

WARREN COUNTY SCHOOL DISTRICT

PLANNED INSTRUCTION

COURSE DESCRIPTION

Course Title: Introduction to Environmental Science CP
Course Number: 00309
Course Prerequisites: None

Course Description: This course focuses on the principles of ecology and the interdependence of natural and human systems. Students will develop skills in making informed decisions and taking constructive actions. Relevant lab activities will be incorporated throughout, utilizing scientific inquiry and appropriate technology. This course will involve writing, detailed content and lab analysis. Final assessment required.

Suggested Grade Level: Grade 9

Length of Course: Two Semesters

Units of Credit: 1

PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:

CSPG 32 Biology 34 Chemistry 43 Environmental Education 46 General Science 56 Physics 30 Agriculture 40 Earth and Space 54 Middle Level Science 7-9

To find the CSPG information, go to <https://www.education.pa.gov/Educators/Certification/Staffing%20Guidelines/Pages/default.aspx>

Certification verified by the WCSD Human Resources Department: Yes No

WCSD STUDENT DATA SYSTEM INFORMATION

Course Level: Academic

Mark Types: Check all that apply.

F – Final Average MP – Marking Period EXM – Final Exam

GPA Type: GPAEL-GPA Elementary GPAML-GPA for Middle Level NHS-National Honor Society

UGPA-Non-Weighted Grade Point Average GPA-Weighted Grade Point Average

State Course Code: 03003

To find the State Course Code, go to <https://nces.ed.gov/forum/sced.asp>, download the Excel file for SCED, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

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TEXTBOOKS AND SUPPLEMENTAL MATERIALS

Board Approved Textbooks, Software, and Materials:

Title: Environmental Science Your World Your Turn
Publisher: Pearson
ISBN #: 978-0-13-372475-2
Copyright Date: 2011
WCSD Board Approval Date: May 14, 2018

Supplemental Materials: [Click or tap here to enter text.](#)

Curriculum Document

WCSD Board Approval:

Date Finalized: 2/28/2018
Date Approved: 5/14/2018 on 11/5/2018
Implementation Year: 2018-2019

SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

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SCOPE AND SEQUENCE OF CONTENT, CONCEPTS, AND SKILLS

| Performance Indicator | PA Core Standard and/or Eligible Content | Month Taught and Assessed for Mastery |
|--|---|--|
| Explain the focus of environmental science. | Bio 3.1.10 | September September |
| Describe the recent trends in human population and resource consumption. | Bio 4.4.10 | September September |
| Explain what science is. | Bio B3.3.1 | September September |
| Describe the process of science. | Bio B.3.3.1 | September September |
| Describe the major roles of the scientific community. | 3.1.10 | September September |
| Explain the study of environmental ethics. | 4.5.10 | September September |
| Describe feedback loops. | Bio B 4.1.3 | September September |
| Define Earth's geosphere, lithosphere, biosphere, atmosphere and hydrosphere. | Bio B.4.2.2 | September September |
| Describe earth's biosphere and atmosphere. | Bio B.4.1.3 | September September |
| Explain how the law of conservation of matter applies to the behavior of nutrients in the environment. | Bio B4.2.2 | September September |
| Describe the biogeochemical cycles. | Bio B.4.1.3 | September September |
| Describe the four primary mechanisms of biological evolution. | Bio 3.1.10 | October October |
| Describe how speciation and extinction affect the diversity of life on Earth. | Bio 3.1.10 | October October |

