

Veterinary Assistant 1

COURSE OUTLINE - UC

DESCRIPTION:

This introduction to veterinary assistant course is designed to provide students a comprehensive knowledge of veterinary science and basic animal care. This course focuses on the application of animal anatomical and physiological knowledge in cells, tissues, musculoskeletal, circulatory, respiratory, renal, digestive, reproductive, nervous, and immune systems to help students understand topics such as veterinary medical terminology, sanitation, disease control and prevention, zoonosis and public health, nutrition, species differentiation in nutrition and techniques for animal restraint. Students will study a unit on careers and professionalism and create a personalized resume for future job searches. Activities in this course include hands-on clinical experience and work-based learning that connects students to industry and the local community.

INFORMATION:

PRE-REQUISITE: Biology or Zoology (Recommended)

LENGTH: One Year

SECTOR: Agriculture and Natural Resources

PATHWAY: Animal Science

ARTICULATED: No

UC A-G APPROVAL: Yes: College-Preparatory Elective (G) / Science – Integrated Science

O*NET SOC CODES:

31-9096.00 Veterinary Assistants and Laboratory Animal Caretakers

39-2021.00 Nonfarm Animal Caretaker

Orientation
<ul style="list-style-type: none"> A. Introduce the course and facilities. B. Discuss the syllabus and major objectives. C. Explain applicable classroom management procedures, and any operational guidelines. D. Review instructor/student expectations. E. Explain attendance requirements and procedures. F. Review grading and student evaluation procedures. G. Discuss the work-based learning aspect of the program, if applicable. H. Discuss the “next steps” related to additional education, training, and employment. I. Review classroom safety, emergency and disaster procedures.
1. Communication Skills
<ul style="list-style-type: none"> A. Demonstrate positive verbal communication skills using appropriate vocabulary, demeanor, and vocal tone in the classroom and/or worksite. B. Read and interpret written information and directions. C. Practice various forms of written communication appropriate to the occupation. D. Practice positive body language skills. E. Practice professional verbal skills for resolving a conflict. F. Demonstrate active listening skills including techniques for checking for understanding, and for obtaining clarification of directions.
2. Interpersonal Skills
<ul style="list-style-type: none"> A. Demonstrate positive teamwork skills by contributing to a group effort. B. Practice the importance of diversity awareness and sensitivity in the workplace. C. Define sexual harassment in the workplace and identify the employee’s role and responsibility. D. Practice participation skills. E. Identify different personality types and demonstrate flexibility and adaptability working with diverse individuals. F. Practice business and social etiquette skills appropriate to the occupation. G. Evaluate and discuss the role of business and personal ethics in decision making based on various job-related scenarios. H. Demonstrate the use of time management skills.
3. Employability Skills

- A. Demonstrate appropriate attendance and punctuality practices for the classroom (and worksite, if applicable).
- B. Prepare a resume, cover letter, and job application.
- C. Demonstrate interviewing techniques in seeking employment, using appropriate tone, body language and professional dress and grooming standards.
- D. Identify strategies for employment retention.
- E. Identify and analyze sources of job information, including electronic sources and the impact of social networking on employability.
- F. Identify the need for continuing education, professional development, and professional growth in chosen field.
- G. Identify appropriate procedures for leaving a job.
- H. Review company policies and current trends in employee compatibility screening, drug screening, and background checks.

4. Leadership

- A. Define leadership and identify the responsibilities, competencies, and behaviors of successful leaders.
- B. Work with peers to promote divergent and creative perspectives.
- C. Demonstrate how to organize and structure work, individually and in teams, for effective performance and the attainment of goals.
- D. Explain multiple approaches to conflict resolution and their appropriateness for a variety of situations in the workplace.
- E. Employ ethical behaviors and actions that positively influence others.
- F. Analyze the short-term and long-term effects a leader's actions and attitudes can have on productivity, morale, and organizational culture.

5. Personal and Occupational Safety

- A. Demonstrate procedures to be followed in case of emergencies.
- B. Describe and discuss the procedure for reporting a work-related hazard or injury (worker's comp), including ways to report a potential safety hazard to a supervisor.
- C. Identify and discuss cyber ethics, cyber safety, and cyber security.
- D. Apply personal safety practices to and from the job.
- E. Recognize the effects of substance abuse in the workplace.
- F. Explain importance of CAL-OSHA in relation to the American Animal Hospital Association's rules and regulations.
- G. Define and discuss ergonomics in relation to the working environment.
- H. Discuss the electrical hazards of working with electronic equipment.
- I. Recognize good housekeeping as a safety issue.

