

FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT



Agriscience 2: The Chemistry of Soil, Plants and Animals

Board Approval Date: June 18, 2025	Course Length: 2 Semesters
Grading: A-F	Credits: 5 Credits per Semester
Proposed Grade Level(s): 10, 11	Subject Area: Chemistry, CTE Elective Area (if applicable):
Prerequisite(s): Agriscience 1	Corequisite(s):
CTE Sector/Pathway: Agriculture and Natural Resources	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (d) Laboratory Science	
Graduation Requirement: No	
Course Intent: Site Specific Program (if applicable): CTE	
Folsom Cordova Unified School District 2024-2025 Nondiscrimination Statement The Folsom Cordova Unified School District prohibits discrimination, intimidation, harassment (including sexual harassment) or bullying based on a person's actual or perceived ancestry, color, disability, gender, gender identity, gender expression, immigration status, nationality, race or ethnicity, religion, sex, sexual orientation, or association with a person or a group with one or more of these actual or perceived characteristics. For questions or complaints, contact: Jim Huber, Ed.D., Assistant Superintendent, Educational Services Compliance Officer, Section 504 Coordinator, ADA Coordinator (students) jhuber@fcusd.org 916-294-9000 x 104580 Shannon Diaz, Director of Compliance Compliance Officer and Title IX Coordinator sdiaz@fcusd.org 916-294-9000 x 104415	

**1965 Birkmont Drive
Rancho Cordova, CA 95742**

The Folsom Cordova Unified School District does not discriminate on the basis of sex and prohibits sex discrimination in any education program or activity that it operates, as required by Title IX and its regulations, including in admission and employment.

Inquiries about Title IX may be referred to the Folsom Cordova Unified School District's Title IX Coordinator, the U.S. Department of Education's Office for Civil Rights, or both. The District Title IX Coordinator is:

**Shannon Diaz, Director of Compliance
Compliance Officer and Title IX Coordinator
sdiaz@fcusd.org
916-294-9000 x 104415
1965 Birkmont Drive
Rancho Cordova, CA 95742**

The District nondiscrimination policy can be located at:

<https://www.fcusd.org/district/about-us/nondiscrimination-statementpolicy>

The District's nondiscrimination complaint procedures can be located at:

Students: <https://www.fcusd.org/departments/compliance/complaints/uniform-complaints>

Staff: <https://www.fcusd.org/departments/compliance/complaints/nondiscrimination-in-employment>

To report information about conduct that may constitute sex discrimination or sex-based harassment, or make a complaint of sex discrimination or sex-based harassment under Title IX, please refer to:

Students: <https://www.fcusd.org/district/about-us/title-ix-notificationsexual-harassment>

Staff: <https://www.fcusd.org/departments/compliance/complaints/sexual-harrassment-title-ix>

COURSE DESCRIPTION:

The Chemistry of Soils, Plants, and Animals is a hands-on, laboratory-based course that explores the chemical principles vital to agricultural science. Aligned with chemistry standards, this course examines the chemistry underlying soil properties, plant nutrition, and animal health, integrating agricultural applications with core scientific principles. Students will delve into soil chemistry and fertility, analyze plant and animal nutrient cycles, investigate water quality in agricultural contexts, and explore chemical interactions impacting crop and livestock production.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Introduction to Agricultural Chemistry	What role do chemical processes play in the life cycles of plants and animals?	*Group discussions analyzing case studies where chemistry improves agricultural practices (e.g., fertilization, pest control)	*A reflective essay on the impact of agricultural chemistry on food production and sustainability
HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.			
2. Soil Composition and Chemistry	What chemical properties of soil contribute to plant health?	*Guided practice on reading soil test reports, focusing on chemical indicators	*Lab report detailing the chemical properties of a soil sample and its suitability for various crops
HS-PS1-1: Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. HS-PS1-3 3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. (chemical properties of substances)			
3. Plant Chemistry and Photosynthesis	What are the chemical pathways in photosynthesis, and why are they essential for agriculture?	*Hands-on experiment: Measuring the rate of photosynthesis under different light conditions	*Research report on how varying environmental factors impact the photosynthetic efficiency of crops
HS-PS1-2: Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.			
4. Soil Fertility and Nutrient Cycles	What role does chemistry play in nutrient cycles within soil ecosystems?	*Soil testing activity, where students apply fertilizers and analyze the nutrient changes	*Lab reports on the effects of different fertilizers on soil

			chemistry and plant growth
C10.0 Explain soil science principles.			
5. Animal Nutrition and Biochemistry	What biochemical components are necessary for animal growth and health?	*Digestion lab: Students simulate enzymatic breakdown of macronutrients	*Diagram and explain the process of cellular respiration, linking it to dietary needs
HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs C6.0 Explore animal anatomy and systems. C8.0 Understand fundamental animal nutrition and feeding.			
6. Water in Agricultural Systems	How does water chemistry impact soil quality and plant growth?	* Group discussion on water cycle's role in agriculture and environmental impact	*Water management plan for a farm that considers chemical water properties and crop needs
HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.			
7. Chemical Control of Pests and Diseases	What are the benefits and risks of chemical pest control in agriculture?	*Case study analysis on common agricultural chemicals and their environmental impact	*Lab experiment on the effect of a safe pesticide on a sample plant
HS-PS1-5 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs HS-PS1-6: Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.* C12.0 Understand fundamental pest management.			
8. Animal Physiology and Endocrine Chemistry	What is the role of hormones in animal growth, health, and reproduction? How do chemical reactions occur within an animal's body systems?	*Diagram of endocrine system pathways, identifying key hormones and their functions	*Presentation on the chemistry of hormone production and how it impacts animal health
HS-PS1-7: Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.			
9. Biochemistry of	How can biochemistry inform regenerative	*A collaborative brainstorming session on	*Research project on a chosen regenerative

Regenerative Practices	practices in agriculture?	regenerative practices, with an emphasis on the chemistry underlying each practice	practice, detailing the chemical principles involved and its ecological impact
HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human Activity.			

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):

Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.

Link to Framework (if applicable):

Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.

Link to Subject Area Content Standards (if applicable):

Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.

<https://www.cde.ca.gov/ci/ct/sf/documents/agnatural.pdf>

Link to Program Content Area Standards (if applicable):

Program Content Area Standards apply to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.

<https://www.cde.ca.gov/ci/ct/sf/documents/ctestdfontpages.pdf>

TEXTBOOKS AND RESOURCE MATERIALS:**Textbooks**

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
<i>Yes</i>		<i>Principles of Agriculture, Food and Natural Resources 2nd Edition *Digital availability</i>	John S. Rayfield, Kasee L. Smith, Travis D. Park, and D. Barry Croom	John S. Rayfield, Kasee L. Smith, Travis D. Park, and D. Barry Croom	2nd Edition	<i>1/1/2023</i>