

Secondary Course Description

COVER PAGE

1. Course Title: Veterinary Science	
2. Transcript Title / Abbreviation: Veterinary Science/ Vet Sci	
3. Transcript Course Code / Number (Office Use Only):	
4. School: Davis Senior High School	
5. District: Davis Joint Unified School District	
9. Subject Area: <input type="checkbox"/> History/Social Science <input type="checkbox"/> English <input type="checkbox"/> Mathematics <input checked="" type="checkbox"/> Science <input type="checkbox"/> Language other than English <input type="checkbox"/> Visual & Performing Arts <input checked="" type="checkbox"/> DJUSD Graduation Elective <input checked="" type="checkbox"/> College Prep Elective (will seek UC/CSU approval)	
6. Length of Course: 1 year	10. Grade Level(s): 11-12
7. School / District Web Site: http://www.djUSD.net	11. Seeking "Honors" Distinction? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
8. School Contact Name: Ellie Michel Title/Position: Agriculture Teacher Phone: 530-757-5400 Ext.: Fax: 530-757-5492 E-mail: emichel@djUSD.net	12. Credit Value: <input type="checkbox"/> 0.5 (half year or semester equivalent) <input checked="" type="checkbox"/> 1.0 (one year equivalent) <input type="checkbox"/> 2.0 (two year equivalent) <input type="checkbox"/> Other: _____
13. Was this course previously approved by UC? <input type="checkbox"/> Yes If so, in what year? Under what course title?	
14. Pre-Requisites: Integrated Agricultural Biology or Animal Science (C or better) Co-Requisites:	
15. Preliminary Approval - Secondary Site Principal Signature (Must be signed before proceeding to Step 16): _____	
16. Date Course Proposal with Preliminary Approval (Step 15) sent to Associate Superintendent, Educational Services: _____	

17. Review & Approval:

Date _____

Signature _____

Site Curriculum and Instruction Leadership Team

Signature/Title _____

Secondary Department Articulation/Collaboration

Signature/Title _____

Secondary Principal Signatures: _____

Date: _____

COURSE GOALS AND/OR MAJOR STUDENT OUTCOMES

Description of how this course supports district goal to increase student awareness and appreciation of diversity:

Academic Excellence: Each student will determine and pursue a Certificate Excellence (FFA proficiency award) in at least major content area of the class while achieving academic success across each unit of instruction.

Post-secondary success: Each student will prepare a career and college success plan aligned with their expressed career goal.

Social Development: Students, through a variety of academic and social experiences, will learn to appreciate differences and understand the commonalities between all people. Each student will plan, prepare, and implement a leadership activity aligned with the FFA program of activities.

(adapted from 2014 District adopted objectives and strategies)

COURSE OBJECTIVES

The student will be able to:

1. Access research material from the library, Internet, and other sources to complete increasingly challenging assignments as self-directed learners. In depth study of the anatomy and physiology of a variety of animal species is designed to build knowledgeable problem solvers in the field of Veterinary Science.
2. Acquire advanced animal principles, know and respect diversity in the animal kingdom, and become an animal advocate for their welfare on all levels encompassing family pets, domestic livestock and our wildlife resources.
3. Prepare for advanced post-secondary level education in animal science, biology, and/or zoology.
4. Demonstrate ability to solve problems and think critically by effectively completing challenging group and individual projects and assignments. The combination of science labs and academic research enables students to use complex, creative thinking skills to reach sound conclusions.
5. Develop and enhance computer skills while working on individual and group projects to practice and refine written, oral and multimedia communication skills.
6. Develop advanced communication, leadership and research skills, which will contribute to personal and post-secondary success.

COURSE OUTLINE

COURSE DESCRIPTION

Animal health, behavior, handling, training, and veterinary procedures are explored. Gain hands-on experience with companion, food, lab, and exotic animal species (when they are available). Students will learn medical terminology common to the animal health care field. Students will also be required to assigned class and afterschool time in the care and health monitoring of animals. Enrollment in this course limited to students participating in the Agrscience pathway sequence of courses. The study of dogs, cats, horses, swine and ruminants body systems (anatomy and physiology) is foundational. Whenever possible, topics will be related to pertinent veterinary career applications and situations. Training and career opportunities pertaining to Registered Veterinary

Technicians will be thoroughly explored. FFA participation and SAE projects are required graded components of this course.

