**DEP Environmental Education Curricula**

**Lesson Plan**

**GRADE/LEVEL: High School**

**LESSON TITLE: Environmental Regulations**

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| **Next Generation Science Standards** |  |  | | | |
| **HS-ESS3-4** | **HS-ESS3-4** | Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. | | | |
|  | **Science and Engineering Practices** | Design or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. | | | |
|  | **Disciplinary Core Ideas** | [**ESS3.C: Human Impacts on Earth Systems**](http://www.nap.edu/openbook.php?record_id=13165&page=194)  [Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation.](http://www.nap.edu/openbook.php?record_id=13165&page=194)  [**ETS1.B: Developing Possible Solutions**](http://www.nap.edu/openbook.php?record_id=13165&page=175)  [When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. *(secondary)*](http://www.nap.edu/openbook.php?record_id=13165&page=206) | | | |
|  | **Crosscutting Concepts** | [**Stability and Change**](http://www.nap.edu/openbook.php?record_id=13165&page=98)  [Feedback (negative or positive) can stabilize or destabilize a system.](http://www.nap.edu/openbook.php?record_id=13165&page=98) | | | |
| **Objectives** | | | | | |
|  |  | **Objective 1:** Students will gain a brief awareness of environmental issues in the United States  **Objective 2:** Students will understand the reasons for the formation of the Environmental Protection Agency.  **Objective 3:** Students will review the purpose of several key environmental regulations in the United States. | | | |
| **Vocabulary** |  |  | | | |
|  | **Acid Rain** | Acid rain, or acid deposition, is a broad term that includes any form of precipitation with acidic components, such as sulfuric or nitric acid that fall to the ground from the atmosphere in wet or dry forms. | | | |
|  | **Inversion** | The action of inverting something or the state of being inverted; a reversal of the normal decrease of air temperature with altitude, or of water temperature with depth. | | | |
|  | **Hydroelectricity** | Hydroelectricity is electricity made by generators that are pushed by movement of water. | | | |
|  | **Legal Doctrine** | A framework, set of rules, procedural steps, or test, often established through precedent in the common law, through which judgments can be determined in a given legal case. | | | |
|  | **NOAA** | The National Oceanic and Atmospheric Administration (NOAA) is an American scientific agency that focuses on the conditions of the oceans and the atmosphere. NOAA warns of dangerous weather, charts seas, guides the use and protection of ocean and coastal resources and conducts research to provide understanding and improve stewardship of the environment. | | | |
|  | **NonPoint Source Pollution** | Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. | | | |
|  | **OSHA** | The Occupational Safety and Health Administration is an agency whose mission is to "assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance". | | | |
|  | **Ozone Layer** | A region of Earth's stratosphere that absorbs most of the Sun's ultraviolet (UV) radiation. | | | |
|  | **Regulations** | Mandatory requirements that can apply to individuals, businesses, state or local governments, non-profit institutions, or others. | | | |
|  | **Smog** | Fog or haze combined with smoke and other atmospheric pollutants. | | | |
|  | **Statute** | A written law passed by a legislative body. | | | |
|  | **Superfund** | Superfund is a United States federal government program designed to fund the cleanup of sites contaminated with hazardous substances and pollutants. | | | |
|  | **Toxicity** | The degree to which a chemical substance or a particular mixture of substances can damage an organism. | | | |
| **Background** |  |  | | | |
| **Teacher Version**  Selected Materials from … | | **Sources:** as noted below. | | | |
| **A Short History of Environmental Laws and Events**  **1600s-1890s**   * Discharges of all forms of pollution are an established disposal practice   **Late 1800s – 1914**   * Similar to prior practices, very little control * Some authority to local health departments and U.S. Forest Service Rules on grazing and timber-cutting   **1914-1960s**   * The Public Health movement gets underway with limited success   **1930s-1940s**  One example of issues in this time period, The Dust Bowl, refers to the drought-stricken Southern Plains region of the United States, which suffered severe dust storms during a dry period in the 1930s. As high winds and choking dust swept the region from Texas to Nebraska, people and livestock were killed and crops failed across the entire region. The Dust Bowl intensified the crushing economic impacts of the Great Depression and drove many farming families on a desperate migration in search of work and better living conditions. Source: https://www.history.com/topics/dust-bowl  **1950s**   * Many of the first federal efforts to address air and water pollution came about in the 1950s   **1960s**   * Johnson administration supports substantive federal environmental regulations * The Wilderness Act of 1964 - created the legal definition of wilderness in the United States, and protected some 9 million acres (36,000 km²) of federal land   The Wilderness Act, signed into law in 1964, created the National Wilderness Preservation System and recognized wilderness as “an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain.” The Act further defined wilderness as "an area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, which is protected and managed to preserve its natural conditions…"  Source: https://wilderness.nps.gov/faqnew.cfm  Congress has now designated more than 106 million acres of federal public lands as wilderness: 44 million of these acres are in 47 parks and total 53 percent of National Park System lands. Additional national park areas are managed as “recommended” or "proposed" wilderness until Congress acts on their status.  