



Biology - Agricultural Science (02.0112) (District)

Granite Technical Institute > 2016-2017 > Basic > Agricultural Education > Biology - Agricultural Science (02.0112) (District) > Hartley, Devon; Tuttle, Jonathon
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Unit	CTE Standards and Objectives	Essential Questions	Content	Skills	Vocabulary	Formative & Summative Assessments
Starting Gate (Week 1, 4 Weeks)	UT: CTE: Agricultural Education UT: Grades 9-12 Animal Science I Standard 1 Students will explain the role of FFA in agricultural education. Objective 1 Discuss the history and organization of FFA as it relates to the complete program of agricultural education. a. Explain the interrelationship of classroom and laboratory instruction, supervised agricultural experience, and FFA. b. Describe how, when, and why FFA was organized. c. Identify key FFA historical events. d. Identify the mission and strategies, colors, motto,	Essential Questions: <ul style="list-style-type: none"> FFA, what's in it for me? Hands-on science, what's in it for me? Enduring Understandings: <ul style="list-style-type: none"> FFA is a great way for me to gain leadership skills and improve myself Through my own SAE I'll be able to apply what I learn Science is one process used to gain knowledge Good science leads to truth Good science 	FFA <ul style="list-style-type: none"> Mission Motto Slogan Symbol Creed Degree program SAE program CDE program Science as a process <ul style="list-style-type: none"> scientific method experimental design 	<ul style="list-style-type: none"> Define various terms Recall and explain the FFA symbol, mission, motto, slogan and creed Design and begin to carryout a personal SAE Design and begin to carryout a 9th grade project Outline the steps of the scientific method Recognize the components of a well designed experiment 	<ul style="list-style-type: none"> 9th Grade Project analyze CDE control data dependent variable experiment FFA FFA creed FFA motto FFA slogan FFA symbol hypothesis independent variable qualitative quantitative SAE sample size science scientific law scientific method theory trial variable 	Starting Gate Test: Written Covers FFA standards and objectives. In canvas. Science and Agriculture Test: Written Covers scientific method standards and objectives.

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	<p>emblem and parts of the emblem, and organizational structure of FFA.</p> <p>e. Recite and explain the meaning of the FFA Creed.</p> <p>f. Discuss the meaning and purpose of a program of activities and its committee structure.</p> <p>g. List FFA chapter officers, and discuss the role of each.</p> <p>Objective 2 Identify opportunities in FFA.</p> <p>a. Describe FFA opportunities that develop leadership skills, personal growth, and career success.</p> <p>b. Summarize major state and national activities available to FFA members.</p> <p>Objective 3 Describe FFA degrees, awards, and career development events (CDEs).</p> <p>a. List and explain the FFA degree areas.</p> <p>b. Identify FFA proficiency awards.</p> <p>c. List and discuss various team and individual CDEs.</p>	<p>is well documented</p>				

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	<p>Standard 2 Students will explain the role of supervised agricultural experience (SAE) programs in agricultural education.</p> <p>Objective 1 Examine the responsibilities and benefits associated with an SAE.</p> <ul style="list-style-type: none"> a. Explain the meaning and benefits of supervised agricultural experience. b. Explain the characteristics of an effective SAE program and the responsibilities of those involved. <p>Objective 2 Determine the types of SAE programs.</p> <ul style="list-style-type: none"> a. Compare entrepreneurship SAEs and placement SAEs. b. Describe research/experimentation SAEs. c. Describe exploratory SAEs. <p>Objective 3 Plan an SAE</p>					

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	<p>program.</p> <p>a. Identify the steps in planning an SAE program.</p> <p>b. Describe the function of a business/training plan and/or agreement in an SAE program.</p> <p>c. Develop a short-range plan and a long-range plan for an SAE program.</p> <p>d. Relate classroom and laboratory instruction to an SAE program.</p> <p>Objective 4 Maintain and use SAE records.</p> <p>a. Explain the importance of keeping records on an SAE program.</p> <p>b. Explain how SAE records are organized.</p> <p>c. Follow approved procedures to make entries in SAE records.</p>					
<p>The Whole House (Week 5, 4 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • How is life on Earth like a big spider web? 	<p>Levels of Organization:</p> <ul style="list-style-type: none"> • Organism • Population • Community • Ecosystem • Biome 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Define vocabulary terms • Outline the relationships that exist 	<ul style="list-style-type: none"> • abiotic • biotic • carbon cycle • carnivores • community • competition • conservation 	<p>The Whole House Test Summative: Written Covers ecology standards and</p>

