PROPOSAL FOR A NEW INTRODUCTORY VETERINARY SCIENCE COURSE

A Project
Presented
to the Faculty of
California State University, Chico

In Partial Fulfillment
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in
Agricultural Education

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VETERINARY SCIENCE COURSE

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DEDICATION

This is dedicated to my fiancé, Jacob Pignone, and my parents, Bill and Trish Mattos, who have always supported me throughout my agricultural education journey and never doubted that I could accomplish my goals.
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Dr. Aschenbrener, I thank you for your advising, time, and assistance with completing this project.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii</td>
</tr>
<tr>
<td>iii</td>
</tr>
<tr>
<td>iv</td>
</tr>
<tr>
<td>v</td>
</tr>
<tr>
<td>vi</td>
</tr>
</tbody>
</table>

## CHAPTER

### I. Introduction ................................................................. 1
- Background ................................................................... 1
- Purpose of the Project ........................................ 2
- Objectives .......................................................... 4
- Limitations of the Project .................................... 5
- Definition of Terms .................................................. 7

### II. Literature Review .......................................................... 7
- Career Technical Education ........................................ 7
- Agricultural Education ........................................... 9
- Experiential Learning ................................................ 12
- FFA Involvement ..................................................... 13
- Agricultural Literacy ................................................ 14
- Importance of Veterinary Science ............................... 15
- Need for Veterinarians in the industry ......................... 16

### III. Methodology ................................................................. 18
- Objective One .......................................................... 18
- Objective Two .......................................................... 20

### IV. Results and Discussions .................................................. 24

### V. Summary, Conclusions, and Recommendations .......................... 26
- Conclusion ................................................................. 26
VI. References

VII. Appendixes

Appendix A: New Course Application
Appendix B: Course Outline
Appendix C: Syllabus
Appendix D: Sample Curriculum
ABSTRACT

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For students to feel prepared to study veterinary science at a post-secondary institution or progress directly into the industry, students should learn as much as possible in the field of veterinary science. In order for this issue to be resolved, a new introduction course needs to be added to the current Animal Science Pathway at El Capitan High School in Merced, California. This course will be the first introductory veterinary science course to be implemented in the Merced Union High School District. Adding this course will provide students the opportunity to learn more aspects of the veterinary science industry. It will also enhance the agricultural program by increasing FFA involvement through the veterinary science career development event team, supervised agricultural education projects, and leadership activities. The development of this course including a new course application, syllabus, and curriculum will help aide in the transition of students into the world of veterinary medicine.
CHAPTER I

INTRODUCTION

Background

Purpose of the Project

**Agriculture Education & Career Technical Education**

Agricultural education focuses on three key components to provide students with the opportunity to grow as young professionals. These three components are classroom/laboratory instruction, experiential learning through supervised experiences, and FFA (CDE, 2006). Students will have access to all three components once enrolled in an agricultural class.

Agricultural Education is also a part of Career Technical Education (CTE) which offers various industry sectors for students to become involved in. There are currently fifteen industry sectors ranging from Agriculture and Natural Resources to Education, Child Development, and Family services.

There are many pathways for students to enroll within the Agriculture and Natural Resources sector according to the school and district’s CTE list of courses. This sector includes agricultural business, agricultural mechanics, agriscience, animal science, forestry and natural resources, ornamental horticulture, and plant and soil science (CDE, 2006). These pathways include many hands-on opportunities for students to learn a significant skill in a career area of interests. When students complete a pathway, it consists of an introductory, concentration, and capstone course. Upon completion of a career pathway, students are exposed to many skills that prepare them for a career, including “collaboration, articulation, and networking,” supervised
entrepreneurial and workplace learning experiences, and linkages and partnerships with business and industry.” (CDE, 2006, p. 1)

Purpose of the project

The purpose of this project was to develop a new introductory veterinary science course at El Capitan High School in the Merced Union High School District to increase student numbers in the program while appealing to students' career interests. MUHSD consists of six schools that could benefit from this new course being established. El Capitan High School opened in 2013 with only one agricultural education teacher. There are now five agricultural education teachers with five different CTE pathways for students to enroll in on campus. These include Animal Science, Small Engines, Ornamental Horticulture, Welding, and Agriscience. In addition, there is growing interest in the animal science courses due to student passion for working with both small and large animals. Currently, the Animal Science Pathway only offers two courses for students to choose from including, Animal Anatomy and Veterinary Science. These classes are mostly offered at the junior and senior level. Often students are added into the pathway their junior year through the Animal Anatomy class, it is then too late for them to become involved in the agricultural program.

Career pathways are necessary for students to become successful industry workers. “A career pathway is a sequence of articulated academic and career courses beginning in high school and continuing through to an industry-recognized certificate or licensure, an associate degree, or a baccalaureate degree and beyond” (Offenstein, 2009, p.1). There are numerous benefits for students completing career pathways. These may include “reduced high school drop-out rates, increased aspirations among students, increased college-going, improved transitions to workforce and postsecondary education, reduced remediation, and increased efficiency of
students progressing through postsecondary education” (Offenstein, 2009, p.2). With only two courses in the current Animal Science pathway, there is not room for student growth, resume building, and career readiness. Adding this new course would help alleviate the current problem.

Importance of CTE

High school students completing career technical education courses are positively influenced in college or their career; these courses help ease transition of students into a college or career (Offenstein, 2009). Students completing both CTE and academic courses have a lower probability of dropping out of high school (Offenstein, 2009). Many parents showed support for students being involved in CTE Pathways because it provided children with a career exploration learning experience (Fitzgerald, 2018). Historically, students were better prepared for a career or post-secondary institute and students who recently completed a pathway program scored significantly higher on the ACT than non-CTE students (Bragg, 2007).

CTE programs stand out compared to other programs is because they rely “…on partnerships with employers to deliver content and provide learning opportunities outside the classroom. Employers provide information about the knowledge, skills, and competencies needed for career progression in the industry clusters…” (Brand, 2013, p. 5). Along with the guidance of industry professionals for CTE teachers, employers offer work-based learning opportunities for students which allows them to gain industry experience while still in high school (Brand, 2013).

There has been a tremendous demand in the workforce for high school graduates that are CTE pathway completers in the past ten years (Brand, 2013). These job areas include engineering, manufacturing, and more. Implementing additional CTE programs across the secondary education system will help solve the issue of filling these middle level positions
(Brand, 2013). This project is significant because it identifies the importance of CTE pathways at the high school level, which will overall help prepare students for college or a career and provide employers with graduates who possess industry certifications and knowledge of the workforce.

Objectives

To implement the new introductory veterinary science course, the following objectives guided this project:

1. To develop a new course application for the Merced Union High School District
2. To develop a course outline that categorizes units, standards, objectives, key assignments, and laboratory activities through collaboration with other agricultural education teachers.

Scope (Description) of the Project

This project targets El Capitan High School in Merced, California, which is the only high school in the district implementing a new Veterinary Science Pathway Program, starting with a new introduction course. The current Animal Science Pathway consists of two courses, Animal Anatomy and Veterinary Science. The issue faced with this pathway is the lack of an introductory course that transitions into the concentration and capstone course. Due to this issue, many students are funneling into the pathway their junior year. Adding a new introduction course for the pathway would solve this current problem. The introduction course would be titled, Introduction to Veterinary Science 1. This course will help retain students in the program all four years as well as give them the opportunity to experience more job shadowing, obtain industry certifications, and learn more within the veterinary science career development event. The research developed for this project was designed to indicate the importance of successful
career technical education courses on students' learning experiences. Course outlines and curriculum for the introduction will be designed for the new course in hopes to be approved and implemented at El Capitan High School for the next school year.

Significance of the Project

Adding the new introduction veterinary science course will create a new opportunity for incoming freshman and sophomore students who decide they want to pursue a career in veterinary medicine. Furthermore, it will provide students opportunities to complete the animal science pathway by their junior year, thus allowing them the opportunity to complete an internship within the veterinary science field (pet supply stores, veterinary clinics, veterinary hospitals, zoos, etc.) during their senior year. The goal is created courses that are appealing for students, including bold names as well as an exciting curriculum that prepares students to become a veterinarian or related career.

Limitations of the Project

One limitation of this project is a lack of animals on campus. There is not a school farm and unfortunately not a space in the agricultural department for animals to be housed. This can be difficult to implementing hands-on, animal science lessons in the curriculum without easy access to animals in the classroom. This has been a constant struggle at El Capitan High School due to students unable to house livestock SAE projects.

