes
- *BSCS Biology – An Ecological Approach*

SUGGESTED TITLES/AUTHORS WEB SITES:

Approved by HSCA: 12/04

STRAND I: SCIENTIFIC THINKING AND PRACTICE
CONTENT STANDARD: The student understands the processes of scientific investigations and uses inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

BENCHMARKS:
A. The student uses accepted scientific methods to collect, analyze, and interpret data and observations, and to design and conduct scientific investigations and communicate results.
B. The student understands that scientific processes produce scientific knowledge that is continually evaluated, validated, revised, or rejected.
C. The student uses mathematical concepts, principles, and expressions to analyze data, develop models, understand patterns and relationships, evaluate findings, and draw conclusions.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	1. Describes the essential components of an investigation, including appropriate methodologies, proper equipment, and safety precautions (NM – I.I.I.1). 2. Designs and conducts scientific investigations that include (NM – I.I.I.2): • testable hypotheses, • controls and variables, • methods to collect, analyze, and interpret data, • results that address hypotheses being investigated, • predictions based on results, • re-evaluation of hypotheses and additional experimentation as necessary, and • error analysis. 3. Uses appropriate technologies to collect, analyze, and communicate scientific data (e.g., computers, calculators, balances, microscopes) (NM – I.I.I.3).	**NOTE: Illustrations include suggested activities for attaining each performance standard. A check (√) refers to a key feature to look for while assessing student performance.** **Note:** All of the illustrations represented in this course are based on the premise that the instructor models everything. Before the student can actually carry out investigations, experimentation, exploration, or research, he/she has to observe the practice first before it can be replicated. 1 – 4, 6 – 16. A model biosphere is set up as a group experiment with every student doing the same thing. The student, as part of the class, gathers results, analyzes them, and makes conclusions. From here the student starts with a field trip (e.g., on-site, off site) to observe. Upon return to class, he/she selects a project and properly designs and/or performs a controlled experiment using a recognized scientific method, gathers data, and reports results in either an oral or written format. ✓ proper safety techniques ✓ correct use of equipment ✓ appropriate equipment ✓ evidence of current scientific knowledge ✓ effective communication skills ✓ use of technology ✓ quantitative data ✓ critical thinking and insights ✓ **Hint:** The student can start by creating a biosphere in a jar or bottle or wander around the vacant fields close to school or home to get ideas. If possible, the student can go by bus to the mountains or the Bosque.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	4. Conveys results of investigations using scientific concepts, methodologies, and expressions, including (NM – I.I.I.4; APS – IV.5E): • scientific language and symbols, • diagrams, charts, and other data displays, • mathematical expressions and processes (e.g., mean, median, slope, proportionality), • clear, logical, and concise communication, and • reasoned arguments. 5. Understands how scientific theories are used to explain and predict natural phenomena (e.g., plate tectonics, ocean currents, structure of atom) (NM – I.I.I.5). 6. Understands how scientific processes produce valid, reliable results, including (NM – I.I.II.1): • consistency of explanations with data and observations, • openness to peer review, • full disclosure and examination of assumptions, • testability of hypotheses, and • repeatability of experiments and reproducibility of results. 7. Uses scientific reasoning and valid logic to recognize (NM – I.I.II.2): • faulty logic, • cause and effect, • the difference between observation and unsubstantiated inferences and conclusions, and • potential bias. 8. Understands how new data and observations can result in new scientific knowledge (NM – I.I.II.3; APS - !V.1E). 9. Critically analyzes an accepted explanation by reviewing current scientific knowledge (NM - I.I.II.4). 10. Examines investigations of current interest in science (e.g., superconductivity, molecular machines, age of the universe) (NM – I.I.II.5).	5. As a class project the student first analyzes data provided by the instructor. From here, the student breaks off and selects a project to do on his/her own. The main criteria is for him/her to do something relevant to the area where he/she lives. The student graphs and charts his/her data and presents it to the class. ✓ organization of data ✓ data supports theory ✓ relevance ✓ connections ✓ critical thinking/insights ✓ clear communication ✓ graphical representations ✓ effective presentation Extension: The student does a research of his/her local community and defines a local environmental problem. He/She applies the scientific method process to propose a possible solution to the problem.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	11. Examines the scientific processes and logic used in investigations of past events (e.g., using data from crime scenes, fossils), investigations that can be planned in advance but are only done once (e.g., expensive or time-consuming experiments such as medical clinical trials), and investigations of phenomena that can be repeated easily and frequently (NM – I.I.II.6). 12. Creates multiple displays of data to analyze and explain the relationships in scientific investigations (NM – I.I.III.1). 13. Uses mathematical models to describe, explain, and predict natural phenomena (NM – I.I.III.2; APS – I.16, I.18). 14. Uses technologies to quantify relationships in scientific hypotheses (e.g., calculators, computer spreadsheets and databases, graphing software, simulations, modeling) (NM – I.I.III.3). 15. Identifies and applies measurement techniques and considers possible effects of measurement errors (NM – I.I.III.4). 16. Uses mathematics to express and establish scientific relationships (e.g., scientific notation, vectors, dimensional analysis) (NM – I.I.III.5).	