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		<ul style="list-style-type: none"> • What did you eat for breakfast? • Are you spending your children's inheritance? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • Humans are one strand in the web of life • Every living thing is connected to others in the web of life • Energy and matter cycle in our living world • For our own sake, people who do agriculture need to be smart and careful 	<ul style="list-style-type: none"> • Biosphere <p>Connections:</p> <ul style="list-style-type: none"> • Food chains and food webs • Energy pyramid and trophic levels • Symbiosis • Predation • Competition <p>Cycles:</p> <ul style="list-style-type: none"> • Hydrologic • Carbon • Nitrogen • Phosphorus <p>Roles:</p> <ul style="list-style-type: none"> • Niche vs. habitat <p>Consevation:</p> <ul style="list-style-type: none"> • Biodiversity • Invasive species • Extinction • Sustainable agriculture 	<ul style="list-style-type: none"> • between various trophic levels • Design and create an ecosystem in an aquarium • Design and carryout an experiment regarding the relationships and balance of life in the ecosystem in the aquarium • Collect and analyze personal and class-wide data with respect to the ecosystems in the aquariums • Draw conclusions based on the results of your experiment and your classmates' experiments regarding your ecosystems in an aquarium • Critique a current environmental issue 	<ul style="list-style-type: none"> • consumers • decomposers • detritivores • diversity • ecosystem • energy pyramid • food chain • food web • herbivores • limiting factor • nitrogen cycle • oxygen cycle • population • predator • prey • producers • species • symbiosis • top carnivores • trophic level 	<p>objectives. In canvas</p>

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Life's Chemistry and Energy (Week 9, 3 Weeks)		Essential Questions: <ul style="list-style-type: none"> • Got water? • Did you know that you are busy building and tearing apart trains? • In what way are plants and animals perfect partners? • What are the workers that do this thing we call <i>life</i>? 	Chemistry: <ul style="list-style-type: none"> • Elements and atomic structure • Chemical bonding (ionic, covalent, hydrogen) • Properties of water • Compounds, molecules, and solutions • Chemical reactions 	<ul style="list-style-type: none"> • Define various terms • Document experimental work done in the greenhouse • Distinguish between carbohydrate, lipid, protein, and nucleic acid • Outline how macromolecules are synthesized and degraded • Explain how cellular respiration and photosynthesis are antagonistic 	<ul style="list-style-type: none"> • adhesion • antagonism • carbohydrate • chemical reaction • chlorophyll • cohesion • enzyme • fermentation • lipid • monomer • nucleic acid • photosynthesis • polymer • protein • respiration • solute • solution • solvent 	Life's Chemistry and Energy Test Summative: Test: Written Covers metabolism and chemistry standards and objectives. In canvas.
		Enduring Understandings: <ul style="list-style-type: none"> • Every thing is made of atoms • Life happens in water • Life is famous for making macromolecules • Life requires an input of energy • We get our energy from what we eat • Photosynthesis is using 	Biochemistry: <ul style="list-style-type: none"> • Macromolecules (carbohydrates, lipids, proteins, nucleic acids) • Polymer synthesis and degradation 			
			Energy and life: <ul style="list-style-type: none"> • Photosynthesis • Respiration • Antagonism 			

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		<ul style="list-style-type: none"> light energy to build sugar Respiration is breaking sugar apart and getting the energy out of it 				
Living Compartments <i>(Week 12, 2 Weeks)</i>		<p>Essential Questions:</p> <ul style="list-style-type: none"> Why does this thing we call <i>life</i> only happen in cells? How is the cell like a factory? What would you like to be when you grow up? What side of the fence are you on? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> Life happens in cells Structures (parts) have functions (jobs) 	<p>Cell structures and functions:</p> <ul style="list-style-type: none"> Specific organelles and functions Factory analogy <p>Cell membrane:</p> <ul style="list-style-type: none"> Permeability and diffusion Transport (passive and active) Equilibrium (hypo, hyper, and isotonic) 	<ul style="list-style-type: none"> Define various terms Document experimental work done in the greenhouse Explain how "form fits function" Distinguish between passive and active transport Identify when a cell is in each of the following conditions: <ul style="list-style-type: none"> hypotonic hypertonic isotonic 	<ul style="list-style-type: none"> active transport cell membrane cell theory cell wall chloroplast diffusion equilibrium ER eukaryotic function golgi apparatus homeostasis lysosome microorganism mitochondria nucleus organelle organic osmosis 	<p>Living Compartments Test Summative: Written</p> <p>Covers cell standards and objectives. In canvas.</p>

