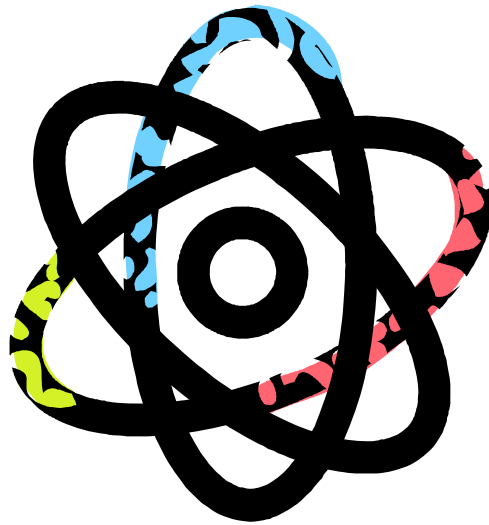


Environmental Science Curriculum



Bridgeport Public Schools

Aresta L. Thompson
Director Science/ Life Skills

Bridgeport Public Schools 06/08 - Draft



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Nanci Walsh - Teacher Bassick High School

COURSE: Environmental Science
UNIT 1: Introduction to Environmental Science
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 5 weeks - Marking Period 1

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.5 Students will use data to construct reasonable explanations.
- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.
- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.6 Students will present information in words and drawings.
- D.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- D.43 Students will describe the factors that affect the carrying capacity of the environment.
- D.44 Students will explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations.

- D.45 Students will explain how technological advances have affected the size and growth rate of human populations throughout history.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Question:

1. What is environmental science?
2. Can you list and describe the steps of the scientific method?
3. How would you describe the composition and structure of the earth?

Focus Questions:

1. What are the five major fields of studies that contribute to environmental science?
 2. What three categories are used to classify environmental problems?
 3. What is the difference between environmental science and ecology?
 4. How did hunter-gatherers affect the environment in which they lived?
 5. What were three major effects of the Agricultural and Industrial Revolution?
 6. What is a biodegradable pollutant? (give an example)
 7. How can environmental problems be local, regional, and global? (give an example of each)
 8. Stating the law of supply and demand, give an example of how it relates to the environment.
 9. Explain the difference between a developed and a developing nation, and give an example of each.
 10. Why is it important for us to have a sustainable world?
 11. Why is a hypothesis not just a guess?
 12. Can you name three scientific habits of minds and explain their importance?
 13. What are the layers of the geosphere?
 14. What are the layers of the atmosphere?
 15. Explain how the water cycle is dependent on the hydrosphere.
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CONTENT

Environmental Science
Tools
Scientific Method
Statistics
Models
Informed Decisions
Dynamic Earth
Geosphere
Atmosphere
Hydrosphere
Biosphere

SKILLS

Making observations
Scientific literacy
Learning prefixes and suffixes and how to use them with root words in environmental science.
Note taking
Organizing environmental connections
Writing
Reading
Measurement
Collecting Data
Graphing
Observing
Sequencing
Illustrating
Data collection
Interpreting graphs
Analyze and compare

ASSURED EXPERIENCES

Environmental Science Careers

ASSESSMENTS

Quizzes
Plate tectonics Lab

OPTIONAL ACTIVITIES

Unscrambled puzzle - put together in scientific methods

RESOURCES

Environmental Science textbook - Karen Arms - Holt
"How Scientists Work: What Is the Scientific Method?" (United Streaming video)
"Emerging Careers: Environmental Occupations: Professional" (United Streaming video)

ADDITIONAL NOTES

Instructional Strategies:

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities

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Create and embed science, technology and society (STS) activities
 Strengthen comprehension for content area text
 Common assessments within and across all disciplines
 Allow opportunities for peer review
 Direct instruction
 Classroom discussion
 Graphic organizers
 Cooperative learning strategies
 Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