<p>6. Introduction to Careers in Veterinary Science</p> <ul style="list-style-type: none"> A. Identify the education, role and responsibilities of a veterinary assistant. B. Recognize transferable skills from other occupations that relate to the veterinary assistant. C. Differentiate between licensed and unlicensed positions in the veterinary field.
<p>7. Veterinary Medical Terminology</p> <ul style="list-style-type: none"> A. Identify the basic word building system used in veterinary medical terminology. B. Define veterinary medical terms by breaking them into their component parts. C. Use veterinary medical abbreviations and terms in both classroom and professional setting. D. Utilize word roots, combining forms, prefixes, suffixes, to analyze unfamiliar veterinary terms and phrases. E. Identify and demonstrate pronunciation of medical terms. F. Demonstrate proper spelling of veterinary medical terminology.
<p>8. Restraint, Handling and Observation Skills</p> <ul style="list-style-type: none"> A. Define species commonly treated in a small veterinary practice. B. Identify and observe behaviors for safe handling and restraining of canines and felines. C. Demonstrate specific physical restraint methods for both canine and feline patients. D. Demonstrate restraint for different routes of administering medication. E. Identify equipment used to restrain canines and felines. F. Differentiate restraint methods for various veterinary medical procedures. G. Describe the indications for use of chemical restraints. H. Explain to clients the purpose and need for restraints.
<p>9. Cells and Tissues</p> <ul style="list-style-type: none"> A. Outline the use of the microscope for routine testing. B. Explain the molecular makeup of cells. C. Identify the basic structures and their corresponding functions. D. Discuss mitosis and its clinical significance in diseases such as cancer including benign vs. malignant cells. E. Outline meiosis in mammalian reproduction. F. Describe the properties, locations, functions of epithelial, connective, muscle, and nerve tissues.

10. Musculoskeletal System
<ul style="list-style-type: none"> A. Describe the function of the musculoskeletal system. B. Compare the bones of equine skeletal system and canine skeletal system. C. Identify the different types of joints and their role in movement. D. Explain how bone grows and remodels. E. Relate bone and muscle groups to movement.
11. Cardiovascular and Respiratory Systems
<ul style="list-style-type: none"> A. Describe the function of blood and its components. B. Detail the basic structures of the mammalian heart. C. Track blood flow through the heart and identify the purpose of the blood vessels during this process. D. Explain the clinical significance of electrocardiogram, heart sounds including murmurs, and blood pressure on heart function and control. E. List and discuss the function and control of breathing. F. Practice how to artificially keep a pet's heart, lungs, and vital organs working in an emergency (Pet CPR & First Aid).
12. Digestive and Renal Systems
<ul style="list-style-type: none"> A. Identify the basic structure of the digestive system. B. Explain digestion in mono-gastric and ruminant animals, including digestive tract function and absorption. C. Describe the role of the liver in digestion and metabolism. D. Describe the basic structure and function of the renal system. E. Detail the structures within the kidney and understand urine formation and regulation.
13. Reproductive System
<ul style="list-style-type: none"> A. Discuss female anatomy and the estrous cycle. B. Identify the stages in pregnancy and parturition. C. Describe the male anatomy and hormonal function.
14. Central Nervous System
<ul style="list-style-type: none"> A. Identify the nerve impulse, neuron, the synapse and the components of a reflex arc. B. Compare and contrast the sensory somatic system to the autonomic system. C. Describe the anatomy of the spinal cord and the brain.

- D. Evaluate nerve reflexes and the senses.
- E. Perform nerve/reflex tests.

15. Nutrition

- A. List the six essential nutrients and their functions.
- B. Compare and contrast nutrient content among prescription, premium, brand name and generic foods in relation to dietary needs.
- C. Compare nutritional needs of various animal species including equine/ruminant nutrition and fiber digestion.
- D. Describe special diets based on need, age, disease, etc.