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		<ul style="list-style-type: none"> Life requires an input of energy 		<ul style="list-style-type: none"> Explain why osmosis occurs 	<ul style="list-style-type: none"> passive transport prokaryotic ribosome structure vacuole 	
<p>Copycat Cells (Week 14, 2 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> How does mitosis make copy cat cells? Have you ever been chased down a mountain by a run-a-way truck? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> Mitosis makes copy cat cells Cancer is like a runaway truck Many cancers can be prevented Different types of cells 	<p>Reproduction:</p> <ul style="list-style-type: none"> Sexual Asexual Cellular <p>Cell Cycle:</p> <ul style="list-style-type: none"> Phases (G1, Interphase, G2, Mitosis, Cytokinesis) <p>Mitosis:</p> <ul style="list-style-type: none"> Phases (Prophase, Metaphase, Anaphase, Telophase) Chromosomes <p>Cell Division:</p> <ul style="list-style-type: none"> Plant vs Animal <p>Cell differentiation: Pluripotent:</p>	<ul style="list-style-type: none"> Define various terms Document experimental work done in the greenhouse Analyze experimental results Distinguish between sexual and asexual reproduction Outline the phases of the cell cycle Outline the phases of mitosis Distinguish between cell division in plant and animal cells Characterize cancer in the context of cell reproduction 	<ul style="list-style-type: none"> anaphase asexual reproduction cancer cell division centrioles centromere chromatin chromosome cytokinesis differentiation embryo interphase metaphase mitosis pluripotent prophase sexual reproduction sister chromatid stem cell telophase totipotent tumor 	<p>Copy Cat Cells Test Summative: Test: Written Covers cell cycle standards and objectives. In canvas.</p>

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			<p>do different things</p> <p>Cancer:</p> <ul style="list-style-type: none"> • Characterization • Causes • Cures and treatments 			
<p>Parents to Kids (Week 16, 3 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • Does nature make clones? • Why are we all different? • What are the chances? • What did your parents give you? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • Asexual reproduction produces clones • Sexual reproduction produces variation • Meiosis is like mitosis done twice 	<p>Sexual and Asexual Reproduction:</p> <ul style="list-style-type: none"> • Pros and cons • Outcomes • Processes <p>Meiosis:</p> <ul style="list-style-type: none"> • Phases (I and II) • Chromosomes • Diploid vs. haploid • Somatic and germ cells <p>Inheritance:</p> <ul style="list-style-type: none"> • Probability (P through F3) • Punnett Squares 	<ul style="list-style-type: none"> • Define vocabulary terms • Distinguish between sexual and asexual reproduction in terms of pros and cons • Design and conduct an experiment regarding the inheritance of a visible trait using guppies as the model organism • Construct a pedigree chart that depicts the results of your experiment. • Draw conclusions based on the 	<ul style="list-style-type: none"> • allele • asexual reproduction • bioethics • chromosome • diploid • dominant trait • fertilization • gamete • gene • genotype • germ cell • haploid • heterozygous • homozygous • hybrid • inheritance • karyotype • meiosis • pedigree • phenotype • polygenic 	<p>Parents to Kids Test Summative: Test: Written Covers inheritance standards and objectives. In canvas.</p>

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		<ul style="list-style-type: none"> • Meiosis produces variation • Parents give their offspring genes which code for traits • The specific traits that an offspring inherits is due to chance 	<ul style="list-style-type: none"> • Modes (simple, sex-linked, polygenic) • Dominant and recessive alleles • Genotype and phenotype 	<p>results of your experiment with respect to modes of inheritance (dominant, recessive, and sex-linked)</p>	<ul style="list-style-type: none"> • purebred • recessive trait • sex linked • sexual reproduction • somatic cell 	
<p>DNA: Life's Information Molecule (Week 19, 3 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • What told you to be you? • What is the magic of DNA? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • DNA codes for life • The sequence of the bases in DNA is the message • Because As match with 	<p>DNA structure:</p> <ul style="list-style-type: none"> • Backbone • Nucleotide • Complimentary bases • Sequence <p>Genetic Information and Protein Synthesis:</p> <ul style="list-style-type: none"> • Genes • Replication • Transcription • Translation • Protein function 	<ul style="list-style-type: none"> • Define various terms • Construct an accurate model of DNA • Model DNA replication • Outline the steps of protein synthesis • Document experimental work done in the greenhouse • Collect and analyze personal and class-wide data with respect to the 	<ul style="list-style-type: none"> • amino acid • base • complimentary bases • DNA • DNA polymerase function • gene • mRNA • nucleotide • polypeptide chain • protein • replication • RNA polymerase • rRNA • sister chromatid • transcription 	<p>DNA: Life's Information Molecule Test Summative: Test: Written Covers DNA structure and function standards and objectives.</p>

