

# Veterinary Science

Santa Maria Joint Union High School District



## Basic Course Information

### School(s) Offering This Course:

School Name	Course Learning Environment	Transcript Code(s)	
Ernest Righetti High School (053303)	Classroom Based	<b>Abbreviation</b>	<b>Course Code</b>
		Vet Science A	AG6296
		Vet Science B	AG6297
Santa Maria High School (053305)	Classroom Based	<b>Abbreviation</b>	<b>Course Code</b>
		Vet Science A	AG6296
		Vet Science B	AG6297
Pioneer Valley High School (053847)	Classroom Based	<b>Abbreviation</b>	<b>Course Code</b>
		Vet Science A	AG6296
		Vet Science B	AG6297

<b>Title:</b>	Veterinary Science
<b>Length of course:</b>	Full Year
<b>Subject area:</b>	Science (D) / Biology / Life Sciences
<b>UC honors designation?</b>	No
<b>Prerequisites:</b>	Biology/Ag Biology (Recommended)
<b>Co-requisites:</b>	Algebra (Required)

**Integrated (Academics / CTE)?** Yes

**Grade levels:** 10th, 11th, 12th

## Course Description

### Course overview:

Veterinary Science is a course designed to provide students an applied scientific study in the area of animals and veterinary care. This course focuses on the application of animal anatomical and physiological knowledge to the maintenance and improvement of animal health to include; clinical diagnosis of disease and parasites, administration of medications, and common surgical procedures. Biological applications will include studies in cells, genetics, evolution, and ecology as they pertain to the animal/veterinary field. The feline dissection and various other livestock specimens will serve as a supplemental lab practicum throughout the duration of this course. Each unit includes a clinical practice component at the conclusion to put the knowledge learned into a real veterinary clinical situation. Additional emphasis will be placed on industry practices to include office procedures, public relations and communications, laboratory skills. At the conclusion of this course and completion of requirements, students will be able to take the exam to become level 1 assistant veterinary technician certified.

### Course content:

---

#### Unit 1: Introduction to Animal Anatomy, Physiology, and Veterinary Medicine.

---

1. In this first unit, students will learn the overall course objectives, grading procedures, and classroom procedures for safely working with animals. They will also discuss and compare the use of animals in society as pets, service animals and companion animals versus animals used for food production.
2. Students will learn proper safety and regulations to include handling of animals, routine clinical procedures, surgical practices, and emergency situations.
3. They will also review the use of the microscope for routine testing as well as develop an understanding of prescription placement and the use of the autoclave machine.
4. An overview of research and data collection procedures will be discussed as it pertains to veterinary medical cases.
5. Students will begin to develop their foundation of medical terminology to include common abbreviations, suffixes, root words and measurements.

**Assignment:** Drawings of laboratory tools, demonstration of use, proper identification, short 2 page essay on proper safety techniques and escape routes from classroom.

**Assignment:** Students will be given practicum on routine restraints and be expected to demonstrate the common safety restraints specifically used for dogs and cats in a classroom setting. Students will take the role of assistant technician and veterinarian to work together for restraints such as lateral recumbency on a large dog, dorsal recumbency for a urine sample, and sternal recumbency for placement of x-rays.

**Assignment:** Students will produce a computer generated presentation of importance of animals in society. PowerPoint, Prezi, or Google Slides will be the preferred template to create the presentation. They will work in pairs of two and present the information to the class.

**Activity:** Students will go on a field trip to a local veterinary clinic to take a tour and identify common safety practices in the clinic. They will get a brief lecture on the radiography equipment and learn about the regulations related to their use. Students will write a thank you card to the vet clinic and comment with major points learned on the trip.

---

## Unit 2: Cells

---

1. Students will be able to review and explain the molecular makeup of cells
2. Identify the basic structures of the cell and their corresponding functions. RNA and DNA Bases. Basic structure and function such as metabolism, anabolism, and catabolism.
3. Discuss mitosis and its clinical significance in diseases such as cancer. Review Interphase, Prophase, Metaphase, Anaphase, Telophase. Students will comprehend benign vs. malignant cells.
4. Detailed meiosis in mammalian reproduction

**Assignment:** A local veterinarian and cancer expert in small animal care will come give a guest lecture on how to diagnose and treat patients with cancer. She will also discuss a variety of common unknown forms of cancer that pets develop in our everyday lives. Options for care, prognosis for the future, and specific breeds known to be prone to cancer will be discussed. An open class discussion with feedback will be the format of this activity.