16. Immune System and Disease Transmission

- A. Describe the immune system including the function of adjuvants, antigens, and antibodies.
- B. Differentiate passive and active immunity as well as primary and secondary immune response.
- C. Describe Koch's postulates.
- D. Identify major disease agents and resulting disease.
- E. List the basic steps for disease prevention.
- F. Identify common animal diseases contagious to humans.
- G. Describe diseases and the corresponding species that contracts the disease.

17. Sanitation and Disease Control

- A. Demonstrate the proper cleaning of animal cages and other surfaces to eliminate/reduce disease transmission.
- B. Distinguish between disinfectants and antiseptics.
- C. Demonstrate proper labeling, storage, and correct use of disinfectants and antiseptics.
- D. Describe isolation, traffic control, and social distancing procedures.
- E. Correctly handle and dispose of contaminated waste.

18. Vaccinations

- A. Describe the symptoms of diseases for which canines and felines are routinely vaccinated.
- B. Identify the sites of administration in canines and felines for administration of vaccines.
- C. Identify procedures for proper storage and handling of vaccination medications.
- D. Explain the importance of maintaining a preventative health care schedule.
- E. List health and rabies certificate types required for travel.

19. Participate in FFA (Future Farmers of America) <https://www.calaged.org/>

- A. Explain the history and structure of the FFA student organization.
- B. Interpret the goals and opportunities available through FFA.

20. Portfolio

- A. Create a professional digital portfolio reflecting employability skills in the relevant industry to include an “About Me” page.
- B. Collect original works and documents that demonstrate technical skills and knowledge in the industry.
- C. Demonstrate knowledge of competencies by accompanying each selected document or work with a journal entry or summary.
- D. Write a brief resume and cover letter to be included in portfolio.
- E. Develop interviewing techniques using portfolio materials.
- F. Display portfolio materials for critique by a professional panel (industry partners and classmates).
- C. Gather feedback and update portfolio.

Key Assignments

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
1. Students will participate in mock interviews that represent current industry practices (e.g., skills demonstrations, resumes, opportunities through FFA, applications, portfolios, personal websites, etc.).	1A, B, D 2A,D,F,I,J 3B, C, D, I, J 6A-C 20	2 3 10	2 3		LS 11-12.6 SLS 11-12.2
2. Students will define medical terminology words including prefixes and suffixes, look up origin of words, practice pronunciation, and practice spelling and meaning of terminology by preparing index cards or using Apps, such as Quizlet.	1A-C 7A - F	1 2 4	2 4 6 10	D6.0 B2.0 B5.0 B6.0	LS 11-12.1; LS 11-12.4; LS 11-12.6 RLST 11-12.4 SLS 11-12.1 SLS 11-12.1d
3. Students will learn to handle canine and feline patients utilizing proper equipment, restraint methods (physical, chemical or mechanical), and instruments. Students will select the appropriate method of restraint by documenting data and comparing with previous findings.	1C,D, F 2A, D, I, J 5J, K 8A-H	1 2 4 5 8 9	5 6 8 9 10	D6.0 D9.0 B4.0 B5.0 B8.0 B9.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1d SEP 3 SEP 4 SEP 8 WS 11-12.2 WS 11-12.7 WS11-12.8
4. Students will use a microscope to view how certain cells and tissues are connected, then create and label a 3-D drawing or model (using any material) of the muscle structure. Students will write a 2-3 page comparative essay on tissues versus cell functions.	1B,C,F 2 D, I, J 5J, K 9A-F	1 2 5 9 11	5 6 9 10	D3.0 B3.0 B5.0 B7.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1d SEP 3 SEP 4 SEP 8 WS 11-12.2 WS 11-12.7