COURSE UNITS:

Overarching Unit Topics

Animal Health
Animal Behavior
Animal Handling and Behavior
Veterinary Procedures
Veterinary Medicine Terminology
Animal Care and Health Procedures
K9 and Feline Anatomy and Physiology
Food Animal Anatomy and Physiology
Equine Anatomy and Physiology
Veterinary Hospital Intern Preparation
Careers in Veterinary Sciences

Specific Unit Topics

Anatomy and Physiology:

1. Explain the molecular makeup of cells
2. Identify the basic structures of the cell and their corresponding functions
3. Discuss mitosis and its clinical significance in diseases such as cancer
4. Detail meiosis in mammalian reproduction
5. Describe the properties, locations, functions, and varieties of epithelial tissues, connective tissues, muscle and nerve tissues
6. Describe the functions of musculoskeletal system
7. Detail the structure of the bone; name the joint types and their accompanying role in movement
8. List the two major sections of the skeleton, name the corresponding bones, and compare species differentiation
9. Explain how bone grows and remodels; relate bone and muscle groups to movement
10. List blood components and explain the functions of blood
11. 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
12. Use knowledge of heart function and control to explain the clinical significance of the electrocardiogram; heart sounds, including heart murmurs; and blood pressure
13. Identify the basic components of the respiratory tract; list and discuss the function and control of breathing
14. Identify and name the basic structures in the renal system; name and explain the functions of the renal system
15. Identify structures within the kidney and detail the formation of urine and its regulation
16. Evaluate urine and blood as a measure of the health of the animal and the urinary system
17. Identify the basic structures of the digestive system; explain digestion in monogastrics, including digestive tract function, absorption and the role of the liver in digestion and metabolism
18. Compare and contrast the specialization of dentition and digestive tracts identify male anatomy and relate associated hormonal function
19. Discuss female anatomy and the estrous cycle; list the steps in establishing pregnancy and identify the stages of parturition
20. Describe the neuron, the nerve impulse, and the synapse and explain the components of a reflex arc
21. Identify the major structures of the brain
22. Discuss the anatomy and function of the spinal cord
23. 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
24. Describe the endocrine system; name the major endocrine glands, list the hormones secreted by each gland, and describe the functions of these hormones
25. Define the term antigen and explain its significance in immunity; distinguish between passive and active immunity

B. 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

C. Infectious Diseases:

1. Describe Koch's postulates
2. List the important distinguishing features, give an 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

D. Principles of Surgery:

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

E. 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

F. 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

G. Professional Opportunities:

1. List requirements to become a registered animal health professional in California
2. Outline the steps to acquiring a veterinary license in California
3. Explain what work ethics are and give examples of their importance in the health profession
4. Create a professional portfolio and demonstrate its use in the interview process for college or work

Course Outline - Career Planning

CAREER PREPARATION STANDARDS

Understand how personal skill development—including positive attitude, honesty, self-confidence, time management, and other positive traits—affect employability.

1. Demonstrate an understanding of the classroom and policies and procedures.
2. Understand the importance of ethical standards and social responsibilities associated with the Animal Science Pathway.
3. Discuss and define personal hygiene and acceptable business attire and grooming.
4. Learn methods for prioritizing tasks and meeting deadlines.
5. Discuss importance of lifelong learning.
6. Discuss the importance of the following personal skills in the Animal Science Pathway:
 - positive attitude
 - self-confidence
 - ethics
 - integrity
 - honesty
 - perseverance
 - self-discipline

Understand principles of effective interpersonal skills, including:

Group dynamics, conflict resolution and negotiation and their importance within the Animal Science pathway.

1. Identify and discuss the key concepts of group dynamics.

2. Discuss and demonstrate the dynamics of conflict resolution and negotiation and their importance within the law enforcement forensics environment.
3. Work cooperatively, share responsibilities, accept supervision, and assume leadership roles.
4. Demonstrate cooperative working relationships and proper etiquette across gender and cultural groups.
5. Discuss laws which apply to sexual harassment and discuss tactics for handling harassment situations.

Understand the importance of good academic skills, critical thinking and problem-solving skills in the workplace.

1. Recognize the importance of good reading, writing, and math skills and implement a plan for self-improvement as needed.
2. Read, write, and give directions.
3. Exhibit critical and creative thinking skills and logical reasoning skills.
4. Recognize problem situations; identify, locate, and organize needed information or data; and propose, evaluate, and select from alternative solutions.

