

# Poultry Science

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**Arkansas Department of Career Education  
Model Framework**

**Course Title:** Poultry Science

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

<b>Secondary – Agriculture Science and Technology</b>	
Course Number	491440
CIP Number	01.0907
Grade Level	10-12
Prerequisite	Survey of Agriculture Systems
Course Type	Elective
Teacher Certification	010 Agriculture 218 Agricultural Sciences & Technology
CTSO	FFA
Facility Requirements	<a href="http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx">http://arkansasfacilities.arkansas.gov/SchoolFacManual.aspx</a>
Industry Certifications	Contact the University of Arkansas Poultry Department, Gary D. Davis <a href="mailto:gddavis@uark.edu">gddavis@uark.edu</a> about students receiving college credit for this course.

**Course Description**

A program that focuses on the production and management of poultry and the production and handling of poultry products.

**Program Purpose/Structure**

This course allows for an in-depth look at the Poultry Industry while providing Hands on Laboratories, and opportunities to participate in FFA and Supervised Agriculture Experiences.

**Arkansas Department of Career Education  
Poultry Science Student Performance Standards**

**Standard 1.0 *Assess the history and economics of the poultry industry.***

- 1.1 Investigate the Poultry Industry in the US.
- 1.2 Investigate the financial impact the Poultry Industry has in the US.

**Standard 2.0 *Evaluate Poultry Genetics.***

- 2.1 Cite Historical Evidence of Genetic Changes.
- 2.2 Develop a logical argument that heritability affects a breeding program.
- 2.3 Analyze the Primary Breeder Program.

**Standard 3.0 *Investigate Poultry Reproductive Anatomy and Egg Formation.***

- 3.1 Evaluate the Anatomy of the Egg.
- 3.2 Evaluate the Reproductive Anatomy of Poultry.

**Standard 4.0 *Asses Embryo Development and Egg Hatching Conditions in poultry.***

- 4.1 Investigate the Development of the Egg.
- 4.2 Evaluate Environmental Conditions for Hatching.

**Standard 5.0 *Asses the Environmental Physiology and Health of poultry.***

- 5.1 Evaluate the Importance of Environmental Conditions in Poultry Health
- 5.2 Investigate Disease Transmission and Prevention in Poultry.

**Standard 6.0 *Assess the Nutritional Needs of Poultry.***

- 6.1 Evaluate the Avian Digestive System.
- 6.2 Connect Avian Nutrition Requirements to the functions of the bird.
- 6.3 Analyze the feeding of Commercial Poultry.

<b>Standard 1.0 Assess the history and economics of the poultry industry.</b>			
<b>Performance Indicator 1.1 Investigate the Poultry Industry history in the US.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
1.1.1 Explain how the poultry industry has changed from the 1900's to the present, and how environmental conditions and consumer demands have driven these changes. ( New York dressed bird, vertical integration, artificial incubation)	<ul style="list-style-type: none"> <li>• Create a timeline of the poultry industry in the US from the 1900's to the present including types of birds raised.</li> <li>• Create a timeline of methods of marketing dressed birds from the 1900's to the present.</li> </ul>	SL11-12.5 SL11-12.4 R11-12.2 R11-12.7	CRP 5 AG- ANI 1
1.1.2 Formulate the ranking of the top 5 states in each major area of production and determine reasons for migration to those states. (broilers, table eggs, turkeys)	<ul style="list-style-type: none"> <li>• Research <a href="http://www.nass.usda.gov/Charts_and_Maps/poultry">www.nass.usda.gov/Charts_and_Maps/poultry</a></li> <li>• Create a map of the United States indicating the top 5 states for each major poultry product.</li> </ul>	SL11-12.1a SL11-12.5 R11-12.1	CRP 2 CRP 4 CRP 5 CRP 7 AG- ANI 1
<b>Performance Indicator 1.2 Investigate the financial impact the Poultry Industry has in the US.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
1.2.1 Compare the value of current market trends in broiler processing. Whole bird, parts and cut-up, value added products	<ul style="list-style-type: none"> <li>• Research <a href="http://www.ers.usda.gov/">www.ers.usda.gov/</a></li> <li>• Visit a local grocery store to compare the price per pound for different poultry products.</li> </ul>	R11-12.1 R11-12.4 W11-12.2a	CRP 2 CRP 5 CRP 7 AG- ANI 1
1.2.2 Identify the divisions of a vertically integrated poultry company.	<ul style="list-style-type: none"> <li>• Create a visual representation of the divisions of a vertically integrated poultry company.</li> <li>• Interview an employee of a local poultry company.</li> </ul>	SL 11-12.1c SL11-12.3 SL11-12.5	CRP 1 CRP 11 AG- ANI 1