Source: https://wilderness.nps.gov/faqnew.cfm  **First Earth Day**  Earth Day - The idea for a national day to focus on the environment came to Earth Day founder Gaylord Nelson, then a U.S. Senator from Wisconsin, after witnessing the ravages of the 1969 massive oil spill in Santa Barbara, California. Inspired by the student anti-war movement, he realized that if he could infuse that energy with an emerging public consciousness about air and water pollution, it would force environmental protection onto the national political agenda. Source: https://www.earthday.org/about/the-history-of-earth-day/  **Environmental Protection Agency (EPA)**  President Richard Nixon proposed the establishment of EPA. The EPA was established on December 2, 1970 to consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. The agency also conducts environmental assessment, research, and education.  It has the responsibility of maintaining and enforcing national standards under a variety of environmental laws, in consultation with state, tribal, and local governments. Since its inception, EPA has been working for a cleaner, healthier environment for the American people. Source: https://www.epa.gov/history  **Notorious Pollution Incidents**  L.A. Killer Smog   * 1943 -  In the middle of World War II, Los Angeles residents believe the Japanese are attacking them with chemical warfare. A thick fog that makes people’s eyes sting and their noses run has taken hold of the city. Visibility is cut down to three city blocks. Source: Wired.com * As residents would later find out, the fog was not from an outside attacker, but from their own vehicles and factories. Massive wartime immigration to a city built for cars had made L.A. the largest car market the industry had ever seen. But the influx of cars and industry, combined with a geography that traps fumes like a big bowl, had caught up with Angelenos. Source: Wired.com   **Love Canal**  The Love Canal site (Site) is located in Niagara Falls, New York. It was one of two initial excavations in what was to be a canal to provide inexpensive hydroelectric power for industrial development around the turn of the 20th century.  The abandoned excavation, partially filled with water, was used largely for recreational purposes.  The canal was about 9,750 feet long and ranged in depth from 10 to 25 feet. Hooker Chemicals & Plastics Corporation (now Occidental Chemical Corporation, or OXY) disposed of over 21,000 tons of hazardous chemicals into the abandoned Love Canal between 1942 and 1953, contaminating soil and groundwater.  In 1953, the landfill was covered and leased to the Niagara Falls Board of Education (NFBE).  Afterwards, the area near the covered landfill was extensively developed, including construction of an elementary school, as well as many residential properties. Source: <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0201290#bkground>  **Donora Air Pollution Incident**  In October 1948, Donora, Pa., was enveloped in a lethal haze.  Over five days, nearly half of the town's 14,000 residents experienced severe respiratory or cardiovascular problems. It was difficult to breathe. The death toll rose to nearly 40.  Disturbing photos show Donora's streets hidden under a thick blanket of gray smog. A warm air pocket had passed high above the town, trapping cooler air below and sealing in pollutants.  Donora was no stranger to pollution. Steel and zinc smelters had long plagued the town with dirty air. But the air pocket left pollutants with no escape route. They sat stewing in the streets, where residents breathed them in lethal doses.  The situation in Donora was extreme, but it reflected a trend. Air pollution had become a harsh consequence of industrial growth across the country and world. Source: https://www.epa.gov/air-research/history-air-pollution  **Allied Chemical & the Pesticide Keypone**  One of the most costly chemical disasters in the United States involved a small, single-product manufacturer, ironically named Life Science Products Company, which made the pesticide Kepone for Allied Chemical Corporation. Life Science operated only 16 months in 1974 and 1975, in Hopewell, Virginia, yet managed to poison its workers and pollute the environment, causing millions of dollars of damage. The case dramatically demonstrates the links between hazards inside the factory and those outside the factory, and the confused responses of both administrative and judicial systems to a chemical disaster. In the Kepone case, as in other instances of toxic contamination, the victims confronted problems of care, compensation, and clean-up. The case illustrates two major causes of a chemical disaster: organizational pathologies of public bureaucracies, and irresponsible production by private corporations. Source: https://www.ncbi.nlm.nih.gov/pubmed/6189792  **OSHA**  The Occupational Safety and Health Act of 1970 Congress created the OSHA to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.  