STRAND II: THE CONTENT OF SCIENCE-LIFE
CONTENT STANDARD: The student understands the properties, structures, and processes of living things and the interdependence of living things and their environments.

BENCHMARKS: A. The student understands how the survival of species depends on biodiversity and on complex interactions, including the cycling of matter and the flow of energy.
B. The student understands the genetic basis for inheritance and the basic concepts of biological evolution.
C. The student understands the characteristics, structures, and functions of cells.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
		Note: The writers of this course felt that the performance standards had to be reordered from the way they were originally presented in this strand. This was necessary to preserve a natural progression of examples that lead into each other and flow in terms of how the content is to be presented. Nothing has been eliminated, just reorganized.
	1. Knows that an ecosystem is complex and may exhibit fluctuations around a steady state or may evolve over time (NM – II.II.I.1). 2. Describes how organisms cooperate and compete in ecosystems (e.g., producers, decomposers, herbivores, carnivores, omnivores, predator-prey, symbiosis, mutualism) (NM – II.II.I.2). 3. Understands and describes how available resources limit the amount of life an ecosystem can support (e.g., energy, water, oxygen, nutrients) (NM – II.II.I.3).	1 – 3, 5 – 7. Through teacher modeling, the student is introduced to key concepts regarding ecosystems. The instructor performs an experiment with the student as observer. This sets the pace for the rest of the class. The student then selects an ecosystem from around the school (e.g., Rio Grande, foothills, pond) and designs an energy pyramid that features the major organisms that inhabit that ecosystem. The student shows the transfer of energy from the sun through decomposers, including energy loss at each level. ✓ design of pyramid ✓ organisms appropriate for ecosystem ✓ organisms included on proper levels ✓ energy transferences properly noted at each level Extension: The student constructs a model that demonstrates the greenhouse effect.
	4. Critically analyzes how humans modify and change ecosystems (e.g., harvesting, pollution, population growth, technology) (NM – II.II.I.4). 5. Explains how matter and energy flow through biological systems (e.g., organisms, communities, ecosystems), how the total amount of matter and energy is conserved, but some energy is always released as heat to the environment (NM – II.II.I.5).	4. The student examines a local area (e.g., the high desert) and through class discussion responds to the following questions: • Is this ecosystem the same as it was 10 years ago? Why or why not? • How does the choice of plants the people choose to place in their homes compete with native surroundings? Explain. ✓ analysis ✓ response to questions ✓ active participation in class discussion

