

AGRICULTURAL SCIENCE

Curriculum Standard: The student will show the steps of the scientific method and be able to follow it to solve a question or problem. The student will become familiar with various types of lab equipment and be able to use a balance and microscope correctly. The student will also become familiar using the metric system for measurement.

Performance Objective	Critical Attributes	Benchmarks/Assessment
1. The student will understand the steps in the scientific method and be able to follow them to solve a problem and generate new questions.	A. Can the student apply logic to solving a problem or proving a solution?	<ul style="list-style-type: none"> • The student will use the scientific method to conduct experiments and solve problems in the content areas. The student will also be able to generate new questions from his/her results and observations. • The student will practice various types of logic problems, such as syllogisms, matrix logic, and Venn diagrams to improve logic skills and organization.
2. The student will understand and demonstrate safety procedures in the lab and with equipment.	A. Can the student identify potential safety hazards and concerns in the classroom?	<ul style="list-style-type: none"> • The student will pass a safety quiz. • The student will follow safety procedures throughout the year.
3. The student will be able to identify and use basic school lab equipment.	A. Can the student recognize common lab equipment?	<ul style="list-style-type: none"> • The student will be able to identify the parts of the light microscope and their function. The student will be able to focus a microscope on all power settings.

AGRICULTURAL SCIENCE

Applied Natural Science

SCIENTIFIC PROCESS

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>4. The student will become familiar with the metric system as used in lab applications.</p>	<p>A. Can the student use a ruler, measuring cup, timer, and scale? Can the student demonstrate familiarity with the basic metric units: meter, gram, and liter?</p>	<ul style="list-style-type: none"> • The student will be able to use and focus a dissecting scope and explain how it is different from a light microscope. • The student will be able to identify the parts of a pan balance and their function. The student will be able to mass different substances. • The student will be able to identify various pieces of common labware, such as beakers, test tubes, and graduated cylinders. • The student will demonstrate the ability to use various measuring devices in lab situations and express values using the metric system. • The student will be able to compare metric values to American standard values.

AGRICULTURAL SCIENCE

Curriculum Standard: The student will develop an awareness of the classification system of living things used by scientists today. Key concepts include the history of binomial nomenclature, the characteristics of the 5 kingdoms, and how individual life forms fit into the system.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will understand that ancient man started classifying animals according to physical characteristics.</p>	<p>A. Can the student:</p> <ol style="list-style-type: none"> 1. Name some physical characteristics that people could be classified by? 2. Compare 2 animals and explain ways they are alike and different? 3. Compare members of a family, such as felidae and describe how they are alike and different? 	<ul style="list-style-type: none"> • The student will classify students in the classroom according to 3 or 4 physical attributes in a hierarchy. • The student will classify pictures of “bugs” (insects, arachnids, crustaceans, etc.) according to physical characteristics and label each of the groups with the characteristic.
<p>2. The student will understand that life on earth is divided into 5 kingdoms-- animal, plant, monera, protista, and fungi. Each kingdom is further divided into a hierarchy of subgroups called phylum, class, order, family, genus, and species.</p>	<p>A. Can the student name some living things that are not plants or animals?</p>	<ul style="list-style-type: none"> • The student will name the 5 kingdoms and describe some simple characteristics of members of each.

AGRICULTURAL SCIENCE

Curriculum Standard: The student will understand that living things are composed of cells that are grouped to form systems that carry out life processes. Even cells contain internal structures that carry out the cell’s life processes. Living things pass on their characteristics through the generations through sexual and asexual reproduction. The genetic information received from the parents will determine the characteristics of the offspring. Man can influence this through selective breeding.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will understand that plants and animals are composed of different types of cells and that these cells are organized into systems and structures that promote growth and reproduction, process or manufacture food, remove waste, transport food, remove waste, transport food, water and metabolic gases and provide protection, support and sometimes locomotion.</p> <p>Cells themselves have internal structures that carry out the life functions for the cell, including getting energy from food, getting rid of waste, and reproducing.</p>	<p>A. Can the student name the basic systems of the human body? Can the student explain what makes something “alive” and what some of the basic requirements are for living things?</p>	<ul style="list-style-type: none"> • The student will label a diagram of a cell and its structures and explain the purpose of each structure. • The student will construct a chart of the main body systems of humans and a domestic animal and explain how they work. • The student will diagram the main plant systems and explain how they work. • The student will show examples of how the various systems in a plant or animal interact and cooperate to keep entity alive. • The student will compare and contrast plant and animal cells and body systems.

