

Environmental Science Scope and Sequence

| Unit of Study | Big Idea | Essential Questions | Resources | Standards |
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| Unit 1: Introduction to Environmental Science and Sustainability (Ch. 1.1, 1.2, 1.3, 2.1, 2.2, 2.3) | <ul style="list-style-type: none"> • Interdisciplinary Nature and Goals of Environmental Science • Natural Resource Use • Types of Environmental Impacts – Loss of Biodiversity, Pollution, Resource Degradation • Current Hunter-Gatherers, Agricultural Revolution, Industrial Revolution • Applying Scientific Method: Studying Human impacts on the Environment • Sustainability, Environmental Justice, and Environmental Decision-Making • Science Fair | <ul style="list-style-type: none"> ❖ Discuss the interdisciplinary nature and goals of environmental science. ❖ How do scientists uncover, research and solve environmental problems? ❖ What happens to scientific study after data have been gathered and results are analyzed? ❖ How can we best balance our own interests and needs with the health of the environment? ❖ What is sustainability? | Unit 1 People, Planet and Profit menu Chapter 1 & 2 Worksheets C01 WS 02-07 C02 WS 02-07 Chapter 1 & 2 Power Point Programs C01 PR & C02 PR Chapter 1 & 2 Labs C01 LB 01,03,05 C02 LB 01,03,05 Unit 1 Homework Packet Chapter 1 test A Chapter 1 test B Chapter 2 test A Chapter 2 test B | <p>NATURAL RESOURCE USE</p> <ul style="list-style-type: none"> ➤ 4.3.10.A Evaluate factors affecting the use of natural resources. ➤ 4.3.12.A Explain how consumption rate affects the sustainability of resource use. ➤ 4.3.10.A Evaluate the effect of consumer demands on the use of natural resources ➤ 4.3.12.B Analyze social, economic, and political factors that affect the distribution of natural resources (e.g. wars, political systems, classism, racism) ➤ 4.5.12.A Research how technology influences the sustainable use of natural resources. ➤ 4.5.12.A Analyze how consumer demands drive the development of technology enabling the sustainable use of natural resources. ➤ 4.5.10.E Analyze how consumer demands promote the production of pollutants that affect human health. <p>POLICY</p> <ul style="list-style-type: none"> ➤ 4.3.10.A Describe how local and state agencies manage natural resources. ➤ 4.2.12.B Investigate the intended and unintended effects of public policies and regulations (relating to wetlands). ➤ 4.5.10.A Explain how public policy encourages or discourages the sustainable use of natural resources <p>SUSTAINABILITY/CONSERVATION</p> <ul style="list-style-type: none"> ➤ 4.4.10.B Analyze the effects of (agriculture) on a society's economy, |

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| | | | | <p>environment, standard of living, and foreign trade.</p> <ul style="list-style-type: none">➤ 4.4.10.C Analyze how agricultural sciences and technologies strive to increase efficiency while balancing the needs of society with the conservation of natural resources.➤ 4.5.10.D Evaluate various methods of managing waste as related to economic, environmental and technological factors. |
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| <p>Unit 2: Biodiversity, Population (Ch. 4.1, 4.2, 4.3, 7.1, 7.2, 7.3, 8.1, 8.3)</p> | <ul style="list-style-type: none"> • Studying Ecology • Population Study and Trends • Biodiversity • Protecting Biodiversity <p>Applying Scientific Method: Studying Biodiveristy</p> | <ul style="list-style-type: none"> ❖ How do ecologists organize and study life? ❖ What factors determine whether and how a population's size changes? ❖ Why is biodiversity critical to life? ❖ How and why should biodiversity be protected and preserved? ❖ What factors influence the impact a population has on the environment? ❖ Compare population