(feed mill, hatchery, veterinary/technical service, processing plant, further processing plant)	<ul style="list-style-type: none"> <li>• Tour poultry facilities in your area.</li> </ul>		AG-ANI 2 AG- ANI 4
1.2.3 Analyze the impact of poultry industry in Arkansas.	<ul style="list-style-type: none"> <li>• Research poultry companies operating in Arkansas.</li> <li>• Research economic impact and employment data in the poultry industry in Arkansas.</li> <li>• Summarize a newspaper article from an Arkansas newspaper concerning the poultry industry.</li> <li>• Create an Arkansas map to identify the counties with the highest economic impact from broilers and turkeys.</li> </ul>	R 11-12.2 R 11-12.9 W11-12.2a W11-12.9	CRP 2 CRP 7 AG- ANI 1

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<b>Standard 2.0 Evaluate Poultry Genetics.</b>			
<b>Performance Indicator</b> <b>2.1 Cite Historical Evidence of Genetic Changes.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
2.1.1 Defend the purpose for the poultry industry moving from a dual purpose bird to broilers and table egg layers. (negative correlation between meat and egg production)	<ul style="list-style-type: none"> <li>Research dual purpose breeds used by early poultry producers. (Plymouth Rock)</li> <li>Describe two natural attributes that were critical in the success of poultry breeding programs.</li> </ul>	R11-12.9 W11-12.9 L11-12.4	CRP 2 CRP 7 AG- ANI 1
2.1.2 Identify the breeds used to develop today's broiler and layer strains. (Plymouth Rock, Cornish, White Leghorn, Rhode Island Red)	<ul style="list-style-type: none"> <li>Teams prepare a multimedia presentation outlining the breeds used to develop today's broiler or layer.</li> <li>Create a multimedia presentation illustrating changes in percentage of breast meat in broilers over several decades.</li> <li>Enrichment activity - Teams use the American Standard of Perfection to research classes of chickens, comb types, breed varieties or show standards.</li> </ul>	SL 11-12.1 SL 11-12.1b SL 11-12.5	CRP 2 CRP 7 CRP 11 CRP 12 AG- ANI 6
2.1.3 Connect the contributions of modern innovations to the success of early breeding programs. (trap nests, artificial incubators, broody)	<ul style="list-style-type: none"> <li>Research broodiness of various breeds and write an essay on how broodiness has been genetically reduced.</li> <li>Design and perform a comparison trial on broodiness of various breeds of poultry.</li> </ul>	R11-12.2 W11-12.1 W11-12.1a W11-12.2a	CRP 2 CRP 7 AG- ANI 4 AG- ANI 6
2.1.4 Analyze important genetic changes that occurred in the 1940s through the 1990s.	<ul style="list-style-type: none"> <li>Create a timeline including genetic changes discussed in this unit.</li> </ul>	SL 11-12.1 SL 11-12.1a W 11-12.2a	CRP 2 AG- ANI 6
<b>Performance Indicator</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>

<b>2.2 Develop a logical argument that heritability affects a breeding program.</b>			
2.2.1 Prove that heritability affects selection progress. (high heritability = rapid progress, low heritability = slow progress)	<ul style="list-style-type: none"> <li>Describe why poultry geneticists have focused on breast meat as a trait for improvement.</li> <li>Research and rank economically important traits by heritability.</li> </ul>	SL 11-12.1a SL 11-12.1d W 11-12.1b W 11-12.1c	CRP 2 CRP 4 AG- ANI 6
2.2.2 Connect selection pressure and genetic progress.	<ul style="list-style-type: none"> <li>Read graphs depicting levels of selection pressure.</li> <li>Calculate genetic progress using selection data.</li> </ul>	L 11-12.4 R 11-12.4 R 11-12.8	CRP 2 AG- ANI 6
2.2.3 Compare the traits emphasized for male genetic lines and female genetic lines. (Males - meat yield, weight for age, days to market, feed efficiency, body conformation, fat content. Females - fertility, hatchability, age at sexual onset, rate of egg production)	<ul style="list-style-type: none"> <li>Draw an example of an ideal male and female bird for a male line.</li> <li>Draw an example of an ideal male and female bird for a female line.</li> <li>Evaluate live male and female birds for their suitability as male or female line breeders.</li> </ul>	SL 11-12.1a SL 11-12.1c SL 11-12.5	CRP 2 CRP 4 AG- ANI 6
2.2.4 Explain how sex-linked traits work and how the commercial egg industry uses this in their breeding programs.	<ul style="list-style-type: none"> <li>Diagram a pairing of chickens to produce offspring that are sex-linked (can be sexed at hatch by chick down color)</li> <li>Pair chickens to produce offspring with color that is sex-linked and hatch the chicks.</li> </ul>	SL 11-12.1d R 11-12.2 W 11-12.2a	CRP 2 CRP 4 AG- ANI 4
<b>Performance Indicator</b> <b>2.3 Analyze the Primary Breeder Program.</b>	<b>Recommend Application / Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
2.3.1 Assess the pyramidal structure of the primary breeder program.	<ul style="list-style-type: none"> <li>Diagram the pyramidal structure of the primary breeder program.</li> <li>Name and describe the purpose and origin of the types of</li> </ul>	W11-12.1d W 11-12.2a R 11-12.2	CRP2 CRP4 AGANI4

