Pacing & Curriculum Guide

Environmental Science Course Description

GENERAL NOTES

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory and a technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers

Reading Standards for Literacy in Science and Technical Subjects (Grades 9-12)

Grades 9–10 Students:	Grades 11–12 Students:
Key Ideas and Details	
1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	1. Cite specific textual evidence to support analysis of science and technical texts, attendin important distinctions the author makes and to any gaps or inconsistencies in the account.
2. Determine the central ideas or conclusions of a text; trace the text's explanation or depi of a complex process, phenomenon, or concept; provide an accurate summary of the text.	2. Determine the central ideas or conclusions of a text; summarize complex concepts, processes or information presented in a text by paraphrasing them in simpler but still accurate terms.

3. Follow preoo pr te pr9.8 (on) (t)11o024.1 3-0.8 (r(p)-830.587 (te)1(24 1.9 (px015 TEM(

Writing Standards for Literacy in Science and

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are

Common Core State Standards for Mathematics: Mathematical Practices Grade K-12	
MP 1: Make sense of problems and persevere in solving them	Mathematically proficient students will • start by explaining to themselves the meaning of a problem and looking for entry points to its solution. • analyze givens, constraints, relationships, and goals. • make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. • consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. • monitor and evaluate their progress and change course if necessary. • explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. • check their answers to problems using a different method, and they can also ask themselves, “Does this make sense?” • understand the approaches of others to solving complex problems and identify correspondences between different approaches.
MP 2: Reason abstractly and quantitatively	Mathematically proficient students will • make sense of quantities and their relationships in problem situations. • bring two complementary abilities to bear on problems involving quantitative relationships: o the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents o the2 1 Tf 8.7948 -0 0 8.52 239.4 355.32 Tm ( )Tj /TT0 1 Tf14

MP 5: Use appropriate tools strategically	Mathematically proficient students will • consider the available tools when solving a mathematical problem. o o

Environmental Science Post Biology (Course number 2001340)

Guiding Questions	Learning Goals	Academic Vocabulary	Suggested Labs, Activities, and Video Resources
How does environmental science help us understand the natural world?	Explain the focus of environmental science. Describe the recent trends in human population and resource consumption.	environment environmental science environmentalism natural resource renewable natural resource nonrenewable natural resource sustainable fossil fuel ecological footprint	Ecological Footprint Calculations Activity Tragedy of the Commons Lab Double Bubble Map of Environmental Science vs. Environmentalism Ecological Footprint: Do We Fit On Our Planet? https://www.youtube.com/watch?v=g_aguo7V0Q4
What does it mean to "do science"?	Explain what science is. Describe the process of science.	hypothesis prediction independent variable dependent variable controlled study data	Green vs. Conventional Cleaners Lab (Teacher Resource CD) Go Outside: Meet the Trees Data Collection Lab
What happens to a scientific study after data have been gathered and the results are analyzed?	Describe the major roles of the scientific community in the process of science. Explain the study of environmental ethics.	peer review theory ethics environmental ethics	Can You Repeat That? Replication Quick Lab (Textbook pg. 2
How is sustainability affected by economics?	Describe 2 basic concepts of economics. Explain the relationship between economics and the environment. Describe ways that economies are working toward sustainability.	economics supply demand cost-benefit analysis ecological economics environmental economics non-market value market failure ecolabeling	Cost-Benefit Analysis Quick Lab (Textbook pg. 37)
How do environmental policies protect the environment?	Explain the purpose of environmental policy. Describe the history of U.S. environmental policy. Describe the direction of current U.S. environmental policy.	policy environmental policy Environmental Impact Statement (EIS)	Timeline of Environmental Policy Project

How can governments work with each other and citizens to form sound environmental policy?	Identify major international institutions involved in environmental policy. Discuss different approaches to environmental policy. List the steps involved in the environmental policy process.	command-and-control approach

What role does the environment play in an organism's survival and reproduction?	Describe the four primary mechanisms of biological evolution. Describe how speciation and extinction affect the diversity of life on Earth.	evolution gene mutation genetic drift natural selection fitness adaptation artificial selection speciation extinction	Artificial Selection in Dogs Activity http://www.mrsapora.com/uploads/1/6/1/9/16196938/evo_dog_arti_selec_activity.pdf Hand Adaptation Activity Natural Selection Explained Science Literacy Article https://www.teacherspayteachers.com/Product/Science-Literacy-Reading-41-Natural-Selection-Explained-Science-Sub-Plan-2302613 What is Natural Selection? https://www.youtube.com/watch?v=0SCjhI86grU What is Evolution? https://www.youtube.com/watch?v=GhHOjC4oxh8 Myths & Misconceptions of Evolution https://www.youtube.com/watch?v=mZt1Gn0R22Q&t=61s
How do species interact in nature?	Discuss the factors that influence an organism's niche. Compare and contrast predation, parasitism, and herbivory. Describe mutualism and commensalism.	niche tolerance resource partitioning predation coevolution parasitism symbiosis herbivory mutualism commensalism	Habitat vs. Niche Venn Diagram Activity Bozeman Science: Niche