growth problems in developed/developing countries. | <p>Unit 2 Population menu</p> <p>Chapter 4, 7 & 8 Worksheets C04 WS 01-07 C07 WS 01-07 C08 WS 01-07</p> <p>Chapters 4,7 & 8 Power Point Programs C04 PR, C07 PR, and C08 PR</p> <p>Chapters 4, 7, & 8 Labs C04 LB 01, 03, 05 C07 LB 01, 03, 05 C08 LB 01, 03, 05</p> <p>Unit 2 Homework packet</p> <p>Chapter 4 test A Chapter 4 test B Chapter 7 test A Chapter 7 test B Chapter 8 test A Chapter 8 test B</p> | <ul style="list-style-type: none"> ➤ 4.1.10 Explain the concept of carrying capacity in an ecosystem. Examine the effects of limiting factors and population dynamics. Analyze possible causes of population fluctuations ➤ 4.3.12.B Compare the use of natural resources in different countries <p>HUMAN IMPACTS</p> <ul style="list-style-type: none"> ➤ 4.1.10.E Analyze how humans influence the pattern of natural changes (e.g. primary/secondary succession and desertification) in ecosystems over time. ➤ 4.1.12.E Research solutions to addressing human impacts on ecosystems over time. ➤ 4.3.10.A Evaluate the effect of consumer demands on the use of natural resources ➤ 4.3.12.A Explain how consumption rate affects the sustainability of resource use. |
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| <p>Unit 3: Ecosystems and Biomimicry (Ch. 3.2, 5.4, 6.1, 6.2)</p> | <ul style="list-style-type: none"> • Types of Ecosystems • Systems Thinking: Ecosystem Interconnectedness • Learning from Nature: Biomimicry | <ul style="list-style-type: none"> ❖ What biotic and abiotic factors are used to classify biomes? ❖ How do energy and nutrients move through communities? ❖ How do organisms respond, interact with and change with their surroundings? ❖ Explain the quote, “Nature, imaginative by necessity, has already solved many of the problems we face” ❖ How can nature be used in the human architectural process? | <p>Unit 3 Biomimicry menu</p> <p>Chapter 3, 5, and 6 Worksheets C03 WS 01-08 C05 WS 01-08 C06 WS 01-07</p> <p>Chapters 3,5,and 6 Power Point programs C03 PR, C05 PR, C06 PR</p> <p>Chapters 3, 5, and 6 Labs C03 LB 01 & 03 C05 LB 01, 03, 05 C06 LB 01 & 03</p> <p>Unit 3 Homework Packet</p> <p>Chapter 3 test A Chapter 3 test B Chapter 5 test A Chapter 5 test B Chapter 6 test A Chapter 6 test B</p> | <p>BIODIVERSITY</p> <ul style="list-style-type: none"> ➤ 4.1.12.A Analyze the significant of biological diversity in an ecosystem ➤ 4.1.12.A Analyze differences between natural causes and human causes of extinction. ➤ 4.1.12.A Research wildlife management laws and their effects on biodiversity. ➤ 4.1.10.B Explain the consequences of interrupting natural cycles ➤ 4.1.12.B Research solutions to problems caused by interrupting natural cycles. ➤ 4.1.10.C Evaluate the efficiency of energy flow with the food web. ➤ 4.1.12.B Research solutions to problems caused by interrupting natural cycles. ➤ 4.1.5.10.D Research practices that impact biodiversity in specific ecosystems. ➤ 4.1.5.10.D Analyze the relationship between habitat changes to plant and animal population fluctuations. ➤ 4.5.12.D Evaluate the impact of laws and regulations on reducing the number of threatened and endangered species. ➤ 4.2.10.A Examine the interactions between abiotic and biotic factors within a watershed. <p>POPULATION</p> <ul style="list-style-type: none"> ➤ 4.1.10 Explain the concept of carrying capacity in an ecosystem ➤ 4.1.10 Describe how limiting factors cause organisms to become extinct. ➤ 4.1.12.A Explain how species adapt to limiting factors in an ecosystem. |
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| | | | | <ul style="list-style-type: none">➤ 4.1.12.C Research how humans affect energy flow within an ecosystem➤ 4.2.10.C Explain how limiting factors affect the growth and reproduction of freshwater organisms.➤ 4.3.10.A Evaluate the effect of consumer demands on the use of natural resources4.3.12.A Explain how consumption rate affects the sustainability of resource use. |