Understand principles of effective communication.

1. Read and implement written instructions, when required.
2. Present a positive image through verbal and non-verbal communication.
3. Demonstrate active listening through oral and written feedback.
4. Communicate effectively orally and in writing.
5. Use effective telephone skills.
6. Respond to written orders when required.
7. Identify, follow, and enforce rules and regulations.

Understand occupational safety issues, including avoidance of physical hazards.

1. Discuss and implement good safety practices, including the following:
2. Avoidance and reporting of physical hazards in the work environment.
3. Safe operation of equipment
4. Proper handling of hazardous materials
5. Blood-borne pathogens
6. Demonstrate and apply universal precautions.
7. Explain and follow all safety procedures.

Understand career paths and strategies for obtaining employment.

1. Explore career opportunities and projected trends, investigate required education, training, and experience.
2. Identify steps for setting goals and writing personal goals and objectives.
3. Examine aptitudes related to career options; relate personal characteristics and interest to educational and occupational opportunities
4. Identify and demonstrate effective interviewing techniques.
5. Make realistic occupational choices
6. Develop job acquisition documents, including the following:
 - a. job application
 - b. resume
 - c. appropriate cover and follow-up correspondence
 - d. portfolio

Understand and adapt to changing technology.

1. Identify and explain the importance of the current available computer diagramming software used today in the forensic field.
2. Understand the importance of lifelong learning in adapting to changing technology.
3. Understand the importance of cell phones, pagers, fax machines, and other communication technology.
4. Correctly use and care for all supplies and equipment.

Course Outline - Content Area Skills

A. *Introduction to Pre-Veterinary Science*

1. Safety and Regulations
2. Laboratory skills
3. Research and data collection procedures
4. Medical terminology

Lab – Using the microscope

Lab – Introduction to lab techniques

B. **Anatomy & Physiology**

1. Cells of the animal body
2. Cell makeup, structure & function
3. Mitosis and cancer
4. Mammalian reproduction

Lab – Identify animal cells; by tissue type

Lab – Identify plant cells; compare the difference between plant and animal cells

Lab – Cell Chemistry – Periodic table of elements

Lab – Build a cell model

Lab – Osmoses & diffusion investigation

C. **Tissue Types and Functions**

1. Epithelial
2. Connective
3. Muscle
4. Nerve

Lab – Contraction of glycerated muscle with ATP

Lab – Examination and diagram cells microscopically

Lab – Dissect muscle, bone, and connective tissue

D. **Musculoskeletal System**

1. Musculoskeletal system functions
2. Bone structure, growth and remodeling
3. Joint types and movements
4. Axial and appendicular skeletons

Lab – Owl pellet dissection

Lab – Compare and contrast skeletons of mammals, avian, fish

Lab – Observation & diagram of muscle tissue and bone cells

E. **Circulatory System**

1. Blood components and functions
2. Mammalian heart structures
3. Blood vessels and blood flow
4. Electrocardiograms, heart sounds, and blood pressure

Lab – Separate chemical compounds of blood samples, PCV, etc.

Lab – Evaluate sample of different species for normal and abnormal values

Lab – Compare human norms with animals

Lab – Dissection of a cow heart

Lab – Examine stained blood slides for form, function, parasites etc.

F. **Respiratory System**

1. Respiratory tract
2. Mechanisms of breathing

Lab – Pulse & breathing rate

Lab – Compare metabolic rates of species

Lab – How fish respire

G. **Renal System**

1. Renal system structure and functions
2. Kidney structure and urine formation and regulation
3. Urine and blood evaluation

Lab – Urinalysis – chemistry and morphology

Lab – Dilution and toxicity

H. **Digestive System**

1. Digestive system structures
2. Monogastric digestion

- Lab – Chemical mechanism of digestion
- Lab – Conversion of cellulose to glucose through enzymatic hydrolysis
- Lab – Enzyme action on starch
- Lab – Chemistry analysis that identifies blood glucose levels

I. Reproductive System

1. Male and female anatomy hormonal function
 2. Pregnancy and parturition
- Lab – Mitosis and meiosis
 - Lab – Chick embryo development
 - Lab – Alcohol and seed germination

