

HUDSONVILLE HIGH SCHOOL COURSE FRAMEWORK



COURSE / SUBJECT

Environmental Strategies A

KEY COURSE OBJECTIVES/ ENDURING UNDERSTANDINGS Important ideas and core processes	UNIT PACING Names of units and approximate pacing	UNIT LEARNING TARGETS By the end of the unit, students will be able to...	STANDARD Which standards (i.e. common core, MMC, etc.) does this address?
Environmental conscience starts at home where you live. Many students do not connect their choices to the environment around them. The vision of this class is to learn about the immediate environment around them through investigative practices and inquiry.	Soils study using the Muck fields and the Hudsonville Nature Center. 2 weeks	Students will be able to assess the condition of the soil using texture, color, and NPK testing. Students will use collaborative soil data to make connections with soil forming factors.	B2.3x Humans can have tremendous impact on the environment. Sometimes their impact is beneficial and sometimes it is detrimental.

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	Forestry and Forest Ecology 3.5 weeks	<p>Students will learn about the history of western MI.</p> <p>Students will learn that profession of forestry is the answer to forest sustainability.</p> <p>Students will also learn to appreciate and understand the value of a forest for its many non consumptive and consumptive uses.</p> <p>Students will be able to measure the DBH of a tree in order to find the biomass and carbon mass of a tree.</p> <p>Students will assess and determine the commercial timber values of the HNC.</p> <p>Students will graph tree placement of a tenth acre to estimate biomass and carbon mass of a stand of trees. From the data gathered during the tree density lab, students will propose a sustainability plan for the area studied.</p> <p>Students will conduct their own study of their own choosing at the Hudsonville Nature Center.</p>	<p>B2.3x Humans can have tremendous impact on the environment. Sometimes their impact is beneficial and sometimes it is detrimental. Ecological relationships between and among species and their environment.</p> <p>L2.p4 The number of organisms and populations an ecosystem can support depends on the biotic resources available and abiotic factors, such as quantity of light and water, range of temperatures and soil composition.</p> <p>L2.p5 All organisms can cause changes in the environment where they live. Recognize that and describe how human beings are part of the Earth's ecosystems. Note that human activities can deliberately or inadvertently alter the equilibrium.</p> <p>B2.R3 Locally, or in a larger geographical area such as the Great Lakes watershed, identify and describe an ecosystem.</p> <p>B2.1A Identify where energy is stored in an ecosystem.</p> <p>B2.4e Recognize that and describe how the physical or chemical environment may influence the rate, extent, and nature of population dynamics within ecosystems.</p> <p>B2.R1 Analyze and graph changes in an ecosystem resulting from natural causes, changes in climate, human activity, technology, or introduction of non-native species.</p>

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OVERARCHING/ESSENTIAL SKILLS OR QUESTIONS Ideas/skills that transcend discipline-specific learning	Water Quality on the Grand River Watershed. 3.5 weeks	Students will use chemical and physical testing methods to study the water quality of the Grand River, Rush and Buttermilk Creek. Students will use a Q-value system to summarize data. Students will study macroinvertebrates in order to determine the quality of Rush and Buttermilk Creeks. Students will also be educated on the land use issues in the area.	B1.1E Describe a reason for a given conclusion using evidence from an investigation.
Students will use inquiry to learn about land use and water in western Michigan.	Water Management - Sewers, Septic Tanks, Wastewater treatment plants 1.5 weeks	Students will develop an understanding of clean water management as it pertains to humans and the Grand River watershed.	B1.1E Describe a reason for a given conclusion using evidence from an investigation.
	Great Lakes Pollution .5 week	Student will learn about the history of Great Lakes water pollution and understand the necessity for management.	



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<p>The vision of this class is to educate students on the topic of Energy so that they will be able to make informed decisions about the current and future needs for themselves, their communities, the United States and world.</p> <p>This will be done through the process of inquiry. THINK GLOBAL/ ACT LOCAL</p>	<p>Coal</p> <p>2 weeks</p>	<p>Students will study the history and mining of coal and its importance in the U.S. economy.</p> <p>Students will be able to discuss the advantages and disadvantages of electrical power from coal and the environmental impacts it has.</p> <p>Students will use the internet websites to write a journal on the issue of coal.</p>	<p>See below.</p>

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	Petroleum/ Natural Gas 2 weeks	<p>Students will study the history and mining of petroleum and its importance in the U.S. economy.</p> <p>Students will be able to discuss the products of petroleum, their global demand, and the effects it has on the environment.</p> <p>Students will watch the video Fuel and keep a journal for discussion. Students will debate the issue of fracking.</p> <p>Students will use the internet websites to help inform the class on the latest technologies used to support nonrenewable energy.</p> <p>Students will use the internet websites to write a journal on the issues of petroleum and natural gas.</p>	<p>B1.2g Identify scientific tradeoffs in design decisions and choose among alternative solutions.</p> <p>B1.2i Explain the progression of ideas and explanations that leads to science theories that are part of the current scientific consensus or core knowledge.</p> <p>B1.2j Apply scientific principles or scientific data to anticipate effects of technological design decisions.</p> <p>B1.2k Analyze how science and society interact from a historical, political, economic or social perspective.</p> <p>B3.4d Describe the greenhouse effect and list possible causes.</p> <p>B3.4e List the possible and consequences of global warming.</p> <p>E5.4A Explain the natural mechanism of the greenhouse effect.</p> <p>B3.5B - Explain the influences that affect population growth</p>

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OVERARCHING/ESSENTIAL SKILLS OR QUESTIONS (ideas/skills that transcend discipline-specific learning)	Nuclear Energy 2 weeks	<p>Students will be able to discuss the advantages and disadvantages of uranium fuel for electricity.</p> <p>Students will be able to provide an argument for or against the use of nuclear energy.</p> <p>Students will design a capsule to contain simulated radioactive material.</p> <p>Students will use the internet websites to help inform the class on the latest technologies used to support nonrenewable energy.</p> <p>Students will use the internet to write a journal on the issue of nuclear energy.</p>	See above.

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<p>Trimester Exam Question: What should the energy profile look like for the United States in 10 yrs? 25 yrs? 100 yrs?</p> <p>Students will use what they have learned throughout the semester to answer this question for part of the exam.</p>	<p>Biofuels - Biodeisel / Ethanol and Beyond</p> <p>1 week</p>	<p>Students will investigate the energy differences between ethanol, kerosine, and biodiesel.</p> <p>Students will summarize the process in which biodiesel and ethanol is made.</p> <p>Students will discuss the energy and environmental challenges as it applies to biofuels.</p> <p>Students will investigate what raw material is best to produce of ethanol.</p> <p>Students will discuss the differences in ethanol production (corn vs. cellulosic).</p> <p>Students will use the internet to write a journal on the issue of biodiesel or ethanol.</p>	<p>See above</p>

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	Wind/ Solar Energy 3 weeks	Students will study the advantages and disadvantages of solar, wind, biomass. Students will investigate to see what rotor design creates the most power. Students will design experiments using PVC cells. Students will build and race solar cars on the HHS track. Students will use the internet to write a journal on wind and solar energy.	B1.2j Apply scientific principles or scientific data to anticipate effects of technological design decisions.
	Energy and YOU 1 week	Students will complete an energy survey and be able to suggest cost saving measures for their homes. Students will investigate products available that address energy efficiency and conservation. Students will design their own energy portfolio as they address their energy needs now and in the future. Students will use the internet to write two journals on Energy Innovations and Energy Economics	