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
					WS11-12.9
5. Students will frame a hypothesis after squeezing a tennis ball for two minutes, then write a summary of the process that led to the muscle fatigue based on their knowledge of muscle structure and function.	1B,C,F 2A, D, I, J 4B,C,F 10A,C-E	1 2 4 9	2 4 9	D3.0 B2.0 B5.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1d WS 11-12.2 WS 11-12.4
6. Students will examine and compare joints of equine and bovine to identify joint types and write a 2-3 page paper that outlines the joint types in mammals and their corresponding movements.	1B,C 2A,D,I,J 4B,C,F 10B,C,E	1 2 5 9 11	5 6 9 10	D3.0 B3.0 B5.0 B7.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1d SEP 3 SEP 4 SEP 8 WS 11-12.2 WS 11-12.7 WS11-12.9
7. Students will identify capillary refill time (CRT), practice taking respiratory rates and use a stethoscope to listen for normal and abnormal heart and respiratory sounds and document the data on medical records to compare current findings with previous findings to draw conclusions. Students will perform CPR on a dog mannequin (after watching a video). In groups, students will develop an emergency procedures bulletin that instructs the correct method for performing dog CPR.	1B,C 2A,D,I,J 4B,C,F 11A-E	1 2 5 9 10 11 12	2 5 7 8 9 10	B4.0 B5.0 B6.0 B7.0 B8.0 B9.0	LS 11-12.6 RLST 11-12.3 SEP 1; SEP 4; SEP 7 SLS 11-12.1 SLS 11-12.1b SLS 11-12.1d WS 11-12.2 WS 11-12.4 WS 11-12.6
8. Students will visit a local farm to get an overview of the ruminant digestive system of a cow. In groups, some students will create models of the mono-gastric or ruminant digestive system tracts and present to the class the movement of food through the	1A,B,C, D,F 2A,D,I,J 3A	1 2 4	2 4 7	D3.0 D10.0 B2.0	LS 11-12.3 WHSST 11-12.2 WS 11-12.2

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
system.	4B,C,F 12A-C	7 9 10 11	9 10	B5.0	WS 11-12.4 WS 11-12.6 SLS 11-12.1 SLS 11-12.1d SLS 11-12.1b
9. In groups, students will walk around campus and recognize common plants toxic to the renal system of animals. Students will create a graphic organizer of common toxic plants and the corresponding prevention/treatment and use the graphic organizer to write a 2 to 3-page paper on toxic plants and how to counteract/treat the poison.	1B 2A, D, I, J 4C 12D,E	1 2 4 5 8 9 11 12	2 4 5 6 7 9 10	D3.0 D6.0 D9.0 B5.0 B9.0	RLST 11-12.3 RLST 11-12.4 SEP 3, 4, 8 WS 11-12.2,12.7, WS11-12.9
10. A guest speaker from a veteran clinic will be invited to discuss the advantages and disadvantages of spraying and neutering pets. In groups, students will create and present a multimedia software or video that demonstrates either the advantages or disadvantages of spraying and neutering pets. Students will debate in class, making an argument for or against neutering while using proper reproductive system terminology.	1A,D,F 2D,F 13A,C	1 2 4 5 10 11 12	2 4 5 10	D4.0 B2.0 B5.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1 SLS 11-12.1d SLS 11-12.1b SEP 3, 4, 8 WS 11-12.2,12.7, WS11-12.9
11. Students will test reflexes and stimulated response in classmates. In pairs, students will drop a yardstick through the hand of their partner (with their eyes closed and then eyes open) and record the speed at which each partner grips the stick. Students will graph their findings and draw a conclusion on the speed and efficiency of the nervous system.	1B,C,F 2A, D, I, J 4B,C,F 14A,B,D,E	1 2 4 9	2 4 9	D3.0 B2.0	RLST 11-12.3 RLST 11-12.4 SLS 11-12.1d WS 11-12.2 WS 11-12.4

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
12. Students will write and present a 6-8 page paper on a neurological disease including the cause, symptoms, species affected, diagnosis and treatment. In groups, students will choose a topic from a pre-selected list of neurological diseases, write paper (using google docs for rough drafts, peer editing, final draft), and present in class.	1A,B,C,F 2A,D 14C	1,2,4,5,6,7 ,8,9,10,11, 12	2,4,5,6,7,8, 9,10	D3.0 D6.0 D9.0 B1.0 B5.0 B9.0	LS 11-12.1 LS 11-12.6 SLS 11-12.1d SEP 4 SEP 8 WHSST 11-12.4 WS 11-12.2 WS 11-12.6 WS 11-12.7 WS 11- 12.9
13. Students will research popular pet foods, analyze the label for nutritional information, and prepare a diet plan for various situations taking into consideration nutrition and cost.	1B, C 15A-D	1 2 4 5 10	2 4 5 10	D2.0 B3.0 B9.0	LS 11-12.6 SEP 3 SEP 4 SEP 7 WS 11-12.6 WS 11-12.7 WS 11-12.9
14. Students will visit an equine center or farm where they will learn about the feed ratios for a horse or cow. Students will be given a hypothetical scenario to calculate the feed and nutritional requirements for a horse or cow based on the age, use, etc.	1A, B, C, D, F 2A, D, I, J 3A 4B, C, F 15A-D	1,2,3,4,5, 10,11	1,4,5,10	D2.0 B3.0 B9.0	SEP 3 SEP 4 SEP 8 WS 11-12.6
15. Students will be divided into three groups representing adjuvant, antigen, and antibody. Based on a scenario, students will act out the difference between adjuvant, antigen and antibody in relation to vaccines and immune response. Students will research and write a 2-3 page paper explaining the role of adjuvant, antigen and antibody in relation to vaccines and immune response.	1B,C 2A,D,I,J 4B,C,F 16A,B	1 2 4 9 11	2 4 9 10	D3.0 D6.0 D9.0 B5.0 B9.0	LS 11-12.6 SEP 8 WS 11-12.6 WS 11-12.7 WS 11-12.9
16. Students will practice calculating concentrations of a solute by using a concentrated disinfectant to demonstrate proper dilution ratios and practice cleaning cages and other surfaces.	1B 2A,D,I,J 4C 17A-D	1 2 5 9	2 5 6 9	D6.0 B3.0	RLST 11-12.3 SEP 3 SEP 4 SEP 8