Environmental Science: Post Biology (Course number 2001340)

What conditions and organisms characterize the world's aquatic ecosystems?	Describe the criteria ecologists use to classify aquatic ecosystems. List the major categories of freshwater ecosystems. Explain the ecological importance of estuaries. List the three major zones of the ocean.	salinity photic zone aphotic zone benthic zone littoral zone limnetic zone wetland flood plain estuary upwelling	Introduction to Ocean Zones Project http://www.cosee.net/best_activities/activity/Intro_to_Ocean_Zones.pdf

Unit 3: Human Impacts Recommended Pacing Quarter Three

How do chemicals in our environment affect our health?	Explain what makes chemicals hazardous. Discuss how chemical hazards affect human health. List some indoor chemical hazards. Discuss where chemical hazards can be found in the environment. Describe biomagnification.	pollution carcinogen teratogen neurotoxin asbestos, radon bioaccumulation biomagnificaiton	In Your Neighborhood Activity Scientific Method Lab Biomagnification in Bald Eagles Activity http://www.learnnc.org/lp/pages/2963?ref=search

Unit 4: Earth's Resources	Recommended Pacing: Quarter Three

Standards:

SC.912.L.16.1 Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.
SC.912.L.17.1 Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
SC.912.L.17.2 Discuss the political, social, and environmental consequences of sustainable use of land.
SC.912.L.17.3 Discuss the need for adequate monitoring of environmental parameters when making policy decisions.
SC.912.L.17.4 Assess the need for adequate waste management strategies.
SC.912.L.17.5 Discuss the effects of technology on environmental quality.
SC.912.L.17.6 Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, deforestation, and surface and groundwater pollution.
SC.912.L.17.7 Describe how human population size and resource use relate to environmental quality.
SC.912.L.17.8 Describe how different natural resources are produced and how their rates of use and renewal limit availability.
SC.912.L.17.20 Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Guiding Questions	Learning Goals	Academic Vocabulary	Suggested Labs, Activities, and Video Resources
How can we manage renewable resources for sustainable use?	Explain the importance of managing specific renewable resources. Describe 3 resource management approaches.	resource management maximum sustainable yield (MSY) ecosystem-based management adaptive management	Management Approaches – advantages and disadvantages (Textbook pg. 328)
How can resource managers strike a balance between the ecological and economic value of forest resources?	List some of the ecological and economical values of forest resources. Describe the costs and benefits of the different methods of timber harvesting. Discuss the current levels of deforestation in the U.S. and developing nations.	even-aged uneven-aged clear-cutting seed-tree approach shelterwood approach selection system deforestation old-growth forest	Quick Lab /P <<</MCID [(Q)1.2.4 235.2.0.004 Tc 0.004 Tw -6.

How has agriculture evolved?	Discuss the beginnings of agriculture. Explain the importance of industrial agriculture and the green revolution. Identify different types of pest control. Explain the importance of pollinators to agriculture.	traditional agriculture

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What are the effects of climate

What problems are associated with fossil fuel use?	Explain how pollutants released by fossil fuels damage health and the environment. Describe the environment and health effects of mining and drilling. Explain the implications of dependence on foreign nations for fossil fuels. Explain why energy conservation is	

How can we rely on the sun and wind for power?	Describe techniques for using solar energy to heat buildings and generate electricity. Analyze the benefit and costs of solar energy. Explain how wind energy can be used to produce electricity. Analyze the benefits and costs of wind energy.	passive solar heating active solar heating flat-plate solar collector photovoltaiccell concentrating solar power wind turbine wind farm	Scientific Method Lab Go Outside Lab – (Textbook pg. 564) Are Wind and Solar Energy Worth It? https://www.youtube.com/watch?v=2UCaCUH4BLY Store Wind Energy Underground https://www.youtube.com/watch?v=ji_DiGGqOhI Crazy Solar Power Plants https://www.youtube.com/watch?v=kbuLfXgw4Gs
How can we use hydrogen as a source of energy?	Describe how hydrogen fuel can be produced. Explain the way fuel cells work and how they are used.	electre usee?	

How can we best reduce the impact of hazardous waste?	Define hazardous waste. Describe some of the sources of hazardous wastes. Describe current methods for hazardous waste disposal. Describe the danger of radioactive wastes. Idee Tw 3.067 0pppppppp 1(l)-meb( )-13 (d)1 (an_667 Td ( )Tj EMC EW)-8. r12.3 (e)0.(e)0.7 (7 (c)-7i)-3.2 6oa30.6 (o)-10.4 (e)0 5 (st)-2.3 (ib (e)- /) 5 (st)	