

Environmental Science Syllabus

Mrs. Kari Cruze

N-136

I. Course Description and Requirements

The goal of this course is to equip students with the knowledge and skills to understand and address environmental challenges. This includes learning about how natural systems function, how humans interact with the environment, and how to develop sustainable solutions for environmental problems. The focus is on interdisciplinary approaches, preparing students for careers in various environmental fields, including government, natural resources, conservation, and research.

Because experimentation is the basis of science, laboratory demonstrations and investigations are an integral part of this course. Students should be prepared to conduct projects each 9-weeks and write a formal lab report. At times students will work independently from the teacher to achieve student autonomy that will be expected of upper school students. Classes are structured to utilize every minute for learning and assessing understanding. Real world application is a daily objective. Higher-level thinking will be incorporated into each lesson as well as use of technology when applicable to increase student achievement. Students are expected to participate in all activities and actively engage and ask questions during teacher-led lectures. Students are also expected to review and study the content covered in class outside of school *daily*.

II. Class Expectations

- Students are expected to **be present** and active members of the classroom each day.
- Students are expected to come to class **prepared** with all necessary materials and completed assignments as well as a desire to learn and participate in all lectures and activities.
- Students are expected to **be respectful** of the teacher, the classroom, and their peers.

III. Class Discipline

Students who are not acting present, coming prepared, and being respectful will earn one of the following consequences:

- Warning in class
- Teacher/Student conference after class AND parent contact
- Written referral, removal from class AND parent contact

***Any student caught cheating on an assignment will receive a zero and immediate referral to the Assistant Principal.**

IV. Required Materials

All students must come to class each day with the following materials:

- 3 Ring Binder.
- Loose leaf college ruled paper
- Pencil/pen & highlighters
- Chromebook and charger
- Colored pencils, Glue/tape, and markers are optional as they are provided in class.

V. Late/Absent Work Policy

From the Student/Parent Handbook:

- **It is the responsibility of the student** to see that the requirements of the attendance policy are met and that all work missed is completed to the satisfaction of the teacher. This also applies when a student has been suspended from school.
- At a minimum, a student will be allowed three school days to complete the make-up work from an excused absence. More time for make-up work may be granted in special circumstances by making arrangements with the teacher involved.
- A student who does not have an assignment completed and ready to turn in the day the assignment is due will receive a twenty-percentage (20%) point deduction and will be given one additional day to turn in the assignment. Teachers are not required to accept a late assignment after the following day the assignment is due.
- A student is allowed two (2) late assignments **per semester**. After the second late assignment, the teacher may assign a grade of zero (0) for each subsequent late assignment. A student is responsible for arranging additional time with his/her teacher(s) if the situation warrants.

VI. Assessment and Grading Plan

We will cover eleven units over the course of the semester. Each unit consists of classwork, labs, quizzes, and unit assessments. Classwork is expected to be completed in class. In the event that it is not completed then the classwork becomes homework and will be due the following day. All assessments include both multiple choice and open response questions.

<u>1st 9 Weeks</u>	<u>2nd 9 Weeks</u>
Unit 1: Introduction to Environmental Science	Unit 6: Geosphere Unit 1- Plate Tectonics
Unit 2: Biosphere Unit 1- Basic Ecology	Unit 7: Geosphere Unit 2- Minerals, Mining, & Soil
Unit 3: Biosphere Unit 2- Species & Population Ecology	Unit 8: Geosphere Unit 3- Fossil Fuels & Renewable Energy
Unit 4: Biosphere Unit 3- Communities, Biomes & Biodiversity	Unit 9: Hydrosphere Unit 1- Surface water & Groundwater
Unit 5: Atmosphere & Biogeochemical Cycles	Unit 10: Hydrosphere Unit 2- Marine Biomes, Wetlands & Water Pollution
	Unit 11: Urbanization, Sustainable Forestry & Agriculture

*****Accessing Grades and Assignments:** Parents, if you want access to your student's grades and assignments in this class, follow these directions. Log on to the Franklin County School District website www.fcstn.net Scroll a little bit down the page. In the middle of the screen, find the SKYWARD logo and tap the "Student/Family Access". Type YOUR name as: first initial and last name (no capital letters) and 000. Your temporary password will be: pass1234. You will be asked to change your password. If this does not work for you please call FCHS Guidance at 931-967-2294 for assistance. *****

VII. Communication

Students and parents are encouraged to contact me via email. I will respond to all emails within 24 hours during the school week and can respond in much more detail and speed than if you attempt to call. *If you would like to schedule a conference, my planning is from 9:37-11:07 each school day except Wednesdays, when it is from 9:27-11:27.*

Email: kari.cruze@fcstn.net

FCHS Teacher Webpage: <http://fchs.fcstn.net/> Tap "School Staff" on the left column to find my teacher webpage and class information.

