***Unit 4-Advanced Animal Science Lesson Plans***

**Molecular Genetics and Heredity of Livestock**

DAY 1: History of Genetics and Mendel’s Law

DAY 2: Genotype, Phenotype, Punnett Square

DAY 3: Sex-Linked Characteristics

DAY 4: Nucleic Acids-Parts and Functions

DAY 5: Heredity Used in Livestock-Breeding Systems, EPD’s

DAY 6: Heredity Cont’d. and Review

DAY 7: LAB

DAY 8: Unit Review

DAY 9: Unit Exam

DAY 10: Exam Review and Record Books

History of Genetics and Mendel’s Law

TEKS: (c) (7) (A)

Objectives:

Interest Approach: Ask students some of the traits their favorite celebrity possess’? Tie this into genetics.

Method 1: Lecture-History of Genetics

Method 2: Student-Centered Learning-Draw a timeline on a large piece of paper at the front of the classroom and have students each come add a different piece of genetics history on the timeline and tell other students about it.

Method 3: Guided Reading-Mendel’s Law

Method 4: Student Centered Learning-students will use the internet to research and come up with their own hybrid, then present it to the class and tell its benefits over parents.

Method 5: Hand out a worksheet of vocabulary terms that will be presented the next day for students to work on and try to find the answers through various resources available.

Closure

Genotype, Phenotype, Punnett Square

TEKS: (c) (7) (A)

Objectives:

* Recognize genotypes and Phenotypes
* Predict genetic outcomes of animal
* Demonstrate use of Punnett Square

Interest Approach: show pictures of rare animal deformities

Method 1: Lecture-This will be a PowerPoint that includes vocabulary terms and the Punnett Square.

Method 2: Demonstration-Reese’s Peanut Butter cups will be used to help students get a picture of certain vocabulary terms. The chocolate will represent phenotype because it is the physical characteristics expressed. The peanut butter in the center will represent genotype. If students don’t know why it would be so, get them to refer back to the definition given and come to their own conclusion.

Method 3: Group Work-Genetic Deformities. The students will be grouped into 3 and given a 15 minute period to research a genetic deformity in cattle, swine, or sheep. This information can be found in the book, *Ninth Edition Scientific Farm Animal Production, An Introduction to Animal Science by Field and Taylor.* Students will also be given the option to use a computer.

Method 4: Student-Centered Learning-The students will present their information to the class.

Method 5: Punnett Square worksheet

Closure/Review

Sex-Linked Characteristics

TEKS: (c) (7) (B)

Objectives:

* Comprehend how inheritance plays a role in sex-linked genes
* Explain the difference between sex- linked, limited, and influenced inheritance
* Compare the difference between simply-inherited and polygenic traits

Interest Approach: comic strips

Method 1: Lecture

Method 2: Guided Reading- Chapter 12-Genetics in the book, *Ninth Edition Scientific Farm Animal Production, An Introduction to Animal Science by Field and Taylor,* along with a worksheet.

Method 3: Examples/Discussion

Method 4: Student-Centered Learning-Research a sex-linked characteristic that was no covered in class and present it to the class.

Closure/Summary

Nucleic Acids-Parts and Functions

TEKS: (c) (7) (C & D)

Objectives:

* Determine what DNA and RNA are
* Label parts of nucleic acids
* Construct DNA model
* Discuss nucleic acids

Interest Approach: short video

Method 1: Lecture-PowerPoint presentation

Method 2: Game- included in the end of the PowerPoint entitled DNA-nucleic acids

Method 3: Diagramming-label parts of nucleotides

Method 4: Demonstration-DNA Model Using Recycled Materials

Closure/Review

Heredity Used in Livestock-Breeding Systems, EPD’s

TEKS: (c) (7) (E, F)

Objectives:

* Discuss heredity and herd selection
* Determine types of breeding systems
* Compose DNA Extraction
* Analyze EPD’s

Interest Approach: Clip from Jurassic Park-Mr. DNA

Method 1: Discussion-your selection of an ideal herd

Method 2: Guided Reading-Chapter 13: Genetic Change Through Selection

Method 3: Virtual Lab-www.learn.genetics.utah.edu: DNA Extraction

Method 4: Discussion

Closure: check notes

Heredity and Review

TEKS: (c) (7) (E)

Objectives:

* Compare and contrast breeding systems
* Give examples of herd improvements

Interest Approach: Introduce the topic and spark interest by asking questions about improving herds, etc.

Method 1: Discussion-finish up heredity

Method 2: Review Worksheet

Method 3: Game-split into teams, ask questions to 1 person from team 1: point if answered correctly, point to team 2 if incorrect, then team 2 gets their turn, and so on. Winner gets extra points toward lowest grade.

Method 4: Chapter 13 Review Questions

Closure: check review sheets

LAB: DNA Extraction

TEKS: (c) (7) (C & D)

Objectives:

* Discuss laboratory procedures and safety
* Evaluate DNA extraction
* Organize results of lab work

Method 1: Discussion- lab procedures, safety, introduce lad instructions

Method 2: LAB Work-Strawberry DNA Extraction

Method 3: Guided Worksheet-goes along with the lab

Method 4: Student Centered Learning-completing the lab and asking one another for help

Method 5: Quick Pace-quickly review what was done in this lab and the purposes

Closure: Talk about one thing everyone learned

Unit Review

TEKS: (c) (7) (A-F)

Objectives:

* Review nucleic acid structure, parts and functions
* Discuss herd improvement
* Demonstrate use of Punnett Square
* Explain breeding systems
* Explain the difference between sex- linked, limited, and influenced inheritance

Method 1: Discussion-Bring out review sheets and go over every question and discuss the correct answers.

Method 2: Question All Write- I will ask questions and students will write their answer on a personal dry erase board and hold it up. Pause for a minute and talk about wrong answers that were given.

Method 3: Group work-Give a different review packet and have groups work together to get the correct answers.

Method 4: Game-Flashcards with question on one side and the answer to another question on the back. This game requires all students to participate in the activity.

Closure: Talk about the exam and be sure students are made aware of what they will need to do to prepare.

Unit 4 Exam

TEKS: (c) (7) (A-F)

Objectives:

* Review nucleic acid structure, parts and functions
* Discuss herd improvement
* Demonstrate use of Punnett Square
* Explain breeding systems
* Explain the difference between sex- linked, limited, and influenced inheritance

Method 1: EXAM-break every 15 minutes and let the students stand up to stretch then sit back down.

Method 2: Work on record books if finished early.

Go Over Test and Record Books

TEKS: (c) (15) (B)

Objectives:

* Apply record-keeping skills to supervised agriculture experience.

Method 1: Go Over the Exam and Make Proper Corrections

Method 2: Record Books

Method 3: Check Notes

Method 4: Opportunity to correct mistakes from exam

Closure