

The Use and Abuse of Pittsburgh's Environment

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Overview

This unit enhances the ninth grade civics curriculum. It provides an introduction to environmental awareness using Pittsburgh as a case study. Students will study the founding of Pittsburgh and the vast resources readily available to those who settled in Pennsylvania. The unit examines these resources and their role in the economic development of our region. Students will study the chronological development of various industries along with their impact on our land, air and water. The economic growth of Pennsylvania will be analyzed along with the environmental impact of this growth. The curriculum unit also discusses Pittsburgh's renaissance and attempts to clean up the environment. Students are introduced to wise environmental choices and the revitalization efforts encompassed by our city. Throughout the unit, various civics skills are reinforced as students learn about Pittsburgh's environmental history.

Rationale

This unit will reinforce several objectives of the ninth grade civics curriculum. Civics examines the concept of citizenship and its relationship to government. All students learn about the founding of our nation and the ideals on which it was based. Students identify what it means to be an American citizen and the rights and responsibilities associated with citizenship. The theme of citizenship is reinforced throughout the course.

The civics course begins with the study of government. Students discuss the purpose of government and the roles and responsibilities of those who run the government as well as those who are governed. The creation of our federal government is examined as well as an in depth look at the United States Constitution. Units of study also include examination of the federal government, with time devoted to the legislative, executive and judicial branches. State and local

government are also studied; specifically, their structure, responsibilities, and citizen participation.

The second semester of the civics course is designed to reinforce the concept of government specific to the roles and responsibilities of citizens. Students examine the concept of participation through political parties, elections and voting. An in-depth look at the Bill of Rights outlines the basic freedoms of Americans and its interpretation through the judicial branch. Specific supreme court decisions are analyzed to show the way the Constitution has changed and adapted to an evolving world. Our nation's legal system is studied as well as juvenile law and its impact on youth today. In conjunction with the Pittsburgh Police Department and several speakers from various law enforcement agencies, students examine all aspects of the Pennsylvania legal system and its role in protecting the rights of the accused.

Several weeks are devoted to the study of Economics. A comparative look at world economies begins the unit. Students then identify the characteristics of the United States economy, the role of our government in the economy and the role of the consumer in the economy. Students are encouraged to be educated and responsible consumers through various activities including: personal banking skills, smart shopper tips, educated buyers, and making everyday economic decisions.

The civics course ends with a unit on careers. Ninth graders focus on identifying interests and abilities and their relationship to the world of work. The Career Decision Making Inventory is used as the basis of this unit. Students then examine specific careers through a comprehensive research project.

There are several skills that are addressed throughout the civics course. Students must learn to think critically so that they can become thoughtful participants in our society. Critical thinking skills are learned and enhanced so that students can comprehend, apply, analyze, synthesize and evaluate what they know. Cooperative learning is a key to success in our diverse world. Students must learn to work together, share ideas, appreciate differences and arrive at a goal together. Cooperative learning teaches individual responsibility and teamwork in achieving the group's common goal. School to work skills are stressed throughout the course. Students learn the importance of attendance and participation; a skill that is necessary in the world of work. Students also practice decision making skills, following directions, problem solving skills, identifying goals, and communication skills. The career unit also gives students the opportunity to explore various occupations.

The civics curriculum also encompasses the rapid technological developments of our society. Students must manipulate various research and search tools for success in civics. The computer lab is utilized for a variety of lessons and students are encouraged to consult on-line sources for a variety of purposes. Traditional assessment methods are used as well as performance and standard based assessments. Students demonstrate that not only do they "know" the material, but that they can also "do" the material.

The unit I have developed will reinforce the objectives of the civics curriculum. It is designed to be taught near the end of the year after students have completed the ninth grade civics

course. *The Use and Abuse of Pittsburgh's Environment* will use Pittsburgh as an example to illustrate many of the concepts and ideas studied throughout the year. Students must have background information on the development of the American political, legal and economic systems as well as knowledge and understanding of citizenship, its rights and responsibilities.

"For every action, there is a reaction; for each cause, an effect; for each decision, an outcome; for every choice, a consequence." This quote from the video, *Echoes through Penn's Woods: A second chance for Pennsylvania*, sums up the goal of this unit. Students will begin with a background of civics; our government and civic duties. This basic knowledge will be applied to the study of Pittsburgh's environmental history to examine the development of our area, the diversity of resources, both human and natural, that contributed to the growth of our area, the decisions made by the people and the government and the effects of these decisions on our environment. By studying the past and the consequences of our choices, students will be able to demonstrate their responsibility in shaping the environmental future.

Pennsylvania was an ideal location for explorers to settle because of its vast expanse of natural resources. The mountains were full of timber to provide fuel and shelter. The land was rich in fossil fuels and minerals such as coal, oil, natural gas and iron. The numerous waterways were ideal for travel and commerce. Lake Erie, on the northwestern boundary, connected Pennsylvania with the Great Lakes. The Delaware River provided a water highway for ships coming from and going to the Atlantic Ocean. The convergence of the Allegheny, the Monongahela, and the Ohio Rivers gave Pennsylvania the necessary inland transportation system to complement its industries. Railroads also supported industrial expansion. By 1850 the Pennsylvania Railroad was the nation's largest rail system and the world's largest freight carrier. Eventually, Pennsylvania became home to millions of European immigrants hungry to participate in the economic boom. The roots of the labor union movement were laid in Pennsylvania. Pennsylvania has prospered because of its location and wealth of natural resources. This abundance of industrial activity, however, laid the way for years of abuse on the natural environment.

