Oroville Union High School District

Science Curriculum

Science - College Agricultural Biology

College Agricultural Biology

COURSE TITLE: Agricultural Biology

LENGTH OF COURSE: One Year

TYPE OF CREDIT: Lab Science (10 credits, UC)

GRADE LEVEL: 9-12 (9th Approval of instructor)

PREREQUISITES:

Students must be enrolled in Algebra A or higher. Exceptions must be made by approval of the instructor.

TEXTBOOK:

Biology Principles and Explorations, Holt, Rinehart, and Winston, 2001, ISBN 0-03-051999-3

SUPPLEMENTAL MATERIALS:

Biology Visualizing Life; Holt, Rinehart, and Winston, 1994, ISBN 0-03-053817-3

The Science of Agriculture: A Biological Approach, Herren & Ray, Delmar Publishers, 1996, ISBN 0-8273-5811-3

COURSE DESCRIPTION:
Agricultural Biology is a one-year laboratory science course designed for the college-bound student with career interests in agriculture. Using agriculture as the learning vehicle, the course emphasizes the biological principles and central concepts. The course centers on an extensive laboratory component to connect the principles of life science with agricultural applications, other curricular areas and other scientific disciplines. This course meets the Life Science laboratory "D" requirements for entrance into the University of California and California State University systems. A grade of "B" or better will qualify the student for U.C. Credit.

NOTE: Standards that all students are expected to achieve in the course of their studies are unmarked. Standards that all students should have the opportunity to learn are marked with an asterisk (*).

BOARD ADOPTION DATE: June 20, 2001

Scientific Method

To ask meaningful questions and conduct careful investigations (California Star Earth Science Blueprint: 9 Test Items, 15% of Test)

Investigation and Experimentation

The learner will be able to a) select and use appropriate tools and technology to perform tests, collect, and display data, b) identify and communicate sources of unavoidable experimental error, c) identify possible reasons for inconsistent results, d) formulate explanations using logic and evidence, e) distinguish between hypothesis and theory as scientific terms, f) read and interpret topographic and geographic maps, and g) analyze the locations, sequences or time intervals that are characteristic of the succession of species in an ecosystem.

Strand	Scope	Source
Science	Master	Oroville Union High School District(a)

Unit Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Chapters 1-44 [Textbook].

Cell Biology

The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. (California Star Biology/Life Science Science Blueprint: 9 Test Items, 15% of Test)

Cell Membranes

The learner will be able to understand that cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 3 (45). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (203). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3-5 (59-60, 74-91). [Textbook].

Functions of Enzymes

The learner will be able to understand that enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapters 1 (37) and 5 (91-93). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3-4 (40-47). [Textbook].

Differences in Cell Structure

The learner will be able to understand how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.c.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 3. [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3-4 (57-58, 61-71, 452-457). [Textbook].

Transcription &Translation of Protei

The learner will be able to understand the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapters 3 (56-60) and 7 (138 and 141-142). [Textbook].

Endoplasmic Reticulum & Golgi Appara

The learner will be able to understand the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 3 (59). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3 (62-63). [Textbook].

Photosynthesis

The learner will be able to understand that usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.f.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 5 (96-101). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3, 5 (65-66, 104-107, 112, 114-115). [Textbook].

Functions of the Mitochondrion

The learner will be able to understand the role of the mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.g.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 3 (58). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3,5 (64, 104-107, 112, 114-115). [Textbook].

Macromolecules

The learner will be able to understand that most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.h.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 2 (33 and 38). [Textbook].

* Chemiosmotic Gradients

The learner will be able to understand how chemiosmotic gradients in the mitochondria and chloroplast store energy for ATP production .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.i*.

* Eukaryotic Cell Structure

The learner will be able to understand how eukaryotic cells are given shape and internal organization by a cytoskeleton or cell wall or both .

Strand	Scope	Source
Cell Biology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 1.j*.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 3 (56-60). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (203). [Textbook].

Genetic Variation

Mutation and sexual reproduction lead to genetic variation in a population. (California Star

Biology/Life Science Science Blueprint: 7 Test Items, 12% of Test)

Meiosis

The learner will be able to understand that meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (123-126). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (204-207). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 7 (142-147, 153-157). [Textbook].