Another limitation to this project is that adding courses to the department can take away from other agricultural courses currently offered at El Capitan High School. This is an issue that has been happening as new agricultural courses are added into MUHSD the less popular courses
start dwindling away. This issue could be solved if a new teacher was added to the agricultural department.

Definition of Terms

*Introductory Course:* Introductory courses provide you with a sound knowledge of essential areas and are a foundation for studies within your program.

*Pathway:* Learning Pathways are the routes learners take to discover new ideas, pursue their interests, and develop their skills.

*CTE:* Career and Technical Education (CTE) promotes and supports locally based middle and high school programs that provide 21st century, academic and technical skills for all students.

*Veterinary Medicine:* The branch of medicine that deals with the causes, diagnosis, and treatment of diseases and injuries of animals, especially domestic animals.
CHAPTER II

LITERATURE REVIEW

Career Technical Education

Career Technical Education (CTE) focuses on career readiness through hands-on methods. High school students have the opportunity to be a part of a CTE pathway in high school that focuses on acquiring skills for them to work in different environments. In order to possess a great CTE program, one must begin with high quality curriculum, effective pedagogy, and authentic assessment that prepares students for a career of their choosing or post-secondary education (Stone, 2017). One of the primary goals of CTE is to prepare each student to succeed in college or a great career. This goal can be achieved by:

1. Help many youths’ complete high school, a necessary but not sufficient condition to Achieving a productive adulthood;
2. Prepare participants to continue formal learning beyond high school; and
3. Equip participants with credentials recognized by business and industry as evidence of preparation for initial employment with the potential for continued occupational Development (Stone, 2017, p. 156).

CTE offers opportunities for t students to obtain college credit while in high school, earn industry recognized certifications, and obtain real-life experience in the industry. General education typically focuses more on Common Core Standards. To provide a high quality CTE program it should employ, “three pedagogical strategies: classroom instruction, work-based
learning, and career and technical student organizations” (Stone, 2014, p. 1). Support from the school district and industry professionals enhances a successful program.

The power of CTE in a high school student’s education is remarkable. It has been shown through a study through the National Research Center for Career and Technical Education (NRCCTE) that “the greater the percentage of CTE in a student’s total course load, the lower the probability that the student would drop out” (Stone, 2004, p.4). Additionally, lower ability students benefited from CTE programs. CTE focuses on bettering students for their future career in a direct way. Students enroll in courses that interest them and motivate them to stay track and achieve their goals. “CTE provides the link between the needs of the labor market and the needs of young people to be prepared to move into the workforce or continue their education beyond high school” (Stone, 2004, p.5).

The role of CTE has updated over the years, but the main goal of students becoming college and career ready remains. For CTE programs to receive proper funding through grants such as Perkins, they must:

1. Incorporate secondary education and postsecondary education elements.
2. Include coherent and rigorous content aligned with challenging academic standards and relevant career and technical content in a coordinated, non-duplicative progression of courses that align secondary education with postsecondary education.
3. Offer opportunities, where appropriate, for secondary education students to gain postsecondary education credits through dual or concurrent enrollment programs or other means.
4. Lead to an industry-recognized credential or certificate at the postsecondary level or an associate’s or bachelor’s degree (Stone, 2014, p. 8).
The integration of CTE at the high school level provides students with “marketable skills as well as information about exposure to potential careers” (Loprest, 2019, p. 231). In order for a CTE program to be successful, there must be depth of student involvement that includes both work opportunities or internships (Loprest, 2019). It is shown that 85% of high school students enroll in at least one CTE class throughout their high school education (Loprest, 2019). In order to increase work readiness there needs to be strong connection with “in-demand sectors and careers and often paid work experiences” (Loprest, 2019, p. 231). Overall, connection of work and school remains a challenge, which is why it is crucial for job training to be included in CTE courses.

Agricultural Education

Agricultural Education has been known to show a vast number of benefits for students, including preparing students for careers in agriculture, gaining leadership skills and project-based learning experience (Dailey, 2001). Agricultural education incorporates many sciences and mathematical techniques in the classroom as well. For example, students that do not generally excel at science tend to improve their skill set by being enrolled in an agricultural education program because educators provide subject matter contest that interest them (Dailey, 2001). More specifically, “agricultural education provides, at a minimum, hands-on, experiential, science and mathematics education that meet the demands for cross-curricular integration and needs of students in the nontraditional settings” (Dailey, 2001, p. 13).

Classroom and Laboratory instructions consists of contextual, inquiry-based instruction and learning (CDE, 2006). Student learning begins with organized instruction in and outside the classroom. This can include students learning in the classroom and laboratory activities.
conducted in a greenhouse, agricultural mechanics shop, school farm, etc. Agricultural education promotes “the development and use of curriculum, instructional materials, and instructional strategies that prepare students in a; aspects of the agricultural industry…” (CDE, 2006, p.1) This can be completed through collaboration, articulation, networking, and partnerships.

SAE consists of experiential, service, or work-based learning. This key component of the three-ring model is conducted outside of the classroom. Students can benefit from SAE projects by, “authentic assessment of knowledge, skills and abilities through on-demand demonstrations and portfolios” (CDE, 2006, p.1). This project is required by all agricultural students each year while they are in FFA. There are various types of SAE projects to fit the interest of many diverse students. An SAE could be as small as taking care of a garden at home or as big as operating an agricultural business. SAE projects provide students the opportunity to earn technical skills necessary for career success.

The last ring of the agricultural education model is FFA. FFA consists of premier leadership, personal growth, and career success through engagement in FFA (CDE, 2006). This component is designed to enrich students in both the classroom/laboratory and the SAE component of the three-ring model. Through involvement in FFA, students participate in leadership conferences, speaking competitions, career development events, and serve the community. These experiences aid in students developing student leadership and interpersonal skills through the program (CDE, 2006).

As stated on the California Department of Education page, “A successful agriculture education program must be based on three components: classroom instruction, Future Farmers of America (FFA) leadership activities, and Supervised Occupational Experience Project” (CDE, 2006, p. 1). The implementation of the three-ring model of agricultural education is very
important to the success of students in the classroom. In order to reach these three models, it is integral for curriculum to reflect workplace needs, effective instructional methodologies, and technical program strategies (CDE, 2006).

Historically the effect an agricultural teacher can have on a student’s education is astronomical. Roberts and Dyer (2004) found the characteristics of an effective agricultural teacher. Some participant responses “included, “Encourages, counsels, and cares for students,” Has a sound knowledge of FFA, actively advises the FFA chapter, and effectively prepares students for Career Development Events and effectively determines student needs, plans for instruction, evaluates student.” (Roberts, 2004, p. 82). Training for effective agricultural instructors should include, For educators to be trained in becoming an effective agricultural teacher, “it is necessary to provide experienced-based learning opportunities to nurture the development of some of these characteristics” (Roberts, 2004, p. 93). This can include classroom management, displaying patience humor, and other personal traits (Roberts, 2004).

To become a highly qualified agricultural educator, one must possess personal qualities in various categories that are important for student success. These include instruction, FFA, SAE, community relations, marketing, professionalism/personal Growth, program planning/management, and personal qualities (Roberts, 2004). To have a successful agriculture program with dedicated students, there must be qualified and dedicated individuals to teach the next generation of agriculturalists. Creating effective agriculture teachers is also imperative for the long-term sustainability of agricultural education programs (Roberts, 2004).
Experiential Learning

The four-stage model of experiential learning “depicts two opposite dimensions of grasping experience concrete experience (CE) and abstract conceptualization (AC), and two polar opposite dimensions of transforming experience –reflective observation (RO) and active experimentation (AE)” (McCarthy, 2010, p. 132). The learner will go through each stage of the model where they will engage in experiencing, reflecting, thinking, and acting. Experiential learning roots came from the “founding fathers” which are John Dewey, Kurt Lewin and Jean Piaget. It has been intended to center around merging experience, perception, cognition, and behavior in the classroom (McCarthy, 2010). The veterinary classes at El Capitan High School reaches each stage of the experiential learning model by providing students with the opportunity to learn through hands-on methods, promoting critical thinking questions in the classroom, and using self-guided assessments that demonstrate mastery of a skill.