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| <p>Unit 4: Water bioaccum/bio mag only) (Ch. 6.3, 14.1, 14.2, 14.3, 9.3)</p> | <ul style="list-style-type: none"> • Pollution • Watershed • Water Treatment Process • Water Pollution • Wetlands Conservation and Preservation • Storm water management | <ul style="list-style-type: none"> ❖ What conditions and organisms characterize the world’s aquatic ecosystems? ❖ How does water move through our ecosystems? ❖ How can we change the way we use water? ❖ How does water pollution affect humans and ecosystems? ❖ What are bioaccumulation and biomagnification? | <p>Unit 4 Water Menu</p> <p>Chapter 6, 9, and 14 Worksheets C06 WS 01-07 C09 WS 01-08 C014 WS 01-07</p> <p>Chapters 6, 9, and 14 Power Point programs C06 PR, C0 9 PR, C014 PR</p> <p>Chapters 6, 8, and 14 Labs C06 LB 01 & 03 C09 LB 01, 03, 05 C014 LB 01, 03, 05</p> <p>Unit 4 Homework Packet</p> <p>Chapter 6 test A Chapter 6 test B Chapter 9 test A Chapter 9 test B Chapter 14 test A Chapter 14 test B</p> | <p>WATERSHED</p> <ul style="list-style-type: none"> ➤ 4.2.10.A Describe how topography influences the flow of water in a watershed ➤ 4.2.10.A Describe how vegetation affects water runoff ➤ 4.2.10.C Explain the relationship between water quality and the diversity of life in a freshwater ecosystem. ➤ 4.2.10.C Explain how limiting factors affect the growth and reproduction of freshwater organisms. <p>WETLANDS</p> <ul style="list-style-type: none"> ➤ 4.2.10.B Examine how human interactions impact wetlands and their surrounding environments. ➤ 4.2.10.A Investigate and analyze the effects of land use on the quality of water in a watershed. ➤ 4.2.10.B Describe how land use decisions affect wetlands. ➤ 4.2.12.B Examine various public policies relating to wetlands. ➤ 4.2.12.B Analyze the effects of policies and regulations at various governmental levels on wetlands and their surrounding environments. ➤ 4.2.12.B Investigate the intended and unintended effects of public policies and regulations relating to wetlands. <p>POLLUTION</p> <ul style="list-style-type: none"> ➤ 4.5.10.C Analyze real-world data and explain how point and non-point source pollution can be detected and eliminated. ➤ 4.2.12.A Examine environmental laws related to land use management and its |
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| | | | | <p>impact on the water quality and flow within a watershed.</p> <ul style="list-style-type: none">➤ 4.2.12.C Analyze the effects of policies and regulations at various governmental levels on water quality.➤ 4.2.12.C Assess the intended and unintended effects of public policies and regulations relating to water quality.➤ 4.3.12.A Explain how consumption rate affects the sustainability of resource use.➤ 4.5.12.C Analyze the costs and benefits of means to control pollution.➤ 4.5.12.C Analyze the role of technology in the reduction of pollution.➤ 4.5.12.C Research and analyze the local, state and national laws that deal with point and non-point source pollution.➤ 4.5.12.C Explain mitigation and its role in maintaining environmental health.➤ 4.5.10.E Analyze efforts to prevent, control, and/or reduce pollution through cost and benefit analysis and risk management. |