(Pedigree Level, Great grandparent Level , Grandparent Level, Parent Level, Commercial Broiler)	birds contained within the pyramid structure of a primary breeder company.		
2.3.2 Defend the reasons for crossing pedigree lines to develop the modern commercial broiler. (heterosis, hybrid vigor, blending male and female traits, protection from theft of genetics)	<ul style="list-style-type: none"> <li>Diagram the multiplication of broiler stock within the primary breeder company</li> <li>Create a 3 generation breeding plan to produce selected traits.</li> </ul>	SL11-12.1d SL 11-12.4 W 11-12.1c	CRP2 CRP4 AGANI4
2.3.3 Investigate how the value of broiler stock changes within the pyramid structure.	<ul style="list-style-type: none"> <li>Calculate the value of birds at each level of the pyramid structure.</li> <li>Research a poultry company's policies on the selling of breeder stock at different levels on the pyramid structure.</li> </ul>	R11-12.3 R11-12.9 L11-12.6	CRP2 CRP7 AGANI1 AGANI6
<b>Standard 3.0 Investigate Poultry Reproductive Anatomy and Egg Formation.</b>			
<b>Performance Indicator 3.1 Evaluate the Anatomy of the Egg.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
3.1.1 Analyze the major anatomical features of the egg, and differentiate each structure according to the type(s) of function performed. (stigma, albumen, shell, chalazae, germinal disc, yolk membrane, yolk)	<ul style="list-style-type: none"> <li>Dissect an egg and label the structures.</li> <li>Grade broken –out eggs using USDA standards</li> <li>Weigh and classify eggs according to USDA sizing standards.</li> <li>Grade exterior eggs according to USDA standards.</li> </ul>	R11-12.3 L11-12.6 SL 11-12.4	CRP2 AGANI5 AGANI6
3.1.2 Outline the steps involved in egg shell formation beginning with raw materials in the blood.	<ul style="list-style-type: none"> <li>Diagram the steps involved in egg shell formation beginning with raw materials in the blood.</li> <li>Formulate a chart showing the steps involved in egg shell formation beginning with raw materials in the blood.</li> <li>Use common chemicals to decalcify an eggshell and record</li> </ul>	W 11-12.3 SL 11-12.1a SL 11-12.2	CRP2 CRP4 AGANI7

	findings.		
<b>Performance Indicator 3.2 Evaluate the Reproductive Anatomy of Poultry.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
3.2.1 Examine how estrogen contributes to sexual maturation of the hen.	<ul style="list-style-type: none"> <li>• Draw a pullet and a mature hen and label the secondary sexual characteristics.</li> <li>• Complete a poster comparing the secondary sexual characteristics of poultry and other food animals.</li> </ul>	SL11-12.1a SL11-12.5	CRP2 CRP4 AGANI4
3.2.2 Analyze the individual parts of the oviduct, describe their functions, and assess the time the egg spends in each segment of the oviduct. (ovary, follicle, infundibulum, uterus, magnum, isthmus, cloaca, vent, vagina)	<ul style="list-style-type: none"> <li>• Dissect an avian oviduct and label the parts.</li> <li>• Diagram an avian ovary and label the types of follicles.</li> </ul>	R11-12.4 SL 11-12.5 W 11-12.3	CRP2 AGANI 5
3.2.3 Assess the average amount of time a developing egg spends in each segment of the oviduct.	<ul style="list-style-type: none"> <li>• Create a timeline following the developing egg through the oviduct.</li> <li>• Formulate a chart that shows the average amount of time a developing egg spends in each segment of the oviduct.</li> </ul>	SL11-12.1c SL 11-12.4 L 11-12.6	CRP2 CRP4 AGANI6
3.2.4 Investigate the functions of the parts of the male avian anatomy. (testicle, cloaca, vas deferens)	<ul style="list-style-type: none"> <li>• Dissect a rooster's reproductive tract and label the structures.</li> <li>• Use household items to create a model of the rooster's reproductive tract and indicate the passage of sperm through the system..</li> </ul>	SL 11-12.1a SL 11-12.1c R 11-12.3	CRP2 AGANI4
3.2.5 Investigate the events that occur in the brain and body of both male and female poultry	<ul style="list-style-type: none"> <li>• Create a flow chart diagramming the hormonal activity and physical changes in the hen or rooster in response to photoperiod.</li> <li>• Choose a breed of chicken or other poultry and draw a</li> </ul>	SL 11-12.5 R 11-12.1 W 11-12.1c	CRP2 CRP4 CRP7 AGANI4