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| Discuss the factors that influence an organism's niche. | Bio 4.1.10 | October October |
| Compare and contrast predation – parasitism and herbivory. | Bio B 4.2.12 | October October |
| Describe mutualism and commensalism. | Bio B 4.2.12 | October October |
| Explain the difference between a producer and a consumer. | Bio B 4.2.12 | October October |
| Explain the effect of inefficient energy transfer on community structure. | Bio B 4.2.12 | October October |
| Describe how feeding relationships can have both direct and indirect effects on community members. | Bio B 4.2.12 | October October |
| Describe what happens to a community after a disturbance. | Bio 4.1.10. | October October |
| Explain the conditions necessary for a species to become invasive. | Bio B 4.2 | October October |
| Explain how biomes are characterized. | Bio 4.1.10 | November Choose an item. |
| Describe how net primary production varies among biomes. | Bio 4.1.10 | November Choose an item. |
| Explain how organisms are adapted to the conditions of their biomes. | Bio 4.1.10 | November Choose an item. |
| Describe the criteria ecologists use to classify aquatic ecosystems. | Bio 4.2.10 | November Choose an item. |
| List the major categories of freshwater ecosystems. | Bio 4.2.10 | November Choose an item. |

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| Explain the ecological importance of estuaries. | Bio 4.2.10 | November Choose an item. |
| List the three major zones of the ocean. | Bio4.1.10 | November Choose an item. |
| Discuss how an organism's habitat relates to its survival. | Bio4.1.10 | September Choose an item. |
| Explain the usefulness of tracking population size. | Bio3.1.10 | September September |
| Define population density. | Bio 3.1.10 | September Choose an item. |
| Describe three ways populations can be distributed. | Bio 4.1.10 | September September |
| Explain what age structure diagrams tell you about a population. | Bio4.1.10 | September September |
| Describe the factors that influence a population's growth rate. | Bio 4.1.10 | September September |
| Explain how limiting factors and biotic potential affect population growth. | Bio 4.1.10 | September September |
| Differentiate between the components of biodiversity. | Bio 4.3.10 | November Choose an item. |
| Explain two ways in which biodiversity varies across groups or geography. | Bio 4.3.40 | November Choose an item. |
| Describe the economic benefits of biodiversity. | Bio 4.5.10 | November Choose an item. |

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| Describe how biodiversity is monitored and explain current biodiversity trends. | Bio 4.5.10 | November Choose an item. |
| List the major causes of biodiversity loss. | Bio4.5.10 | November Choose an item. |
| Explain legal actions nations can take to protect biodiversity. | Bio 4.5.10 | Choose an item. November |
| Explain the goal of Species Survival Plans. | Bio 4.5.10 | November Choose an item. |
| Describe three strategies for managing whole ecosystems and habitats. | Bio 4.1.10 | November November |
| Explain recent trends in population growth. | Bio 4.5.10 | December Choose an item. |
| Identify characteristics of human population that are studied by demographers. | Bio 4.5.10 | December Choose an item. |
| Describe total fertility rates and replacement fertility. | Bio 4.5.10 | December Choose an item. |
| Explain how the age structure and sex ratio of a population define its potential for growth. | Bio 3.1.10 | December Choose an item. |
| Describe the demographic transition. | Bio 4.3.10 | December Choose an item. |
| Discuss social factors that affect population growth. | Bio 4.5.10 | December Choose an item. |

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| Describe how humans impact their environments. | Bio 4.5.10 | December Choose an item. |
| Discuss the negative and positive impacts of technology. | Bio 4.5.10 | December Choose an item. |
| Describe the reasons why individuals respond differently to the same environmental hazards. | Bio 4.5.10 | December Choose an item. |
| Discuss risk assessment. | Bio 4.5.10 | December Choose an item. |
| Explain why emerging diseases are important to monitor and control. | Bio 3.1.10 | December Choose an item. |
| Differentiate between social hazards that are lifestyle choices and those that cannot be controlled. | Bio 4.5.10 | December Choose an item. |
| Explain what makes chemicals hazardous. | Bio 3.1.10 | December Choose an item. |
| Describe how infectious diseases spread. | Bio 3.1.10 | December Choose an item. |
| Discuss how chemical hazards affect human health. | Bio 3.1.10 | December Choose an item. |
| List some indoor chemical hazards. | Bio 3.1.10 | December Choose an item. |
| Discuss where chemical hazards can be found in the environment. | Bio 3.1.10 | December Choose an item. |