---

## Unit 3: Tissue Types and Functions

---

Students will be able to describe the properties, locations, functions, and varieties of:

1. Epithelial: properties, locations, functions, and varieties.
2. Connective: tendons, fat, blood, cartilage, and bone make up the extracellular matrix.
3. Muscle: smooth, skeletal, and cardiac.
4. Nerve: central nervous system and peripheral nervous system.

**Assignment:** Students will utilize microscopes and prepared histology slides of common tissue types for an identification lab. They will draw detailed diagrams of what they see in order to be able to properly connect certain cells and tissue types for routine laboratory practices. They will be expected to identify common tissue samples under a microscope for assessment.

**Assignment:** Students will create a 3-D study tool of tissues, draw and color basic tissues. They will illustrate comparative writing on tissue types. They will use this for review on their unit test and turn in for points.

---

## Unit 4: Muscle and Skeletal System

---

1. Students will be able to describe the functions of musculoskeletal system
2. Detail the structure of the bone; name the joint types and their accompanying role in movement
3. List the two major sections of the skeleton, name the corresponding bones, and compare species differentiation
4. Explain how bone grows and remodels; relate bone and muscle groups to movement

**Assignment:** Begin Anatomical Overlay project: Students will draw and trace the anatomical parts of their selected specie of animal. This will include external parts, skeletal system, and eventually the organ system. Use of cardstock and transparencies to create overlay affect.

**Assignment:** Skeletal system painting lab. Students paint the appendicular and axial skeleton on live animals to include horse, cows, and sheep. Use washable paint and work in groups of 3-4. Must be able to name the bones as the teacher quizzes them afterward.

**Assignment:** Students will construct a long bone out of clay and create 'flags' to identify all the major parts. They will then transfer this knowledge to a real long bone and place tags on the major components using their clay model.

**Assignment:** Students will receive review worksheets and study guides for musculoskeletal system, create study tools with diagrams, answer questions in short essay format related to material (Ex: Explain the types of joints found in mammals and their movement patterns. Use terms from connective tissue study to explain movement. )

---

## Unit 5: Circulatory System

---

1. Students will be able to list blood components and explain the functions of blood
2. Identify the basic structures of the mammalian heart; trace the flow of blood through the heart and body while detailing the parts of the blood vessels and their structural significance
3. Use knowledge of heart function and control to explain the clinical significance of the electrocardiogram; heart sounds, including heart murmurs; and blood pressure

**Assignment:** Anatomical overlay project continued. They will create the circulatory System layer. Students will draw and label all of the major veins and arteries in the selected animal diagram. They will use the color blue for arteries and the color red for veins. They will create a key for labeling all of the major blood vessels in the circulatory system.

**Assignment:** Students will perform a dissection of the heart where they must identify the four major chambers of the heart and major blood vessels circulating blood throughout it.

**Assignment:** Design a t-shirt with the heart and major components of the circulatory system. Shirt must be white to begin and students will use t-shirt paint markers to draw diagram.

**Activity:** Students will go on a field trip to the local veterinary clinic to watch an echocardiogram or EKG demonstrated by the veterinarians. Upon return they will write a one page summary of what an EKG is and how it is performed.

---

---

---

## Unit 6: Respiratory System

---

1. Identify the basic components of the respiratory tract
2. List and discuss the function and control of breathing

**Assignment:** Using a stethoscope, students will listen to lung sounds of various animals (dogs, cats, horses, sheep etc...) and practice taking respiratory rates.

**Assignment:** The class will dissect a full grown pig carcass and extract the respiratory system. Students will identify all major parts and learn how to inflate lungs. Also, they will be given a demonstration on how a tracheotomy procedure will take place.

---

---

---

## Unit 7: Renal System

---

1. Identify and name the basic structures in the renal system
2. Name and explain the functions of the renal system
3. Students will comprehend the kidney structure and urine formation and regulation.
4. Students will learn how to do urine and blood evaluations.

**Assignment:** Students will dissect kidneys and identify all of the parts and functions. They must be able to label the kidneys on a diagram and discuss their functions.

**Assignment:** Students will learn how to perform a urinalysis and how to interpret lab results. This will help them to determine if a patient is in kidney failure. Having to interpret lab work will be a common procedure in the vet clinic.

**Assignment:** Students will go on a walking tour to identify common toxic plants to animals. They common plants will cause major issues and can be toxic to the renal system and therefore students will need to know how to identify the plants and what to do in the situation if an animal has eaten them.