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| <p>Unit 5: Agriculture, Land and Waste (Ch. 10.3, 12.2, 12.3, 12.4, 19)</p> | <ul style="list-style-type: none"> • Land-use Planning, Urbanization • Land Conservation and Preservation • Soil Contamination/Integrated Pest Management • Materials Economy: Story of Stuff • Reduce, Reuse, Recycle/Compost | <ul style="list-style-type: none"> • What are the characteristics of a sustainable city? • How do erosion, desertification, and soil pollution affect the productivity of soil? • How has agriculture evolved? • How can we produce enough food for a rapidly growing population while sustaining our ability to produce it? • How does our current waste disposal impact our environment? • What is the best way to manage our solid waste? • How can we best reduce the impact of hazardous waste? | <p>Unit 5 Land Menu</p> <p>Chapter 10, 12, and 19 Worksheets C010 WS 01-07 C012 WS 01-08 C019 WS 01-07</p> <p>Chapters 10, 12, and 19 Power Point programs C010 PR, C012 PR, C019 PR</p> <p>Chapters 10, 12, and 19 Labs C0 10 LB 01, 03, 05 C0 12 LB 01, 03, 05 C0 19 LB 01, 03, 05</p> <p>Unit 5 Homework Packet</p> <p>Chapter 10 test A Chapter 10 test B Chapter 12 test A Chapter 12 test B Chapter 19 test A Chapter 19 test B</p> | <p>LAND USE</p> <ul style="list-style-type: none"> ➤ 4.2.10.B Examine how human interactions impact wetlands and their surrounding environments. ➤ 4.2.10.B Describe how land use decisions affect wetlands. ➤ 4.2.10.A Investigate and analyze the effects of land use on the quality of water in a watershed. ➤ 4.1.5.10.D Analyze the relationship between habitat changes to plant and animal population fluctuations. ➤ 4.1.10.E Analyze how humans influence the pattern of natural changes (e.g. primary/secondary succession and desertification) in ecosystems over time. <p>PEST MANAGEMENT</p> <ul style="list-style-type: none"> ➤ 4.5.12.D Analyze the effects of new and emerging technologies on biodiversity in specific ecosystems. ➤ 4.5.10.B Describe the impact of integrated pest management practices on the environment. ➤ 4.5.12.B Evaluate pest management using methods such as cost/benefit analysis, cumulative effects analysis, environmental impacts analysis, ethical analysis and risk analysis. <p>WASTE MANAGEMENT</p> <ul style="list-style-type: none"> ➤ 4.5.10.D Evaluate various methods of managing waste as related to economic, environmental and technological factors. ➤ 4.5.12.D Evaluate waste management practices ➤ 4.5.12.D Research the impact of new and emerging technologies in the use, reuse recycling and disposal of materials. <p>CONSUMPTION</p> <ul style="list-style-type: none"> ➤ 4.1.12.C Describe the impact of agricultural, and commercial enterprises on an ecosystem. |
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| | | | | <ul style="list-style-type: none"> ➤ 4.3.10.A Analyze how technologies such as modern mining, harvesting, and transportation equipment affect the use of our natural resources. ➤ 4.3.12.A Explain how consumption rate affects the sustainability of resource use. ➤ 4.3.10.B Analyze how humans manage and distribute natural resources. ➤ 4.3.10.B Describe the use of natural resource with the emphasis on the environmental consequences of extracting, processing, transporting, using and disposing of it. ➤ 4.3.10.B Analyze the impact of technology on the management, distribution and disposal of natural resources. ➤ 4.3.12.B Analyze factors that influence the local, regional, national and global availability of natural resource. ➤ 4.3.12.B Compare the use of natural resources in different countries ➤ 4.3.12.B Analyze social, economic, and political factors that affect the distribution of natural resources (e.g. wars, political systems, classism, racism) ➤ 4.4.10.A Explain the relationships between and among the components of the food and fiber system li.e. production, processing, research and development, marketing, distribution, and regulations) ➤ 4.4.12.A Research and analyze the social, political, economic and environmental factors that affect agricultural systems. ➤ 4.4.10.D Evaulate the use of technologies to increase plant and animal productivity. ➤ 4.5.10.C Compare and contrast the environmental effects of different industrial strategies. ➤ 4.5.12.D Evaluate ways that waste could be reduced during the production of specific product. |