“Learning experientially in authentic contexts has been a foundational model of teaching and learning in agricultural education” (Knobloch, 2003, p.22). Experiential learning focuses on student centered instruction, performance-based assessments, solving problems, and applying skills in real-life contexts (Knobloch, 2003). SAE plays a large role in experiential learning by, “improved student achievement, motivation, work habits, and responsibility” (Knobloch, 2003, p. 25). The results of implementing experimental learning in the classroom are remarkable. This will promote intellectual achievements inside and outside the classroom. More importantly, it will play a role in their adulthood in society (Knobloch, 2003)

In a study regarding teacher’s knowledge of experiential learning, participants suggested teacher’s knowledge of experiential learning requires the teacher to be an essential element in the experiential learning model (Arnold, 2006). Implementing experiential learning begins with
teacher experience. In order to be successful, teachers should implement, “internships, field placement, work/study assignments, and structured exercises, to increase student learning” (Arnold, 2006, p. 37). An additional way for teachers to gain experience of implementing experiential learning is to participate in professional development workshops that focus on the subject. In these workshops, teachers, would learn engagement strategies and learning methods that they can incorporate back into the classroom. This will promote meaningful interaction and individual responsibility for learning (Arnold, 2006).

**FFA Involvement**

FFA involvement can play an important role in student success in a veterinary/animal science course. In a study conducted by Western Kentucky University and Iowa State University it stated, “Involvement of the students in 4-H and FFA helps determine the students’ perception of their knowledge of topics to be discussed in the Introduction to Animal Science course (Zoglmann, 2004). There are many opportunities through the FFA organization to best prepare students for an agricultural career outside of learning in the classroom. One example is veterinary science career development event.

The purpose of the veterinary science CDE is:

*The Veterinary Science event seeks to effectively prepare the students for the expectations of the animal health care and services (Veterinary Hospitals/Clinics, Grooming Facilities, Pet Stores, Kennels/Boarding Facilities, and Feed Stores) workplace. Workers seeking careers in the animal health care field must develop a high degree of knowledge, skill and ability to solve difficult problems. This event blends the testing of skills and knowledge required for careers in the animal science career pathway.*
The Veterinary Science CDE consists of three components: identification tests, practicums, and a general knowledge test. Identification tests include: equipment and materials; parasites; and breed identification. Examples from the curricular code include: autoclave (equipment); flea larva (parasites); and angus (breeds). Practicums are both clinical and handling based, for the year of 2021-2022. Examples include filling a syringe for injection, restraint of rabbit; and surgical site preparation

Students who participate in this event are eligible to attend various field days across California at state universities, community colleges, and high schools. To compete at the state level, the team must be in the top 24 qualifying teams. Students acquiring these skills will be more prepared for internships, college, and ultimately a career in veterinary medicine.

Agricultural Literacy

“Agriculture literacy is understanding and possessing knowledge of our food and fiber system” (Balschweid, 1997, p.3). With less than two percent of the population involved in farm production, the public has become increasingly unaware of the source and methods of food production (Balschweid, 1997). For an individual to become an agricultural literate they should understand the food industry which includes history, economics, and social and environmental significance (Balschweid, 1997). Historically, once this individual is aware of such knowledge, they should be able to effectively communicate basic information about agriculture.

Historically, the decline in agricultural literacy is due to educational emphasis in the classroom (Balschweid, 1997). Teachers with little agricultural background can still educate students on the importance of agricultural literacy if they receive the proper training though instructional assistance through pre-service and in service programs (Balschweid, 1997). In
addition, to effectively promote agricultural literacy in the classroom, “teachers should be encouraged to form partnerships with local agriculture business and industry professionals to promote agricultural literacy and career awareness” (Christensen, 2009, p. 11). Teaching agricultural literacy will aide in preparing students for an agricultural related career (Christensen, 2009).

Importance of Veterinary Science classes

It is important for agriculture educators to implement career related curriculum to enable students to feel better prepared for the workforce. One key industry factor that should be considered in the Animal Science curriculum is general farm safety. Safety is a substantial unit used in agriculture mechanics classes, but not as frequently used in Veterinary Science classes despite the potential benefits (Slusher, 2011). As the agricultural industry constantly evolves, it is important to reevaluate curriculum and discuss with industry professionals regarding the skills students should be acquire to best prepare them for a career in animal science. A way to solve this issue is industry exposure.

For students to gain exposure into the world of veterinarian medicine, there needs to be interest. “Essentially, the more experience and exposure that an applicant has to an agricultural enterprise or agriculturally associated organizations (4-H and National FFA Organization), the more likely they are to pursue a career in food supply veterinary medicine (Sterner, 2006, p.30). It has been shown that enthusiastic faculty and interesting and stimulating course offerings can also play a role in student interest in veterinary science (Sterner, 2006).

With Currently, 38% of United States households owning at least one dog and 25% owning at least one cat, thus students may be interested in some level of veterinary science due
to their love for pets at home (Kogan, 2021). There are many advantages for owning a pet at the physical, emotional, and social level (Kogan, 2021). With the many advantages and growing number of pet ownership, it is crucial to educate students on how to properly care for them.

Veterinary science students are high achieving and motivated if they are seriously interested in a career in veterinary medicine (Ebinger, 2000). When taking a veterinary science course, students will be exposed to using specialized equipment utilized in the industry. This will enhance experience for students when applying for a post-secondary institution or career. For example, when discussing the excretory system teachers will demonstrate how to perform an ultrasound of a dog’s bladder and kidneys (Ebinger, 2000). In order for students to gain exposure of the life of veterinarian, programs need to step away from traditional teaching and focus on experience-based learning.

Need for Veterinarians in the Industry

In the last ten years, those that are interested in pursuing a career in Large Animal Veterinary Science have a greater likelihood of gaining employment due to the shortage of rural veterinarians (Villarroel, 2010, p.1). Villarroel stated, “the lack of exposure during childhood and undergraduate school seems to result in having to train veterinary students in basic farm animal husbandry during the veterinary curriculum, thereby reducing time available to teach veterinary medicine of farm animals” (Villarroel, 2010, p.3). Agricultural Education can play a pivotal role in changing the data of veterinary science students interested in large animal practice.

To obtain more large animal veterinarians in the U.S., there must be improved recruitment and retention throughout veterinary science classes. This begins with agricultural
educators playing a role in the process. To retain students into the field of large animal veterinary medicine, “it has generally been assumed that interest in veterinary medicine develops at an early age. Consequently, efforts to increase interest in veterinary medicine among youth often target individuals in grade school and high school, rather than college” (Villarroel, 2010, p. 2). There are many interest techniques that can easily be incorporated into high school veterinary science courses to retain student interest in the field.
CHAPTER III

METHODOLOGY

New Intro Veterinary Science Course

The purpose of this project was to develop a new introductory veterinary science course at El Capitan High School in the Merced Union High School District that will increase student numbers in the program while appealing to students' career interests. This project sought to develop a new course proposal entitled, introductory to veterinary science 1 at El Capitan High School in Merced, California. The objectives to complete this project were to develop a new course application for the Merced Union High School District, to develop a course outline that categorizes units, standards, objectives, key assignments, and laboratory activities, and to collaborate with other veterinary science teachers to design course curriculum. The current Animal Science Pathway needed an introduction course to help better prepare students for a career in veterinary science. Development of the introductory course is the first step in designing a new pathway to replace the current Animal Science Pathway at El Capitan High School. This will be a veterinary science Pathway that will include one new course and two redesigned courses to better fit the needs for our student’s interests.

Objective One:

The first objective was to develop a new course application for MUHSD. This was a district document that had to outline financial implications, course goals, course learning intentions, and instructional/assessment methods. Various old course applications for veterinary science were used as a template to complete this objective. This needed to be discussed as an
Developing student outcomes and course goals were the first items required in the application. To complete this process, a decision was made to determine which skills students should receive from the course. An example of this included teamwork and collaboration skills, data collection and analysis, and project completion – initiation, investigation, collaboration, and presentation. These areas were chosen based upon introductory level science laboratory procedures with agricultural education implementation. Course goals included gaining knowledge of the animal science discipline and the ability to understand the future of the field and its diversity were a key component in outlining the course. It was also important for students to apply biological principles to animal science related topics such as: physiology, nutrition, and genetics.

The next items included were course learning intentions/objectives, intentions it was extremely important to include research, demonstration of hands on skills, and communication various scientific concepts. A student sample may include the ability to demonstrate mastery of skills inherent to scientific inquiry and methodology in relationship to veterinary science. It is crucial that students feel prepared for a post-secondary institution or related career. This begins with effective course learning objectives. Ultimately, students will explore all aspects of veterinary science as a prospective profession.