Multicellular Process and Meiosis

The learner will be able to understand that only certain cells in a multicellular organism undergo meiosis.

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (123-126). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 7 (146-147, 154-157). [Textbook].

Random Chromosome Segregation

The learner will be able to understand how random chromosome segregation explains the probability that a particular allele will be in a gamete .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.c.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (119-123). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (203-209). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Chapter 7-8 (142-145, 1153, 156-157, 162-163). [Textbook].

Fertilization

The learner will be able to understand that new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization) .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (124). [Textbook].

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (207). [Textbook].

Organisms DNA Sequence

The learner will be able to understand why approximately half of an individual's DNA sequence comes from each parent .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (123-126). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (208-210) and 11 (236-240). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 6-7 (120-121, 142-145). [Textbook].

Chromosomes and Sex Determination

The learner will be able to understand the role of chromosomes in determining an individual's sex.

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.f.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (123-126). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (216-217). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 6 (122). [Textbook].

Predicting Genetic Makeup of Parents

The learner will be able to understand how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 2.g.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (210-219). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8-9 (164-174, 181-182, 189). [Textbook].

Phenotype and Genotype

A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. (California Star Biology/Life Science Science Blueprint: 3 Test Items, 5% of Test)

Phenotype Prediction

The learner will be able to understand how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of

inheritance (autosomal or X-linked, dominant or recessive).

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 3.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (119-120). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (208). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8 (173-174, 180, 184-185). [Textbook].

Mendel's Law Of Segregation

The learner will be able to understand the genetic basis for Mendel's laws of segregation and Mendel-dent assortment .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 3.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 6 (117-123). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart, and Winston, 1996, Unit 9 (200). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8 (164-167). [Textbook].

* Pedigree Evaluation

The learner will be able to understand how to predict the probable mode of inheritance from a pedigree diagram showing phenotypes .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 3.c.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 14 (293) and 31 (656). [Textbook].

* Interpreting Genetic Information

The learner will be able to understand how to use data on frequency of recombination at meiosis to estimate genetic distances between loci and to interpret genetic maps of chromosomes .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 3.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter . [Textbook] [Textbook].

Genes

Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. (California Star Biology/Life

Science Science Blueprint: 4 Test Items, 7% of Test)

Protein Synthesis by Ribosomes

The learner will be able to understand the general pathway by which ribosomes synthesize proteins using tRNAs to translate genetic information in mRNA.

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (142, 145 and 154-155). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 10 (206-212). [Textbook].

Genetic Coding Rules

The learner will be able to understand how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (143). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 9 (208-210). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 10 (209-212, 222-223). [Textbook].

Mutations in DNA

The learner will be able to understand how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.c.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (140). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 10 (217-220, 221-223). [Textbook].

Specialization of Cells

The learner will be able to understand the specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (141-150). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 10, 20, 32 (206-218, 437, 724-725). [Textbook].

Protein Differentiations

The learner will be able to understand that proteins can differ from one another in the number and sequence of amino acids .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 2 (33-37) and 3 (51-57). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 10 (206-209). [Textbook].

* Protein Shapes and Chemical Properties

The learner will be able to understand why proteins having different amino acid sequences typically have different shapes and chemical properties .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 4.f*.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 2 (36) and 9 (183). [Textbook].

Altered Cell Genetics

The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. (California Star Biology/Life Science Science Blueprint: 5 Test Items, 8% of Test)

DNA, RNA, & Protein

The learner will be able to understand the general structures and functions of DNA, RNA, and protein.

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 5.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (136-150). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8, 9, 10 (181-194, 206-212). [Textbook].

Copying of DNA

The learner will be able to understand how to apply base-pairing rules to explain precise copying of DNA during semiconservative replication and transcription of information from DNA into mRNA .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 5.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 7 (140-142). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 9-10 (195-197, 202-203, 206-212). [Textbook].

Biotechnology in Agriculture

The learner will be able to understand how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 5.c.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 8 (161-164). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 11 (236-250). [Textbook].

* DNA Technology and Recombinant DNA

The learner will be able to understand how basic DNA technology (restriction digestion by endonu-cleases, gel electrophoresis, ligation, and transformation) is used to construct recombinant DNA molecules .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 5.d*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 11 (237-243). [Textbook].

