

2012 – 2013

**Arkansas Department of Career Education  
Model Framework**

**Course Title:**        **Animal Science 1**

**Career Cluster:**     **Agriculture, Food & Natural Resources**

<b>Secondary – Agriculture Science and Technology</b>	
Course Number	491180
CIP Number	<i>(Program area responsibility to insert CIP code(s)/titles <a href="http://nces.ed.gov/ipeds/cipcode/Default.aspx?v=55">http://nces.ed.gov/ipeds/cipcode/Default.aspx?v=55</a> )</i>
Grade Level	10-12
Prerequisite	Survey of Ag Systems
Course Type	Core
Teacher Certification	
CTSO	FFA
Facility Requirements	<a href="http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx">http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx</a>
Industry Certifications	<i>(Program area responsibility to insert web address of certification site(s))</i>

**Course Description**

The course is structured to enable all students to have an overview of the Animal Industry. Topics covered in Animal Science 1 include the Animal Industry, Animal Handling and Safety, Animal Anatomy/Physiology, and Animal Nutrition. Opportunities are provided for students to participate in FFA and supervised experience activities.

**Program Purpose/Structure**

**3T**

**Laboratory Activities**

3T

**Special Notes**

3T

**Career and Technical Student Organization (CTSO)**

FFA

Pilot Year 2013-14

<b>Standard 1.0 Animal Industry</b>				
<b>Performance Indicator 1.1 The Animal Industry in the U.S.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	<b>AFNR Standards</b>
1.1.1 Examine the distribution of Animal species in the U.S. (beef cattle, dairy cattle, meat sheep, wool sheep, meat goat, dairy goat, and swine)	<ul style="list-style-type: none"> <li>• Create a color coded map of the U.S. showing top 5 states for each species.</li> <li>• Students will use <a href="http://www.arfb.com">www.arfb.com</a> to create a map of Arkansas counties with common livestock produced in each one.</li> </ul>	SL9-10.2, SL11-12.2	AG-ANI1, CRP11	AS.01.01.01.a
1.1.2 Identify common products from animal species in the U.S. (beef cattle - meat, dairy cattle - milk, meat sheep - meat, wool sheep - wool, meat goat - meat, dairy goat - milk, and swine - meat)	<ul style="list-style-type: none"> <li>• Create a presentation on the products and by-products of each species.</li> <li>• Create a flow chart from birth to consumable product for each species. (Ex. Calf born till weaning, through feedlot, to processing, to consumer)</li> </ul>	SL9-10.2, SL9-10.4, SL9-10.5, SL11-12.2, SL11-12.4, SL11-12.5	AG-ANI6, CRP12	AS.01.01.02.b
<b>Performance Indicator 1.2 Classifying Animals</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	
1.2.1 Explain the importance of the <b>binomial nomenclature</b> system of naming	<ul style="list-style-type: none"> <li>• Students match common names and scientific names for species.</li> <li>• Students research common names that are the same for different species (Ex. Cow elk, cow cattle, cow bison)</li> </ul>	SL9-10.4, SL11-12.4	AG-ANI6, CRP7	AS.02.01.01.a

animals.				
1.2.2 Classify common livestock species (cattle, sheep, goats, swine, horses, chickens and turkeys) based on gender (adult male, adult female, young male, young female, castrated male, newborn)	<ul style="list-style-type: none"> <li>Match game with species and gender terminology.</li> </ul>	SL9-10.4, SL11-12.4	AG-ANI6, CRP2	AS.02.02.01.a