Given this course is an agricultural course, assessments will be conducted in both a traditional and nontraditional format. Assessment methods for this class were designed for students to participate in performing mastery in many hands-on formats. These will be completed through experiments, demonstrations, discussions, debates, and stimulation. An example of a
common assessment used amongst veterinary science teachers includes practicums. Practicums require students to show mastery of procedures such as applying a dog muzzle or restraining a cat for a cephalic iv catheter placement. Including performance-based assessments through the classroom and veterinary science CDE contest leads to student’s interest.

**Objective Two:**

The second objective was to develop a course outline that categorizes units, standards, objectives, key assignments, and laboratory activities. Each unit begins with a unit description summarizing materials to be addressed to address CTE standards within the unit. Most key assignments in each unit focused on projects where students research a topic within production agriculture while enhancing their communication and collaboration skills. The lab activities were written as scientific as possible to receive UC/CSU “D” lab credit. These laboratory activities were written to provide students hands on experience in several areas, including genetics, food science, identification, handling, and anatomy.

To complete the course outline and prepare to launch the course, a syllabus, and instructional materials were designed (See Appendix D). A syllabus was modeled after an Introduction to Animal Science course at Madera South High School. The units were designed to help aid in transition to the current concentration and capstone courses. Standards were included from the CTE Agricultural and Natural Resource sector including the Animal Science Pathway and CTE anchor standards. CTE Agricultural and Natural Resource standards focus on content knowledge whereas anchor standards focus on teamwork, communication, certifications, using digital media information (CDE, 2006). Key assignments and objectives were written after reviewing standards and materials collected from various veterinary science teachers in the
central valley. In order to achieve course approval, a collaboration with El Capitan High School’s instructional coach and MUHSD staff was developed to identify required modifications.

Unit One: Classification, Welfare, Selection, and Domestication

The first unit in the course outline was Classification, Welfare, Selection, and Domestication. This unit focused on history of production agriculture, animal husbandry, humane treatment of animals, and how to judge livestock for meat/dairy production. Upon completion of this unit, students will have a greater understanding of agricultural animals including history, classification, welfare, and selection.

Unit Two: Beef Cattle Production

The next unit outlined beef cattle production. The course focused on terminology, breeds, genetics, anatomy, diseases, and reproduction. Students participate in a “Build-a-Calf” by carrying out an investigation on beef cattle genetics. When students finish this unit, they will be exposed to all aspects of the beef cattle industry.

Unit Three: Dairy Cattle Production

Dairy cattle production focused on breeds, milk production, nutrition, diseases, reproduction, and dairy products. There is an opportunity to visit a local dairy in the Merced County area in which students experience the milking process. Throughout this unit, students will be able to comprehend milk production and explore production trends.

Unit Four: Swine Production

Swine production emphasizes on breeds, processing, diseases, and evaluation and selection. Students design their own swine operation and distinguish the differences between farrowing, finishing, and nursery operations.
Unit Five: Careers in Animal Agriculture

The careers in animal agriculture unit was created to allow students to explore diverse careers. These range from the livestock industry, companion animal care, and wildlife. As a final for the first semester, students will choose a career to research information on and formulate a presentation to display to the class.

Unit 6: Goat Production

Goat production placed emphasis on purpose, feeding, management, marketing, and diseases. Students will create their own feed label that includes all required information including brand name, main ten ingredients, manufacturer, and guaranteed analysis.

Unit 7: Sheep Production

Sheep production focused on breeding, feeding, anatomy, production, weaning management, and nutrition. Students will gain exposure to the wool industry through demonstrations by a local wool spinner. The local expert will provide students instruction regarding different wool grades allow students to feel the differences between fine, coarse, and medium wool. In this unit, students will also participate in a sheep brain dissection while recording and analyzing data.

Unit 8: Horse Production

Horse production consisted of breeds, evaluation, anatomy, and handling. Students were trained to properly wrap legs, properly saddle a horse, trim hooves, and bridle a horse.

Unit 9: Poultry Production

Poultry production unit included production systems, terms, breeds, and classification. Students learned egg grading and will record grams, ounces, and egg grading size for various
eggs in the classroom. Upon completion of the unit, students will be able to classify different eggs and observe color of yolk, texture, and shell.

Unit 10: SAE

The last unit in this course identifies SAE projects. Students learned all types of SAE projects and chose one to complete based upon their agricultural interest. Students will develop an SAE portfolio project that included a description of the project, financial information, and journal entries. SAE projects are a hands-on way for students to gain exposure into the agricultural industry.

Collaboration was required to develop the course application, course outline, and curriculum for the new introduction to veterinary science 1 class. Nearly all collaboration was conducted via zoom, phone calls, and though email. Most communication was conducted with Madera South High School as well as current MUHSD veterinary science teachers. Without collaboration, this course application would be extremely difficulty to complete as a new teacher. The California Agricultural Teachers’ Association is an active community that played a tremendous role in the process of drafting all corresponding course materials.
The purpose of this project was to develop a new introductory veterinary science course at El Capitan High School in the Merced Union High School District that will increase student numbers in the program while appealing to students' career interests.

**New Course Application**

To complete the objectives, a new course application was designed. This involved communicating with curriculum council staff to gain access to the application and instructions on how to complete each section. The course description of the course was modeled after exemplary animal science programs in California. The description of the course encompassed breeding, reproduction, marketing, and consumption. Along with the course description, course content goals, learning intentions, and instructional and assessment methods were developed. These necessary components were modeled after Madera South High School’s Introduction to Animal Science 1 course.

**Unit Outline**

To complete the new course application, unit names were designed as well as curriculum. Ten units were outlined in the course application. Each unit included a description, standards, key assignment, and laboratory activity. Each unit was carefully designed to meet CTE anchor standards and the CTE Agricultural and Natural Resource standards.

Unit descriptions were modeled after course outlines from various schools with an introductory animal science class. Standards, assignments, and laboratory activities were aligned with similar courses taught on other campuses. The goal was to develop exciting, hands-on,
application-based, classroom activities that maintain student engagement and retained student interest throughout all pathway courses. Key assignments included for each unit were derived off student learning outcomes addressed in the new course application. Each unit was designed with collaboration amongst agricultural teachers in the MUHSD as this class will be implemented throughout the district.

For laboratory activities outlined, the goal was to introduce a skillset to students that would benefit them beyond the classroom. This was accomplished by working with El Capitan High School’s Instructional Coach. Feedback was provided to best redesign the language utilized in the laboratory activity description to address the UC/CSU “D” lab science credit. This required reviewing Next Generation Science Standards (NGSS) to utilize the correct terminology in the application. To achieve student interest in the course, key assignments were written to include stimulating activities for students to gain hands on skills.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Conclusions

In summary, a need was established to add a new veterinary science introductory course for the current Animal Science Pathway at El Capitan High School. Currently, an introductory course specifically designed for the pathway does not exist, which resulted in many students lacking the opportunity to participate. There is a need for MUHSD students to gain exposure to the industry of veterinary medicine at an earlier grade than the concentration and capstone course allowed. To meet this need, the new course application for a veterinary science course and supporting materials were developed. This allowed for lower classmen students to participate in the pathway and in FFA and SAE. This will provide students additional preparation for a post-secondary institution or related career which has been shown effective through sources included. This new course will improve MUHSD agricultural program’s enrollment given the increasing interest in veterinary science.

Upon completion of this course, students will gain a deeper breadth of animal terminology, breed identification, and introductory level practicums. This program also provides concentration and capstone courses which focus on earning certifications, dual enrollment opportunities, job shadowing, and building portfolios. In this course, students will have the opportunity to learn additional knowledge of the veterinary science field including small animals, large animals, anatomy and physiology and clinical skills. This course will also lead to students joining El Capitan High School’s agricultural program at the freshman level, which leads to an increase of
students' involvement in SAE projects, career development events, and leadership opportunities. It has been shown in the research that has been outlined, that involvement in opportunities in the FFA has aided in leadership development skills.

The introduction of veterinary science 1 course will consist of ten units. These units include: classification; welfare; selection; and domestication of animals; beef production; dairy production; swine production; careers in animal agriculture; goat production; sheep production; horse production; poultry production; and SAE projects. This course will serve to introduce students to the world of agricultural veterinary medicine, focusing on large animals. Each unit outlined terminology, breeds, reproduction, genetics, and nutrition. Recommendations are to present this new course proposal and supported materials to the MUHSD curriculum council for approval. Upon approval, this course will be launched for students in the 2022-2023 school year.