OSHA is part of the United States Department of Labor.   The administrator for OSHA is the Assistant Secretary of Labor for Occupational Safety and Health. OSHA's administrator answers to the Secretary of Labor, who is a member of the cabinet of the President of the United States. Source: https://www.osha.gov/about.html  Statute: a written law passed by a legislative body. Source: Dictionary.com  Regulations are mandatory requirements that can apply to individuals, businesses, state or local governments, non-profit institutions, or others. Source: www.epa.gov  All regulatory systems under environmental statutes have common elements   * Planning and priority setting * Standard setting * Permitting * Monitoring and surveillance * Enforcement   Cooperative Federalism = Federal/State Partnership  This entails   * Nationwide environmental planning * Research and demonstration * Standard setting at the federal level   Delegation of legal authority to consenting states for   * Local environmental planning * Set more stringent standards * Administer permit systems * Carry out monitoring, surveillance, and enforcement   Who sets the standards?   * Tenth amendment states “The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.” * Typically, minimum standards are set by the Federal government; States may have standards that are stricter than Federal, they may not have standards that are more lax than Federal.   **Several Significant Regulations**  **Clean Air Act**   * Congress established much of the basic structure of the Clean Air Act in 1970 and made major revisions in 1977 and 1990. * To protect public health and welfare nationwide, the Clean Air Act requires EPA to establish national ambient air quality standards for certain common and widespread pollutants based on the latest science.   EPA has set air quality standards for six common "[criteria pollutants](https://www.epa.gov/criteria-air-pollutants)":   * particulate matter (also known as particle pollution), * ozone, * sulfur dioxide, * nitrogen dioxide, * carbon monoxide, * and lead.   Dense, visible smog in many of the nation's cities and industrial centers helped to prompt passage of the 1970 legislation at the height of the national environmental movement.  The subsequent revisions were designed to improve its effectiveness and to target newly recognized air pollution problems such as acid rain and damage to the stratospheric ozone layer.  https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history  **Clean Water Act**  The 1972 amendments:   * Established the basic structure for regulating pollutant discharges into the waters of the United States. * Gave EPA the authority to implement pollution control programs such as setting wastewater standards for industry. * Maintained existing requirements to set water quality standards for all contaminants in surface waters. * Made it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit was obtained under its provisions. * Funded the construction of sewage treatment plants under the construction grants program. * Recognized the need for planning to address the critical problems posed by nonpoint source pollution. Source: https://www.epa.gov/laws-regulations/history-clean-water-act   **The Federal Water Pollution Control Act of 1948** was the first major U.S. law to address water pollution. Growing public awareness and concern for controlling water pollution led to sweeping amendments in 1972. As amended in 1972, the law became commonly known as the Clean Water Act (CWA). Source: https://www.epa.gov/laws-regulations/history-clean-water-act  **Endangered Species Act**   * The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. * The law requires federal agencies, in consultation with the U.S. Fish and Wildlife Service and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. * The law also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. * Likewise, import, export, interstate, and foreign commerce of listed species are all generally prohibited.   Source: https://www.epa.gov/laws-regulations/summary-endangered-species-act  **Safe Drinking Water Act**   * The Safe Drinking Water Act (SDWA) is the federal law that protects public drinking water supplies throughout the nation. * Under the SDWA, EPA sets standards for drinking water quality and with its partners implements various technical and financial programs to ensure drinking water safety. Source: <https://www.epa.gov/sdwa>   **Resource Conservation and Recovery Act (RCRA)/Hazardous and Solid Waste Amendments (HSWA)**   * The Resource Conservation and Recovery Act gives EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. * HSWA - the Federal Hazardous and Solid Waste Amendments - are the 1984 amendments to RCRA that focused on waste minimization and phasing out land disposal of hazardous waste as well as corrective action for releases. Some of the other mandates of this law include increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program.   