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| Discuss how earthquakes affect structures on the Earth's surface. | Bio 3.3.10 | December Choose an item. |
| Describe bio magnification. | Bio 4.3.10 | December Choose an item. |
| Discuss how volcanoes affect human lives and property. | Bio 3.3.10 | December Choose an item. |
| Describe tornadoes, hurricanes and thunderstorms. | Bio 3.3.10 | December Choose an item. |
| Discuss the dangers of avalanches. | Bio 3.3.10 | December Choose an item. |
| Differentiate between land cover and land use, and describe how people affect both. | Bio 4.3.10 | January Choose an item. |
| Explain how and where urbanization occurs. | Bio 4.5.10 | January Choose an item. |
| Describe the contributors to sprawl and its patterns. | Bio 4.5.10 | January Choose an item. |
| Explain the impacts sprawl has on our area. | Bio 4.5.10 | January Choose an item. |
| Describe four different components of city planning. | Bio 4.5.10 | January Choose an item. |
| Explain the importance of mass transit options to a city and its residents. | Bio 4.5.10 | January Choose an item. |

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| Explain the importance of open space to a livable city. | Bio 4.5.10 | January Choose an item. |
| Differentiate green buildings from conventional buildings. | Bio 4.5.10 | January Choose an item. |
| Discuss the progress toward sustainability some cities have made and its importance to the world. | Bio 4.5.10 | Choose an item. January |
| Describe factors that affect how the sun warms the Earth. | Bio 3.3.10 | February Choose an item. |
| Discuss the role of wind patterns in determining climate. | Bio 3.3.10 | February Choose an item. |
| Explain how the oceans affect climate. | Bio 3.3.10 | February Choose an item. |
| Chapter 11 Explain the importance of managing specific renewable resources. | Bio 4.3.10 | February Choose an item. |
| Describe three resource management approaches. | Bio 4.3.10 | February February |
| Chapter 15 Describe the properties of the atmosphere. | Bio 3.3.10 | February Choose an item. |
| Identify the four main layers of the atmosphere. | Bio 3.3.10 | February Choose an item. |
| Explain heat transfer and the interaction of air masses in the troposphere. | Bio 3.3.10 | February Choose an item. |

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| Explain how both natural processes and human activities can cause air pollution. | Bio 4.1.10 | February Choose an item. |
| Describe how air pollutants affect human health. | Bio 4.5.10 | February Choose an item. |
| Explain what causes smog and how temperature inversions affect it and other forms of air pollution. | Bio 4.1.10 | February Choose an item. |
| Explain how acid deposition occurs and describe its effects. | Bio 4.3.10 | Choose an item. February |
| Explain how the provisions of the Clean Air Act have reduced air pollution in the US. | Bio 4.5.10 Bio 4.5.10 | February February |
| Describe international efforts to reduce the ozone hole. | Bio 4.3.10 | February Choose an item. |
| Chapter 16 Describe factors that affect how the sun warms the Earth. | Bio 3.3.10 | February Choose an item. |
| Discuss the role of wind patterns in determining climate. | Bio 3.3.10 | Choose an item. February |
| Explain how the oceans affect climate. | Bio 4.3.10 | February Choose an item. |
| Describe how climate is affected by topography, volcanoes, regional vegetation and periodic changes in Earth's orbit. | Bio 3.3.10 | February Choose an item. |
| Identify evidence of global warming. | Bio 4.5.10 | February Choose an item. |