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		<p>Ts and Cs match with Gs, each side of the DNA molecule can serve as a template to make the other sides</p> <ul style="list-style-type: none"> Proteins do life 		<p>ecosystems in the aquariums</p> <ul style="list-style-type: none"> Draw conclusions based on the results of your experiment and your classmates' experiments regarding your ecosystems in an aquarium 	<ul style="list-style-type: none"> translation tRNA 	
<p>Genetics Not as Expected (Week 22, 2 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> Have you ever not gotten what you expected? Does Nature ever make mistakes? Do you think that it's okay to fiddle with DNA? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> Genetic alterations may be caused by random "mistakes" or 	<p>Genetic Alterations:</p> <ul style="list-style-type: none"> Molecular Chromosomal Causes <p>Nondisjunction:</p> <ul style="list-style-type: none"> Process Karyotype examples <p>Genetic Engineering:</p> <ul style="list-style-type: none"> Examples <p>Bioethics:</p> <ul style="list-style-type: none"> Pre-embryo screening 	<ul style="list-style-type: none"> Define vocabulary terms Distinguish between various types of molecular and chromosomal alterations. Distinguish between normal gametogenesis and that of nondisjunction Outline in general terms how genetic engineering is accomplished Evaluate various biotechnological advances in 	<ul style="list-style-type: none"> artificial cloning deletion gene splicing insertion inversion karyotype mutagen mutation natural nondisjunction recombinant DNA technology teratogen 	<p>Genetics Not as Expected Test Summative: Test: Written Covers inherited disorders and mutations standards and objectives. In canvas.</p>

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		<ul style="list-style-type: none"> by environmental insults • Nondisjunction results in gametes that have the incorrect number of chromosomes • Genetic engineering involves moving DNA from one organism to another • There are many beneficial uses of genetic engineering in agriculture 	<ul style="list-style-type: none"> • Gene Therapy 	<ul style="list-style-type: none"> terms of their appropriateness • Document experimental work done in the greenhouse 		
<p>Change Through Time (Week 24, 3 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • How old is this old earth? • Is evolution a fact, a theory, or both? • How would you feel if you were brought to 	<p>Theory vs. Law:</p> <ul style="list-style-type: none"> • Evolution as a fact • Evolution as a theory <p>Evidence:</p> <ul style="list-style-type: none"> • Artificial and natural selection 	<ul style="list-style-type: none"> • Define vocabulary terms • Explain the evidences that support Darwin's Theory of Evolution • Design and carryout an experiment using guppies 	<ul style="list-style-type: none"> • adaptation • artificial selection • biodiversity • evidence • evolution • extant • extinct • fossil record • gene pool 	<p>Change Through Time Test Summative: Written Covers evolution standards and objectives. In canvas.</p>

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		<p>trial and declared "guilty" but no evidence had been presented?</p> <ul style="list-style-type: none"> Is Adam Ape turning into Harry Human during Adam Ape's lifetime an example of evolution? Can we watch evolution happen? Do you think that there is more to the story of life on Earth than evolution alone? 	<ul style="list-style-type: none"> Fossil record Comparative morphology Comparative embryonic development Comparative molecular genetics <p>Counter arguments:</p> <ul style="list-style-type: none"> Darwin's black box 	<p>as the model organism that verifies evolution as a process.</p> <ul style="list-style-type: none"> Collect and analyze personal and class-wide data with respect to the experiments that are conducted. Draw conclusions based on the results of your experiment and your classmates' experiments regarding evolution as a process. Debate the Theory of Evolution vs. Creationism 	<ul style="list-style-type: none"> geologic record homologous inference molecular selection population scientific law speciation successful reproduction The Theory of Evolution theory vestigial structure 	
		<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Evolution is a fact; our living world has changed and is changing through time The idea that our living world 				