# Pilot Year 2013-14

<b>Standard 2.0 Animal Handling and Safety</b>				
<b>Performance Indicator 2.1 Animal Handling and Human Safety</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	<b>AFNR Standards</b>
2.1.1 Discuss the dangers to humans involved in working with animals. (physical contact, diseases, safe handling of medicine)	<ul style="list-style-type: none"> <li>View the Baxter Black and Temple Grandin animal handling safety videos available online.</li> <li>Identify personal protective equipment (PPE) that would be used in animal handling.</li> </ul>	SL9-10.5, SL11-12.5	AG-ANI2, CRP3	AS06.01.01.a
2.1.2 Outline safety procedures for working with animals by species. (beef cattle, dairy cattle, meat sheep, wool sheep, meat goat, dairy goat, and swine).	<ul style="list-style-type: none"> <li>Design a safe animal handling facility for a specific species.</li> </ul>	R9-10.3, R11-12.3, R9-10.9, R11-12.9	AG-ANI2, CRP8	AS.06.01.01.b
<b>Performance Indicator 2.2 Animal Safety</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	
2.2.1 Assess the implications of <b>animal welfare</b> for animal agriculture.	<ul style="list-style-type: none"> <li>Compare and contrast the difference between animal welfare and animal rights.</li> <li>Use the animal handling facility created 2.1.2 and evaluate for the safety of the animal being handled.</li> <li>Develop a quality assurance program for a specific species.</li> </ul>	SL9-10.3, SL11-12.3, SL9-10.4, SL11-12.4	AG-ANI2, CRP9	AS.06.01.02.a

<b>Standard 3.0 Animal Anatomy/Physiology</b>				
<b>Performance Indicator 3.1 Animal Cells</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	<b>AFNR Standards</b>
3.1.1 Identify the parts of an animal cell and their functions. (cell membrane, nucleus, cytoplasm, mitochondrion, ribosome)	<ul style="list-style-type: none"> <li>Diagram a typical animal cell and identify the organelles.</li> <li>Make edible animal cells using food products.</li> </ul>	SL9-10.2, SL11-12.2	AG-ANI6, CRP6	AS.02.02.02.a
3.1.2 Describe the basic functions of animal cells in growth and reproduction. (meiosis and mitosis)	<ul style="list-style-type: none"> <li>Research and diagram the steps involved in both meiosis and mitosis.</li> <li>Look at a cell under each phase under a microscope</li> </ul>	SL9-10.1a, SL11-12.1a, SL9-10.2, SL11-12.2	AG-ANI6, CRP11	AS.02.02.03.a AS.02.02.03.b
<b>Performance Indicator 3.2 Animal Tissues and Organs</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	<b>AFNR Standards</b>
3.2.1 Describe the four major types of animal tissues. (epithelial, connective, nerve and muscle)	<ul style="list-style-type: none"> <li>Observe animal tissues on a live animal and identify the function of each.</li> <li>Collect samples of animal tissues from animals</li> </ul>	R9-10.3, R11-12.3	AG- ANI6, CRP5	AS.02.02.04.a
3.2.2 Research the function of animal body systems and organs involved with each.	<ul style="list-style-type: none"> <li>Dissect an animal system collected from an animal.</li> <li>Develop a presentation on the function of each system.</li> <li>Research possible external influences on each system. (Ex. Weather, human interaction, physical activity)</li> </ul>	SL9-10.1a, SL11-12.1a, SL9-10.1c, SL11-	AG-ANI6, CRP8	AS.02.02.05.a AS.02.02.06.a

<p>1. <b>reproductive</b> – testis, ovaries 2. <b>nervous</b> – brain, spinal cord 3. <b>circulatory</b> – heart 4. <b>respiratory</b> – lungs 5. <b>digestive</b> – stomach 6. <b>skeletal</b> – bones 7. <b>muscular</b> - muscles</p>		<p>12.1c, R9-10.3, R11-12.3</p>		
	•			