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| Explain three methods used to study climate change. | Bio 4.3.10 | February Choose an item. |
| State the probable cause of global climate change. | Bio 4.5.10 | Choose an item. February |
| State ways in which the warming atmosphere affects ecosystems and organisms. | Bio 4.5.10 | Choose an item. February |
| Explain how climate change is affecting people now. | Bio 4.5.10 | February Choose an item. |
| Predict future effects of climate change on people. | Bio 4.5.10 | February Choose an item. |
| List ways to reduce greenhouse gases related to the use and generation of electricity. | Bio 4.3.10 | February Choose an item. |
| Describe some of the ways of reducing greenhouse gases related to transportation. | Bio 4.3.10 | February Choose an item. |
| Describe other strategies for reducing greenhouse gases. | Bio 4.3.10 | February Choose an item. |
| Explain how nations are working together to try to address climate change. | Bio 4.3.10 | February Choose an item. |
| Chapter 17 Define energy and differentiate between kinetic and potential energy. | Bio 3.3.10 | February Choose an item. |
| Identify different forms of energy. | Bio 3.3.10 | February Choose an item. |

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| Describe how human society uses energy resources. | Bio 4.3.10 | Choose an item. February |
| Explain how fossil fuels formed. | Bio 4.3.10 | Choose an item. February |
| Describe the uses of coal and how it is removed from the ground. | Bio 4.3.10 | Choose an item. February |
| Describe the uses of oil and how it is extracted. | Bio 4.3.10 | February Choose an item. |
| Explain the characteristics and uses of natural gas. | Bio 4.3.10 | February Choose an item. |
| Relate nuclear fission to the production of energy. | Bio 3.3.10 | February Choose an item. |
| Describe how a nuclear power plant generates electricity. | Bio 4.3.10 | February Choose an item. |
| Identify the advantages and disadvantages of nuclear power. | Bio 4.3.10 | Choose an item. February |
| Contrast nuclear fusion with nuclear fission, and explain the issues related to nuclear fusion. | Bio 4.3.10 | Choose an item. February |
| Chapter 18 Explain the benefits and current status of renewable energy resources. | Bio 4.3.10 | March Choose an item. |
| Define biomass energy and explain how it is used. | Bio 4.3.10 | March Choose an item. |

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| Explain how river water can be used to generate electricity. | Bio 4.3.10 | March Choose an item. |
| Identify benefits and costs of hydropower. | Bio 4.3.10 | March Choose an item. |
| Describe how energy from the ocean can generate electricity. | Bio 4.3.10 | March Choose an item. |
| Describe techniques for using solar energy to heat buildings and generate electricity. | Bio 4.3.10 | March Choose an item. |
| Analyze the benefits and costs of solar energy. | Bio 4.3.10 | March Choose an item. |
| Explain how wind energy can be used to produce electricity. | Bio 4.3.10 | March Choose an item. |
| Analyze the benefits and costs of wind energy. | Bio 4.3.10 | Choose an item. March |
| Describe how hydrogen fuel can be produced. | Bio 4.3.10 | March Choose an item. |
| Explain the way fuel cells work and how they are used. | Bio 4.3.10 | March Choose an item. |
| Chapter 19 Identify the three categories of waste. | Bio 4.3.10 | March Choose an item. |
| Describe conventional waste disposal methods. | Bio 4.3.10 | March Choose an item. |

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| Discuss the importance of reducing waste. | Bio 4.3.10 | March Choose an item. |
| Describe how composting and recycling help reduce the amount of waste. | Bio 4.3.10 | March Choose an item. |
| Define hazardous waste. | Bio 4.3.10 | March Choose an item. |
| Describe some of the sources of hazardous wastes. | Bio 4.3.10 | March Choose an item. |
| Describe the danger of radioactive waste. | Bio 4.3.10 | March Choose an item. |
| Identify the agencies that regulate hazardous waste. | Bio 4.3.10 | March Choose an item. |
| List some of the ecological and economical values of forest resources. | Bio 4.3.10 | April Choose an item. |
| Describe the costs and benefits of the different methods of timber harvesting. | Bio 4.3.10 | April Choose an item. |
| Discuss the current levels of deforestation in the US and developing nations. | Bio 4.3.10 | April Choose an item. |
| Explain how logging is managed in US national forests. | Bio 4.4.10 | April Choose an item. |
| Describe where most logging in the US takes place. | Bio 4.4.10 | April Choose an item. |