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		<p>is solely the product of evolution by means of natural selection is a theory – the Theory of Evolution</p> <ul style="list-style-type: none"> • The earth is really really old • There is a lot of evidence to support the Theory of Evolution • There may be more to the story of life on Earth than evolution alone • Evolution is a population and a generations thing 				
<p>Grouping Life (Week 27, 2 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why do people classify stuff, say music for example? 	<p>Biological Classification:</p> <ul style="list-style-type: none"> • Scheme • Concept of species 	<ul style="list-style-type: none"> • Classify various organisms using a dichotomous key • Document experimental work done in 	<ul style="list-style-type: none"> • binomial nomenclature • cladogram • classification scheme • classify • dichotomous key 	<p>Grouping Life Test Summative: Written Covers classification and taxonomy</p>

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		<ul style="list-style-type: none"> Who are you related to? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> Scientists classify our living world to organize and understand it Every species has a unique scientific name 	<ul style="list-style-type: none"> Nomenclature 	<ul style="list-style-type: none"> the greenhouse Collect and analyze personal and class-wide data with respect to the experiments that are conducted. 	<ul style="list-style-type: none"> kingdom scientific name species taxonomy 	<p>standards and objectives. In canvas</p>
<p>Food Makers (Week 29, 2 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> Why don't plants eat food? What is it about a plant's leaf that makes it a perfect sugar factory? Did you know that Utah has the largest known living organism? 	<p>Plant Characteristics: Plant Anatomy and Physiology:</p> <ul style="list-style-type: none"> Roots, stems, and leaves Vascular tissues <p>Photosynthesis:</p> <ul style="list-style-type: none"> Process Role in ecology and agriculture 	<ul style="list-style-type: none"> Define various terms Document experimental work done in the greenhouse Collect and analyze personal and class-wide data with respect to the experiments that are conducted. Outline the process of photosynthesis 	<ul style="list-style-type: none"> carbon dioxide function leaf multicellular nonvascular organ organ system organism photosynthesis root stem stomate structure sugar tissue 	<p>Food Makers Test Summative: Written Covers plant standards and objectives. In canvas.</p>

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		<p>Enduring Understandings:</p> <ul style="list-style-type: none"> • Plants make their own food • A plant's leaf is a perfect sugar factory • Many plants reproduce both asexually and sexually • Energy is the ability to do work – move things • Life requires an input of energy • Photosynthesis is using light energy to build sugar 		<ul style="list-style-type: none"> • Explain the critical role of photosynthesis in Earth's overall ecology and agriculture 	<ul style="list-style-type: none"> • transpiration • vascular 	
<p>Food Eaters (Week 31, 2 Weeks)</p>		<p>Essential Questions:</p> <ul style="list-style-type: none"> • Why do you eat food? • What are the systems that together make you you? 	<p>Animal Classification:</p> <ul style="list-style-type: none"> • Animal characteristics • Phyla (poriferans through chordata) 	<ul style="list-style-type: none"> • Define various terms • Document experimental work done in the greenhouse • Collect and analyze personal and class-wide 	<ul style="list-style-type: none"> • antibody • antigen • circulatory system • digest • digestive system • endocrine system • excretory system 	<p>Food Eaters Test Summative: Test: Written Covers animal standards and objectives. In canvas.</p>

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		<p>Enduring Understandings:</p> <ul style="list-style-type: none"> Animals get their energy from their food We get our energy from what we eat Respiration is breaking sugar apart and getting the energy out of it It takes all of the systems working together at all levels to maintain homeostasis Animal systems are groups of organs that all work together to perform a higher function 	<ul style="list-style-type: none"> Vertebrate classes (fishes through mammals) <p>Animal Systems:</p> <ul style="list-style-type: none"> Evolutionary advancements System survey (Integumentary through Nervous) 	<p>data with respect to the experiments that are conducted.</p> <ul style="list-style-type: none"> Distinguish between plants and animals Characterize prominent animal phyla Characterize prominent vertebrate classes Characterize the prominent animal systems in terms of structures and functions 	<ul style="list-style-type: none"> gland hormone immune system integumentary system muscular system nerve impulse nervous system reproductive system respiration respiratory system skeletal system 	
	<p>Finish Line (Week 33, 5 Weeks)</p>					<p>Course Practice Test With Resources</p>

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						<p>Formative: Test: Written Covers course content. In canvas.</p> <p>Course Post- Test Without Resources</p> <p>Summative: Test: Written Covers course content. In canvas.</p>