Hazardous waste is regulated under a “cradle to grave” concept, meaning that the waste is tracked via written records from the time it becomes a waste, and that ownership remains with the generator forever. Source: www.mtu.edu/ehs/forms-procedures/hazardous-waste/  **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund Amendments and Reauthorization Act**   * -- otherwise known as Superfund -- provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. * Through CERCLA, EPA was given power to seek out those parties responsible for any release and assure their cooperation in the cleanup. * EPA cleans up orphan sites when potentially responsible parties cannot be identified or located, or when they fail to act. * Through various enforcement tools, EPA obtains private party cleanup through orders, consent decrees, and other small party settlements. * EPA also recovers costs from financially viable individuals and companies once a response action has been completed.   EPA is authorized to implement the Act in all 50 states and U.S. territories. Superfund site identification, monitoring, and response activities in states are coordinated through the state environmental protection or waste management agencies.  There are approximately 14 Superfund sites in Maine currently.  Source: https://www.epa.gov/laws-regulations/summary-comprehensive-environmental-response-compensation-and-liability-act | | | | | |
| **Crosscutting Concepts** | | | [**Stability and Change**](http://www.nap.edu/openbook.php?record_id=13165&page=98)  [Feedback (negative or positive) can stabilize or destabilize a system.](http://www.nap.edu/openbook.php?record_id=13165&page=98) | | |
| **Discussion**  Have students read the Maine DEP reading assignment to learn more about the function of the Maine DEP prior to the lesson plan. Discuss how values and vision of the DEP. | | | | | |
| **Assignment**  Environmental Trends in Maine | | | | **Source:** http://www.maine.gov/dep/commissioners-office/environmental\_trends.html | |
| Visit the source listed above to answer the following questions about environmental trends in Maine.  The Environmental Trends Dashboard will appear. Environmental regulations are put in place to try to provide protection to people and the environment that we inhabit.     1. What is the purpose of the DEP’s Environmental Trends Dashboard? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. What are the meanings of the following symbols?    1. Green circle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    2. Yellow Square \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    3. Red Pentagon \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. Look at information for Ozone in the Air Quality portion of the Dashboard. What is the current condition for Ozone in Maine? What symbol is used to describe ozone trends? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. Look at information for Invasive Aquatic Plants in the Water Quality portion of the Dashboard. What is the trend for Invasive Aquatic Plants in Maine? What symbol is used to describe Invasive Aquatic Plants trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 5. Look at information for Municipal Solid Waste – Recycled in the Sustainability portion of the Dashboard. What is the trend for Municipal Solid Waste – Recycled in Maine? What symbol is used to describe the Municipal Solid Waste – Recycled Trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Consider your town. What technologies can be used to prevent the following:    1. Air Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    2. Water Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    3. Ground Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | | |
| **Teacher Prep** |  |  | | | |
|  | **Advanced Preparation Steps &**  **Duration** | 1. Read and consider associated background material (1 hour) 2. Review Environmental Regulations PowerPoint (30 minutes) 3. Read Discussion Article and Questions (30 minutes) | | | |
| **Needed Materials** |  |  | | | |
|  |  | 1. Environmental Regulations PowerPoint with embedded video - Don’t Fall In The River https://www.youtube.com/watch?v=nlHiaZFvcXA   (1:24 minutes)   1. Lesson Plan 2. Internet Connection | | | |
|  | **Duration of activities** | 60 minutes | | | |
|  | **Safety notes** | Follow school rules regarding internet access. | | | |
| **Procedures for instruction** |  |  | | | |
|  |  | Introduce the class to the idea of environmental regulations. | | | ~5 minutes |
|  |  | Environmental Regulations PowerPoint with embedded video. | | | ~40 minutes  (PowerPoint) |
|  |  | Maine DEP Environmental Trends Assignment & Discussion | | | ~15 minutes  (Classroom) |
| **Student Materials** |  |  | | | |
|  | Background Informational Sheet | Reading assignment prior to environmental regulations discussion day. | | | |
|  | Vocabulary List | Available for clarification of terminology as students read their Background Informational Sheet. | | | |