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	6. Describes how energy flows from the sun through plants to herbivores to carnivores and decomposers (NM – II.II.I.6).	Extension: The student does an analysis of the Siberian elm and presents findings to the class.
	7. Understands and explains the principles of photosynthesis (i.e., chloroplasts in plants convert light energy, carbon dioxide, and water into chemical energy) (NM – II.II.I.7).	
	8. Understands and explains the hierarchical classification scheme (i.e., domain, kingdom, phylum, class, order, family, genus, species), including (NM – II.II.I.8): • classification of an organism into a category, • similarity inferred from molecular structure (DNA) closely matching classification based on anatomical similarities, and • similarities of organisms reflecting evolutionary relationships.	8. By now the student has prior knowledge of plants and their classification system and has done some work with specimens. Working in pairs, the student takes a field trip, collects 10 – 20 different specimens (e.g., plants, animals), photographs each specimen, and makes a dichotomous key using logic (each can be different). The pair breaks down the specimens and names each one according to the key. The student teams then trade around with other groups to see how each pair analyzed his/her specimens. ✓ vocabulary/terminology ✓ clear descriptions ✓ teamwork/collaboration ✓ individual participation
	9. Describes the evidence for the first appearance of life on Earth as one-celled organisms, over 3.5 billion years ago, and for the later appearance of a diversity of multicellular organisms over millions of years (NM – II.II.II.8). 10. Critically analyzes the data and observations supporting the conclusion that the species living on Earth today are related by descent from the ancestral one-celled organisms (NM - II.II.II.9). 11. Understands the data, observations, and logic supporting the conclusion that species today evolved from earlier, distinctly different species, originating from the ancestral one-celled organisms (NM – II.II.II.10). 12. Understands that evolution is a consequence of many factors, including the ability of organisms to reproduce, genetic variability, the effect of limited resources, and natural selection (NM – II.II.II.11). 13. Explains how natural selection favors individuals who are better able to survive, reproduce, and leave offspring (NM – II.II.II.12).	9 – 14, 23 – 29. As building blocks and as a starting point, the student responds to the question, "How did the world begin?" This question leads into the beginning of life (e.g., space, Earth), how the first life forms came together, the basis of DNA, RNA and genetics, the characteristics of life (e.g., What did that life form have to have?), and ending with what we have today. The student discusses what makes things living and nonliving, moves into processes that make things get more complex, and looks at a complex system of interactions that have compiled what we have today. ✓ active participation in discussion ✓ response to questions ✓ understanding of evolutionary concepts ✓ clear communication

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	14. Analyzes how evolution by natural selection and other mechanisms explains many phenomena including the fossil record of ancient life forms and similarities (both physical and molecular) among different species (NM – II.II.II.13). 15. Understands variation within and among species, including (NM – II.II.I.9): • mutations and genetic drift, and • factors affecting the survival of an organism natural selection. 16. Knows how DNA carries all genetic information in the units of heredity called genes, including (NM – II.II.II.1): • the structure of DNA (e.g., subunits A, G, C, T) • information-preserving replication of DNA • alteration of genes by inserting, deleting, or substituting parts of DNA. 17. Uses appropriate vocabulary to describe inheritable traits (i.e., genotype, phenotype) (NM – II.II.II.2). 18. Explains the concepts of segregation, independent assortment, and dominant/recessive alleles (NM – II.II.II.3). 19. Identifies traits that can and cannot be inherited (NM – II.II.II.4). 20. Knows how genetic variability results from the recombination and mutation of genes, including (NM – II.II.II.5): • sorting and recombination of genes in sexual reproduction result in a change in DNA that is passed on to offspring, and • radiation or chemical substances can cause mutations in cells, resulting in a permanent change in DNA. 21. Understands the principles of sexual and asexual reproduction, including meiosis and mitosis (NM – II.II.II.6). 22. Knows that most cells in the human body contain 23 pairs of chromosomes including one pair that determines sex, and that human females have two X chromosomes and human males have an X and a Y chromosome (NM – II.II.II.7). 23. Knows that cells are made of proteins composed of combinations of amino acids (NM – II.II.III.1).	15 – 20. As a springboard to other activities in which the student participates, he/she examines dog breeds, Darwin finches, and some plants (e.g., gambel oak) to learn about variations. After this study, the student takes a field trip (e.g., surrounding area) to look at behaviors (e.g., pigeons, prairie dogs). He/She looks for marks and other familial types of relationships. The student notes what he/she observes so that in a class discussion he/she can explain how he/she came up with those particular patterns. ✓ observation skills ✓ individual participation in activities ✓ clear communication 21, 22. The student reviews what was learned in the prior activity regarding variation, takes those ideas, and looks at variation in a different way (e.g., variations in people). Through some type of presentation (e.g., oral, written, visual) the student explains why variation exists in all species. ✓ understanding of variability ✓ synthesis ✓ effective presentation