in response to increased photoperiod. (sexual maturation, estrogen, pituitary gland, FSH, LH ovulation, progesterone)	<p>picture of the mature male, label the secondary sexual characteristics.</p> <ul style="list-style-type: none"> <li>• Compose an outline of the events that occur in the brain and body of both male and female poultry in response to increased photoperiod.</li> </ul>		AGANI6
3.2.6 Describe pigment loss in a laying hen.	<ul style="list-style-type: none"> <li>• Evaluate pigment loss in hens to compare estimated past productivity.</li> <li>• Place in order representations of a laying hen's shanks at different stages of the laying period.</li> </ul>	W 11-12.2c	CRP2 AGANI1
3.2.7 Analyze the calcium metabolism of an egg-producing hen.	<ul style="list-style-type: none"> <li>• Diagram the calcium metabolism of an egg-producing hen.</li> <li>• Decalcify an egg using household chemicals.</li> </ul>	W 11-12.2c R 11-12.1	CRP2 CRP4 AGANI6
3.2.8 Compare clutch lengths in the following birds: Turkey hens, Jungle fowl hens, Leghorn hens, Broiler breeder hens, Quail hens	<ul style="list-style-type: none"> <li>• Research clutch length in various types of poultry.</li> <li>• Create a poster representing clutch length in various types of poultry.</li> <li>• Use household materials to create a representation of the eggs in a clutch of a type of poultry.</li> </ul>	SL 11-12.1c R 11-12.9 L 11-12.6	CRP2 CRP4 CRP7 AGANI6
<b>Standard 4.0 Asses Embryo Development and Egg Hatching Conditions in poultry.</b>			
<b>Performance Indicator 4.1 Investigate the Development of the Egg.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
4.1.1 Connect embryonic development (two phases) and structures in hatching eggs	<ul style="list-style-type: none"> <li>• Candle incubated eggs (white) in various stages of embryo development and identify what is visibly occurring and how it relates to embryo development</li> </ul>	R 11-12.3 R 11-12.9	CRP2 CRP11 AGANI4
4.1.2 Compare developmental occurrences in the early, mid and late incubation	<ul style="list-style-type: none"> <li>• Incubate a set of eggs adding one each day till hatching occurs.</li> <li>• Dissect each embryo and label the structures found.</li> </ul>	R 11-12.2 R 11-12.3 SL 11-12.1d	CRP2 CRP11 AGANI7
<b>Performance Indicator 4.2 Evaluate</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>

<b>Environmental Conditions for Hatching.</b>			
4.2.1 Assess responsibilities of the breeder farm in hatching egg preparation. Why is packing the eggs onto carts correctly so critical?	<ul style="list-style-type: none"> <li>• Interview a breeder farm employee about egg handling procedures</li> <li>• Visit a breeder farm to see egg collection, storage and handling procedures</li> <li>• Grade exterior eggs according to USDA standards.</li> </ul>	SL 11-12.1a SL 11-12.1c SL 11-12.3 R 11-12.3	CRP1 CRP2 AGANI6
4.2.2 Investigate the major responsibilities and concerns of a hatchery. (hatchability, fertility, hatch of fertile)	<ul style="list-style-type: none"> <li>• Tour a hatchery.</li> <li>• Calculate hatchability, true fertility, and hatch of fertile.</li> </ul>	SL 11-12.1a SL 11-12.3	CRP1 AGANI2 AGANI5
4.2.3 Describe proper egg temperature and humidity in the hatchery: egg storage, incubator and hatcher. Discuss the implications if these conditions are not maintained.	<ul style="list-style-type: none"> <li>• Explain why the relative humidity needs to be higher in a hatcher than in a setter.</li> <li>• Explain why the amount of supplemental heat provided in a setter changes during incubation.</li> <li>• Create a visual presentation indicating defects caused by improper temperature and humidity.</li> <li>• Conduct an experiment with hatching eggs to compare differing temperature and humidity levels on embryonic development.</li> </ul>	SL 11-12.4 SL 11-12.5 R 11-12.3	CRP11 AGANI5
4.2.4 Cite evidence why egg rotation is necessary in the setter, but not in the hatcher.	<ul style="list-style-type: none"> <li>• Conduct an experiment comparing developing eggs that are rotated correctly and those that are not.</li> </ul>	R 11-12.3 R 11-12.9 W 11-12.2b	CRP2 AGANI7
4.2.5 Investigate the length of time chicken and turkey eggs are held in the setter and hatcher.	<ul style="list-style-type: none"> <li>• Incubate chicken and turkey eggs, following correct environmental conditions and procedures in the setter and hatcher. Record hatching times.</li> <li>• Calculate the effect that size and storage has on hatching time using a standard formula.</li> </ul>	R 11-12.1 R 11-12.3 W 11-12.1e	CRP2 CRP11 AGANI7
4.2.6 Calculate hatchability, fertility, and hatch of fertile	<ul style="list-style-type: none"> <li>• Calculate hatchability, fertility, and hatch of fertile.</li> <li>• Research how these three (Hatchability, fertility, and hatch of fertile) are used to evaluate reproductive performance. Explain which area of production is most responsible for</li> </ul>	W 11-12.1e R 11-12.9 SL 11-12.4	CRP5 CRP7 AGANI5