* Altering Genetic Makeup

The learner will be able to understand how exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products .

Strand	Scope	Source
Genetics	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 5.e*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 11 (226-230). [Textbook].

Ecology

Stability in an ecosystem is a balance between competing effects. (California Star Biology/Life Science Science Blueprint: 7 Test Items, 12% of Test)

Biodiversity

The learner will be able to understand that biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 12 (248). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 19, 19 (360-364, 406-414, 442). [Textbook].

Changes in Ecosystems

The learner will be able to understand how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 13 (272-279). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 19 (406-415). [Textbook].

Fluculations in Populations in Ecosystem

The learner will be able to understand how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.c.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 19 (414-415). [Textbook].

Water, Carbon, Nitrogen & Oxygen Cyc

The learner will be able to understand how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 12 (254-256). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 17 (370-376). [Textbook].

Stability of Producers and Consumers

The learner will be able to understand that a vital part of an ecosystem is the stability

of its producers and decomposers .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 12 (250). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 17 (365-367, 375, 378-379). [Textbook].

Food Webs and Energy Pyramids

The learner will be able to understand that at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.f.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 12 (251) and 24 (537 and 542). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 17 (368-369, 375-376, 378-379). [Textbook].

* Accom. vs. Adaptation of Organisms

The learner will be able to understand how to distinguish between the accommodation of an individual organism to its environment and the gradual adaptation of a lineage of organisms through genetic change .

Strand	Scope	Source
Ecology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 6.g*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (286-289, 327-330). [Textbook].

Gene Pool Allele Frequency

The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. (California Star Biology/Life Science Science Blueprint: 5 Test Items, 8% of Test)

Natural Selection

The learner will be able to understand why natural selection acts on the phenotype rather than the genotype of an organism.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 9 (176-182). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13, 16 (267, 279, 281, 346-352, 356-357). [Textbook].

Lethal Alleles

The learner will be able to understand why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.b.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8 (173-174). [Textbook].

Mutations

The learner will be able to understand new mutations are constantly being generated in a gene pool.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.c.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 8, 13 (178-180, 276, 281). [Textbook].

Species Variation

The learner will be able to understand that variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.d.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 7, 13 (145, 276, 281, 290-294). [Textbook].

* Hardy-Weinberg Equilibrium

The learner will be able to understand the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.e*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 16 (346-353). [Textbook].

* Solve Hardy-Weinberg Equation

The learner will be able to understand how to solve the Hardy-Weinberg equation to

predict the frequency of genotypes in a population, given the frequency of phenotypes .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 7.f*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (276, 281-282, 290-294, 298-299). [Textbook].

Genetic Changes & Environment

Evolution is the result of genetic changes that occur in constantly changing environments. (California Star Biology/Life Science Science Blueprint: 4 Test Items, 7% of Test)

Differential Survival

The learner will be able to understand how natural selection determines the differential survival of groups of organisms.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.a.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (276, 281-282, 290-194, 298-299). [Textbook].

Species Diversity vs. Species Survival

The learner will be able to understand that a great diversity of species increases the chance that at least some organisms survive major changes in the environment .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 12 (248) and 13 (267-291). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (276, 290-294, 298-299). [Textbook].

Genetic Drift

The learner will be able to understand the effects of genetic drift on the diversity of organisms in a population.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.c.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 16 (34-349). [Textbook].

Reproductive and Geographic Isolation

The learner will be able to understand that reproductive or geographic isolation affects speciation.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.d.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (281-282, 293-294). [Textbook].

Fossil Analysis

The learner will be able to understand how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 9 (176-192) and 10 (199-214). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13 (283-289). [Textbook].

* Evolutionary Relationships

The learner will be able to understand how to use comparative embryology, DNA or protein sequence comparisons, and other independent sources of data to create a branching diagram (cladogram) that shows probable evolutionary relationships .

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.f*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13, 15 (286-289, 327-330). [Textbook].

* Estimates of Evolutionary Divergence

The learner will be able to understand how several independent molecular clocks, calibrated against each other and combined with evidence from the fossil record, can help to estimate how long ago various groups of organisms diverged evolve from one another.