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| **Student Reading Assignment & In Class Assignment – Maine DEP** | | |
| Source: <http://www.maine.gov/dep/about/index.html>  **About the Maine Department of Environmental Protection**  **History:**  **The Department of Environmental Protection**(DEP) is responsible for protecting and restoring Maine's natural resources and enforcing the state's environmental laws. The agency can trace its roots back to the Sanitary Water Board that was created in 1941. The purpose of that Board was to study, investigate, recommend means of eliminating and preventing pollution in waters used for recreational purposes. The Board was renamed the Water Improvement Commission in 1951. In 1969, the Commission's title was abbreviated to the Environmental Improvement Commission.  On July 1, 1972, legislation re-designated the Commission as the Board of Environmental Protection and created a new Department of Environmental Protection, consisting of a commissioner and three program bureaus: Air Quality, Land Quality Control, and Water Quality Control. Over the years, the Department has continued to evolve to its current organization consisting of the [Commissioner's Office](http://www.maine.gov/dep/commissioners-office/index.html) and four bureaus which administer the Department's environmental programs: Air Quality, Land Resources, Remediation and Waste Management and Water Quality. The [Board of Environmental Protection](http://www.maine.gov/dep/bep/) is a citizen's board of seven members nominated by the Governor and confirmed by the Legislature that performs major substantive rulemaking, makes decisions on select permit applications and appeals of Commissioner licensing and enforcement actions, and provides a forum for public participation in department decisions.  **Mission:**  Legislative mandate directs DEP to prevent, abate and control the pollution of the air, water and land. The charge is to preserve, improve and prevent diminution of the natural environment of the State. The Department is also directed to protect and enhance the public's right to use and enjoy the State's natural resources. The Department administers programs, educates and makes regulatory decisions that contribute to the achievement of this mission.  In pursuing this mission, it is the policy of the Department to treat its employees and the public with courtesy, respect and consideration and to be fair and honest in its dealings, and to be mindful of the special qualities that make Maine a unique place to live and work.   |  |  |  | | --- | --- | --- | | **Values** | **Vision** | **Customer Service Commitment** | | **We value** a clean environment where public health and natural heritage are protected.  **We value** treating every person we interact with every day as a customer.  **We value** working hard to understand the needs of our customers, and we work cooperatively with them.  **We value** each individual staff person and believe each is important to the success of the department.  **We value** creativity, enthusiasm. innovation and excellence, and we build on the efforts of individuals through team work.  **We value** performing our work in a timely and effective manner with honesty, courtesy and respect. | **A Maine** where people include, in every aspect of their daily lives, a commitment to the protection and enhancement of our environment.  **A Maine** where a stewardship of natural resources ensures a sustainable economy for future generations.  **A Maine** where people understand that a healthy environment and a strong economy support one another.  **A Maine** Department of Environmental Protection that fosters teamwork, continuous improvement, public service and creativity, with a dedicated, highly skilled and diverse work force. | As an integral member of the Maine Department of Environmental Protection, I am committed to serving each of my internal and external customers.  To accomplish this:  **I will** listen to my customers, understand their needs and explain clearly the needs, responsibilities and mission of the department and its programs.  **I will** work in partnership with my customers to further the department's mission to protect and improve the environment and the health of Maine's citizens.  **I will** act promptly, fairly, professionally and courteously in all my endeavors, and I hold myself accountable for my actions. |   **Activities:**  The Department engages in a wide range of activities. It makes recommendations to the Legislature regarding measures to prevent, minimize and eliminate environmental pollution; issues licenses; initiates enforcement actions; and provides information and technical assistance. The DEP serves as the main link to the federal government on environmental issues and administers some federal programs. Working with the general public, legislators and state and municipal agencies, department staff implement environmental laws and programs.  **Organization:**  The Department is organized by environmental media into four bureaus – Air Quality, Land Resources, Remediation & Waste Management, Water Quality – and the Office of the Commissioner, which includes the Office of Communications & Education, the Policy Development & Implementation Unit and the Office of Innovation and Assistance. Within this structure, department leadership continues to implement organizational improvements that will enhance the agency’s effectiveness in providing protections for the state’s air, land and water while enacting efficiencies to strengthen customer service and operations.  The Department maintains offices across the state to provide accessibility to municipalities and the public and to enable staff to conduct necessary field work. The Office of the Commissioner and Central Maine Regional Office are located in Augusta. Other offices include the Northern Maine Regional Office in Presque Isle, the Eastern Maine Regional Office in Bangor and the Southern Maine Regional Office in Portland. | | |
| **Student Vocabulary List– Environmental Regulations** | | |
|  | **Acid Rain** | Acid rain, or acid deposition, is a broad term that includes any form of precipitation with acidic components, such as sulfuric or nitric acid that fall to the ground from the atmosphere in wet or dry forms. |
|  | **Inversion** | The action of inverting something or the state of being inverted; a reversal of the normal decrease of air temperature with altitude, or of water temperature with depth. |
|  | **Hydroelectricity** | Hydroelectricity is electricity made by generators that are pushed by movement of water. |
|  | **Legal Doctrine** | A framework, set of rules, procedural steps, or test, often established through precedent in the common law, through which judgments can be determined in a given legal case. |
|  | **NOAA** | The National Oceanic and Atmospheric Administration (NOAA) is an American scientific agency that focuses on the conditions of the oceans and the atmosphere. NOAA warns of dangerous weather, charts seas, guides the use and protection of ocean and coastal resources and conducts research to provide understanding and improve stewardship of the environment. |
|  | **NonPoint Source Pollution** | Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. |
|  | **OSHA** | The Occupational Safety and Health Administration is an agency whose mission is to "assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance". |
|  | **Ozone Layer** | A region of Earth's stratosphere that absorbs most of the Sun's ultraviolet (UV) radiation. |
|  | **Regulations** | Mandatory requirements that can apply to individuals, businesses, state or local governments, non-profit institutions, or others. |
|  | **Smog** | Fog or haze combined with smoke and other atmospheric pollutants. |
|  | **Statute** | A written law passed by a legislative body. |
|  | **Superfund** | Superfund is a United States federal government program designed to fund the cleanup of sites contaminated with hazardous substances and pollutants. |
|  | **Toxicity** | The degree to which a chemical substance or a particular mixture of substances can damage an organism. |
| **Student Worksheet**  Visit the source listed above to answer the following questions about environmental trends in Maine.  The Environmental Trends Dashboard will appear.  What is the purpose of the DEP’s Environmental Trends Dashboard? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    What are the meanings of the following symbols?  Green circle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Yellow Square \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Red Pentagon \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Look at information for Ozone in the Air Quality portion of the Dashboard. What is the current condition for Ozone in Maine? What symbol is used to describe ozone trends? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Look at information for Invasive Aquatic Plants in the Water Quality portion of the Dashboard. What is the trend for Invasive Aquatic Plants in Maine? What symbol is used to describe Invasive Aquatic Plants trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Look at information for Municipal Solid Waste – Recycled in the Sustainability portion of the Dashboard. What is the trend for Municipal Solid Waste – Recycled in Maine? What symbol is used to describe the Municipal Solid Waste – Recycled Trend? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  Consider your town. What technologies can be used to prevent the following:   1. Air Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 2. Water Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 3. Ground Pollution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |

**Project Assessment**

**Project Title:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Instructor/School/Grade: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Instructor Contact Information: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date assigned: \_\_\_\_\_\_\_\_\_\_\_\_\_ Number of Students Participating \_\_\_\_\_\_\_\_\_\_\_\_**

The following questions are intended to help us understand your feelings regarding the presentation and materials. Your sincerity in answering these questions is appreciated. Please feel free to use the space at the end of the form for any additional comments that you may have. *This form has been left in Microsoft Word format so that you may fill it in electronically. Please fill out the form completely and email your assessment to* [david.madore@maine.gov](mailto:david.madore@maine.gov).

**Ranking System**

1 ~ Excellent / Strongly agree

2 ~ Good – Above average / Moderately agree

3 ~ Average – ok / Neutral in agree or disagree

4 ~ Poor – below average / Moderately disagree

4 ~ Very poor – not acceptable / Strongly disagree

NA / not applicable

*Please continue on the second page…*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **NA** | **Questions** |
|  |  |  |  |  |  | **Course Content** |
|  |  |  |  |  |  | 1. Value of course content to you. |
|  |  |  |  |  |  | 1. Importance of course content given your teaching topic. |
|  |  |  |  |  |  | 1. Overall rating of course content. |
|  |  |  |  |  |  | 1. Ease of implementing materials into daily lessons. |
|  |  |  |  |  |  | **Materials/Project** |
|  |  |  |  |  |  | 1. Movie (if applicable) was easy to present. |
|  |  |  |  |  |  | 1. Student worksheet was useful and easy to follow. |
|  |  |  |  |  |  | 1. Student project stimulated thinking & conversation. |
|  |  |  |  |  |  | 1. The project put ideas across effectively. |
|  |  |  |  |  |  | 1. Teacher materials were useful and easy to follow. |
|  |  |  |  |  |  | 1. The method of material presentation encouraged students feel free to ask questions, disagree, express ideas, etc. |
|  |  |  |  |  |  | **Self-Evaluation (Instructor)** |
|  |  |  |  |  |  | 1. What was your level of knowledge concerning this topic prior to this presentation? |
| **Please share any recommendations you feel would be helpful.** | | | | | | |

**Thank you for providing your feedback!**

Please email your assessment to david.madore@maine.gov.