Pilot Year 2013-14

<b>Standard 4.0 Animal Nutrition</b>				
<b>Performance Indicator 4.1 Animal Digestive Systems</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	
4.1.1 Identify and compare the digestive systems of livestock animals (cattle, sheep, goats, horses, swine, chickens and turkeys) and how they function. (ruminant/polygastric, non-ruminant/monogastric, pseudo-ruminant, avian)	<ul style="list-style-type: none"> <li>Obtain each type of digestive tract and dissect.</li> <li>Create the digestive systems using modeling clay.</li> <li>Compare and Contrast the four types of digestive systems.</li> <li>Write a creative story of the journey of a feedstuff through a digestive system from start to finish.</li> </ul>	R9-10.3, R11-12.3, W9-10.4, W11-12.4, W9-10.5, W11-12.5	AG-ANI3, CRP11	
<b>Performance Indicator 4.2 Nutrients</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	
4.2.1 Identify the six major nutrients required by animals. ( <b>carbohydrates, protein, fat, vitamins, minerals, water</b> )	<ul style="list-style-type: none"> <li>Obtain a sample of each type of nutrient for display.</li> <li>Describe how the body uses each nutrient.</li> <li>Research examples of nutrient deficiencies (Ex. Anemia, milk fever, vitamin deficiencies)</li> <li>Given a sample feedstuff, sort it in to nutrient groups.</li> </ul>	SL9-10.2, SL11-12.2, SL9-10.1, SL11-2.2	AG-ANI3, CRP7	
<b>Performance Indicator 4.3 Feedstuffs</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>	
4.3.1 Examine the importance of types of <b>feedstuffs</b> in the diets of animals. (roughages, concentrates)	<ul style="list-style-type: none"> <li>Research local roughages used in livestock feeds. (legumes, non-legumes)</li> <li>Analyze a feedstuff for its protein and carbohydrate sources.</li> <li>Research protein and carbohydrate sources that are economically available locally.</li> <li>Collect samples of roughages and concentrates.</li> <li>Examine types of by-products that can be used as a feedstuff.</li> </ul>	SL9-10.1, SL11-12.1, SL9-10.4, SL11-12.4	AG-ANI3, CRP5	AS.04.01.01.a

(Ex. Distiller's grain, hominy, rice bran)				
Performance Indicator 4.3 Balanced Rations	Recommended Application/Activity	CCSS Standards	CCTC Standards	
4.3.1 Assess the importance of a balanced <b>ration</b> for animals.	<ul style="list-style-type: none"> <li>Compare and Contrast a ration and a balanced ration.</li> <li>Analyze a feed label to determine if it meets nutrient needs of a given animal.</li> <li>Determine the Total Digestible Nutrients (TDN) of a feed ration.</li> <li>Create a chart of nutrient values for animals based on use. (maintenance, finishing, reproduction, lactating, working)</li> </ul>	SL9-10.1, SL11-12.1, SL9-10.2, SL11-12.2	AG-ANI3, CRP11	AS04.01.02.a
4.3.2 Use the <b>Pearson Square</b> to balance given feed rations.	<ul style="list-style-type: none"> <li>Formulate/Balance a given ration for a specific animal.</li> <li>Mix a balanced feed ration from given feedstuffs.</li> <li>Given sample feedstuffs and costs, develop a least cost balanced ration.</li> </ul>	SL9-10.2, SL11-12.2, R9-10.3, R11-12.3	AG-ANI3, CRP8	AS.04.01.02.c
4.3.3 Research the purpose and benefits of <b>feed additives</b> in animal production. (antibiotics, growth promotants, flavor enhancers)	<ul style="list-style-type: none"> <li>Debate pros/cons of growth promotants in feeds.</li> <li>Research FDA regulations and withdrawal periods on sample feed additives.</li> <li>Conduct a feed study using feed additives.</li> </ul>	SL9-10.1, SL11-12.1, SL9-10.1a, SL11-12.1a, SL9-10.1b, SL11-12.1b	AG-ANI3, CRP9	AS.04.02.01.a

## Glossary

### ***Standard 1.0 Animal Industry***

***Bionomical Nomenclature*** - A two word system of naming using the first word being genus and the second word being species.

Pilot Year 2013-14

***Standard 2.0 Animal Handling and Safety***

- 1. Animal rights** – line of thinking that proposed that animals have the same rights as people.
- 2. Animal welfare** - line of thinking that proposed that animals should be treated well and that their comfort and well-being should be considered in their production.