VOCABULARY

Agriculture Asthenosphere Atmosphere Biodiversity Biosphere Closed System Conceptual Model Condensation Conduction Control Group Convection Core Crust	Data Correlation Distribution Ecological Footprint Ecology Environmental Science Erosion Evaporation Experiment Experimental Group Freshwater Geosphere Greenhouse Effect Hypothesis	Law of Supply and Demand Lithosphere Mantle Mathematical Model Mean Model Natural Resource Observation Open System Ozone Pollution Precipitation Prediction	Probability Radiation Risk Salinity Sample Statistics Stratosphere Sustainability Tectonic Plate Troposphere Variable Water Cycle
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COURSE: Environmental Science
UNIT 2: Organization of Life
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 8 weeks - Marking Periods 1 & 2

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.5 Students will use data to construct reasonable explanations.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- D.INQ.6 Students will present information in words and drawings.
- D.INQ.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- D.6 Students will describe common food webs in different Connecticut ecosystems
- D.4 Students will describe how abiotic factors such as temperature, water and sunlight affect plants ability to create their own food through photosynthesis.
- D.29 Students will describe the flow of matter and energy in the processes of photosynthesis and cell respiration.

SCIENCE - EARTH SCIENCE (VIII, IX, X)

- D.12 Students will describe how the sun's energy drives the water cycle.
- D.18 Students will explain how chemical and physical processes drive carbon to cycle through the major Earth reservoirs.
-

ESSENTIAL/FOCUS QUESTIONS

Focus Questions:

1. Why are habitats important to organisms?
 2. What are the components of an ecosystem?
 3. What are the causes and effects of natural selection?
 4. How is energy transferred amongst organisms within an ecosystem?
 5. What are the distinguishing characteristics of each biome?
 6. What are the similarities and differences between freshwater ecosystem and marine ecosystem?
 7. Why is the water cycle important to life on earth?
 8. What role does plant life play in the carbon cycle?
 9. What role do animals play in the nitrogen cycle?
 10. What is the importance of the phosphorous cycle?
-

CONTENT

Organization of life
Ecosystem
Evolution
Diversity of life
Energy flow in ecosystems
Cycling of materials
Ecosystem change
Biomes
Aquatic ecosystems

SKILLS

Interpreting diagrams
Sequencing
Math skills: percentages, graphing
Scientific literacy
Analyzing results
Balancing chemical formulas
Critical thinking

ASSURED EXPERIENCES

ASSESSMENTS

Lab report on owl pellet dissection
Test on land biomes and aquatic ecosystems
Oral presentation/evaluation (biome in box)

OPTIONAL ACTIVITIES

Designing food web
Webquest on energy flow

RESOURCES

National Geographic videos
Audubon videos
LIS magazine
Environmental Science textbook
"Elements of Biology: Biomes: The Adaptations of Organisms" (United Streaming video)
"Elements of Biology: Ecosystems: Organisms and Their Environment
A segment of Elements of Biology: Ecosystems: Organisms and Their Environment" (United Streaming video)
"Biology: The Science of Life: Ecology: Organisms in Their Environment
A segment of Biology: The Science of Life: Ecology: Organisms in Their Environment" (United Streaming video)

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities
Create and embed science, technology and society (STS) activities
Strengthen comprehension for content area text
Common assessments within and across all disciplines
Allow opportunities for peer review
Direct instruction
Classroom discussion
Graphic organizers

Cooperative learning strategies
 Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

Research paper on aquatic ecosystems must include the following (3 pages written, plus cover sheet, bibliography, and visual aids)

VOCABULARY

Abiotic Factor	Ecosystem	Plankton
Adaptation	Emergent Layer	Population
Altitude	Epiphyte	Primary Succession
Angiosperm	Estuary	Producer
Artificial Selection	Eutrophication	Protist
Bacteria	Evolution	Resistance
Barrier Island	Food Chain	Salt Marsh
Benthic Zone	Food Web	Savanna
Benthos	Fungus	Secondary Succession
Biome	Gymnosperm	Species
Biotic Factor	Habitat	Taiga
Canopy	Invertebrate	Temperate Deciduous Forest
Carbon Cycle	Latitude	Temperate Grassland
Cellular Respiration	Littoral Zone	Temperate Rainforest
Chaparral	Mangrove Swamp	Trophic Level
Climate	Natural Selection	Tropical Rainforest
Climax Community	Nekton	Tundra
Community	Nitrogen-fixing Bacteria	Understory
Consumer	Organism	Vertebrate
Coral Reef	Permafrost	Wetland
Decomposer	Phosphorous Cycle	
Desert	Photosynthesis	
Ecological Succession	Pioneer Species	

COURSE: Environmental Science
UNIT 3: Populations
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 6 weeks - Marking Period 2

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.5 Students will use data to construct reasonable explanations.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- D.INQ.6 Students will present information in words and drawings.
- D.INQ.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- D.43 Students will describe the factors that affect the carrying capacity of the environment.