	the success of each of these.		
<b>Standard 5.0 Asses the Environmental Physiology and Health of poultry.</b>			
<b>Performance Indicator 5:1 Evaluate the Importance of Environmental Conditions in Poultry Health</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
5.1. Investigate both <b>homeothermic</b> and <b>homeostasis</b> in terms of poultry temperature regulation.	<ul style="list-style-type: none"> <li>Research how poultry regulate their body temperature.</li> <li>Compare temperature regulation of warm-blooded and cold-blooded animals.</li> </ul>	L 11-12.4 L 11-12.4c	CRP2 AGANI5
5.1.2 Contrast methods of heat exchange. (convection, conduction, radiation)	<ul style="list-style-type: none"> <li>Create a multimedia presentation with visual representation of the methods of heat exchange. (convection, conduction, radiation)</li> <li>Create a tactile representation demonstrating the methods of heat exchange.</li> </ul>	SL 11-12.4 SL 11-12.5	CRP6 CRP9 AGANI5
5.1.3 Analyze sensible and insensible methods of heat loss.	<ul style="list-style-type: none"> <li>Research the methods of heat loss in poultry.</li> <li>Summarize the research article “Dealing With Summer Heat in Free Range Poultry” at <a href="http://www.uaex.edu/publications/pdf/FSA-8010.pdf">http://www.uaex.edu/publications/pdf/FSA-8010.pdf</a></li> </ul>	R 11-12.9 SL 11-12.4	CRP7 AGANI5
5.1.4 Investigate vasoconstriction and vasodilation, and indicate how heat flow from the core through the physiological shell is impacted by these processes.	<ul style="list-style-type: none"> <li>Prepare a visual of a bird showing how these will differ depending upon the changes in ambient temperature.</li> <li>View and summarize the video “How animals Regulate their temperature: by Craig Savage at: <a href="https://www.youtube.com/watch?v=ISnvJQe63rw">https://www.youtube.com/watch?v=ISnvJQe63rw</a></li> <li>Watch the video about temperature regulation at <a href="https://www.youtube.com/watch?v=ZywM3DN-eo0">https://www.youtube.com/watch?v=ZywM3DN-eo0</a> and compare the responses of the human body with those of</li> </ul>	SL 11-12.4 SL 11-12.5 R 11-12.9	CRP2 CRP6 AGANI5

	birds.		
5.1.5 Investigate how total heat production and heat production per unit body weight changes as body weight increases.	<ul style="list-style-type: none"> <li>Prepare a graph showing the relationship between heat production in relation to bird body weight.</li> <li>Read the article about heat production and loss at <a href="http://wc.pima.edu/~bfiero/tucsonecology/adaptations/size.htm">http://wc.pima.edu/~bfiero/tucsonecology/adaptations/size.htm</a> and write a description of how this information might relate to poultry</li> </ul>	SL 11-12.2 SL 11-12.5 R 11-12.7	CRP2 CRP6 AGANI5
5.1.6 Differentiate between the two major categories of thermoregulatory mechanisms, and explain the differences (active vs passive)	<ul style="list-style-type: none"> <li>Create a display showing how active and passive thermoregulation interact with vasoconstriction and vasodilation</li> </ul>	SL 11-12.5 R 11-12.7 W 11-12.2a	CRP2 CRP6 AGANI5
5.1.7 Differentiate between each of the temperature zones to which poultry may be exposed. For each zone, list the thermoregulatory mechanism(s) that may be used, including specific examples.	<ul style="list-style-type: none"> <li>Create a visual representation of the temperature zones to which poultry may be exposed and include the thermoregulatory mechanisms that may be used in each zone.</li> </ul>	SL 11-12.5 R 11-12.9 W 11-12.2a	CRP2 CRP6 CRP11 AGANI5
5.1.8 Connect how the range of temperatures in the thermoneutral zone changes as birds age.	<ul style="list-style-type: none"> <li>Create a graph or chart displaying the thermoneutral zone and how it differs by age of the bird.</li> </ul>	SL 11-12.5 R 11-12.9 W 11-12.2a	CRP2 AGANI1
5.1.9 Evaluate how the proportion of heat lost by insensible and sensible mechanisms is impacted by environmental temperature and humidity.	<ul style="list-style-type: none"> <li>Research how heat lost by insensible and sensible mechanisms is impacted by changing temperature and humidity.</li> </ul>	R 11-12.9 SL 11-12.4	CRP2 CRP6 AGANI5
5.1.10 Draw conclusions about how feed and	<ul style="list-style-type: none"> <li>Conduct an experiment with living birds, recording feed and water intake in response to temperature.</li> </ul>	R 11-12.3 W 11-12.2a	CRP4 CRP8