Further recommendations include to redesign the current concentration and capstone courses at El Capitan High School. The current courses were developed several years ago and lack a quality transition between courses. The goal for this pathway is for the introduction course to focus on production agriculture. The concentration course will focus on small animal care and client relations. Lastly, the capstone course will focus on earning certifications, job shadowing, and demonstration of skills with both small and large animals. It is also suggested that students who wish to join the veterinary science CDE team will be better prepared with an extra course to prepare them for contests.

The Animal Science industry offers several career choices for students. Diverse career choices for students range from livestock production to zoology depending on interest. Adding another course will provide students more time to explore what aspect of the industry they are interested in pursuing.
REFERENCES


APPENDIX A – NEW COURSE APPLICATION

<table>
<thead>
<tr>
<th>Part A: Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Course Title: Introductory to Veterinary Science</td>
</tr>
<tr>
<td>2. Grade Level(s): 9th/10th</td>
</tr>
<tr>
<td>3. School(s): El Capitan High School</td>
</tr>
<tr>
<td>9. CTE</td>
</tr>
<tr>
<td>(X) Yes □ No</td>
</tr>
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<td></td>
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<tr>
<td>4. School Information</td>
</tr>
<tr>
<td>Teacher Name: Michaela Vindel</td>
</tr>
<tr>
<td>Title/Position: Agriculture Teacher</td>
</tr>
<tr>
<td>Credential: Agriculture Specialist and Single Subject</td>
</tr>
<tr>
<td>E-mail: <a href="mailto:mvindel@muhsd.org">mvindel@muhsd.org</a></td>
</tr>
<tr>
<td>Principal’s Signature:</td>
</tr>
<tr>
<td>Industry Sector: Agriculture &amp; Natural Resources</td>
</tr>
<tr>
<td>Pathway: Animal Science</td>
</tr>
<tr>
<td>Do you have a CTE credential?</td>
</tr>
<tr>
<td>□ No (X) Yes: Agriculture Specialist and Single Subject</td>
</tr>
<tr>
<td>5. Subject Area</td>
</tr>
<tr>
<td>□ History/Social Science</td>
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<tr>
<td>□ English</td>
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<tr>
<td>□ Mathematics</td>
</tr>
<tr>
<td>(X) Laboratory Science</td>
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<tr>
<td>□ Language other than English</td>
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<tr>
<td>□ Visual &amp; Performing Arts</td>
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<tr>
<td>□ Elective</td>
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<tr>
<td>6. Seeking A-G Approval?</td>
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<tr>
<td>(X) Yes □ No</td>
</tr>
<tr>
<td>7. Pre-requisites: N/A</td>
</tr>
<tr>
<td>12. Co-requisites: N/A</td>
</tr>
<tr>
<td>13. Brief course description for the Course Catalog (75 words maximum): This course is designed to introduce students to the field of Veterinary Science. Students will explore the many aspects of the Animal Science industry from breeding and reproduction to marketing and consumption. Emphasis will be placed on current production aspects of the different animal industries.</td>
</tr>
</tbody>
</table>

Updated 3/2/2020; S. Cooll
14. Describe how the new course fits into the sequence of courses offered in the department:

This course will serve as a second introductory course to the current Animal Science Pathway here at El Capitan High School. This course would provide a more adapted introductory course for students who know they are explicitly interested in the Veterinary Sciences. This option will provide better retention within the Animal Science Pathway and the Agriculture Department as a whole. This course will also provide a smoother transition from the introductory class to the concentration class.

15. If intended to be an honors course, how is it different from the standard course?

N/A

16. Check all that apply:

☐ This course was previously taught in MUHSD.
  Same course title?  ☐ Yes  ☐ No
  If no, previous course title & Aeries course number: ______

☐ Identical course approved at another school in same district. Which school: Madera Unified School District
  Same course title?  ☐ Yes  ☐ No
  If no, course title at other school: Introduction to Animal Agriculture

☐ Alternative course title for course with identical content at this school/district. *Used for course name changes without changes to content.*
  Title of previously-approved identical course: ______

☐ Advanced Placement (AP) course

☐ UC Curriculum integration (UCCI) course:

17. Texts & Supplemental Instructional Materials:
   • Modern Livestock and Poultry Production by Frank Flanders, James R. Gillespie - 8th Edition

18. Financial Implications (Be as specific as possible; include textbooks, supplemental materials, supplies, and equipment necessary to initiate the course as proposed):

$250-300 for laboratory supplies through Agriculture Incentive Grant
Part B: Course Content

19. Course Goals and/or Major Student Outcomes:
   Upon completion of the course, students will possess the following skills:
   a. Research Types and Methods
   b. Accurate Lab Techniques
   c. Data Collection and Analysis
   d. Teamwork and Collaboration
   e. Presentation Skills
   f. Project Completion - Initiation, Investigation, Collaboration, and Presentation

Goals:
1. Gain broad knowledge of the Animal Science discipline to understand the future of the field and its diversity.
2. Apply biological and chemical principles and quantitative reasoning to concepts presented in core subject areas in Animal Science such as physiology, nutrition, genetics, and reproduction.
3. Develop an in-depth understanding of option-specific subject areas such as animal production and lab animal science.
4. Develop critical thinking skills to identify scientific questions and devise solutions including, designing experiments, analyzing and interpreting research data, and summarizing findings.
5. Develop an understanding of the principles of animal welfare and ethical treatment of animals.

20. Course Learning Intentions/Objectives:
1. Incorporate and understand the relationship of scientific methods and biological principles with animal health practices.
2. Demonstrate skills inherent to biological sciences
3. Prepare students for college level entry in various science disciplines within agriculture.
4. Explore the field of Veterinary Science as a prospective profession.
5. Demonstrate mastery of skills inherent to scientific inquiry and methodology in relationship to veterinary science.
6. Design research projects dealing with animal health.
7. Use the necessary and appropriate language arts skills to communicate scientific concepts, practices, and experimental conclusions.
8. Use critical thinking and problem solving skills to draw logical conclusions from research activities, lab experiments, and field experience.
9. Identify and interpret the effects of environmental, nutritional, and pathogenic stressors in animal health.

Updated 3/2/2020: S. Cool
21. Instructional and Assessment Methods and/or Strategies:

Methods of instruction will include, but are not limited to:

1. Direct Instruction (lecture, reading, labs, and investigations, writing - reports, journals, analyses, essay - speaking, presentations, guest speakers).
2. Laboratory investigations and projects using educational courseware and computer technology.
3. Use a variety of instructional materials and resources including electronic media, professional journals and reference materials, textbooks and other print information.
4. Self-directed, cooperative, and collaborative learning to increase responsibility of students for their own learning.
5. Student presentations, exhibits, and competitions - both team and individual.
6. Embedded assessment as a learning tool.
7. SDAIE (Specially Designed Academic Instruction in English).
8. Differentiated instruction of exceptional students.

Evaluation Procedures:
Assessment opportunities, which allow continuous evaluation of students' progress, will be embedded throughout the course and should be a learning experience. All students will be expected to achieve mastery of all topics; often, demonstrations of mastery will occur in public forums. The following strategies, which include both formal and informal assessment techniques will include, but are not limited to:

1. Performance-based assessment such as experiments, demonstrations, discussions, debates, simulations, and projects.
2. Student presentations, exhibits, and competitions - both team and individual.
3. On-going and cumulative portfolio record of project and component investigative accomplishments.
4. Written tests with a variety of short answers and essay questions.
5. Written assignments such as justification, investigations, and research evaluative, or technical papers.
6. Individual and group assessments (including assessments of working relationships).
APPENDIX B
## APPENDIX B – COURSE OUTLINE

<table>
<thead>
<tr>
<th>Unit Title</th>
<th>Unit Description</th>
<th>Key Assignment</th>
<th>Lab Activity</th>
</tr>
</thead>
</table>
| Classification, Welfare, Selection, Domestication | Throughout this unit, students will be able to list four main sciences involved in animal sciences. They will be able to describe how farms have changed in terms of size, population, and types of animals produced and define terms such as domestication, ruminant, animal husbandry, and animal science.  