- D.44 Students will explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations.
- D.45 Students will explain how technological advances have affected the size and growth rate of human populations throughout history.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- D.5 Students will explain how populations are affected by predator-prey relationships.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Question:

How does human population impact environmental resources?

Focus Questions:

1. How fast can a population grow?
 2. How do species interact with each other?
 3. What is competition?
 4. What are the species interrelationships?
 5. What is demography?
 6. Why are population trends changing?
 7. What factors affect urban population growth?
 8. What is biodiversity?
 9. Why are organisms in danger of extinction?
 10. How do we preserve biodiversity?
 11. What are density dependent and independent factors?
-

CONTENT

Population
Populations change
Species interaction
Human population
Human population trends
Biodiversity
Biodiversity at risk
Future of biodiversity

SKILLS

Interpret an age structure diagram
Research
Validity in scientific reporting
Scientific literacy
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Construct graphs

ASSURED EXPERIENCES

Chart: Common Medicines Derived from Plants
Graph: How will our population grow? (page 236-237 in text)
Interpret carrying capacity graphs
Population Clock Internet Activity

ASSESSMENTS

Quiz on carrying capacity
Quiz on density-dependent and density-independent
Unit Test

OPTIONAL ACTIVITIES

Design a bottle neck to explain population survival.
Owl and mice grid
Design a habitat for a species.
Select a threshold species and design an informational poster.

RESOURCES

Video - People Bomb
Environmental Science textbook
World Wild Life website
enature.com
National Geographic website
Medicine Man video
"Threats to Biodiversity: Why We Should Care" (United Streaming video)
"Understanding Biodiversity" (United Streaming video)

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities
Create and embed science, technology and society (STS) activities
Strengthen comprehension for content area text

Common assessments within and across all disciplines
 Allow opportunities for peer review
 Direct instruction
 Classroom discussion
 Graphic organizers
 Cooperative learning strategies
 Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

VOCABULARY

Age Structure Arable Land Biodiversity Biodiversity Treaty Carrying Capacity Commensalism Competition Demographic Transition Demography Density Dispersion Ecotourism Endangered Species	Endangered Species Act Endemic Species Exotic Species Exponential Growth Fertility Rate Gene Germ Plasm Growth Rate Habitat Conservation Plan Infrastructure Keystone Species Least Developed Countries Life Expectancy	Migration Mutualism Niche Parasitism Poaching Population Predation Reproductive Potential Survivorship Symbiosis Threatened Species Urbanization
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COURSE: Environmental Science
UNIT 4: Water, Air, and Land
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 10 weeks - Marking Period 3

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.5 Students will use data to construct reasonable explanations.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- D.INQ.6 Students will present information in words and drawings.
- D.INQ.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - PHYSICAL SCIENCE (II, III, IV)

- D.12 Students will explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- D.34 Students will describe, in general terms, how the genetic information of organisms can be altered to make them produce new materials.
- D.35 Students will explain the risks and benefits of altering the genetic composition and cell products of existing organisms.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

1. Why are water and air major components of the environment?
2. What are the causes and affects of global warming?
3. What are the major land use designations?