J. Central Nervous System

1. Neuron function

K. Nutrition

1. Basic Nutrients
 2. Species comparison
 3. Animal nutrition
 4. Pet food labels
 5. Equine nutrition and fiber digestion
 6. Ruminant nutrition and fiber digestion
- Lab – Chemical analysis of common foods such as: sugar, starch and lipids
 - Lab – Evaluation of nutritional values of a meal
 - Lab – Energy from yeast

L. Common Diseases & Disorders

1. Principles of infectious disease
 2. Koch's postulates
 3. Disease agents
 4. Disease prevention
 5. Vaccines
 6. Classification of diseases
 7. Parasites (endoparasites and extroparasites)
 8. Viral
 9. Bacterial
 10. Fungal
 11. Protozoan
 12. Zoonotic
 13. Diagnosis of disease
- Lab – Fecal analysis for parasites, bacteria
 - Lab – Microscopic examination of fleas, ticks, roundworms, flatworms
 - Lab – Gram stain and morphology of bacterium
 - Lab – Bacterial culture and inhibition
 - Lab – Build a virus model
 - Lab – Observe and grow fungi

M. Principles of Surgery

1. Laceration healing
 2. Surgical considerations
- Lab – Testing bactericides
 - Lab – Simulated germs and hand washing

N. Pharmacology

1. Classification and chemistry of common drugs
 2. Determine amount and correctly measure prescribed medication using medical math, calculation, conversions.
 3. Drug laws, dispensing and record keeping
- Lab – Solute and solutions
 - Lab – Chemical structure and compounds

O. Radiology

1. Darkroom techniques and radiation safety
2. Biologic changes with radiation
3. Lab – Anatomical positioning

P. Genetics and Heredity

1. Theory of Classification -Taxonomy
2. Animal Kingdom –Vertebrate & Invertebrate
3. Genetic diseases and disorders

4. Current Issues and Ethics
- Lab – Pattern of variation
- Lab – Gene regulation
- Lab – Manipulation of DNA
- Lab – Genetic traits
- Lab – Gene regulation

Q. 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

R. Veterinary Science Research Presentation

1. Current animal research and investigation
2. Data presentation
3. Summarization and conclusion

S. Agricultural Inter-Personal & Leadership Development

1. Completion of a Supervised Agricultural Experience Program and Record Book
2. Development of listening, speaking, writing & reading skill activities
3. Critical thinking & group team building activities
4. Speaking & Seminar Presentations

Key Assignments

The following laboratory activities will be incorporated:

1. Using the microscope
2. Introduction to lab techniques
3. Identify animal cells; by tissue type
4. Animal health investigation
5. Oral Anatomy & health care investigation
6. Species research - Dogs
7. Species research - Cats
8. Contraction of glycerinated muscle with ATP
9. Examination and diagram cells microscopically
10. Dissect muscle, bone, and connective tissue
11. Owl pellet dissection
12. Compare and contrast skeletons of mammals, avian, fish
13. Observation & diagram of muscle tissue and bone cells
14. Separate chemical compounds of blood samples, PCV – Total Protein – pH, etc
15. Evaluate sample of different species for normal and abnormal values
16. Compare human norms with animals
17. Dissection of an animal heart
18. Examine stained blood slides for form, function, parasites etc.
19. Pulse & breathing rate
20. Compare metabolic rates of species
21. Circulatory system
22. Urinalysis – chemistry and morphology
23. Dilution and toxicity
24. Chemical mechanism of digestion
25. Chemistry analysis that identifies blood glucose levels
26. Chick embryo development
27. Exploring the senses
28. Animal eye dissection
29. Effects of steroids on growth
30. Fecal analysis for parasites & bacteria
31. Immunology Hematology activity

TEXTS AND SUPPLEMENTAL INSTRUCTIONAL MATERIALS

This course draws upon materials from a variety of print and visual media in order to incorporate current events into course material. Written works read by the students include:

- Introduction to Veterinary Science, Lawhead & Baker, Thomson Learning First Edition
- Biology Text book(currently being used)–Prentice Hall, Miller Levine
- An Illustrated Guide to Veterinary Medical Terminology, 1st Edition, Janet A. Romich
- Clinical Textbook for Veterinary Technicians, 4th Edition, W. B. Saunders Company
- Pharmacology for Veterinary Technicians, Robert Bill, DVM
- Handbook of Veterinary Anesthesia, William Muir, DVM, Mosby Company
- Clinical Anatomy & Physiology for Veterinary Technicians, Mosby-Harcourt Science Co

Previously Adopted? ☐ Yes ☒ No (If no, provide information directly below)

Cost per book est. \$180

Total Cost \$7,200

Budget Source: Animal Science Grant

Introduction to Veterinary Science (Hardcover), 2nd edition by James Lawhead, MeeCee Baker and Cengage Learning Inc.