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| Discuss the potential effects of fire suppression on an ecosystem and on future fires. | Bio 4.4.10 | April Choose an item. |
| Explain how consumer demand is important to sustainable forestry. | Bio 4.4.10 | Choose an item. April |
| Explain how logging is managed in US National Parks. | Bio 4.4.10 | April Choose an item. |
| Chapter 12 Explain three process by which soil forms. | Bio 4.3.10 | April Choose an item. |
| Describe the horizons that make up a soil profile. | Bio 4.3.10 | April Choose an item. |
| List the four characteristics used to classify soil. | Bio 4.3.10 | April Choose an item. |
| Describe some practices that can lead to soil erosion and some that can prevent it. | Bio 4.3.10 | April Choose an item. |
| Identify the causes and effects of deforestation. | Bio 4.3.10 | April Choose an item. |
| Discuss the activities of US and international agricultural organizations. | Bio 4.4.10 | April Choose an item. |
| Explain how irrigation and pesticide use can cause soil pollution. | Bio 4.3.10 | April Choose an item. |
| Discuss the beginnings of agriculture. | Bio 4.4.10 | April Choose an item. |

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| Explain the importance of industrial agriculture and the green revolution. | Bio 4.4.10 | April Choose an item. |
| Identify different types of pest control. | Bio 4.4.10 | April Choose an item. |
| Explain the importance of pollinators to agriculture. | Bio 4.4.10 | April Choose an item. |
| Explain why the world needs to grow more food and to grow it sustainably. | Bio 4.4.10 | April Choose an item. |
| Describe the advantages and disadvantages of industrial food production. | Bio 4.4.10 | April Choose an item. |
| Discuss sustainable agriculture. | Bio 4.4.10 | April Choose an item. |
| Chapter 13 Explain what a mineral is. | Bio 3.3.10 | May Choose an item. |
| Describe how minerals form. | Bio 3.3.10 | May Choose an item. |
| Identify types of rocks and the stages of the rock cycle. | Bio 3.3.10 | May Choose an item. |
| Identify the types of resources that are mined. | Bio 3.3.10 | May Choose an item. |
| Describe different methods used for mining. | Bio 3.3.10 | May Choose an item. |

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| Explain how metals are processed. | Bio 3.3.10 | May Choose an item. |
| Describe the negative impacts of mining on the environment and society. | Bio 4.5.10 | May Choose an item. |
| Explain how mining is regulated. | Bio 4.5.10 | May Choose an item. |
| Describe ways that mineral use can become more responsible. | Bio 4.5.10 | May Choose an item. |
| Chapter 14 Discuss how fresh water can be both renewable and limited. | Bio 4.3.10 | May Choose an item. |
| Explain the significance of a watershed. | Bio 4.3.10 | May Choose an item. |
| Explain how most groundwater is accessed. | Bio 4.3.10 | May Choose an item. |
| List the three primary categories of freshwater use. | Bio 4.3.10 | May Choose an item. |
| Relate the causes of surface water depletion to their effects. | Bio 4.2.10 | May Choose an item. |
| Explain the major cause and effects of groundwater depletion. | Bio 4.5.10 | May Choose an item. |
| Describe strategies for addressing water depletion. | Bio 4.3.10 | May Choose an item. |

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| Discuss the main categories of water pollution. | Bio 4.3.10 | May Choose an item. |
| Explain why groundwater pollution is difficult to clean up. | Bio 4.3.10 | May Choose an item. |
| Discuss the sources and effects of major pollutants found in the ocean. | Bio 4.3.10 | May Choose an item. |
| Describe how water is regulated and treated. | Bio 4.5.10 | May Choose an item. |

ASSESSMENTS

PSSA Academic Standards, Assessment Anchors, and Eligible Content: The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

Formative Assessments: The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

Effective formative assessments for this course include: Exit tickets, worksheets, quizzes, lab assignments, practice tests, writing prompts

Summative Assessments: The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

Effective summative assessments for this course include: Lab reports, Tests