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	24. Knows that specialized structures inside cells in most organisms carry out different functions, including (NM – II.II.III.2): • parts of a cell and their functions (e.g., nucleus, chromosomes, plasma, and mitochondria), • storage of genetic material in DNA, • similarities and differences between plant and animal cells, and • prokaryotic and eukaryotic cells. 25. Describes the mechanisms for cellular processes (e.g., energy production and storage, transport of molecules, waste disposal, synthesis of new molecules) (NM – II.II.III.3). 26. Knows how the cell membrane controls which ions and molecules enter and leave the cell based on membrane permeability and transport (i.e., osmosis, diffusion, active transport, passive transport) (NM – II.II.III.4). 27. Explains how cells differentiate and specialize during the growth of an organism, including (NM – II.II.III.5): • differentiation, regulated through the selected expression of different genes, and • specialized cells, response to stimuli (e.g., nerve cells, sense organs). 28. Knows that DNA directs protein building (e.g., role of RNA) (NM – II.II.III.6). 29. Describes how most cell functions involve chemical reactions, including (NM – II.II.III.7): • promotion or inhibition of biochemical reactions by enzymes, • processes of respiration (e.g., energy production, ATP), and • communication from cell to cell by secretion of a variety of chemicals (e.g., hormones).	

STRAND III: THE CONTENT OF SCIENCE-EARTH AND SPACE
CONTENT STANDARD: The student understands the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

BENCHMARK: The student examines the scientific theories of the origin, structure, energy, and evolution of Earth and its atmosphere, and their interconnections.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	1. Describes the characteristics and the evolution of Earth in terms of the geosphere, the hydrosphere, the atmosphere, and the biosphere (NM – II.III.II.1).	1, 2. See Strand II, the illustration that deals with evolution – illustration for performance standards #9 – 14, 23 – 29.
	2. Understands the changes in Earth's past and the investigative methods used to determine geologic time, including (NM – II.III.II.4): • rock sequences, relative dating, fossil correlation, and radiometric dating, and • geologic time scales, historic changes in life forms, and the evidence for absolute ages (e.g., radiometric methods, tree rings, paleomagnetism).	2, 3. Before the student starts studying genetics, he/she describes the interactions of living and nonliving components since ecology is everything, not just living components. This allows the student a new way of looking at things. ✓ accurate descriptions ✓ active participation
	3. Knows that Earth's systems are driven by internal (i.e., radioactive decay and gravitational energy) and external (i.e., the sun) sources of energy (NM – II.III.II.6).	
	4. Describes the patterns and relationships in the circulation of air and water driven by the sun's radiant energy, including (NM – II.III.II.8): • patterns in weather systems related to the transfer of energy, • differences between climate and weather, • global climate, global warming, and the greenhouse effect, and • El Niño, La Niña, and other climatic trends.	4 – 7. See Strand II, the 1st illustration.
	5. Knows that Earth's system contains a fixed amount of natural resources that cycle among land, water, the atmosphere, and living things (e.g., carbon and nitrogen cycles, rock cycle, water cycle, ground water, aquifers) (NM – II.III.II.9).	
	6. Explains how layers of the atmosphere (e.g., ozone, ionosphere) change naturally and artificially (NM – II.III.II.11).	