VIII. Standards

EVSC.LS2: Ecosystems: Interactions, Energy, and Dynamics

- 1) Using a variety of data sources, construct an explanation for the impact of climate, latitude, altitude, geology, and hydrology patterns on plant and animal life in various terrestrial biomes.
- 2) Develop an explanation of behavioral and physical adaptations organisms have for life in aquatic habitats with varying chemical and physical features.
- 3) Using mathematical models, support arguments regarding the effects of biotic and abiotic factors on carrying capacity for populations within an ecosystem.
- 4) Compare and contrast production (photosynthesis, chemosynthesis) and respiratory (aerobic respiration, anaerobic respiration, consumption, decomposition) processes responsible for the cycling of matter and flow of energy through an ecosystem. Using evidence, construct an argument regarding the importance of homeostasis in maintaining these processes in ecosystems.
- 5) Use a mathematical model to explain energy flow through an ecosystem. Using the first and second laws of thermodynamics, construct an explanation for: A) necessity for constant energy input; B) limitations on energy transfer from one trophic level to the next; and, C) limitations on number of trophic levels that can be supported.
- 6) Evaluate the interdependence among major biogeochemical cycles (water, carbon, nitrogen, phosphorus) in an ecosystem and recognize the importance each cycle has in maintaining ecosystem stability.
- 7) Examine stability and change within an ecosystem by using a model of succession (primary or

secondary) to predict impacts of disruption on an ecosystem.

EVSC.LS4: Biological Change: Unity and Diversity

- 1) Construct an explanation based on scientific evidence for mechanisms of natural selection that result in behavioral, anatomical, and physiological adaptations in populations.
- 2) Justify claims with scientific evidence that changes in environmental conditions lead to speciation and extinction.
- 3) Evaluate the impact of habitat fragmentation and destruction, invasive species, overharvesting, pollution, and climate change on biodiversity (genetic, species, and ecosystem).
- 4) Engage in argument from scientific evidence critiquing effectiveness of the Endangered Species Act. Give specific examples to support your argument.

EVSC.ESS2: Earth's Systems

- 1) Research the development of the theory of plate tectonics. Use the theory to construct an explanation for how changes in Earth's crust cause mountain formation, volcanoes, earthquakes, and tsunamis. Provide evidence to support the explanation using information pertaining to plate boundary types (divergent, convergent, transform).
- 2) Considering Earth's position within our solar system, use a model to demonstrate the causes of day length, seasons, and climate.
- 3) Analyze the composition of the Earth's atmosphere. Obtain information and use graphs to observe patterns regarding stability and change within the Earth's atmospheric composition (O₂, N₂, CO₂, etc.) over geologic time.
- 4) Differentiate weather and climate and analyze and interpret data examining naturally occurring patterns pertaining to each.
- 5) Plan and carry out an investigation examining the chemical and physical properties of water and the impact of water on Earth's topography. Analyze data and share findings.
- 6) Develop a model to explain soil formation and the flow of matter in the rock cycle.

EVSC.ESS3: Earth and Human Activity

- 1) Research Earth's natural resources (renewable and nonrenewable resources). Construct an argument from evidence supporting the claim that a particular type of resource is important for humans.
- 2) Interpret graphical data representing global human population growth over time. Look for patterns within this data and construct possible explanations for the patterns. Revise the explanations as needed based on research.
- 3) Obtain and evaluate information regarding demographics for a variety of countries. Construct an explanation for varying fertility rates and life expectancies between countries and throughout human history. Taking into account demographic transition, predict what trends are likely to occur in various countries over time.
- 4) Gather, organize, analyze, and present data on current land use trends by humans. Based on analysis, predict future trends.
- 5) Plan and carry out an investigation examining best management practices in water usage, agriculture, forestry, urban/suburban development, mining, or fishing and communicate findings.
- 6) Use a model to make predictions regarding the impact of topsoil loss due to erosion resulting from human activity. Design, evaluate, and revise a solution to preserve topsoil.
- 7) Construct an argument including claim, evidence, and scientific reasoning regarding the impact of the Green Revolution on agricultural practices, food availability, and the environment.
- 8) Research information on the environmental impacts of genetically modified organisms and engage in debate regarding pros and cons of this agricultural technology.
- 9) Evaluate ecosystem services provided by forest ecosystems. Construct an explanation for

human impact on these services.

10) Using scientific data, analyze effectiveness of conservation versus preservation efforts. Obtain and communicate information on organizations involved in protecting natural resources.

11) Define problems and suggest solutions associated with using, conserving, and recycling energy and mineral resources taking into account economic, social, and environmental costs and benefits.

12) Ask questions about technology needed to develop alternative energy sources and obtain information from various sources to answer those questions.

13) Analyze and interpret data on the effects of land, water, and air pollution on the environment and on human health. Propose solutions for minimizing pollution from specific sources.

14) Obtain and communicate information on environmental laws pertaining to the regulation of pollution and on regulatory agencies. Provide a specific example of how a given business/industry would comply with such regulations.

15) Evaluate current methods of waste management and reduction and design possible improvements.

16) Obtain, evaluate, and communicate scientific information tracing the breakdown of ozone caused by chlorofluorocarbons and the effectiveness of efforts to address this environmental problem.

17) Using mathematics and computational thinking, analyze data linking human activity to climate change. Design solutions to address human impacts on climate change.

18) Use mathematics to calculate ecological footprints. Develop a personal plan for reducing your impact on the environment.

EVSC.ETS2: Links Among Engineering, Technology, Science, and Society

1) Engage in argument from evidence on the role engineering and technology play in a sustainable human society.

2) Research and communicate information on an environmental science career. Analyze the role of society, engineering, technology, and science in that career.

EVSC.ETS3: Applications of Science

1) Plan and carry out an investigation of a local ecosystem to assess human impacts. Based on your findings, design and evaluate a solution to minimize impacts.