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| | | | | <ul style="list-style-type: none"> ➤ 4.5.10.E Describe the impact of occupational exposure to pollutants. ➤ 4.5.10.E Analyze how consumer demands promote the production of pollutants that affect human health. <p>LAWS & POLLUTION</p> <ul style="list-style-type: none"> ➤ 4.2.12.A Examine environmental laws related to land use management and its impact on the water quality and flow within a watershed. ➤ 4.3.10.A Describe how local and state agencies manage natural resources. ➤ 4.4.12.B Research and evaluate laws and policies that affect the food and fiber system. ➤ 4.4.12.C Analyze research and development initiatives as they relate to agriculture. ➤ 4.4.12.D Describe how policies, regulations and laws affect the technologies adopted in agriculture. ➤ 4.5.10.A Explain how public policy encourages or discourages the sustainable use of natural resources ➤ 4.5.10.A Research laws and policies that address the sustainable use of natural resources (e.g. solid and liquid waste management, industry, agriculture and enterprise) ➤ 4.5.12.C Analyze the costs and benefits of means to control pollution. ➤ 4.5.12.C Analyze the role of technology in the reduction of pollution. ➤ 4.5.12.D Analyze current solid waste regulations. ➤ 4.5.10.E Analyze laws and regulation designed to protect human health. |
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| <p>Unit 6: Air and Climate Change (Ch. 15.1, 15.2, 15.3, 16.1, 16.2, 16.3, 16.4)</p> | <ul style="list-style-type: none"> • Atmosphere and Air Pollution • Climate Change • Climate Adaptation • Conservation and Preservation | <ul style="list-style-type: none"> • How can we describe Earth's atmosphere? • What are sources of air pollution? • What measures can limit and prevent pollution of the atmosphere? • What factors determine Earth's climate? • What evidence shows that global climate change is occurring? Why is it happening? • What are the effects of climate change? • How can we respond, or adapt, to climate change? | <p>Unit 6 Air menu</p> <p>Chapter 15 & 16 Worksheets C015 WS 01-07 C016 WS 01-08</p> <p>Chapter 15 & 16 Power Point programs C015 PR & C016 PR</p> <p>Chapters 15 & 16 Labs C015 LB 01, 03, 05 C016 LB 01 & 03</p> <p>Chapter 15 test A Chapter 15 test B Chapter 16 test A Chapter 16 test B</p> <p>Unit 6 Homework Packet</p> | <p>AIR POLLUTION</p> <ul style="list-style-type: none"> ➤ 4.5.10.C Analyze real-world data and explain how point and non-point pollution can be detected and eliminated. <p>POLLUTION</p> <ul style="list-style-type: none"> ➤ 4.5.10.C Analyze real-world data and explain how point and non-point source pollution can be detected and eliminated. ➤ 4.5.12.C Analyze the costs and benefits of means to control pollution. ➤ 4.5.12.C Analyze the role of technology in the reduction of pollution. ➤ 4.5.10.E Describe the impact of occupational exposure to pollutants. ➤ 4.5.10.E Analyze laws and regulation designed to protect human health. ➤ 4.5.10.E Analyze efforts to prevent, control, and/or reduce pollution through cost and benefit analysis and risk management. ➤ 4.5.10.E Analyze how consumer demands promote the production of pollutants that affect human health. <p>CLIMATE CHANGE</p> <ul style="list-style-type: none"> ➤ 4.3.12.A Evaluate the advantages and disadvantages of using renewable and nonrenewable resources ➤ 4.5.12.C Research and analyze the local, state and national laws that deal with point and non-point source pollution. |
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