water intake are affected by environmental temperature.	<ul style="list-style-type: none"> <li>Calculate the cost of cooling or heating birds in relation to the cost of loss of gain because of environmental temperature.</li> </ul>	W 11-12.3	AGANI3
<b>Performance Indicator 5.2 Investigate Disease Transmission and Prevention in Poultry.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
5.2.1 Explain common methods of disease transmission	<ul style="list-style-type: none"> <li>Research and report on the disease transmission methods and prevention of a common poultry disease using the IMS Poultry Science Manual</li> </ul>	R 11-12.1 R 11-12.9 L 11-12.4c	CRP4 CRP7 AGANI7
5.2.2 Investigate effective measures of preventing infectious disease transmission. (biosecurity, sanitation, vaccination, proper nutrition, protective clothing or PPE)	<ul style="list-style-type: none"> <li>Research biosecurity methods used by a local poultry company.</li> <li>Create a sign with biosecurity practices to be used at the county fair poultry barn.</li> <li>Draw an example proper PPE for someone visiting your poultry barn.</li> <li>Prepare a biosecurity plan for the school poultry barn, or your own.</li> <li>Watch a demonstration of blood testing and wing-banding show birds.</li> </ul>	SL 11-12.1a SL 11-12.2 SL 11-12.5 R 11-12.9	CRP4 CRP7 AGANI5 AGANI7
5.2.3 Assess common disease causing agents. (bacteria, virus, fungus, protozoa, parasite)	<ul style="list-style-type: none"> <li>Diagram the life cycle of a pathogen.</li> <li>Research the pathogens responsible for several common poultry diseases.</li> </ul>	SL11-12.5 R 11-12.3 R 11-12.9	CRP2 CRP11 AGANI5
5.2.4 Analyze the difference between infectious and non-infectious disease and explain why infectious disease can be so damaging for poultry farms. (mortality, morbidity, pathogenicity)	<ul style="list-style-type: none"> <li>Diagram the lifecycle of an infectious disease. (Adherence, penetration, replication, assimilation, release)</li> <li>Calculate mortality rates.</li> </ul>	SL 11-12.1a SL 11-12.5 W 11-12.3	CRP2 CRP8 AGANI5
5.2.5 Differentiate between immunity and	<ul style="list-style-type: none"> <li>Explain how passive immunity is received by chicks.</li> <li>Use the “shrinking note” method to summarize the</li> </ul>	SL 11-12.4 L 11-12.6	CRP2 CRP4

passive immunity: How each is obtained and how prevents/treats illness from pathogens. (antibodies)	information found in the article at: <a href="http://www.poultryhub.org/physiology/body-systems/immune-system/">http://www.poultryhub.org/physiology/body-systems/immune-system/</a>	R 11-12.2	AGANI5
5.2.6 Compare commonly used vaccination methods for poultry. (vaccine, aerosol, subcutaneous, wingweb, oral)	<ul style="list-style-type: none"> <li>• Research vaccination methods used for several common poultry diseases.</li> <li>• Vaccinate chicks or older birds.</li> </ul>	R 11-12.3 W 11-12.7 SL 11-12.4	CRP2 CRP7 AGANI7
<b>Standard 6.0 Assess the Nutritional Needs of Poultry.</b>			
<b>Performance Indicator 6.1 Evaluate the Avian Digestive System.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
6.1.1 Analyze the eating habits of chickens and turkeys and the impact this behavior has on how birds should be fed.	<ul style="list-style-type: none"> <li>• Observe the eating habits of chickens or turkeys, record findings and discuss ways to improve efficiency.</li> <li>• Conduct an experiment manipulating feeding and watering methods for groups of chickens or turkeys and record findings.</li> </ul>	R 11-12.3 W 11-12.7 SL 11-12.2	CRP7 AGANI3 AGANI7
6.1.2 Assess the monogastric digestive system of poultry and identify the function of each segment of the digestive tract. (beak, esophagus, crop, gizzard, ventriculus, small intestine, ceca, large intestine, cloaca, vent)	<ul style="list-style-type: none"> <li>• Dissect the avian digestive tract and label the parts.</li> <li>• Analyze the appearance, texture, and pH of feed residue found in the various segments of the digestive tract.</li> <li>• Create a crossword puzzle of parts and functions of the digestive tract.</li> <li>• Compare and contrast the avian digestive tract to that of another agricultural monogastric.</li> </ul>	SL 11-12.5 R 11-12.5 W 11-12.1b	CRP2 CRP7 AGANI5