---

---

---

## Unit 8: Digestive System

---

1. Identify the basic structures of the digestive system
2. Explain digestion in mono-gastric and ruminant animals, including digestive tract function, absorption and the role of the liver in digestion and metabolism

**Assignment:** Students will be put into groups to create models of either the monogastric or ruminant digestive system tracts. They will have to present their models to the class and also discuss step by step how food moves through the systems.

**Assignment:** Students will go to the local university dairy unit to see a fistulated cow (has a hole in its side) to study the components of a ruminant animal. This will provide an overview of the ruminant digestive system and give students a direct view into the rumen of an animal. Students can take a sample from the rumen and look at it under the microscope to see what microbes are present in the animal's biggest digestive chamber.

**Assignment:** Students will add either the monogastric or ruminant digestive system to their anatomical overlay project. Which one they select depends upon the animal they choose at the beginning and its corresponding system.

---

## Unit 9: Reproductive System

---

1. Discuss female anatomy and the estrous cycle
2. List the steps in establishing pregnancy and identify the stages of parturition
3. Male and female anatomy hormonal function.

**Assignment:** Guest speakers from an Equine Center will discuss the stages of breeding horses beginning with their cycles. This will include all of the stages to include hormone therapy such as "short cycling" a mare to come into heat for breeding purposes. Stages of delivery and foal care will also be discussed. If possible, a trip to the breeding lab and equine center can also be arranged.

**Assignment:** Students will learn the processes of artificial insemination by taking a field trip to a dairy facility to watch a demonstration. Students will get to see the collection of semen from a bull and then they will view the semen under a microscope to see the sperm. They will learn how to assess the viability of sperm and count the number of sperm in a specimen. They will also learn how scientists use extenders to artificially inseminate several animals with one collection.

**Assignment:** Students will create a video demonstration about the advantages and disadvantages of spaying and neutering your pets. They will demonstrate the procedure using proper terminology regarding their reproductive system. Videos will be played in class.

---

## Unit 10: Central Nervous System

---

1. Describe the neuron, the nerve impulse, and the synapse and explain the components of a reflex arc
2. Identify the major structures of the brain
3. Discuss the anatomy and function of the spinal cord
4. Compare and contrast the function of the sensory somatic system to the autonomic nervous system and differentiate between the two branches of the autonomic system

**Assignment:** Students will observe a veterinarian doing a neurological exam on an animal for nervous system issues. They will record data on what they observe and then discuss what types of treatments or therapies are possible for the diagnosis.

**Assignment:** Students will locate and properly extract the brain from their cat specimens. They will identify all the major parts and review their functions. Teacher will verbally quiz each group on their knowledge of the major lobes of the brain and their ability to discuss the functions.

**Assignment:** Students will add a layer to their continued anatomical overlay project that includes the major parts of the Central Nervous System.

---

---

## Unit 11: Nutrition

---

1. List the six major components of animal diets, and discuss their structure and significance in nutrition
2. Explain the general principles in animal nutrition
3. Discuss the difference between dogs, cats and equine nutrition needs

**Assignment:** Students will take a tour of the local university feed mill and interact with animal nutritionists at the college. They will learn how different feeds are made and about possible career choices in animal nutrition.

**Assignment:** A guest speaker will come in to discuss feed options for raising livestock as market animals. He / she will discuss the different stages of growth and the components of the feed that will help the animal produce quality market products.

---

---

## Unit 12: Common Disease and Disorders

---

1. Describe Koch's postulates
2. List the important distinguishing features and give example of major disease agents and discuss resulting diseases
3. Name the basic components of disease prevention
4. Describe the types of vaccines available and their roles in disease prevention
5. Classify diseases, match them with the domestic species in which they occur, and discuss their clinical significance
6. List and describe several diseases common in domestic animals that are contagious to humans
7. List the major methods used to diagnose disease and cite examples of disease diagnosis with each testing method

**Assignment:** Students will create a parasite "catalog" with color pictures, life cycle and diagnosis/treatment. Explain the specific steps to diagnosis of diseases and disorders by creating a visual chart to present to the class. Create a scenario to share with the class of an animal brought to the vet clinic for diagnosis; have class solve scenario.

**Assignment:** Disease Research Report. Students will be assigned a disease that they have to research and develop a presentation with information regarding this topic. Information should include viral, bacterial, fungal category, symptoms / signs, species affected, treatment, and long term prognosis. Photos should be presented and / or videos of animals infected if possible. Possible methods of presenting include Power Point, Prezi, Google slides, or videos.