AGRICULTURAL SCIENCE

Applied Natural Science

PLANT AND ANIMAL STRUCTURES

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>2. The student will understand that plants can reproduce by sexual and asexual methods. Sexual reproduction uses genetic material from both the male and female plant parts to produce a unique offspring.</p> <p>Asexual reproduction uses the complete genetic material from the parent to produce a new identical offspring (clone).</p> <p>Plants can be grown from fertilized seeds or spores and cuttings or offshoots sent out by the parent plant.</p>	<p>A. Can the student explain why everyone is a unique individual, that offspring get their physical characteristics from both parents? Can the student demonstrate a basic understanding of the plant reproduction cycle through planting seeds, growth, and harvest of new seeds from fruit?</p>	<ul style="list-style-type: none"> • The student will propagate several plant species through sexual and asexual methods that include cross pollination, propagation by seed, cutting, layering, division, and grafting. • The student will be able to explain how each method is done and whether it is a unique offspring or clone.
<p>3. The student will understand that man has changed the characteristics of crop plants through selective breeding and today through genetic engineering.</p> <p>Crops we grow today, such as corn, often bear little resemblance to the plant that first appeared in nature. Since ancient times, man has cross pollinated plants with desirable characteristics or mutations to improve the quality of the plant, amount, or</p>	<p>A. Can the student explain that genetic information from the parents is passed on to the offspring and manifests as a variety of physical and systemic characteristics? Can the student predict what characteristics an offspring might have by looking at the parents?</p>	<ul style="list-style-type: none"> • The student will trace the history of a particular crop, such as corn, from ancient times to modern. The student will be able to explain the improvements made as time went on. • The student will explain the basic inheritance rules from Gregor Mendel’s experiments using a Punnett square and mendelian cross. • The student will explain how the genetic code can change and give examples of good and bad results.

AGRICULTURAL SCIENCE

Applied Natural Science

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<p>taste of the fruit produced, even resistance to disease.</p> <p>Today, through genetic engineering, we can actually change the DNA code to create better produce. DNA makes up genes which determine heredity. Genes are segments of the chromosomes in the nuclei of cells. Some genes have more influence on development than others. (dominant vs. recessive)</p> <p>Changes can occur in the parent's and offspring's DNA through mutation, copying error, and recombination. Most of these changes are from natural causes; some are caused by human interference.</p> <p>4. The student will understand that most animals reproduce by sexual means that take half of the genetic information from each of the parents to produce a unique offspring.</p> <p>Humans have changed and improved the characteristics of domestic animals over the centuries through selective breeding.</p>	<p>A. Can the student explain that genetic information from the parents is passed on to the offspring and manifests as a variety of physical and systemic characteristics? Can the student predict what characteristics an offspring might have by looking at the parents?</p>	<p>The student will also give examples of ways man has influenced genetic change.</p> <ul style="list-style-type: none"> • The student will illustrate how chromosomes replicate and divide during nuclear and cytoplasmic division. • The student will trace the history of a particular domestic animal from ancient to modern times. The student will be able to explain the changes and improvements that took place.

AGRICULTURAL SCIENCE

Curriculum Standard: The student will define the characteristics of a biome and explain the geography, weather, examples of plant and animal life of the earth’s major life zones. The student will explain how plant and animal life share common environmental needs and how they interact to survive. Key concepts include energy flow in an ecosystem, survival adaptations, succession, and stewardship of earth’s natural resources.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will understand that there are many life zones (biomes) throughout the world, each with their own unique climate, geography, plant and animal life, and ecosystem. These include arctic, desert, grassland, forest, rainforest, swamp, and ocean.</p> <p>2. The student will understand that plant and animal species live together because they share common environmental needs. Each species has its own niche where it interacts with other species and its physical environment to have its needs met.</p>	<p>A. Can the student describe the general characteristics and some typical plants and animals in the major life zones?</p> <p>A. Can the student:</p> <ol style="list-style-type: none"> 1. State the basic needs for survival? 2. Name some ways people, plants, and animals meet those needs? 3. Explain the food chain? 	<ul style="list-style-type: none"> • The student will create a diorama or mural showing the characteristics of a particular biome and explain how the plants and animals interact. It will include climate, geography, and typical plant and animal life. • The student will select an animal from their biome and explain how it gets its basic needs met and where it fits into the biome’s food chain.