Performance Indicator 6.2 Connect Avian Nutrition Requirements to the functions of the bird.	Recommended Application/Activity	CCSS Standards	CCTC Standards
6.2.1 Analyze classes of nutrients needed by poultry and dietary sources of each. (Protein, carbohydrates, fats, vitamins, minerals, water)	<ul style="list-style-type: none"> <li>• Prepare a table with the classes of nutrients and dietary sources of each.</li> <li>• Identify feedstuffs and discuss nutrients contained in each.</li> <li>• Use the Pearson's Square method to balance a poultry ration for protein</li> </ul>	SL 11-12.4 SL 11-12.5 R 11-12.7	CRP2 CRP4 AGANI3
6.2.2 Categorize essential amino acids and non-essential amino acids and describe factors that influence a bird's requirement for them. (lysine, methionine, cysteine)	<ul style="list-style-type: none"> <li>• Research factors that influence a bird's requirement for essential amino acids.</li> <li>• Evaluate poultry feed formulations to determine amino acid supplementation.</li> </ul>	R 11-12.3 R 11-12.7 R 11-12.8	CRP2 CRP7 AGANI3
6.2.3 Research the relationship between triacylglycerides and essential fatty acids in the blood.	<ul style="list-style-type: none"> <li>• Use web-based research articles to determine the relationship between triacylglycerides and essential fatty acids in the blood, and prepare a report.</li> </ul>		
6.2.4 Analyze why the avian requirement for vitamins is relatively high compared to other species.	<ul style="list-style-type: none"> <li>• Compare avian vitamin requirements to those of another agricultural monogastric or ruminant and report your findings.</li> </ul>	R 11-12.7 R 11-12.9 L 11-12.6	CRP2 CRP7 AGANI3
6.2.5 Connect fat-soluble vitamins and water-soluble vitamins needed in a poultry ration, with the dietary sources to provide them.	<ul style="list-style-type: none"> <li>• Create a chart with fat- and water- soluble vitamins and the feedstuffs containing them</li> <li>• Analyze feed labels and compare vitamin levels for different stages of life</li> </ul>	R 11-12.7 R 11-12.9 L 11-12.6	CRP2 CRP7 AGANI3

6.2.6 Classify macro-minerals and micro-minerals needed in poultry diets.	<ul style="list-style-type: none"> <li>Evaluate feed labels for different types of poultry and compare amounts of macro and micro minerals in each.</li> <li>Use household items to create a representation of macro and micro minerals needed for poultry diets</li> </ul>	R 11-12.1 R 11-12.7 L 11-12.4b	CRP2 AGANI3
6.2.7 Assess the role of cereal grains, oilseed meals, animal protein meals, and oils in poultry nutrition and include some common feedstuffs in each category.	<ul style="list-style-type: none"> <li>Identify feedstuffs and discuss nutrients contained in each.</li> <li>Classify feedstuffs according to the primary nutrients in each.</li> </ul>	R 11-12.7 SL 11-12.4 SL 11-12.5	CRP2 CRP4 AGANI3
6.2.8 Propose conditions that result from nutrient deficiencies in poultry.	<ul style="list-style-type: none"> <li>Prepare a visual presentation showing clinical signs of nutrient deficiencies in poultry.</li> <li>Conduct a feeding trial to create a nutrient deficiency in poultry.</li> </ul>	SL 11-12.5 R 11-12.3 W 11-12.3	CRP2 CRP8 AGANI3 AGANI7
6.2.9 Investigate the importance of the yolk residue in chick nutrition. (Meckel's diverticulum)	<ul style="list-style-type: none"> <li>Identify the Meckel's diverticulum in a chick embryo, and draw the section of the digestive tract in which it is found.</li> <li>Prepare a list of the nutritional benefits of the yolk residue in newly hatched chicks.</li> <li>Compare yolk residue in poultry to colostrum in mammals.</li> </ul>		
<b>Performance Indicator 6.3 Analyze the feeding of Commercial Poultry.</b>	<b>Recommended Application/Activity</b>	<b>CCSS Standards</b>	<b>CCTC Standards</b>
6.3.1 Investigate essential amino acids that in poultry diets.	<ul style="list-style-type: none"> <li>Create a table of common feedstuffs and amino acids that are deficient in those feedstuffs.</li> <li>Research amino acids that are commonly added to poultry rations</li> </ul>	R 11-12.2 R 11-12.9 L 11-12.4	CRP2 CRP4 CRP8 AGANI3
6.3.2 Create the information that must be given for computer-based least-cost formulation programs to work.	<ul style="list-style-type: none"> <li>Use a computer based least cost formulation program to create a ration for poultry. (if available)</li> <li>Use a Pearson's Square to create a least-cost formulation for a poultry ration.</li> </ul>	R 11-12.7 R 11-12.8 W 11-12.2a	CRP2 CRP5 CRP11 AGANI3
6.3.3 Compare and contrast forms and nutrient levels in poultry	<ul style="list-style-type: none"> <li>Identify forms of poultry feeds and discuss their appropriateness for different segments of production.</li> </ul>	SL 11-12.4 R 11-12.2 R 11-12.4	CRP2 CRP4 CRP5