Pilot Year 2013-14

**Standard 3.0 Animal Anatomy/Physiology**

1. **Cell** – Basic unit of life.
2. **Organelle**- A sub unit with a specific function within the cell.
3. **Epithelial tissue** - Membrane tissue covering internal organs and other internal surfaces of the body.
  
4. **Connective tissue**- Tissue that connects, supports, binds, or separates other tissues or organs.
5. **Nerve tissue**- Tissue composed of neurons.
6. **Muscle tissue**- Tissue composed of fibers capable of contracting to effect body movement.
7. **Reproductive system**- Organs and tissues involved in the production of offspring.
8. **Nervous system**- The network of nerve cells and fibers that transmits nerve impulses between parts of the body.
9. **Circulatory system**- The System that circulates blood and lymph through the body.
10. **Respiratory system**- The system for taking in oxygen and giving off carbon dioxide.
11. **Digestive system**- The system that makes food absorbable through the body.
12. **Skeletal system**- The hard structure (bones and cartilages) that provide a frame for the body of the animal.

**Standard 4.0 Animal Nutrition**

1. **Carbohydrates-** Any certain organic chemical compounds of C, H, and O which include sugar and starches
2. **Protein-** Any of a large number of complex organic compounds of amino acids that is an essential part of all living things.
3. **Fat-** The oily or greasy substances found in certain plants
4. **Vitamins-** An organic substance that performs specific and necessary functions in relatively small concentrates in an organism.
5. **Minerals-** A chemical compound or element of inorganic origin.
6. **Water-** The most valuable natural resource.
7. **Feedstuffs-** A feed ingredient.
8. **Ration-** The food an animal consumes in a 24-hour period.
9. **Pearson square-** A tool used for basic calculations in developing feed rations.
10. **Feed additive-** A component of the diet that does not fall within the basic nutrient categories.

Pilot Year 2013-14

## Common Core State Standards Grades 9-12

### ELA Speaking and Listening Standards Grades 9-10

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. **SL9-10.1**
  - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL9-10.1a**
  - b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. **SL9-10.1b**
  - c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. **SL9-10.1c**
  - d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented. **SL9-10.1d**
2. Integrate multiple sources of information presented in diverse media or format(e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source. **SL9-10.2**
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence. **SL9-10.3**
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. **SL9-10.4**
5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL9-10.5**

### ELA Speaking and Listening Standards Grades 11-12

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. **SL11-12.1**
  - a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. **SL11-12.1a**
  - b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. **SL11-12.1b**

- c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives. **SL11-12.1c**
  - d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task. **SL11-12.1d**
2. Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. **SL11-12.2**
  3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used. **SL11-12.3**
  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 of formal and informal tasks. **SL11-12.4**
  5. Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. **SL11-12.5**

#### **ELA Language Grades 9-10**

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. **L9-10.4**
  - a. 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. **L9-10.4a**
  - b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy). **L9-10.4b**
  - c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology. **L9-10.4c**
  - d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). **L9-10.4d**
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. **L9-10.6**

#### **ELA Language Grades 11-12**

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. **L11-12.4**

- a. 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. **L11-12.4a**
  - b. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable). **L11-12.4b**
  - c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage. **L11-12.4c**
  - d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary) **L11-12.4d**
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. **L11-12.6**

### **Reading Standards for Literacy in Science and Technical Subjects Grades 9-10**

1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. **R9-10.1**
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. **R9-10.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **R9-10.3**
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. **R9-10.4**
5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). **R9-10.5**
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. **R9-10.6**
7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. **R9-10.7**
8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. **R9-10.8**
9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. **R9-10.9**
10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. **R9-10.10**