AGRICULTURAL SCIENCE

Applied Natural Science

ECOSYSTEMS

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>3. The student will understand that plants and animals have adaptations that help them cope with their environment and survive to reproduce. Behaviors and physical attributes are the main determinants of a species success in its environment.</p>	<p>A. Can the student name some behaviors or physical traits that help it to protect itself? eat? attract a mate?</p>	<ul style="list-style-type: none"> The student will describe how their animal’s physical characteristics and behaviors help it to survive in its environment.
<p>4. Energy and matter flow through biomes in several systems.</p> <ul style="list-style-type: none"> - Food chain - Carbon cycle - Water cycle - Photo synthesis <p>Humans are also a part of these systems.</p>	<p>A. Can the students:</p> <ol style="list-style-type: none"> 1. Explain the food chain? 2. Explain the water cycle? 	<ul style="list-style-type: none"> The student will draw diagrams showing how the food chain, carbon cycle, water cycle, and photosynthesis work. The student will include how humans fit into these cycles.
<p>5. The student will understand that ecosystems change over time. Certain plant and animal species will succeed others as the ecosystem matures.</p> <p>The forest is an example of a changing ecosystem. Certain tree species will succeed others as the forest matures.</p>	<p>A. Can the student:</p> <ol style="list-style-type: none"> 1. Name some ways man changes the land? 2. Describe how his/her home garden can change if he/she doesn’t weed and take care of it? 3. Describe how his/her yard can become a fire hazard if he/she doesn’t take care of it? 	<ul style="list-style-type: none"> The student will illustrate a forest in 3 stages of its life and explain how one tree species superseded another. The student will compare drawings or photos of a forest before and after a fire explaining how the fire affected the forest ecosystem. The student will debate the pros and cons of stopping forest fires and of controlled burning.

AGRICULTURAL SCIENCE

Applied Natural Science

ECOSYSTEMS

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>6. The student will understand that humans have responsibility to be good stewards of the land and its plant and animal sources so that life for the planet can continue.</p> <p>The forest provides us with lumber and other products but we must use it wisely or lose it. Harvesting methods need to sustain forest health.</p>	<p>A. Can the student name some things that are made of forest products?</p>	<ul style="list-style-type: none"> • The student will explain or draw the steps of making lumber from harvest, to the mill, to building a house. • The student will debate harvesting methods and the need of the consumer, lumber company, conservationists, and forest inhabitants.
<p>7. The student will understand that farming disrupts the ecology and destroys wildlife habitat. Farmers must include provisions for wildlife on their lands.</p> <p>Scientists and farmers are developing methods of farming that protect the environment and provide habitat. Sacramento valley rice farmers are helping migratory birds by flooding their fields in winter.</p>	<p>A. Can the student describe some ways an ecosystem can be affected when land is cleared for farming?</p>	<ul style="list-style-type: none"> • The student will help construct a nesting box or participate in a habitat conservation project that helps wildlife near farming areas, such as the Cosumnes River Reserve.

AGRICULTURAL SCIENCE

Curriculum Standard: The student will investigate the role agriculture has played in the development of civilization. The student will explore the importance of agriculture in the development of the United States and of California in particular.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will understand that agriculture is a very important to the American economy.</p> <p>Farming and animal production are modern businesses that require education, technology, and management skills.</p> <p>2. The student will understand that agriculture has played an important role in the development of civilizations throughout history.</p>	<p>A. Can the student name household products and food that come from the livestock and the dairy industry.</p> <p>A. Can the student describe how the cattle industry was important in the old west and how it has influenced the growth of our country, its culture, and modern ranching methods?</p>	<ul style="list-style-type: none"> • The student will explain the steps involved in the production, processing, marketing, and sales, and distribution of an agricultural product. • The student will identify the major agricultural commodities in the Sacramento region. • The student will give examples of livestock commodities used for food, clothing, medicine, and household products. • The student will research education requirements for various careers in agriculture. • The student will research and compare agriculture practices in different countries. • The student will describe the role the cattle industry had in the growth and development of the United States and modern cattle industry.

AGRICULTURAL SCIENCE

Applied Natural Science

AGRICULTURE

Performance Objective	Critical Attributes	Benchmarks/Assessment
		<ul style="list-style-type: none"><li data-bbox="1354 354 1894 537">• The student will describe the role agriculture had in the development of California. The student will explain how geographical and climate features affect agriculture in California.