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	7. Explains how the availability of ground water through aquifers can fluctuate based on multiple factors (i.e., rate of use, rate of replenishment, surface changes, and changes in temperature) (NM – II.III.II.12).	

STRAND IV: SCIENCE AND SOCIETY
CONTENT STANDARD: The student understands how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

BENCHMARK: The student examines and analyzes how scientific discoveries and their applications affect the world, and explains how societies influence scientific investigations and applications.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	1. Knows how science enables technology but also constrains it, and recognizes the difference between real technology and science fiction (e.g., rockets vs. antigravity machines; nuclear reactors vs. perpetual-motion machines; medical X-rays vs. Star-Trek tricorders) (NM – III.I.I.1). 2. Understands how advances in technology enable further advances in science (e.g., microscopes and cellular structure; telescopes and understanding of the universe) (NM – III.I.I.2). 3. Evaluates the influences of technology on society (e.g., communications, petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples (e.g., the wheel, the plow, the printing press, the lightning rod) (NM – III.I.I.3). 4. Understands the scientific foundations of common technologies (e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment) (NM – III.I.I.4). 5. Understands that applications of genetics can meet human needs and can create new problems (e.g., agriculture, medicine, cloning) (NM – III.I.I.5). 6. Analyzes the impact of digital technologies on the availability, creation, and dissemination of information (NM – III.I.I.6). 7. Describes how human activities have affected ozone in the upper atmosphere and how it affects health and the environment (NM – III.I.I.7). 8. Describes uses of radioactivity (e.g., nuclear power, nuclear medicine, radiometric dating) (NM – III.I.I.8).	1 – 6. The technological aspects and influences are integrated throughout the curriculum and are embedded in almost all chapters and strands of the course. A common practice is to have the student listen to a variety of guest speakers talk about local environmental issues and the impact of technology regarding those issues. The student prepares beforehand a list of questions (teacher approved) to ask the speaker in case he/she does not address them in the lecture. At the end of the visit, the student summarizes (e.g., orally or in written format) what was learned. ✓ listening skills ✓ appropriateness (e.g., behaviors, questions) ✓ relevance ✓ connections ✓ insights ✓ effective communication 7. See Strand II, the illustration for performance standards # 9 – 14. 8. See Strand II, the illustration for performance standards # 9 – 14, 23 – 29.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	9. Describes how scientific knowledge helps decision makers with local, national, and global challenges (e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change) (NM – III.I.I.9). 10. Describes major historical changes in scientific perspectives (e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) and the experimental observations that triggered them (NM – III.I.I.10). 11. Knows that societal factors can promote or constrain scientific discovery (e.g., government funding, laws and regulations about human cloning and genetically modified organisms, gender and ethnic bias, AIDS research, alternative-energy research) (NM – III.I.I.11). 12. Explains how societies can change ecosystems and how these changes can be reversible or irreversible (NM – III.I.I.12). 13. Describes how environmental, economic, and political interests impact resource management and use in New Mexico (NM – III.I.I.13). 14. Identifies how science has produced knowledge that is relevant to individual health and material prosperity (NM – III.I.I.15). 15. Understands that reasonable people may disagree about some issues that are of interest to both science and religion (e.g., the origin of life on Earth, the cause of the Big Bang, the future of Earth) (NM – III.I.I.16). 16. Identifies important questions that science cannot answer (e.g., questions that are beyond today's science, decisions that science can only help to make, questions that are inherently outside of the realm of science) (NM – III.I.I.17). 17. Understands that scientists have characteristics in common with other individuals (e.g., employment and career needs, curiosity, desire to perform public service, greed, preconceptions and biases, temptation to be unethical, core values including honesty and openness) (NM – III.I.I.18). 18. Knows that science plays a role in many different kinds of careers and activities (e.g., public service, volunteers, public office holders, researchers, teachers, doctors, nurses, technicians, farmers, ranchers) (NM – III.I.I.19).	9 – 11. The student selects a modern topic, compares it with a historical topic using the historical data to predict the outcome of the modern topic, and presents findings in either an oral or written format. ✓ relevant topics ✓ comparisons ✓ accuracy ✓ predictions/insights ✓ effective communication of ideas 12, 13. See Strand II, the 1st illustration. 14 – 16. The student examines current news items (e.g., articles, TV, newspapers) on bioethics issues (e.g., cloning stem cell research). In small or large group discussions, the student discusses the particular stances, what ideas are out there, and benefits of having the information or advancement of the new knowledge. ✓ accurate account of news item ✓ differing viewpoints ✓ active participation in discussions 17, 18. Integrated consistently in the curriculum throughout the year is the career connection. Current textbooks interject the "real-life" aspect and applications in almost every chapter. The instructor takes every opportunity to insert that in, whether it be through personal experiences or through questioning (e.g., What does a technician do? What is a environmentalist?). The student talks about his/her personal career interest and explains where science is used in this career (e.g., mechanics, vet, park ranger).