**D9.1** Know the early warning signs of animal distress and how to rectify the problem.  
**D9.2** Understand public concerns for animal welfare in the context of housing, behavior, nutrition, transportation, disposal, and harvest of animals.  
**D9.3** Understand federal and state animal welfare laws and regulations, such as those dealing with abandoned and neglected animals, animal fighting, euthanasia, and medical research.  
**D9.4** Understand the regulations for humane transport and harvest of animals, such as those delineated by the U.S. Department of Agriculture, Food Safety and Inspection Service, and the Humane Methods of Slaughter Act.  

**2.4** Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.  
**2.6** Advocate and practice safe, legal, and responsible | 1. Students will be assigned "sheep (beef, swine, poultry) around the world". This assignment requires students to research a given species as specified by the teacher and report on the population, breeds, use, etc. in specified countries. Students will report their findings through Prezi, Google Slides, etc. and will compare the available livestock numbers produced, consumed, etc. in those countries.  
2. Create a timeline of the significant people and events that led to the domestication and population of species in the USA, as well as their country of origin.  

Students will participate in an Animal Classification lab. They will be divided into small groups and will be given the names of four animals on an index card. Have students classify organisms based on shared characteristics. Some may be as simple as: all barn animals, all have four legs, etc. I also will work backwards and give each student a card with an animal’s name on it and I will have them create their own groups based on the characteristics of their given animal. They will discuss information, ask questions, analyze data, and communicate information. |
| **Beef Cattle Production** | In this unit students study beef production, beginning with industry terms and classifications, as well as parts, functions, and breeds of beef animals. They explore advantages and disadvantages, facilities and equipment, and the economic impact of beef production. They learn about common diseases, pests, and parasites in beef animals, and how to treat them. They Students will learn about identification, both permanent and temporary for cattle. They will design and check brand registry and have an opportunity to use both paint and heated iron brands to simulate the process of branding. Ear tagging technology and tracking with computerized chips in tags will be discussed with the challenge for students to Students will participate in a Build-a-Calf lab activity. Students will be planning and carrying out an investigation on beef cattle genetics. Students will record data for the Mother’s and Father’s traits which will include the following: Polled/Horned, Black coat/Red coat, Solid coat/Spotted coat. After they record the dominant and recessive genes they will be using math computational thinking to piece together the traits of the |
investigate various production systems, evaluation and selection of the right animals for those systems, and products of beef production.

**D5.1** Evaluate a group of animals for desired qualities, and discern among them for breeding selection.  
**D5.2** Select animals, based on quantitative breeding values, for specific characteristics.  
**D5.3** Research and discuss current technology used to measure desirable traits.  
**D5.4** Predict phenotypic and genotypic results of a dominant and recessive gene pair.  
**D5.5** Research the role of mutations, both naturally occurring and artificially induced, and hybrids in animal genetics.

**D10.1** Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals.  
**D10.2** Understand how to develop, maintain, and use growth and management records for large or small animals.  
**D12.3** Understand how meat-based products and meals are made.

**2.4** Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.  
**2.6** Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

Develop a system that is even more financially feasible and efficient for cattle producers to implement. 

offspring. They will discuss results, ask questions, and communicate information.
| 4.1 Use electronic reference materials to gather information and produce products and services |
| 9.13 Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making. |
| 10.1 Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector |
| 11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level. |

<table>
<thead>
<tr>
<th>Dairy Cattle Production</th>
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<tbody>
<tr>
<td>In this unit students will identify the major areas of dairy production in the United States and compare dairy production among the states. The students will also discuss breeds of dairy cows and their characteristics and demonstrate the steps used to milk cows in the modern dairy. Lastly, students will assess the uses of milk from species other than cows in the dairy industry and identify dairy products.</td>
</tr>
<tr>
<td>D10.1 Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals.</td>
</tr>
<tr>
<td>D10.2 Understand how to develop, maintain, and use growth and management</td>
</tr>
</tbody>
</table>

| Plan a trip to the local dairy and have them lead the students through the milking process. They will have the opportunity to plan and carry out an investigation on a typical dairy. The students can see how the cows move from the barn to the parlor and have the opportunity to clean and attach the milk machine to the teats after the teats are stripped and cleaned. Students will be able to explain the process from cow to carton once they finish. |

| While we learn about animal byproducts of Dairy Cattle, students will participate in a butter making lab activity. They will define problems and plan and carry out an investigation. They will need a small container with a lid, heavy whipping cream, salt, crackers or bread, napkins, and plastic knives. Students will grab a plastic container and lid, pour heavy whipping cream in a cup and add a dash of salt, students will need to make sure the lid is on tight, and shake the jar until the cream turns into butter. They will analyze their data collected throughout the conducted experiment and participate in a discussion. |
| Record for large or small animals | D12.4 Understand how nonmeat products (such as eggs, wool, pelts, hides, and byproducts) are harvested and processed. | 2.4 Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format. | 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies. | 4.1 Use electronic reference materials to gather information and produce products and services | 9.13 Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making. | 10.1 Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector. |

**Swine Production**

In this unit students explore swine production. Similar to their study of beef animals, they discuss terms and classifications, animal parts and functions, and breeds of swine animals. They investigate the advantages and disadvantages of swine.

Students will read and see the plans of some hog operations. They will compare and contrast the differences between the farrowing, finishing, nursery, etc. They will design their own facility and label all parts of their

Students will participate in an Ear Notching lab activity. They will be given numbers on a worksheet and will need to ear notch their piece of paper or material correctly. They will use this lab activity to plan and carry out an investigation on swine processing.
production, as well as facilities and equipment, and the ear notching system for identification. They learn about common diseases and their treatment, production practices, evaluation and selection, and products derived from swine animals.

**D10.1** Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals.

**D10.2** Understand how to develop, maintain, and use growth and management record for large or small animals.

**D12.3** Understand how meat-based products and meals are made.

**2.4** Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.

**4.1** Use electronic reference materials to gather information and produce products and services.

**9.13** Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making.

**10.1** Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector.

**11.2** Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued facility, including dimensions. Have them explain the setup they choose, especially with biosecurity hazards and efficiency in mind.
| Careers in Animal Agriculture | In this unit, students will explore Animal Science related careers. They will learn about careers related to the livestock industry, companion animal care, wildlife, animal health, etc.  
2.4 Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.  
2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.  
3.1 Identify personal interests, aptitudes, information, and skills necessary for informed career decision making.  
3.3 Explore how information and communication technologies are used in career planning and decision making.  
3.4 Research the scope of career opportunities available and the requirements for education, training, certification, and licensure.  
3.9 Develop a career plan that reflects career interests, pathways, and postsecondary options.  
9.13 Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making.  
10.1 Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector. | Students will choose an option from the agriculture (Animal Science) Choice Board. They will choose a career in the Animal Science industry, research information about that career including salary, education, description, etc. and embed it together in a Google Slides presentation, essay, flip grid, podcast, etc. | Students will dissect a McDonald’s cheeseburger and then as a team come up with as many careers that are in relation to it. They will record the careers they can think of and ask questions throughout the experiment. It will then be followed with a discussion on different careers in the Animal Science industry. |
| Goat production | In this unit students will learn about the selection of goats by breed for specific purposes, feeding, management, and housing of goats, diseases and parasites of sheep and goats, and marketing mohair. **D10.1** Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals. **D10.2** Understand how to develop, maintain, and use growth and management record for large or small animals. **D12.4** Understand how nonmeat products (such as eggs, wool, pelts, hides, and byproducts) are harvested and processed. **D12.3** Understand how meat-based products and meals are made. | Students will receive the worksheet titled, “Goat Feed Labels.” They must include the brand name, active ingredient, the main ten ingredients, who it is manufactured by, net weight, guaranteed analysis, feeding directions, and precautions. There will be labels provided for them in class that they will have to observe while recording data on their worksheets. The lab is titled, “Goat Epistasis & Dihybrid Inheritance.” Students will analyze, and interpret data; use mathematics and computational thinking. Students will complete this lab in assigned groups of two. They will use two pennies to determine the genotype and phenotype of their goat. They will be determining traits that are affected by epistasis. Epistasis is the condition in which one gene affects the expression of another gene. In the first example, they will be examining the impact of epistasis on the horns of goats. They will determine their goat’s genotype for two sets of genes. Then they will record the phenotype created by the genotype. Lastly, they will pair their goat with another from a different group and discuss what possible phenotypes could exist for your offspring. |
team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making.  