Focus Questions:

1. Where do our water resources come from?
 2. How do we use and manage water?
 3. What types of pollution puts our water at risk?
 4. What are the causes of air pollution?
 5. How does noise and light pollution affect people?
 6. What are the causes and affects of acid precipitation?
 7. What is climate and how it is changing?
 8. What is the ozone shield?
 9. What are the long term effects of global warming?
 10. What is urbanization?
 11. What are the differences between urban land use and rural land use?
 12. Why do cities develop?
 13. What types of pollution are cities at risk for?
 14. Why do we need parks and wilderness areas?
 15. What are the environmental effects of deforestation?
 16. What are the risks of desertification?
 17. What is the green revolution?
 18. Why is soil important?
 19. How do we use bioengineering and technology in agriculture?
 20. Why do we need to evaluate pesticides versus natural biological pest control?
 21. How does UV light affect life on earth?
-

CONTENT

Water resources
Water use
Water management
Water Pollution
Air Pollution
Water Pollution
Noise Pollution
Light Pollution
Acid precipitation

Atmosphere change
Climate
Climate change
Ozone shield
Global warming

Land: How we use land, urban land use, land management and conservation

Food and Agriculture: feeding the world, crops and soil, animals and agriculture

SKILLS

Scientific literacy
Familiarizing students to modern agricultural and bioengineering techniques
Learning about new environmental careers
Graphing techniques
Analyzing
Making inferences
Using graphic organizers
Learning how to apply the pH scale
Learning about global connections
Map reading
GIS map reading
Computer designed presentations
How to do scientific research

ASSURED EXPERIENCES

Genetically Modified Foods Research Paper
Urban Land Use Project
Global Warming Poster

ASSESSMENTS

Quizzes on water, air, and land

Food and agriculture: refer to assured experience

Urban land use: refer to project on "City Design"

All videos will be presented with questions on the film that require analyzing, observation, and making inferences

Marking period exam on unit four: (multiple choice and open-ended) review exercises will be assessed

OPTIONAL ACTIVITIES

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Students will do a food project highlighting global foods that are specific to climate and culture. This piece can be presented in poster, brochure, paper or a creative presentation.

Students will read article "Three Gorges Dam," page 300 in text, and complete at least a one page paper on the article.

Select a city of their choice, (100,000 or over population) and prepare a PowerPoint presentation with the following requirements. Explaining the biome or ecosystem the city is located in, the environmental challenge addressed for the city to develop. Focus on the water connection of the city, coastal, estuary, river, lake, and how this depended on, (manufacturing, mining, mill, etc.) and how that has changed today. Finally, how has the city changed over time, show a progression or downfall that may have occurred? Optional, address the biodiversity of the city and how it may have changed from original founders to present population.

Create a map of the downtown Bridgeport area.

RESOURCES

Text book: Holt, Environmental Science

Miller: Living in the Environment

Videos: Inconvenient Truth, Al Gore

Who Owns the Earth? Robert F Kennedy Jr

Civil Action (film on water pollution causing mutations in Woburn, MA)

Internet Access

Assorted magazine and journal articles

"Biomes: Extreme Climate" (United Streaming video)

"Global Warming: The Signs and the Science" (United Streaming video)

"Our Restless Atmosphere" (United Streaming video)

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

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Cooperative learning strategies
 Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

Assured Experiences Requirements:

Two page paper on genetically modified foods. Identify foods that can be modified, and highlight pros and cons (using bibliography and cite references to examples)

Urban land use: Design a city on paper using concentric circle model, sector model, and multiple-nuclei model. Students will create a legend to follow their design as well as at least one to two page descriptions of their plan. (Visual, legend and written pieve to be assessed.)

Create a poster or brochure on global warming.

VOCABULARY

Acid Precipitation	System (GIS)	Recharge Zone
Acid Shock	Global Warming	Reforestation
Air Pollution	Greenhouse Gases	Reservoir
Aquaculture	Groundwater	River System
Aquifer	Heat Island	Ruminant
Arable Land	Infrastructure	Rural
Artificial Eutrophication	Irrigation	Salinization
Asbestos	Kyoto Protocol	Secondary Pollutant
Biological Pest Control	La Nina	Sick-building Syndrome
Biomagnification	Land-use planning	Smog
Climate	Latitude	Surface Water
Compost	Livestock	Temperature Inversion
Dam	Malnutrition	Thermal Pollution
Decibel (dB)	Overgrazing	Topsoil
Deforestation	Overharvesting	Urban
Desalination	Ozone Layer	Urban Sprawl
Desertification	Pathogen	Urbanization
Diet	Permeability	Wastewater
Domesticated	Pesticide	Water Pollution
Ecosystem Services	pH	Watershed
El Nino	Point-source Pollution	Wilderness
Erosion	Polar Stratospheric Clouds	Yield
Famine	Porosity	
Genetic Engineering	Potable	
Geographic Information	Primary Pollutant	