Strand	Scope	Source
Evolution	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 8.g*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 13, 14, 15, 28, 31, 33 (283-289, 305, 327-330). [Textbook].

Organ Systems & Homeostasis

As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. (California Star Biology/Life Science Science Blueprint: 5 Test Items, 9% of Test)

Major Body Systems

The learner will be able to understand how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.a.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 39, 40 (890-892, 998-899, 901-902). [Textbook].

Nervous System Mediation

The learner will be able to understand how the nervous system mediates communication between different parts of the body and the body's interactions with the environment .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 28 (638-663). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 42 (952-968, 975-977). [Textbook].

Feedback Loops

The learner will be able to understand how feedback loops in the nervous and endocrine systems regulate conditions in the body .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.c.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 38, 42, 43 (859, 963, 983-984, 988, 1000-1001). [Textbook].

Function of the Nervous System

The learner will be able to understand the functions of the nervous system and the role of neurons in transmitting electrochemical impulses .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 28 (638-663). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 42 (952-968, 975-977).

[Textbook].

The Role of Neurons

The learner will be able to understand the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.e.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 28 (652). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 42 (961-963). [Textbook].

*Functions and Sites of Digestive Enzyme

The learner will be able to understand the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.f*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 3, 40 (42, 915-917, 919, 925). [Textbook].

* Homeostatic Role of the Kidneys

The learner will be able to understand the homeostatic role of the kidneys in the removal of nitrogenous wastes and the role of the liver in blood detoxification and glucose balance .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.g*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 40 (920-923, 925). [Textbook].

* Muscle Contraction

The learner will be able to understand the cellular and molecular basis of muscle contraction, including the roles of actin, myosin, Ca +2 , and ATP .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.h*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 39 (867-869, 875). [Textbook].

* Hormones and Internal Feedback

The learner will be able to understand how hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 9.i*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 43 (982-1001). [Textbook].

Organisms' Immune Responses

Organisms have a variety of mechanisms to combat disease. (California Star Biology/Life Science Science Blueprint: 5 Test Items, 8% of Test)

Skin Defenses Against Infection

The learner will be able to understand the role of the skin in providing nonspecific defenses against infection.

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.a.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 27 (616-618). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 41 (932-934). [Textbook].

Antibodies

The learner will be able to understand the role of antibodies in the body's response to infection.

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.b.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 39 (749-759). [Textbook].
- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 10 (232). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 41 (935-937). [Textbook].

Vaccinations

The learner will be able to understand how vaccination protects an individual from infectious diseases.

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.c.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 8 (166) and 16 (351-356).

[Textbook].

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit Unit 16 (358), 37 (765) and 44 (910). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 22, 41 (492, 939-940). [Textbook].

Bacteria and Viruses

The learner will be able to understand that there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.d.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 16 (338-359). [Textbook].
- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 21 (452-471, 938-940). [Textbook].

Compromised Immune System

The learner will be able to understand why an individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.e.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 41 (942-944). [Textbook].

*Phagocytes, B-lymphocytes & T-lymph

The learner will be able to understand the roles of phagocytes, B-lymphocytes, and T-lymphocytes in the immune system .

Strand	Scope	Source
Physiology	Master	CA: Science Content Standards, December 1998, Grades 9-12, Biology/Life Sciences, 10.f*.

Instructional Resources

- Biology Principles & Explorations, Holt, Rinehart and Winston, 2001, Ch 41 (934-937). [Textbook].

Digestive Systems and Nutrition

The principles of animal nutrition involves the the interrelationship between the digestive, endocrine, and circulatory systems.

Digestive Systems

The learner will be able to name, locate, and describe the functions of the parts of the digestive systems of ruminants and nonruminant animals.

Strand	Scope	Source
Animal Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Animal Science Career Path Cluster 2.3.1.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 5 (110-112). [Textbook].

The Digestive Process

The learner will be able to trace the digestive process in a livestock animal of their choice.

Strand	Scope	Source
Animal Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Animal Science Career Path Cluster 2.3.1 and 2.3.2.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 5 (12-121). [Textbook].

Feed Nutrients

The learner will be able to identify the major functions of the basic nutrient groups and identify feeds that are sources of each.

Strand	Scope	Source
Animal Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Animal Science Career Path Cluster 2.2.1.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 6 (122-130). [Textbook].