**10.1** Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector  

**11.2** Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

| Sheep Production | Sheep Production explores the Ovine industry and emphasizes on breeding, feeding and raising production sheep. This unit identifies the different sheep breeds, selecting productive breeding and feeder sheep, sheep nutrition, weaning management and proper ovine health.  

**D10.1** Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals.  

**D10.2** Understand how to develop, maintain, and use growth and management record for large or small animals  

**D12.4** Understand how nonmeat products (such as eggs, wool, pelts, hides, and byproducts) are harvested and processed.  

**D12.3** Understand how meat-based products and meals are made. |  

| Wool evaluation - have the local wool spinners come in and teach different grades of wool and have kids learn how to hand spin wool. They will be able to see and feel the differences between fine, coarse, and medium wool. Students will then research the different countries where wool is more heavily imported and exported and what price per lb. of wool is. |  

| Students will participate in a sheep brain dissection lab activity. They will be cutting into the brain in different sections and recording and analyzing data throughout the lab. They will also ask questions and define problems by observing. The lab will end with a class discussion on their findings. |
| 2.4 | Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format. |
| 2.6 | Advocate and practice safe, legal, and responsible use of digital media information and communications technologies. |
| 4.1 | Use electronic reference materials to gather information and produce products and services. |
| 9.13 | Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making. |
| 10.1 | Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector. |
| 11.2 | Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level. |

### Horse Production

In this unit students discuss horse production. They investigate the historical development of the horse, as well as terms, classifications, and breeds of horses. They study the evaluation and selection of appropriate animals for their herds. They explore the psychology and handling of horses, as well as herd health, facilities, and equipment needed for horse production.

**D10.1** Know how to synthesize and implement optimum.

Students will be assigned different activities/events within the equine industry. They must demonstrate via video, Google Slides, etc. how to perform a specific activity. Activities include, "how to properly wrap legs," "parts of the western saddle and how to properly saddle a horse," "parts of the bridle and how to bridle a horse," etc. Students will be evaluated on how prepared they are, the accuracy of information, use of

Students will be participating in a Registration Exercise Lab activity. They will identify the sex and color of each horse and use the following charts provided to describe coloring pattern of horse, they will do this by observing, analyzing, and interpreting data; They will draw any body, leg, and/or face marking they may have and identify any scars or brands. Then they will obtain, evaluate, and communicate information in a class discussion.
requirements for diet, genetics, habitat, and behavior in the production of large and small animals.

D10.2 Understand how to develop, maintain, and use growth and management record for large or small animals

D12.4 Understand how nonmeat products (such as eggs, wool, pelts, hides, and byproducts) are harvested and processed.

2.4 Demonstrate elements of written and electronic communication, such as accurate spelling, grammar, and format.

2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies.

4.1 Use electronic reference materials to gather information and produce products and services

9.13 Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making.

10.1 Interpret and explain terminology and practices specific to the Agriculture and Natural Resources sector

11.2 Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level.

Poultry Production

In this unit students study poultry production. They

Students will be assigned an independent practice

Students will participate in an egg dissection lab. They will be
| Discuss terms, classifications, production systems, and breeds of poultry. They also explore products of poultry production and careers in this field. |
| D10.1 Know how to synthesize and implement optimum requirements for diet, genetics, habitat, and behavior in the production of large and small animals. |
| D10.2 Understand how to develop, maintain, and use growth and management record for large or small animals. |
| D12.4 Understand how non meat products (such as eggs, wool, pelts, hides, and byproducts) are harvested and processed. |
| D12.3 Understand how meat-based products and meals are made. |
| 2.4 Demonstrate elements of written and electronic communication, such as accurate |
| 2.6 Advocate and practice safe, legal, and responsible use of digital media information and communications technologies. Spelling, grammar, and format. |
| 4.1 Use electronic reference materials to gather information and produce products and services |
| 9.13 Participate in group or team activities, including those offered by the student organization, that develop skills in leadership, cooperation, collaboration, and effective decision making. |
| 10.1 Interpret and explain terminology and practices |
| worksheet on Egg Grading. Their task is to grade two dozen eggs. They must record the following information on each egg: grams, oz, and egg grading size. Have different eggs set up at a table and make sure they are numbered for the class. They will have to fill in the data on their charts. |
| comparing three different types of eggs from the grocery store. They will observe the color of yolk, texture, shell qualities and record, analyze, and interpret data. Then they will blind taste test to see if they can tell the difference between each type of egg. Lastly, they will form conclusions with reason and evidence after conducting the experiment. |
| 11.2 | Demonstrate proficiency in a career technical pathway that leads to certification, licensure, and/or continued learning at the postsecondary level. |   |   |
APPENDIX C
APPENDIX C – SYLLABUS

Ms. Vindel
Intro to Ag Vet

Student Course Outline and Expectations

Instructor Contact Info:
Ms. Vindel
mvindel@muhsd.org
Room J110
(209) 384-5570

Course Description
This course is designed to introduce students to the field of Veterinary Science. Students will explore the many aspects of the Animal Science Industry from breeding and reproduction to marketing and consumption. Emphasis will be placed on current production aspects of the different animal industries.

Grading Scale:
90-100% ~ A
80-89% ~ B
70-79% ~ C
60-69% ~ D
59% - Lower ~ F

Late Work Policy
ALL assignments will be given a due date. LATE WORK will be accepted, however the student will receive a deduction of points. Late assignments will only be accepted if the assignments are in the current quarter. Students may not turn in assignments from previous quarters for credit.

Grading Policies
40% Classwork, Homework, Projects, Presentations
30% Tests and Quizzes
10% Class Participation
10% FFA Participation
10% Ongoing Supervised Agricultural Project (SAE) and AET record book.

Items you’ll need for class:
School Provided:
- School Issued Laptop
- Charger
Student Provided:
- Single Notebook for this class only
- Pencil or Pen (Blue or Black only)

VinDel’s Tip
Do work when assigned. Participate in FFA activities as they are made available. NEVER, wait until the last minute to complete things.

Need Help?
If you are struggling with class content or something personal please reach out by email or phone call.
**My Course Policies and Expectations**

Be in your seat and ready to work, when the bell rings. If you are not, you are considered tardy.
- A single spiral notebook is required. The notebook is to be used for this class only.
- Each student must bring a pencil or black/blue pen to class everyday.
- **No food is allowed** in the classroom during class. Drinks with a lid are the only drinks allowed in class.
- The classroom and Agriculture Department must be kept clean. All clean up activities will be done prior to students being dismissed.
- Be respectful to yourself, your classmates, and to the teacher.
- You must stay in your seat until I dismiss you, there will be no lining up at the door.
- Cellphones are not allowed to be used during class time unless specified by the teacher.
- Earbuds are not allowed to be used during class time unless specified by the teacher. If specified, only one earbud may be allowed. Please come into the classroom without earbuds in and hood off.

**FFA/SAE**

- Being enrolled in an agriculture course means you are automatically a member of Future Farmers of America (FFA). FFA is worth 10% of their grade in this class. Each student must earn a minimum of 15 FFA Activity points per school quarter. How these points will be obtained will be explained throughout the school year.
- **SAE PROJECTS:** All students enrolled in an agriculture class must conduct an approved SAE project each year and keep accurate, up-to-date record books under the guidance of an advisor.

Visit our FFA website to stay updated!
[https://www.elcapitanffa.org/](https://www.elcapitanffa.org/)
Parent and Student Signature

Student Name (Printed): ____________________________ Date: ________________

Period: __________

By Signing below I will know that you have read and understand the course expectations listed above. Again, if you have any questions please feel free to ask.

