

# Vicksburg Community Schools Proposal Form with Guidance

Please review VCS General Guidelines for Program Review and Proposal Development prior to completion of this form. Send completed *Proposal Form* and supporting documents to the Curriculum office by March 1<sup>st</sup>.

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Title of Proposal: AP Environmental Science

Proposal Author(s): Tina Porter

Department and Curriculum Area: VHS Science

Building: VHS

Committee Members: Adam Brush, Tina Porter, Mandy Keiser

❖ This proposal is for: (put an X next to all that apply)

Textbook and other teaching resources (requires planned pilot process as part of the proposal request)

New courses or course revisions

Full program or curriculum area reviews

Program or curriculum area modifications

Supplemental Instructional/Intervention Resource

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Dates of Anticipated Review and Action: DCILT March, 2023 BOE March 2023

Principal's Signature(s): Adam Brush

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(To be completed by Director of Curriculum and Instruction upon receipt of proposal.)

Date Received: 1/19/23

Comments on proposal:

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RESPONSE:

Need more information: \_\_\_\_\_

Proceed as outlined in the proposal

Gail VanDoff

3/21/23

Director of Curriculum and Instruction

Date

[Signature]

3/21/23

Director of Technology

Date

I. **Proposal Background & Overview** – Write a narrative that includes *all* of the following:

- Relevant background/history.
- Problem or other basis for the proposal (i.e. student needs, etc.).
- Reasons for making the change.
- Targeted Continuous Improvement Goals

*The current VHS science graduation requirements are for students to take biology, and either chemistry or physics, and a third course. We offer several life science and physical science elective courses that can be used for the third course, including AP Biology, AP Chemistry, and AP Physics. However one science discipline is notably absent from our offerings- earth/environmental science. The Michigan Science Standards Earth Science objectives are currently worked into the required biology, chemistry, and physics courses with varying degrees of success. The news/media stories in MI are full of environmental issues such as drinking water contamination from PFAS and Lead, the deregulation of Palisades nuclear power plant, the threat of Asian Carp invading the Great Lakes, etc. Our students are in need of a course that will teach them not only the basic scientific principles of environmental science, but how to analyze data in order to make informed decisions regarding these issues. They need to develop critical thinking skills, not just advocate particular viewpoints. This will allow students to become more engaged in their community and the issues surrounding it. As a result, the VHS Science department would like to offer a new elective course, AP Environmental Science.*

*From the College Board, “The AP Environmental Science course is designed to engage students with the scientific principles, concepts, and methodologies required to understand the interrelationships within the natural world. The course requires that students identify and analyze natural and human made environmental problems, evaluate the relative risks associated with these problems, and examine alternative solutions for resolving or preventing them. Environmental science is interdisciplinary, embracing topics from geology, biology, environmental studies, environmental science, chemistry, math, and geography.”*

*AP Environmental Science will reinforce and expand upon NGSS Disciplinary Core Ideas, Science and Engineering Practices, and Common Core Literacy standards, and prepare them to take the College Board Exam in May. We believe by offering this course and increasing student engagement and exposure to science we will increase student science literacy and college readiness. Research has shown that enrollment in AP Courses increases student achievement, and students who take AP courses, regardless of their exam score, are more likely to be successful in college. Research has also shown that students learn best when they are actively engaged with content that has real-world applications and relevance to them, which this course has in abundance. By offering AP Environmental Science we would be giving students additional exposure to the MSS Earth/Environmental Science objectives in an engaging, rigorous course.*

*This will be an elective course, to be taken by upperclassmen after the completion of biology and chemistry/or physics.*

*Relevant portion of VCS Continuous Improvement Goal*

*Goal #1 “ 55% of High School Juniors will achieve a college ready score in math and EBRW as measured by the district and state assessments by June 15, 2024.*

*District Vision Statement*

*All students will graduate college and career ready.*

II. **Complete Description of Proposed Change(s)** – Write a narrative that includes *all* of the following:

- List all major changes, components and/or strategies of the proposal.
- Give rationale for each change (base the rationale on research or best practice information).
- Include new course/textbook title, course/textbook replaced, credit, and prerequisite(s).
- Attach the current standards, course outline, and/or general syllabus.