Assignment	Competencies	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
			10		WS 11-12.6 WS 11-12.7
17. Assuming there is an epidemic of a zoonotic disease in the community, teams of students will create a patient information pamphlet with treatment and preventative measures to be shared with a local city council. Students will research and describe a disease that has jumped from animals to people, identify the species of animals, category (fungal, bacterial, and viral) of the disease, its contagiousness, signs and symptoms, the prognosis, as well as the appropriate individual and local government preventive measures and treatment plans.	1A, B, C 2A,D,I, J 4B,C,E 16D,E,F 17A-E 18A,D	1 2 4 5 6 7 8 9 10 11 12	2 4 5 6 7 8 9 10	D3.0 D6.0 D9.0 B1.0 B5.0 B9.0 B10.0	LS 11-12.1 LS 11-12.6 SLS 11-12.1d SEP 4 SEP 8 WHSST 11-12.4 WS 11-12.2 WS 11-12.6 WS 11-12.7 WS 11-12.9
18. Students will list common infectious diseases and the corresponding vaccines. Then students will give vaccinations to animals, take rectal temperatures and evaluate graphs to determine the effectiveness of vaccines.	1B,C 2A,D,I,J 4B,C,F 18A-E	1 2 4 5 9	2 4 5 6 9 10	D6.0 B3.0 B5.0	RLST 11-12.3 SEP 3 SEP 4 SEP 8 WS 11-12.6 WS 11-12.7
19. Students will research and demonstrate administering medication through various routes, addressing the pros and cons, safety issues, restraint issues, and time and effect of each route.	1A,B,C,F 2A,D 8C,D,E,F 18A-F	1 2 4 5 9 10 11	1 5 10 11	B 1.0 B 2.0 B 5.0 B 6.0 B 8.0 B 9.0	LS 11-12.3 WHSST 11-12.2 WS 11-12.7 WS 11-12.4 WS 11-12.6

Standards Assessed in this Program

Career Ready Practices

1. Apply appropriate technical skills and academic knowledge.
2. Communicate clearly, effectively, and with reason.
3. Develop an education and career plan aligned to personal goals.
4. Apply technology to enhance productivity.
5. Utilize critical thinking to make sense of problems and persevere in solving them.
6. Practice personal health and understand financial well-being.
7. Act as a responsible citizen in the workplace and the community.
8. Model integrity, ethical leadership, and effective management.
9. Work productively in teams while integrating cultural/global competence.
10. Demonstrate creativity and innovation.
11. Employ valid and reliable research strategies.
12. Understand the environmental, social, and economic impacts of decisions.

Anchor Standards

2.0 Communications

- Acquire and use accurately sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

3.0 Career Planning and Management

- Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

4.0 Technology

- Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the sector workplace environment.

5.0 Problem Solving and Critical Thinking

- Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

6.0 Health and Safety

- Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the sector workplace environment.

7.0 Responsibility and Flexibility

- Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the sector workplace environment and community settings.

8.0 Ethics and Legal Responsibilities

- Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

9.0 Leadership and Teamwork

- Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution.

