

## UNIT OF STUDY

<b>Title:</b> Pollution		<b>Subject/Course:</b> Environmental Science	<b>Length:</b> 7 weeks
<b>Topic:</b> Pollution and Prevention		<b>Grade:</b> 11-12	<b>Designer:</b> D Wright
<b>UNIT GOALS AND EXPECTATIONS</b>			
<b>IMPORTANT CONCEPTS/UNDERSTANDINGS:</b> <ol style="list-style-type: none"> <li>1. Environmental hazards are broadly defined and include cultural, biological, physical, and chemical hazards.</li> <li>2. Risk analysis is based upon a four-step process: hazard assessment, dose-response assessment, exposure assessment, and risk characterization.</li> <li>3. Risk management merges public policy with risk assessment.</li> <li>4. The precautionary principle is gaining ground in the United States. . The perception of risk is included in the decision making process.</li> <li>5. Pests are organisms that compete with humans for food or create annoyances.</li> <li>6. Chemical pesticides have possible adverse human and environmental consequences.</li> <li>7. Water pollutants are pathogenic organisms, chemicals, substances that alter habitat, and various kinds of nutrients.</li> <li>8. The First and Second Laws of Thermodynamics and the Law of Conservation of Energy rule how we use resources and energy.</li> <li>9. All organisms produce waste.</li> <li>10. Air pollution adversely impacts all living things.</li> <li>11. Primary air pollutants are produced from combustion and evaporation while secondary pollutants are a result of chemical reactions between the primary pollutants and naturally occurring compounds.</li> <li>12. Air pollutants are a result of choices we have made concerning how we produce and use energy.</li> </ol>		<b>ESSENTIAL QUESTIONS:</b> <ol style="list-style-type: none"> <li>1. How are environmental hazards defined?</li> <li>2. What are the major aspects of risk management when dealing with environmental hazards?</li> <li>3. What is the precautionary principle in relationship with our dealings with environmental hazards?</li> <li>4. How are organisms defined as "pests"?</li> <li>5. How does water and air pollution affect living organisms?</li> <li>6. How does our air and water get polluted?</li> <li>7. How does energy usage result in air and water pollution?</li> </ol>	
<b>STUDENT LEARNING EXPECTATIONS:</b> <p>PD.1.ES.1- Describe the structure, origin, and evolution of the Earth's components</p> <p>PD.1.ES.16- Explain heat transfer in the atmosphere and its relationship to meteorological processes</p> <p>PD.1.ES.19- Describe the cycling of materials and energy</p> <p>BD.2.ES.1- Compare and contrast biomes</p> <p>BD.2.ES.9- Explain how limiting factors affect populations and ecosystems</p> <p>BD.2.ES.10- Describe the natural selection process in populations</p> <p>SP.3.ES.1- Explain the reciprocal relationships between Earth's processes (natural disasters) and human activities</p> <p>SP.3.ES.2- Investigate the relationships between human consumption of natural resources and the stewardship responsibility for reclamations including disposal of hazardous and non-hazardous waste</p> <p>SP.3.ES.3- Explain common problems related to water quality</p>		<p>SP.3.ES.4- Explain problems related to air quality</p> <p>SP.3.ES.6- Research how political systems influence environmental decisions</p> <p>SP.3.ES.7- Investigate which federal and state agencies have responsibility for environmental monitoring and action</p> <p>SP.3.ES.8- Compare and contrast man-made and natural environments.</p> <p>NS.4.ES.1- Collect and analyze scientific data using appropriate mathematical calculations, figures and tables</p> <p>NS.4.ES.2- Use appropriate equipment and technology as tools for solving problems</p> <p>NS.4.ES. 3- Utilize technology to communicate research findings</p> <p>NS.5.ES.3- Evaluate long-range plans concerning resource use and by-product disposal for environmental, economical and political impact</p> <p>NS.6.ES.1- Research and evaluate science careers using the following criteria</p>	

<b>SPECIFIC DECLARATIVE KNOWLEDGE – What I know</b>  Identify the criteria used to identify or classify environmental hazards. Describe the use of energy in trophic levels, trophic categories and trophic relationships. Identify and describe polluting factors. Understand the role of energy use and conversion in ecosystems. Name and describe the three major changes in human civilization that have affected the environment.	<b>SPECIFIC PROCEDURAL KNOWLEDGE – What I need to do</b>  Make clear and unbiased observations. Make predictions according to a pattern. Identify correctly information found on graphs, tables and charts. Research skills will be used to gather information.
<b>UNIT ASSESSMENTS</b> (Include tasks related to Dimensions 3 and 4 and Bloom’s Taxonomy)	
Daily notebook entries. Discuss (in writing) the idea of a sustainable approach to the Earth’s environment. Chapter Content Brainstorming LPS 4-step Vocabulary strategy	
<b>Traditional Assessments:</b> Unit test. Written quizzes. Chapter outline Activity analysis	<b>Other Evidence of Learning:</b> Daily notebook entries. TI-83 lab Chapter Content Brainstorming LHS 4-step vocabulary

ACTIVITIES AND LEARNING EXPERIENCES	Resources
<p>Identify and define key words and vocabulary: (using LHS vocabulary format)  Environment health, environment, hazards, risk, health, morbidity, mortality, epidemiology, underweight, chronic, acute, carcinogenic, toxicology, risk assessment, epidemiological study, animal testing, dose-response assessment, exposure assessment, risk management, risk perception, precautionary principle, Pests, agricultural pests, weeds, herbicides, pesticides, chemical treatment, ecological control, integrated pest management, first-generation pesticides, scale insects, second-generation pesticides, broad spectrum, persistent, resurgence, secondary pest outbreak, pesticide treadmill, bioaccumulation, biomagnification, bioconcentration, natural and biological control, cultural control, control by natural enemies, genetic control, natural chemical control, hormones, pheromones, juvenile hormone, ecdysone, economic threshold, insurance spraying, cosmetic spraying, field scouts, pest-loss insurance, organic food, tolerances, prior informed consent, Hypoxic area or dead zone, eutrophication, pollutant, nonbiodegradable, point source, pathogens, biochemical oxygen demand (BOD), inorganic chemicals, organic chemicals, National Recommended Water Quality Criteria, benthic plants, submerged aquatic vegetation, emergent vegetation, best management practices (BMPs), raw sewage, storm drains, denitrification, carcinogenic, dose response, exposure, hazardous material, ignitability, Safe Drinking Water Act of 1974, groundwater remediation, Troposphere, stratosphere, weather, climate, meteorology, convection currents, monsoons, adaptation, Precautionary Principle, equity principle, Global Climate Change Initiative, emissions, ozone shield, chlorofluorocarbons (CFCs), Montreal Protocol, industrial smog, photochemical smog, temperature inversion, primary pollutants, secondary pollutants, O<sub>3</sub>, emissions, acid, base, pH, acid precipitation, Clean Air Act of 1970 (CAA),</p> <p>TI-83/CBL lab- “Dissolved Oxygen”  The pH game lab  Carbon dioxide lab  Waste-water treatment lab  Thermal pollution lab  Air Quality Lab  TI-83/CBL lab- “The Garbage Problem”</p>	<p>Environmental Science: Toward A Sustainable Future</p> <p>Media Center</p> <p>Internet</p> <p>Smartboard</p> <p>Power point</p> <p>Newspaper/Magazines</p> <p>Lab exercises</p> <p>TI-83 calculator w/ probes</p>
Career Connections	
<p>Politician  Economist  Sociologist  Ecologist</p>	