______________________________   ________________________________

Signature of Parent or Guardian          Signature of Student
APPENDIX D –
SAMPLE CURRICULUM FOR A CLASSIFICATION, SELECTION, WELFARE,
AND DOMESTICATION UNIT

Domestication

- Domestication is the taming of an animal from its wild state
- Early humans were hunters/gatherers
- Populations shifted to farming and animals began to be domesticated

Farming

+ Nearly all cultures are farming-based
+ Allowed groups to settle
+ As groups settled, animals shifted and became domesticated
+ As animals became domesticated humans started to raise them for different purposes.
  - Meat, work, war, status, milk, protection

Cats

- Domestication is estimated at 4,000 years ago
  - Much later than the dog probably because they are solitary
- Documentation exists at 2500 B.C. with early Egyptian paintings
- Valued for rat control, status symbols, companionship
- Domestic cats are believed to originate from an African Wild Cat called Felis lybica
Dogs
- Believed to be one of the first domesticated
  - About 10,000 years ago
  - Use(s) include protection, meat, service, companionship
  - Modern dog is descendant to Canis lupus

Cattle
- Modern cattle are descendants of Bos taurus and Bos indicus
  - Domesticated for draft, meat, and milk
    - Measure of wealth
  - Brought to U.S. by Columbus in 1493
  - Top ranking states today
    - Milk: California  Meat: Texas

Swine
- American Breeds originate from
  - European wild boar (Sus scrofa)
  - East Indian Pig (Sus vittatus)
  - Brought to the U.S. by Columbus 1493 & Hernando DeSoto 1539
  - Used for meat and lard
  - Iowa and other corn belt states have the highest production

Sheep
- Domesticated as early as 4000 B.C.
  - Used for wool, milk, and meat
  - Brought by Columbus and Cortez(1519)
  - Texas ranks #1 in meat and wool production
Goats
- Used for hair, meat, milk.
- Brought to U.S. by John Smith from Switzerland.
- Angora goats came from Turkey.
- Texas is largest.

Horses
- Evolved from four-toed ancestor Eohippus.
- Domesticated and used for war, draft, pleasure, and sport.
- Brought by DeSoto in 1539.
- Columbus and Cortes also brought horses but they did not make it to the U.S.

Poultry
- Wild Jungle Fowl of India (Gallus gallus) is the ancestor.
- Early Settlers brought chickens to U.S.
- Poultry Production has recently become popular.
- Most production was at home.
- Georgia and Iowa are top producers.
The Issue of Animal Welfare

Animal Rights?
- Animal Rights Movement
  - Began in 1970's
- Philosophies
  1. Animals should have the same rights as humans.
  - Animals should be free to live their life without human interference
  - Animals should not be killed
  2. It is moral to raise animals for human use, but animals should not be abused or

Confinement Operations
- Belief
  - Agriculture operations are factories
  - Producers only care about making a profit
- Agricultural Practices
  - Pigs are confined to pens and farrowing crates
  - Layer hens are kept in cages for egg production
  - Cattle in feedlots are placed in pens with little to no shelter

Argument
- Stressed animals decrease production, so producers strive to minimize stress
- Farrowing crates are used to decrease piglet mortality
- Confined operations provide shelter & protection
- Producer can easily manage and care for animals
Research

- Belief
  - It is unethical to subject animals to testing of new products
- Practices
  - Products and drugs are administered to animals to identify adverse affects of the product
- Argument
  - Animals should not be elevated to the same level as humans

Arguments, cont.

- The use of animals justifies advances in medicine and

Activity

- What is the difference in the positions of people who advocate animals rights and those who advocate animal welfare?
- Why is the controversy over animal welfare likely to continue?
- Which aspects of animal welfare issues do you agree with? Why?
- Which aspects of animal welfare issues do you disagree with? Why?
- What can be done to eliminate concerns regarding animal welfare?

"The cat, like the dog, must disappear... We should cut the domestic cat free from our dominance by neutering, neutering, and more neutering, until our pathetic version of the cat ceases to exist."

"Aroon, property destruction, burglary and theft are 'acceptable crimes' when used for the animal cause."

"The life of an ant and the life of my child should be accorded equal respect."

59
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- John Adams, Animal Rights Activist

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Animal Rights Groups

You will choose one animal rights group from the list below and answer the following questions below.

Animal Rights Groups to choose from:
- PETA
- ASPCA
- Humane Society
- Animal Justice Project
- Citizens for Animal Protection
- Farm Animal Rights Movement (FARM)
- UNCAGED CAMPAIGNS
- The Anti-Fur Society (AFS)
- Friends of Animals

Questions to answer:
1. Who are they?
2. Who is their founder?
3. Why were they formed?
4. Who makes up their membership?
5. Where are they based?
6. How widespread are their efforts?
7. What are their efforts? (shelters, services, picketing, etc.)
8. When does the group become involved? (what triggers their actions)
9. How are they involved?
10. How are they funded?
11. History?
12. What is their philosophy and activism? (neutering, euthanasia, animal testing, wildlife, etc.)
13. What do they target? (species, groups, people,)
14. What have been/are their campaigns? (advertising, media, celebrity support)
15. Do they conduct undercover investigations?
16. What positions do they take on cruelty?
17. What is their website and contact information?
18. Other facts about the group.

Group Opinion:
In five sentences, list your overall opinion of the group. If there are different opinions, include a summary of all opinions.

Grade:
Quality PowerPoint 10 points
Content/Questions 20 points
Opinion 10 points
Presentation 10 points

Total: 50 points
ANIMAL WELFARE RECOMMENDATIONS

After discussing animal rights and welfare, develop guidelines which you would establish for the production of specific animals. Remember that the animals you'll be raising are dependent on you to provide their most basic needs. It has been said that a good producer is one who acts as "steward of the land."

In this exercise, you will develop management and handling guidelines governing the raising of animals for specific purposes. Remember that some of these animals will be used for a productive purpose, i.e., food production, pleasure/recreation, clothing, or work.

Your instructor will divide you into groups of two. Your group will answer the questions listed below in writing. Then after you've developed your rules, your group will explain your guidelines to the class.

The animals listed below will be used as your animals to be considered. Each group will select one type of animal. You don't have to create guidelines for all of the animals listed.

1. Chinchilla for fur  e. hamster  i. Mink for fur
2. horses  f. Domesticated Hedgehogs  j. puppies for sale
3. ferret  g. rabbit  k. Vietnamese pet pig
4. turtle  h. cat  l. 4-foot Boa

To complete this assignment, you'll have to consider the following:
1. The purpose or reason why you're growing the animals.
2. What environmental, animal health, and management practices, as well as, facilities and equipment factors for proper handling should be considered when raising these animals.

Your group will be graded on the following:
1. Your written summary of your laws.
   a. Well thought out.
   b. Is it applicable to your animal group?
   c. Have you considered the management, environmental, facilities, and health, and handling aspects for the animal?
   d. Slaughter Method (if applicable)
2. Your participation in your group. This will be determined by how well you manage your time and if you assume the responsibilities of your group role.

1. The project which will be presented to your classmates.

EXAMPLE:

Animal Welfare Recommendations
The following is an example of a format that you should follow when preparing your recommendations. Be as complete as possible in your descriptions of each area. If you
need help in understanding the various activities that are specific to your animal, use your textbook or other resources in the class to acquire the information.

Sheep

1. **Purpose:** The purpose of sheep is to raise both wool and lambs for slaughter. The ewes will be white-faced and will be bred to black-faced rams. The ewes will be shorn once a year and the wool will be marketed at that time. Ewes will be bred to lamb during the months of November or December. After the lambs finish out on pasture, they will be marketed for slaughter around the Easter month.

2. **Environmental Conditions:** All ewes will be raised in large pastures where they will be provided with ample room to move and forage for feed. Clean water and feed will be provided at all times. Prior to lambing, the ewes will be brought into a smaller pen for observation and shearing. Two days before they lamb, the ewes will be placed into lambing jails to insure bonding of the ewe and lambs.

After the lambs are born, they will run freely with their mothers until weaning. At weaning they should be approaching market weight and will be sold to a buyer.

1. **Animal Health Considerations:** All lambs will be vaccinated for overeating and tetanus. They will also be docked and castrated. These animal health practices will insure that young lambs will not mount others, and that flies will not strike the lambs. Ewes will be shorn to harvest the wool crop, and to make certain that the lambing process will not be hampered by excess wool.

2. **Slaughter:** Lambs will be sent to an auction for sale. We are certain that the lambs will be provided with feed and clean water until the time of slaughter. It is our hope that the lambs will be slaughtered as humanely and quickly as possible.

3. **Animal Handling and Management Techniques:** Ewes will be shorn one time per year. Hooves will also be trimmed on a regular basis, four times per year. This will remedy any foot rot problems that may arise. As stated previously, lambs will be docked and castrated prior to weaning.

4. **Facilities and Equipment:** Housing should be provided to protect animals from insects, rodents, bad weather, and climate changes. Housing should be clean, comfortable, well-lighted, and properly designed. Nothing to cause injuries such as equipment and machinery should be in the area. Protection for the newborn should be provided. Equipment should be strong and safe so that the lambs would not break it up if they are accidentally scare. If the animals are let outside, they should be kept on property with a secure fence to prevent predators from entering.