COURSE: Environmental Science
UNIT 5: Mining and Mineral Resources
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 5 weeks - Marking Period 4

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.5 Students will use data to construct reasonable explanations.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- D.INQ.6 Students will present information in words and drawings.
- D.INQ.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- D.7 Students will describe how earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.
- D.8 Students will describe the availability, current uses and environmental issues related to the use of fossil and nuclear fuels to produce electricity.

- D.9 Students will describe the availability, current uses and environmental issues related to the use of hydrogen fuel cells, wind and solar energy to produce electricity.
- D.24 Students will explain the short-and long-term impacts of landfills and incineration of waste materials on the quality of the environment.
- D.25 Students will explain how housing development, transportation options and consumption of resources may affect the environment.
- D.26 Students will describe human efforts to reduce the consumption of raw materials and improve air and water quality.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

1. What is the impact of population growth on natural resources?
2. Why are energy conservation, alternative energy, and renewable energy important to life on Earth?

Focus Questions:

1. What is a mineral and how do we obtain it?
 2. What are the environmental impacts of mining?
 3. What is the origin of fossil fuels?
 4. What are the similarities and differences between a coal fired power plant and a nuclear power plant?
 5. How is solar energy used in the modern household?
 6. What are the benefits of using wind power?
 7. What are the pros and cons of using hydroelectricity?
 8. What are some alternative energy technologies?
 9. How can energy be conserved?
 10. What are the types of solid waste?
 11. What are the pros and cons of landfills?
 12. What are the methods of disposing solid waste?
 13. Why should we "reduce, reuse, and recycle" solid waste?
 14. What are some examples of hazardous waste?
 15. What are some methods of hazardous waste management?
-

CONTENT

Minerals
Mineral resources
Mineral exploration
Mining
Mining regulations
Mine reclamation
Nonrenewable energy
Energy resources

Fossil fuels
Nuclear energy
Renewable energy
Alternative energy
Energy conservation
Waste
Solid waste
Reduction of solid waste
Hazardous waste

SKILLS

Scientific Literacy
Analyzing Relationships
Making Comparisons
Graphing
Inquiry
Math
Graphic Organizer
Making Inferences
Critical Thinking

ASSURED EXPERIENCES

Renewable and Non-renewable Energy Kit
Energy Reduction Project

ASSESSMENTS

Lab report on energy
Unit test
Quizzes
Homework
Research paper on one alternative energy

OPTIONAL ACTIVITIES

Who Killed the Electric Car video and questionnaire
How to Feed Your Electric Meter
Report on Strip Mining
Reading an Electrical and Gas Bill

RESOURCES

Video
Textbook
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Energy Kit

"Learning about Natural Resources" (United Streaming video)

"Greatest Inventions with Bill Nye: Energy" (United Streaming video)

"The Garbage Story: Dealing with Solid Waste Disposal" (United Streaming video)

"Basics of Geology: All About Rocks and Minerals" (United Streaming video)

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Higher order level thinking skills

Outlines/drawings

Internet research

Integrate technology lessons/activities

Library research

Hands-on laboratory research skills

Laboratory activities

Audio-visual enhancements

Energy Reduction Project Guidelines

List 10 ways in which they would reduce energy use in their everyday lives.