diets for the different segments of production. (pellets, crumbles, meal)	<ul style="list-style-type: none"><li>• Conduct an experiment comparing gain when feeding different forms of diets.</li></ul>		AGANI3
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Pilot Year 2014-15

## Glossary

1. Asymmetrical – informal arrangements that have equal visual weight on both sides of the axis but each side differs in plant materials and the manner of arrangement
2. Balance – a design principle; the placement of objects to create a physical and visual feeling of stability in a design
3. Color – the greatest visual impact of all design elements; subdivided into warm and cool colors
4. Design – a planned organization of plant, floral, or accessory material for a specific purpose
5. Display – one component of visual merchandising that attracts attention, creates interest, and motivates the customer to want to buy the items viewed.
6. Emphasis – the creation of visual importance or accent in a design
7. Focal point – the area of a design that attracts and holds the interest of the viewer
8. Form – the three dimensional shape of an object
9. Harmony – refers to a blending of all components of the design to create a pleasing relationship of color, texture, shape, size, and line so that a central idea or theme is accomplished
10. Hue – the name of a color, which remains the same even though it may be lighter, darker, or grayer
11. Intensity – the brightness or dullness of a flower color
12. Line – the visual path the eye follows to create motion in the design and is the framework holding the entire arrangement together
13. Mark-up - the amount added to the cost price of goods to cover overhead and profit
14. Proportion – the relationship of all parts of an arrangement to each other
15. Radiation – an attempt to make all stems appear to come from one central axis
16. Repetition – a method of obtaining rhythm by repeating similar elements throughout a design
17. Retail - the sale of goods to the public in relatively small quantities for use or consumption rather than for resale
18. Scale – the relationship between an arrangement and the area where an arrangement is to be displayed
19. Symmetrical – formal balance characterized by equal visual on each side of the axis
20. Texture – the physical surface appearance that an object projects
21. Unity – achieved when all the parts of the design suggest a oneness in idea or impression by repeating the same flower and colors throughout the arrangement
22. Wholesale – the wholesaler purchases goods from around the world and sells to the retail florist rather than to the general public

## 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)**

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| <ol style="list-style-type: none"> <li>1. Act as a responsible and contributing citizen and employee. <b>CRP1</b></li> <li>2. Apply appropriate academic and technical skills. <b>CRP2</b></li> <li>3. Attend to personal health and financial well-being. <b>CRP3</b></li> <li>4. Communicate clearly, effectively, and with reason. <b>CRP4</b></li> <li>5. Consider the environmental, social and economic impacts of decisions. <b>CRP5</b></li> <li>6. Demonstrate creativity and innovation. <b>CRP6</b></li> <li>7. Employ valid and reliable research strategies. <b>CRP7</b></li> </ol> | <ol style="list-style-type: none"> <li>8. Utilize critical thinking to make sense of problems and persevere in solving them. <b>CRP8</b></li> <li>9. Model integrity, ethical leadership, and effective management. <b>CRP9</b></li> <li>10. Plan education and career path aligned to personal goals. <b>CRP10</b></li> <li>11. Use technology to enhance productivity. <b>CRP11</b></li> <li>12. Work productively in teams while using cultural/global competence. <b>CRP12</b></li> </ol> |
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