Previously Adopted? ☐ Yes ☐ No (If no, provide information directly below)

Cost per book

Total Cost

Budget Source:

DIFFERENTIATED INSTRUCTIONAL METHODS AND/OR STRATEGIES

Instructional Methods and Strategies utilized to facilitate student learning are as follows:

Inquire-based learning, both independently and in cooperative groups, is a key component of the class. Laboratory activities and field excursions both employ a hands-on approach to inquiry based investigation and require students to use specific processes rooted in the scientific method (observing, problem identification, proposing explanation, hypothesis testing and analysis). Students practice skills utilized by professionals in the field of veterinary science which prepares them for post-secondary study and/or work in this field.

Students have multiple opportunities for written expression using both writing prompts and student projects. Writing prompts used throughout the course facilitate concept development by students and the associated self and peer assessment leading to rewrites promote further understanding by students. Worksheets throughout units allow students to assess their level of understanding and quantitative problems requiring data analysis and calculations provide practice with the type of analysis conducted by professionals in the field.

Students are exposed to current theories and prevailing lines of thought in the field through their reading of selected articles drawn from both the scientific and popular media and in nonfiction works. They are required to expand what they gain from these readings and support their own viewpoints through Socratic seminars and literature circles.

As this is a college prep class, teacher led lectures presented through PowerPoint and discussions are used to disseminate and explore information throughout the year. Technology is

a key component with visual media interwoven throughout to help illustrate the material. Concept maps are used to help students grasp concepts such as the interrelations between production systems and animal health their roles in biological systems. A student response system (“clickers”) is used both for reviewing material and incorporated into lectures to assess student understanding on a real time basis. Demonstrations are incorporated into to aid in student learning.

Incorporating student interests to facilitate learning is a key component of any good classroom environment. Student choice is integrated into projects and activities throughout the year as its value in terms of student excitement and role in the learning process is key.

ASSESSMENT METHODS AND/OR TOOLS

Assessments for this course are multifaceted and not restricted to formal exams at the completion of a unit. Examples of assessments are as follows:

Laboratory Activities: Inquire-based learning, both independently and in cooperative groups, is a key component of the class. Laboratory activities employ a hands-on approach to inquiry based investigation and through the use of the scientific method students ideas and their application have influence the direction of the learning process. Employment of scientific processes, the ability to interpret data, and summative conclusions are used to evaluate student work.

Field Excursions: Students practice skills utilized by professionals in the field of veterinary science and are assessed based upon their observations in the field, precision of procedures learned and analysis of observations.

Tests and Quizzes: Quizzes designed for students to assess their level of understanding prior to a test and unit exams serve as a traditional measure of student’s mastery of concepts. The majority of questions on tests and quizzes are open ended and require written responses rather than simply multiple choice and true false questions.

Writing Prompts: Written responses by students to prompts facilitate concept development and the associated self and peer assessment leading to rewrites promote further understanding.

Socratic Seminars: Student contributions to group discussions and ability to step out of their “comfort zones” are key for this component. Assessments are made based on original thought, persuasive arguments, contribution to discussions.

Review and Extension Worksheets: Worksheets and problem sets used throughout units allow students to assess their level of understanding and quantitative problems requiring data analysis and calculations provide practice with the type of analysis conducted by professionals in the field.

Participation: Students are evaluated based upon their participation in class discussions and sharing of insights in both small group and whole class situations. Teacher observations of student mastery of material as also assessed through conferencing with students.

ASSESSMENT CRITERIA

FFA Participation and Leadership Development	10%
SAE and Proficiency Certification	10%
Labs and lab reports	25%
Quizzes, Tests, Exams	25%
Assignments	25%
Participation	5%

HONORS COURSES ONLY

Sequence Participation

Agri-science Pathway

Post-Secondary Articulation

Veterinary Technology - Cosumnes River College(pending)