



Environmental Science

Unit Focus

Throughout this Environmental Studies course students will learn the dynamic interaction between Earth's four spheres and the impact humans have on the environment. They will learn how to analyze local and global environmental issues through a wide variety of perspectives. Students will develop the skill of fully analyzing environmental issues through the lenses of: Politics, Economics, Society, Technology, Law and the Environment, by applying the PESTLE analysis tool. Throughout the course, students will understand the political forces connected to many environmental issues and consider the economic impact of decision makers, technological innovations and the varying impact on global and local stakeholders. Students will learn how to keep the earth healthy, the amazing scientific innovations that are occurring throughout the world and the varying impact people can have on the environment. The goal of the course is to empower students to deeply analyze, interpret or critique complementary and competing approaches, experiences, and world views to develop an empathetic perspective on local and global environmental issues.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Next Generation Science Standards Cross Cutting Concepts: High School - Much of science deals with constructing explanations of how things change and how they remain stable. (HS-LS2-6), (HSL2-7) (HS.IRE.CC.3.1) - Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible. (HS-ESS3-3) (HS.HS.CC.3.1) - Feedback (negative or positive) can stabilize or destabilize a system. (HSESS3-4) (HS.HS.CC.3.2) - Modern civilization depends on major technological systems. (HS-ESS3-1), (HSESS3-3) (HS.HS.CC.4.1) - New technologies can have deep impacts on society and the environment, including some that were not anticipated. (HS-ESS3-3) (HS.HS.CC.4.3) Disciplinary Core Ideas: High School - All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2) (HS.ESS3.A.2) - The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. (HS-ESS3-3) (HS.ESS3.C.1)	<i>Students will be able to independently use their learning to...</i> T1 Make observations and ask questions to define a problem based on prior knowledge and curiosity that stimulates further exploration, analysis, and discovery. T2 Evaluate scientific claims and analyze issues to verify the credibility of the source, data, and/or approach.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Scientists examine evidence to formulate interesting questions and solve problems. U2 People are continuously working to develop creative methods to solve many of the environmental crises that are impacting the health of our environment. U3 Solutions to environmental problems must take into account functionality, competing interests, stakeholders, constraints and viability of design.	<i>Students will keep considering...</i> Q1 How are ecosystems impacted by human activity? Q2 How can we design solutions that improve environmental quality while addressing competing interests?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 What is the difference between environmental science and environmentalism?	<i>Students will be skilled at...</i> S1 Collection and analysis of environmental data.

Stage 1: Desired Results - Key Understandings

- Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation. (HSESS3-4) (HS.ESS3.C.2)
- When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (secondary to HS-ESS3-2),(secondary to HS-ESS3-4) (HS.ETS1.B.1)

Science and Engineering Practices: High School

- Design, evaluate, and refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. (HS-LS2-7) (HS.IRE.SEP.2.1)
- Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. (HS-LS2-6) (HS.IRE.SEP.3.1)

Madison Public Schools Profile of a Graduate

- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)
- Alternate Perspectives: Interpret or critique complementary and competing approaches, experiences, and worldviews in order to develop an empathetic perspective. (POG.5.2)

K2 Many agencies exist in the government (local, state and federal) and outside of the government to collect data and oversee environmental impact of human activities.

K3 Models can help us understand many man-made environmental problems (from the ozone hole and acid rain formation) as a complex process involving the interdependence of many sphere of earth.

K4 Explain the differences between renewable and non-renewable energy sources and the economic, environmental and societal impacts.

K5 The combustion of fossil fuels is a major contributor to air pollution and climate change.

K6 Human activities alter natural processes.

K7 When humans transport species from their non-native habitats those organisms can become invasive and disrupt the ecosystem.

K8 Stakeholders have varying interests which makes it challenging to come up with effective solutions to the environmental problems facing Earth today.

S2 Analyze and explain an environmental issue scientifically. Cite evidence, consider and acknowledge alternate perspectives.