*A new AP Environmental Science course will be offered beginning in the fall of 2023. AP Environmental Science is geared toward 11-12th grade students who have taken Biology and Chemistry. (prerequisites recommended by the College Board). This course is an elective, and can be used to fulfill the 3rd science course graduation requirement.*

### **Proposed Topics/Syllabus**

<b>Unit</b>	<b>Unit Title</b>	<b>Topics</b>
1	<i>The Living World: Ecosystems</i>	1.1 Introduction to Ecosystems 1.2 Terrestrial Biomes 1.3 Aquatic Biomes 1.4 The Carbon Cycle 1.5 The Nitrogen Cycle 1.6 The Phosphorus Cycle 1.7 The Water Cycle 1.8 Primary Productivity 1.9. Trophic Levels 1.10 Energy Flow 1.11 Food Chains and Food Webs
2	<i>The Living World: Biodiversity</i>	2.1 Introduction to Biodiversity 2.2 Ecosystem Services 2.3 Island Biogeography 2.4 Ecological Tolerance 2.5 Natural Disruptions of Ecosystems 2.6 Adaptations 2.7 Ecological Succession
3	<i>Populations</i>	3.1 Generalist and Specialist Species 2.2 K-selected r-selected Species 3.3 Survivorship Curves 3.4 Carrying Capacity 3.5 Population Growth and Resource Availability 3.6 Age Structure Diagrams 3.7 Total Fertility Rate 3.8 Human Population Dynamics 3.9 Demographic Transition
4	<i>Earth Systems and Resources</i>	4.1 Plate Tectonics 4.2 Soil Formation and Erosion 4.3 Soil Composition and Properties 4.4 Earth's Atmosphere 4.5 Global Wind Patterns 4.6 Watersheds 4.7 Solar Radiation and Seasons 4.8 Earth's Geography and Climate 4.9 El Nino and La Nina
5	<i>Land and Water Use</i>	5.1 The Tragedy of the Commons 5.2 Clearcutting 5.3 The Green Revolution 5.4 Impacts of Agricultural Practices 5.5 Irrigation Methods 5.6 Pest Control Methods 5.7 Meat Production Methods 5.8 Impacts of Overfishing 5.9 Impacts of Mining 5.10 Impacts of Urbanization 5.11 Ecological Footprints 5.12 Introduction to Sustainability 5.13 Methods to Reduce Urban Runoff 5.14 Integrated Pest Management 5.15 Sustainable Agriculture 5.16 Aquaculture 5.17 Sustainable Forestry
6	<i>Energy Resources and Consumption</i>	6.1 Renewable and Nonrenewable Resources 6.2 Global Energy Consumption 6.3 Fuel Types and Uses 6.4 Distribution of Natural Energy Resources 6.5 Fossil Fuels 6.6 Nuclear Power 6.7 Energy from Biomass 6.8 Solar Energy 6.9 Hydroelectric Power 6.10 Geothermal Energy 6.11 Hydrogen Fuel Cell 6.12 Wind Energy 6.13 Energy Conservation
7	<i>Atmospheric Pollution</i>	7.1 Introduction to Air Pollution 7.2 Photochemical Smog 7.3 Thermal Inversion 7.4 Atmospheric CO <sub>2</sub> and Particulates 7.5 Indoor Air Pollutants 7.6 Reduction of Air Pollutants 7.7 Acid rain 7.8 Noise Pollution
8	<i>Aquatic and Terrestrial Pollution</i>	8.1 Sources of Pollution 8.2 Human Impacts 8.3 Endocrine Disruptors 8.4 Human Impacts on Wetlands 8.5 Eutrophication 8.6 Thermal Pollution 8.7 Persistent Organic Pollutants 8.8 Bioaccumulation 8.9 Solid Waste Disposal 8.10 Waste Reduction Methods 8.11 Sewage Treatment 8.12 Lethal Dose 50% 8.13 Dose Response Curve 8.14 Pollution and Human Health 8.15 Pathogens and Infectious Disease
9	<i>Global Change</i>	9.1 Ozone Depletion 9.2 Reducing Ozone Depletion 9.6 Ocean Warming 9.7 Ocean Acidification

	9.3 The Greenhouse Effect 9.4 Increase in Greenhouse Gases 9.5 Global Climate Change	9.8 Invasive Species 9.9 Endangered Species 9.10 Human Impacts on Biodiversity
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Grade	New Textbook Title/Instructional Resource	Previous Textbook/Instructional Resource To Be Replaced
11-12	Environmental Science for the AP Course 4th ed Friedland and Relyea	New

Please see the document linked below for the AP Environmental Science Course and Exam Description and the Next Generation Science Standards and Common Core correlations.