Balancing Rations

The learner will be able to classify feeds and balance livestock rations using commonly accepted practices.

Strand	Scope	Source
Animal Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Animal Science Career Path Cluster 2.2.1.

Instructional Resources

- Modern Livestock & Poultry Production, Delmar, Sixth, 2002, Unit 8 (165-196). [Textbook].

Plants

The Plant Body

The learner will be able to identify the importance of plant parts and functions.

Strand	Scope	Source
Plant Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Plant and Soil Science Career Path Cluster 3.3.1.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 19 (403-407). [Textbook].

How Plants Functions

The learner will be able to summarize how plants function.

Strand	Scope	Source
Plant Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Plant ans Soil Science Career Path Cluster 3.3.2.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 19 (410-414). [Textbook].

Reproduction in Flowering Plants

The learner will be able to summarize the processes of pollination and fertilization.

Strand	Scope	Source
Plant Science	Master	CA: Agriculture Content Standards, June 1999, Grades 9-12, Plant and Soil Science Career Path Cluster 3.4.1.

Instructional Resources

- Biology Visualizing Life, Holt, Hinehart, and Winston, 1994, Chapter 19 (415-420). [Textbook].

Connections, Applications and Standards

Students will understand the importance of career awareness and the related decision making process.

Agricultural Career Clusters

The learner will be able to describe the six agriculture career clusters and give examples of entry, technical, and professional careers in each cluster.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.8.1.

Instructional Resources

- FFA Career Center, National FFA Organization, Careers [On-line]. http://www.ffa.org/careers/index.html
- FFA Career Center, National FFA Organization, Ag Career Clusters [On-line]. http://www.teamaged.org/ffa/careers/clusters.htm

Resumes

The learner will be able to develop a resume and participate in a mock job interview.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.8.2.

Instructional Resources

- California Agricultural Education, Job Interview Contest [On-line]. http://www.calaged.org/CCode/C12.doc

Career Exploration through Technology

The learner will be able to utilize resources to learn about an agriculture occupation of their choice.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.8.3.

Instructional Resources

- EUREKA, The California Career Information System [Software].

Supervised Agricultural Experience

Students will understand the relationship between a supervised occupational experience (SAE) and their preparation for a career in agriculture. Students will actively engage in and manage a SAE which enables them to develop occupational skills.

Supervised Occupational Experience Plan

The learner will be able to develop an agricultural SAE plan (student data sheet).

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.7.1.

Supervised Occupation Experience Project

The learner will be able to demonstrate responsibility, commitment, and time management skills by conducting and maintaining and SAE.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.7.2.

Record Keeping

Students will understand the importance of keeping accurate records and explain the consequences of inaccurate records. Students will maintain and complete the California Agricultural Record Book which pertains to their Supervised Occupational Experience (SAE) Program.

Accurate Record Keeping

The learner will be able to explain reasons for keeping accurate records and consequences of inaccurate records.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.1.

Budgets and Business Agreements

The learner will be able to develop a budget and a business agreement for a project.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.2.

Journals

The learner will be able to complete journal entries for two enterprises and carry entries forward to the next month.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.3.

Financial Statements and Income Summary

The learner will be able to prepare a financial statement and a net income summary.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.4.

Non-Depreciable and Depreciable Property

The learner will be able to complete non-depreciable and depreciable property inventories.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.5.

Straight-line Depreciation

The learner will be able to use the straight-line method for determining depreciation.

Strand	Scope	Source
Agriculture Basic Core	Introduce	CA: Agriculture Content Standards, June 1999, Grades 9-12, Basic Core Career Path Cluster 1.4.6.

Interpersonal Leadership Development

Interpersonal Leadership Development

The learner will be able to participate in leadership training activities associated with the FFA including public speaking, leading group discussions, working within a committee, conducting business meetings, and problem solving.

Strand	Scope	Source
Ornamental Horticulture	Master	CA: Agriculture Contend Standards, June 1999, Grades 9-12, 5.15.

Instructional Resources

- National FFA, Home Page [On-line]. http://www.ffa.org/

© 2009 by Oroville Union High School District and Scantron Corporation. All Rights Reserved. Made with Curriculum Designer by Scantron Corporation.