### Reading Standards for Literacy in Science and Technical Subjects Grades 11-12

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. **R11-12.1**
2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms. **R11-12.2**
3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text. **R11-12.3**
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. **R11-12.4**
5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas. **R11-12.5**
6. Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved. **R11-12.6**
7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. **R11-12.7**
8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. **R11-12.8**
9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. **R11-12.9**
10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently. **R11-12.10**

### Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 9-10

1. Write arguments focused on discipline-specific content. **W9-10.1**
  - a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. **W9-10.1a**
  - b. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience’s knowledge level and concerns. **W9-10.1b**
  - c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W9-10.1c**
  - d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.1d**
  - e. Provide a concluding statement or section that follows from or supports the argument presented. **W9-10.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W9-10.2**

- a. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W9-10.2a**
  - b. 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. **W9-10.2b**
  - c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. **W9-10.2c**
  - d. 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. **W9-10.2d**
  - e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W9-10.2e**
  - f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). **W9-10.2f**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W9-10.3**
  4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W9-10.4**
  5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W9-10.5**
  6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **W9-10.6**
  7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W9-10.7**
  8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. **W9-10.8**
  9. Draw evidence from informational texts to support analysis, reflection, and research. **W9-10.9**
  10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W9-10.10**

### **Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects Grades 11-12**

1. Write arguments focused on discipline-specific content. **W11-12.1**

- a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences the claim(s), counterclaims, reasons, and evidence. **W11-12.1a**
- b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form that anticipates the audience's knowledge level, concerns, values, and possible biases. **W11-12.1b**
- c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. **W11-12.1c**
- d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. **W11-12.1d**
- e. Provide a concluding statement or section that follows from or supports the argument presented. **W11-12.1e**
2. Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. **W11-12.2**
  - a. Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **W11-12.2a**
  - b. 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. **W11-12.2b**
  - c. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. **W11-12.2c**
  - d. 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. **W11-12.2d**
  - e. Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic). **W11-12.2e**
3. Write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results. **W11-12.3**
4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W11-12.4**
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W11-12.5**
6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. **W11-12.6**

7. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. **W11-12.7**
8. Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. **W11-12.8**
9. Draw evidence from informational texts to support analysis, reflection, and research. **W11-12.9**
10. Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. **W11-12.10**

## **Common Career and Technical Core Standards**

### ***Agriculture, Food, and Natural Resources Cluster***

#### **Agriculture, Food, & Natural Resources Career Cluster Standards (AG)**

1. Analyze how issues, trends, technologies, and public policies impact systems in the Agriculture, Food, & Natural Resources (AFNR) Career Cluster. **AG1**
2. Evaluate the nature and scope of the AFNR cluster and the role AFNR plays in society and the economy. **AG2**
3. Examine and summarize importance of health, safety, and environmental management systems in AFNR organizations. **AG3**
4. Demonstrate stewardship of natural resources in AFNR activities. **AG4**
5. Describe career opportunities and means to achieve those opportunities in each of the AFNR career pathways. **AG5**
6. Analyze the interaction among ANFR systems in the production, processing and management of food, fiber, and fuel and sustainable use of natural resources. **AG6**

#### **Agribusiness Systems Career Pathway (AG-BIZ)**

1. Apply management planning principles in AFNR business enterprises. **AG-BIZ1**
2. Use record keeping to accomplish AFNR business objectives, manage budgets, and comply with laws and regulations. **AG-BIZ2**
3. Manage cash budgets, credit budgets, and credit for an AFNR business using generally accepted accounting principles. **AG-BIZ3**
4. Develop a business plan for an AFNR enterprise or business unit. **AG-BIZ4**
5. Use sales and marketing principles common to agribusiness systems to accomplish AFNR business objectives. **AG-BIZ5**