**Assignment:** Guest speaker RVT (Registered Vet Technician) to come in and give a demonstration on how to properly remove ticks from a dog / cat. Also, discuss common parasite control methods useful in small and large animal pets.

---

### Unit 13: Principles of Surgery

---

1. Explain the clinical significance of the basic principles of successful surgery
2. Explain the healing of lacerations

**Assignment:** Students will participate in a suturing lab utilizing proper suturing materials, needle holders, and needles. The use of a banana as the "patient" will show the outcome of a simple interrupted suture technique. Students will be given guided instruction then will practice. Students will also demonstrate how to remove sutures using Lister bandage scissors. A final set of sutures will be graded.

**Assignment:** Students will be divided into groups to perform the the following demonstrations for the class: how to prepare a patient for surgery, how to properly put on a gown and gloves using an aseptic technique, how to pack a surgical pack, how to properly scrub in for surgery and how to monitor animals under anesthesia.

**Assignment:** Students will observed a neuter and spay surgery using their cat specimens. Students will fill out guided notes with the proper steps and use of common tools. The demo will be done by a local veterinarian. They will then try to perform either a spay or neuter (depending on the sex of their cat) on their animal with help from guest DVM. (Doctor of Veterinary Medicine)

---

### Unit 14: Pharmacology

---

1. Define terms relating to general pharmacology
2. Explain the five schedules of controlled substances and their common use
3. Become familiar with pharmacologic agents their uses, adverse side effects and dosage form
4. Identify the parts of drug labels and inserts
5. List routes and describe route of drug administration and routes of drug excretion
6. Define biotransformation and list common chemical reactions involved in this process

**Assignment:** Students will create a drug label for 5 different but common prescriptions given to animals. They will use 5 case studies with recommendations and prescriptions given from the veterinarian. They will use a prescription label sheet to write out the information needed using proper medical abbreviations.



**Assignment:** Students will be given a prescription amount and have to demonstrate their knowledge of how to use a pill counter and use knowledge of medical math to physically count the proper number of pills to administer. Students will use candy (skittles or M&Ms) to pretend they are pills with set dosages.

---

## Unit 15: Genetics

---

1. Debate the pro and con of genetic engineering animals for food, conservation and domestic pets
2. Describe the theory of classification of the animal kingdom
3. List common genetic diseases and disorders

**Assignment:** Students will be assigned a genetic disorder common to species. They will have to research information about the disorder as it pertains to the specie that usually presents these issues and they will give a short presentation describing their disorder.

**Assignment/ Activity:** An AKC (American Kennel Club) dog breeder will come in as a guest speaker to discuss common genetic disorders associated with breeding the incorrect combination of dogs in relation to their color and what common outcomes (blind, deaf, all white etc..) that occur. They will also discuss what genetic tests can be done prior to getting breeding dogs "certified" by a veterinarian.

---

## Unit 16: Professional Career Opportunities

---

1. College education and career planning
2. Professional growth
3. Work ethics and employability skills
4. Resume writing
5. Interview techniques
6. Developing a professional portfolio

**Assignment / Activity:** Several guest speakers will come in to represent DVM, RVT, and assistant technicians to discuss their school and career readiness prior to their given profession.

**Assignment:** Students will all participate in mock phone conversations with common veterinary clinic client interactions. Each will take a turn playing the receptionist and the client. After the situation is done, the class will discuss how each person reacted and what you as the technician or receptionists should do in the situation.

**Assignment:** Students will develop a professional portfolio for a designated "job opportunity" in the veterinary science field. It will include a cover letter, resume, job application, a letter of recommendation and 4 pages of demonstrated skills with photos / descriptions.

**Assignment:** Each student will go through a mock job interview situation to get practice with real job opportunities. Guest interviewers will be invited to come in to the class to conduct the interviews. They will all be asked to demonstrate a basic veterinary technical skill in front of the panel. Feedback and score sheets will be filled out for each student.

---

## Course Materials

### Textbooks

---

Title	Author	Publisher	Edition	Website	Primary
Introduction to Veterinary Science	James B. Lawhead, MeeCee Baker	Delmar	2005	<a href="http://www.delmar.cengage.com">www.delmar.cengage.com</a>	Yes

### Other

---

Title	Authors	Date	Course material type	Website
The Merck Veterinary Manual	Cynthia M. Kahan	10th Edition	Manuals	<a href="http://www.merckvetmanual.com/merckmanualvetbook.htm">http://www.merckvetmanual.com/merckmanualvetbook.htm</a>