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
		OR Either as a school-wide project or class project, the student participates in a Career Day Fair. The student listens to a variety of speakers (e.g., landscape people, electrician, forensics lab person) in the science fields talk about aspects of their jobs. After the fair the student either orally or in written format summarizes one career field that held special interest to him/her, highlighting the science connection. Options: The student helps in the organization of the event by suggesting and contacting some of the guest speakers. Some of these speakers could be personal connections that he/she has (e.g., parents, former students). ✓ individual participation ✓ listening skills ✓ personal connections ✓ scientific significance to career fields ✓ effective presentation

STRAND V: LITERACY
CONTENT STANDARD: The student communicates biological principles through reading, writing, and speaking opportunities.

BENCHMARK: The student demonstrates proficiency in reading comprehension, specialized vocabulary, and a variety of writing and speaking requirements.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
		Although the following examples represent specific instances where the literacy standards are met, multiple opportunities are presented throughout the year and throughout the curriculum where the student demonstrates reading, speaking, writing, and research strategies. They are reflected in every strand.
	1. Develops and demonstrates proficiency with the following strategies to approach reading for information across content areas: (APS – LA I.1): • scans reading selection to determine whether a text contains relevant information, • uses the headings and subheadings of the material to make predictions and to validate comprehension of text, • reads and rereads to decode meaning, and • reviews and summarizes essential elements of text for overview. 2. Identifies and uses roots, prefixes, and suffixes to determine meaning of words (APS – LA I.4). 3. Uses textual evidence to develop and support an interpretation of a scientific process or concept (APS – LA II.2).	1 – 3. See Strand IV, the illustration for performance standards # 14 – 16.
	4. Develops increased competence in using the writing process to create a final product (APS – LA III.1). 5. Develops increased competence in using elements of effective writing (APS – LA III.2).	4 – 7. See Strand I, 1st illustration and Strand IV, last illustration.

GRADE 9 - 12	PERFORMANCE STANDARDS	ILLUSTRATIONS
	6. Supports an informed opinion: (APS – LA III.6): • uses appropriate language, reasoning, and organizational structure for the audience and purpose, • provides relevant and convincing reasons, uses various types of evidence, and • demonstrates an awareness of possible questions, concerns, or counterarguments.	
	7. Responds to a variety of written, electronic, and other media (APS – LA III.7).	
	8. Develops increased competence with speaking and language conventions (APS – LA IV.3).	8. See Strand I, 1st illustration and Strand II, last illustration.
	9. Demonstrates appropriate discussion in group discussions (APS – LA V.2).	9, 10. See Strand II, 2nd illustration and the illustration for performance standards # 9 – 14 and 23 – 29.
	10. Evaluates the information, explanations, or ideas of others (APS – LA V.5).	See Strand IV, 1st illustration and last illustration.
	11. Evaluates information to develop informed opinions (APS – LA VI.1).	11, 12. See Strand IV, illustration for performance standards # 14 – 16.
	12. Develops increased competence in using research strategies (APS – LA VI.5).	