#### **Animal Systems Career Pathway (AG-ANI)**

1. Analyze historic and current trends impacting the animal systems industry. **AG-ANI1**

2. Utilize best practice protocols for husbandry and welfare based upon animal behaviors. **AG-ANI2**
3. Design and provide proper animal nutrition given desired outcomes for performance, development, reproduction, and/or economic production. **AG-ANI3**
4. Apply principles of animal reproduction given desired outcomes for performance, development, and/or economic production. **AG-ANI4**
5. Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health. **AG-ANI5**
6. Classify, evaluate and select animals based on anatomical and physiological characteristics. **AG-ANI6**
7. Apply principles of effective animal health care. **AG-ANI7**

#### **Environmental Service Systems Career Pathway (AG-ENV)**

1. Use analytical procedures and instruments to manage environmental service systems. **AG-ENV1**
2. Evaluate the impact of public policies and regulations on environmental service system operations. **AG-ENV2**
3. Develop proposed solutions to environmental issues, problems, and applications using scientific principles of meteorology, soil science, hydrology, microbiology, chemistry, and ecology. **AG-ENV3**
4. Demonstrate the operation of environmental service systems (e.g., pollution control, water treatment, wastewater treatment, solid waste management, and energy conservation). **AG-ENV4**
5. Use tools, equipment, machinery, and technology common to tasks in environmental service systems. **AG-ENV5**

#### **Food Products and Processing Systems Career Pathway (AG-FD)**

1. Develop and implement procedures to ensure safety, sanitation, and quality in the food product and processing facilities. **AG-FD1**
2. Apply principles of nutrition, biology, microbiology, chemistry, and human behavior to development of food products. **AG-FD2**
3. Select and process food products for storage, distribution, and consumption. **AG-FD3**
4. Explain the scope of the food industry and the historical and current developments of food products and processing. **AG-FD4**

#### **Natural Resources Systems Career Pathway (AG-NR)**

1. Plan and conduct natural resource management activities that apply logical, reasoned, and scientifically based solutions to natural resource issues and goals. **AG-NR1**
2. Analyze the interrelationships between natural resources and humans. **AG-NR2**
3. Develop plans to ensure responsible and sustainable production and processing of natural resources. **AG-NR3**
4. Demonstrate responsible control and management procedures and techniques to protect or maintain natural resources. **AG-NR4**

### **Plant Systems Career Pathway (AG-PL)**

1. Develop and implement a crop management plan for a given production goal that accounts for environmental factors. **AG-PL1**
2. Apply the principles of classification, plant anatomy, and plant physiology to plant production and management. **AG-PL2**
3. Propagate, culture, and harvest plants and plant products based on current industry standards. **AG-PL3**
4. Apply principles of design in plant systems to enhance an environment (e.g., floral, forest, landscape, and farm). **AG-PL4**

### **Power, Structural and Technical Systems Career Pathway (AG-PST)**

1. Apply physical science principles and engineering applications related to mechanical equipment, structures, and biological systems to solve problems and improve performance in AFNR power, structural, and technical systems. **AG-PST1**
2. Operate and maintain AFNR mechanical equipment and power systems. **AG-PST2**
3. Service and repair AFNR mechanical equipment and power systems. **AG-PST3**
4. Plan, build, and maintain AFNR structures. **AG-PST4**
5. Use control, monitoring, geospatial, and other technologies in AFNR power, structural, and technical systems. **AG-PST5**

### **Common Career and Technical Core Career Ready Practices (CCTC CRP)**

1. Act as a responsible and contributing citizen and employee. **CRP1**
2. Apply appropriate academic and technical skills. **CRP2**
3. Attend to personal health and financial well-being. **CRP3**
4. Communicate clearly, effectively, and with reason. **CRP4**
5. Consider the environmental, social and economic impacts of decisions. **CRP5**
6. Demonstrate creativity and innovation. **CRP6**
7. Employ valid and reliable research strategies. **CRP7**
8. Utilize critical thinking to make sense of problems and persevere in solving them. **CRP8**
9. Model integrity, ethical leadership, and effective management. **CRP9**
10. Plan education and career path aligned to personal goals. **CRP10**
11. Use technology to enhance productivity. **CRP11**
12. Work productively in teams while using cultural/global competence. **CRP12**