10.0 Technical Knowledge and Skills

- Apply essential technical knowledge and skills common to all pathways in the sector following procedures when carrying out experiments or performing technical tasks.

Pathway Standards

Agriculture and Natural Resources Sector - Animal Science Pathway

D2.0 Apply principles of animal nutrition to ensure the proper growth, development, reproduction, and economic production of animals.

D3.0 Apply principles of comparative anatomy and physiology to uses within various animal systems.

D4.0 Demonstrate understanding of animal reproduction, including the function of reproductive organs.

D5.0 Discuss animal inheritance and selection principles, including the structure and role of deoxyribonucleic acid (DNA).

D6.0 Prescribe and implement a prevention treatment program for animal diseases, parasites, and other disorders.

D9.0 Assess animal welfare concerns and management practices that support animal welfare.

D10.0 Demonstrate understanding of the production of large animals (e.g., cattle, horses, swine, sheep, goats) and small animals (e.g., poultry, cavy, rabbits).

Health Science & Medical Technology Sector - Patient Care Pathway

B1.0 Recognize the integrated systems approach to healthcare delivery services: prevention, diagnosis, pathology, and treatment.

B2.0 Understand the basic structure and function of the human body and relate normal function to common disorders.

B3.0 Know how to apply mathematical computations used in healthcare delivery system.

- B4.0** Recognize and practice components of an intake assessment relevant to patient care.
- B5.0** Know the definition, spelling, pronunciation, and use of appropriate terminology in the healthcare setting.
- B6.0** Communicate procedures and goals to patients using various communication strategies to respond to questions and concerns.
- B7.0** Apply observation techniques to detect changes in the health status of patients.
- B8.0** Demonstrate the principles of body mechanics as they apply to the positioning, transferring, and transporting of patients.
- B9.0** Implement wellness strategies for the prevention of injury and disease.
- B10.0** Comply with protocols and preventative health practices necessary to maintain a safe and healthy environment for patients, healthcare workers, coworkers, and self within the healthcare setting.

Common Core State Standards

ENGLISH LANGUAGE ARTS

Language Standards

- LS 11-12.6:** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the (career and college) readiness level, demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
- LS 11-12.1:** Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- LS 11-12.2:** Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- LS 11-12.3:** Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
- LS 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 flexibility from a range of strategies.
- LS 11-12.6:** 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.

Reading Standards for Literacy in Science and Technical Subjects

- RLST 11-12.3:** 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.
- RLST 11-12.4:** Determine the meaning of symbols, key term, and other domain-specific words and phrases as they are used in specific scientific or technical context relevant to grades 11-12 texts and topics.

Speaking and Listening Standards

- SLS 11-12.1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others ideas and expressing their own clearly and persuasively.
- SLS 11-12.1b:** Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.

SLS 11-12.1d: 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 work.
SLS 11-12.2: 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.

Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects

WHSST 11-12.2: Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

WHSST 11-12.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Writing Standards

WS 11-12.2: Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

WS 11-12.4: Produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.

WS 11-12.6: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback including new arguments and information.

WS 11-12.7: 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.

WS 11-12.8: 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 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 including footnotes and endnotes.

WS 11-12.9: Draw evidence from literary or informational texts to support analysis, reflections, and research.

MATHEMATICS

Algebra-Arithmetic with Polynomials and Rational Expressions

AAPR 1: Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication: add, subtract, and multiply polynomials, and divide polynomials by monomials. Solve problems in and out of context.

Algebra - Creating Equations

ACED 3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

Algebra-Reasoning with Equations and Inequalities

AREI 1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

AREI 3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

Functions - Interpreting Functions

FIF 6: Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Number and Quantity

NQ 2: Define appropriate quantities for the purpose of descriptive modeling.

NQ 3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Statistics and Probability - Making Inferences and Justify Conclusions

SIC 6: Evaluate reports based on data.

Statistics and Probability - Interpreting Categorical and Quantitative Data

SID 1: Represent data with plots on the real number line (dot plots, histograms, and box plots.)

SCIENCE

Crosscutting Concept

CC 2: Cause and effect: Mechanism and explanation

Scientific and Engineering Practices

SEP 1: Asking questions (for science) and defining problems (for engineering)

SEP 3: Planning and carrying out investigations

SEP 4: Analyzing and interpreting data

SEP 7: Engaging in argument from evidence

SEP 8: Obtaining, evaluating, and communicating information.