VOCABULARY

Alternative Energy	Hydroelectric Energy	Passive Solar Heating
Biodegradable	Landfill	Petroleum
Biomass Fuel	Leachate	Placer Deposit
Compost	Mineral	Reclamation
Deep-well Injection	Municipal Solid Waste	Recycling
Electric Generator	Nuclear Energy	Renewable Energy
Energy Conservation	Nuclear Fission	Smelting
Energy Efficiency	Nuclear Fusion	Solid Waste
Fossil Fuels	Ocean Thermal Energy	Source reduction
Fuel Cell	Conversion (OTEC)	Subsidence

Geothermal Energy Hazardous Waste	Oil Reserves Ore Mineral	Subsurface Mining Surface Impoundment
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COURSE: Environmental Science
UNIT 6: Our Health and Future
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 4 weeks - Marking Period 4

CODE:
MAP LEVEL: 4
GRADE: 11-12

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will read, write, listen and speak about observations of the natural world.
- D.INQ.1 Students will make observations and ask questions about objects, organisms and the environment.
- D.INQ.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- D.INQ.2 Students will use senses and simple measuring tools to collect data.
- D.INQ.5 Students will use data to construct reasonable explanations.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.9 Students will use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials.
- D.INQ.10 Students will use mathematics to analyze, interpret and present data.
- D.INQ.1 Students will identify questions that can be answered through scientific investigation.
- D.INQ.4 Students will identify independent and dependent variables, and those variables that are kept constant, when designing an experiment.
- D.INQ.5 Students will use appropriate tools and techniques to make observations and gather data.
- D.INQ.7 Students will identify and present relationships between variables in appropriate graphs.

SCIENCE - SCIENTIFIC INQUIRY (I)

- D.INQ.2 Students will seek relevant information in books, magazines and electronic sources of information.
- D.INQ.6 Students will present information in words and drawings.
- D.INQ.7 Students will use standard tools to measure and describe physical properties such as weight, length and temperature.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- D.32 Students will describe how bacterial and viral infectious diseases are transmitted and explain the role of sanitation, vaccination and antibiotic medications in the prevention and treatment of infectious diseases.
- D.11 Students will describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.

D.39 Students will describe the difference between genetic disorders and infectious diseases.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

1. How does environmental pollution affect human health?
2. How is environmental science related to economics?

Focus Questions:

1. What is the connection between environmentally caused respiratory diseases and urban areas?
 2. What are some specific pollutants/toxins that affect our health?
 3. What is the role of an epidemiologist?
 4. How have antibiotics changed life expectancies?
 5. Why is malaria becoming more prevalent throughout the world?
 6. What are some specific biological causes of diseases?
 7. What is the role of big business and lobbyists in controlling decisions about the environment?
 8. Why should consumers be environmentally informed?
 9. Why should voters be aware of candidates' environmental platform?
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CONTENT

Environmental pollution
Pollution and human health
Biological hazards
Economics
International cooperation
Environmental policies in the United States
Importance of the individual

SKILLS

Scientific Literacy
Statistics
Predicting Outcomes
Inferences
Primary Research
Analyzing Data
Connecting Scientific Relationships
Math/Graphing

ASSURED EXPERIENCES

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ASSESSMENTS

OPTIONAL ACTIVITIES

Citing potential personal environmental problems in your household.

Short report on health statistics that demographers have prepared to highlight environmental problems in specific areas.

Activity that allows students to assess how personal environment affects their behavior.

AIDS video - modern plague?

Day After Tomorrow video - highlighting inaccuracies of movie

RESOURCES

Textbook

AIDS video

Day After Tomorrow video

Computers to access information to complete unit tasks

"Enviro-Tacklebox: Module Three: Topics and Issues in Environmental Science: Enviro Rules

A segment of Enviro-Tacklebox: Module Three: Topics and Issues in Environmental Science: Enviro Rules" (United Streaming video)

"AIDS: A Changing Epidemic" (United Streaming video)

"AIDS: Ending the Epidemic" (United Streaming video)

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Assured Experiences Guidelines

Environmental Disease Project: Develop an informational piece (brochure/PowerPoint/poster) on environmental diseases

Lead Poisoning and Mental Ability Skills Lab: (page 528 - 529 in text)

Environmental Responsibility Research Project: Select an agency on list, on page 540 in text, and do a 2 pages paper on agency's environmental responsibility

VOCABULARY

Dose
Dose-response Curve
Economics
Environmental Impact Statement
Epidemiology
Host
Lobbying
Particulates
Pathogen
Risk Assessment
Sustainability
Toxicology
Vector