- <https://apcentral.collegeboard.org/media/pdf/ap-environmental-science-course-and-exam-description.pdf>
- <https://www.nextgenscience.org/standards/standards>

III. **Implementation Plan** – include *all* of the following:

- Give a full explanation of the implementation timeline, action items, and responsibilities for implementing.
- Itemize, in detail, all proposal costs. Include 1<sup>st</sup> year costs and a budget to maintain the proposal after implementation. Include resources needed to support change. (texts, soft/hardware, web-based license, consumables, training, substitute cost for training, equipment, personnel). *\*Include attachment if needed.*

a. Implementation strategies

Timeline	Action	Person(s) Responsible
Dec 2022	Write Curriculum Proposal	Tina Porter
Dec 2022	Submit course description in Red Book (for scheduling).	Tina Porter
Jan 2023	Submit Curriculum Proposal and Materials Request for new course	Tina Porter
Summer 2023	APSI- AP Summer Institute Training	Tina Porter
July-August 2023	Course Development	Tina Porter
Fall 2023	Full year course begins/Start utilizing new text and resources	Tina Porter

b. Proposal Costs

Description	Number Needed/ Cost per Unit	Total Cost	Funding Source
<i>Materials (add rows if needed)</i>			
Student Text (hardcover) <b>Environmental Science for the AP® Course 4th Ed</b> ©2023 Andrew Friedland; Rick Relyea	<u>35 student books x \$146.85</u>	\$5139.75 + \$ 325.24 shipping	District General Fund
Sapling Plus + online text	35 digital licenses x \$39.00 (6 years)	\$1365.00	District General Fund
Annotated Instructor’s Edition and Working Teacher Edition	2 Teachers Editions (Free)	\$0	NA
Laboratory Supplies	Itemized in <u>APES Materials List</u>	Year 1 - \$7426.83 Annual - \$900	District - Annual cost & Building - Year 1 costs
<i>Professional Learning/Summer Curriculum Work</i>			
Professional Learning APSI @ Community School of Naples ONLINE	Course Fee <u>\$735</u> <u>\$810 after 5/11/23</u>	\$1187	Title IIA
	Stipend 4 days for 1 person \$100+\$52/day	\$608	Title IIA
Summer Curriculum Work - Course development/Unit planning after APSI	Stipend 1 person for 2 days \$100+\$52	\$304	District General Fund
<b>Total Costs</b>	<b>\$ 16,356</b>		

IV. **Anticipated/Expected Impact** – include *all* of the following:

- List the anticipated proposal outcomes. Describe how the proposal will impact students, staff, and the instructional program. Include expected gains in student success. Include how this proposal articulates with other courses/levels in this subject area & across the curriculum.

- Increased student engagement while solving real-world issues.
- Students engaged in critical thinking and problem solving with higher order learning activities.
- Students will experience lessons and concepts as outlined by the College Board that also incorporate some of the Next Generation Science Standards cross-cutting concepts, science and engineering practices, and disciplinary core ideas.
- Students will improve scientific discourse with teachers and fellow students.
- Increase in science literacy and college readiness.

**V. Proposal Evaluation Plan and Student Achievement** – include *all* of the following:

- Explain how this proposal will be evaluated, the timeline used, what data is to be collected (survey results, national, state, district, or classroom assessments), and how the evaluation will be reported.

<b>How Proposal Will Be Evaluated (who, process)</b>	<b>Timeline</b>	<b>Data to Be Collected</b>	<b>How Evaluation Will Be Shared/Reported</b>
Analysis of Summative Assessments (classroom) - Tina Porter	After each unit/semester	Unit Tests/Midterm and Final Exam, AP Exam data	Shared with Science Team and admin
Analysis of state assessments - HS Science Team and Instructional Coach	Post MSTEP	MSTEP and SAT data when available	Shared with Science Team and admin
Analysis of Summative Assessments (College Board) - Tina Porter	Released in July after national exam	AP Exam	Shared with Science Team and admin
Collect and discuss classroom assessments - Tina Porter	After each unit	Informal student self assessments	Shared with Science Team and admin

**Prior to submitting this form, review your proposal using the checklist outlined under each section to ensure required information has been provided. Incomplete proposals will be returned.**