Throughout the 18th and 19th century people settled in Pennsylvania and used its resources to help build the nation. Pittsburgh was incorporated as a borough in 1794 and granted city status by the Commonwealth of Pennsylvania in 1816. The city was built around a fort used by both the British and French in the 18th century. Its location among the confluence of three rivers, the Allegheny, Monongahela, and Ohio, provided access through the Great Lakes and the St. Lawrence, Ohio and Mississippi rivers to every part of the continent east of the Rockies. The first steamboat, the *New Orleans*, was built in Pittsburgh in 1811. The Pennsylvania Mainline Canal reached Pittsburgh in 1837 and the Pennsylvania Railroad in 1851 (Encarta). Both increased Pittsburgh's capability and Pittsburgh rapidly developed into one of the nation's greatest industrial cities. The high-quality bituminous coal in the region provided an energy source to fuel the industrial development.

The vast forests in Pennsylvania provided 29 million acres of timber for settlers. The virgin forests were soon depleted for several reasons. Most settlers were farmers. They cleared forests to make way for fields of crops. Subsistence was the key. Farmers need clear land to grow food and used the fallen timber to build shelters and provide a source of heat. The clearing of

Pennsylvania forests for agricultural use declined around 1896 to 1902 as people discovered the deep soils of the midwest were superior to the rocky northeastern soil for farming. Trees were also cut for fuel. It took enormous quantities of wood to heat homes and make charcoal to smelt iron. Land was and still is cleared for the purpose of development of houses, towns and cities. As of the 1920s, there was very little original timber left in Pennsylvania. The 29 million acres has decreased to around 9 million acres. The use of the land, specifically the clearing of the forests, has impacted Pennsylvanians to this day. The use of the land by the pioneers was certainly necessary for their survival and livelihood, yet today, we must find ways to revitalize our forests and replenish our natural resources.

As people sought new methods of production and time-saving machines, the iron industry blossomed in Pennsylvania. In the 1700s tools and sturdier goods were being produced with iron. A constant heat source was needed for the iron industry and people turned to the rich coal deposits of Pennsylvania for that fuel source. Even after the conversion to coal, timber was still used in building the railroads and especially to shore up the mines. Mining began in the mid 1700s peaking in 1918 with a combined production of 276 million tons. In 1810 there were a total of 44 iron furnaces in Pennsylvania. Around the civil war, that number increased to over 150 (video). Besides fueling the iron industry, coal also provided the energy to fight both world wars. Coal fueled the steel industry. Today, coal supplies the majority of fuel for electric power generation in the nation. While our area experienced a period of great economic and industrial growth with the help of coal, the effects of coal mining have had serious consequences for our region.

After the coal was extracted from a mine, workers would abandon the mine and move to another location. Today negative consequences abound because of abandoned mines. Properties are damaged from mine subsidence, waterways are polluted from mine drainage, people are killed in unsafe abandoned mines due to dangerous highwalls and water filled pits, vegetation is unsustainable in polluted acidic soil, and underground mine fires burn continuously.

With the steel industry at its peak, Pittsburgh's economy soared. Immigrants found stability, employment and the promise of the American dream. Unbargained for, however, were the problems that came in trying to obtain that dream. As Pittsburgh's population soared, factories and living quarters were being erected side by side. The cholera epidemics of the 1830s and the Great Fire of 1845 were the results of this overcrowding. The Donora Smog of 1948, a toxic cloud that loomed over this Mon Valley town, claimed the lives of 20 people and sickened 7,000. The temperature inversion that trapped air pollutants over the city for days, made people start to wonder about the health effects of industrial pollution. Pittsburgh lost its aesthetic appeal as the Pennsylvania Railroad replaced Liberty Avenue, the city's most elegant street, in 1852. In 1883, writer Willard Glazier described Pittsburgh as "a smoky, dismal city, at her best. At her worst, nothing darker, dingier or more dispiriting can be imagined. The city is in the heart of the soft coal region, and the smoke from her dwellings, stores, factories, foundries and steamboats, uniting, settles in a cloud over the narrow valley in which she is built, until the very sun looks coppery through the sooty haze." (Toker, 11)

At the turn of the century Pittsburgh greeted the 1900s with a population of 321,000. (Toker, 12) Thousands of immigrants came to the region from Eastern Europe, many recruited to work in the

steel mills. Although best known for coal mining and steel production, Pittsburgh was also home to many other industries. Some of the larger industries were:

Aluminum manufacturing (Aluminum Company of America, now ALCOA)

Electrical generators and appliances (Westinghouse Electric)

Glass (Pittsburgh Plate Glass, now PPG Industries)

Coke-making machinery (Koppers)

Railroad cars and locomotives (Pressed Steel Car Company and Pittsburgh Locomotive)

Coke and coal chemicals (H.C. Frick & Company and Pittsburgh Coal Company)

Food products (H.J. Heinz)

After reaching its population peak in 1950 with 700,000 people; Pittsburgh began to experience a decline. By the mid-1980s over 100,000 steel and steel-related jobs had been eliminated. By the 1990s, the number of steel mills was reduced to one major integrated mill (the Edgar Thompson Works); a specialty steel plant (Allegheny Ludlum); and a strip mill (the Irwin Works). One might think that a drastic drop in manufacturing would be the demise of Pittsburgh, however, instead it sparked a renaissance that moved Pittsburgh forward.

In 1946, Pittsburgh entered what was to be its first major renaissance. The economic boom and peak industrialization that occurred during the war began to decline, yet it had lasting effects. Renaissance I began planning for smoke control, flood control and sewage treatment. It created the first urban redevelopment authority, reconstructed the central business district, created Point State Park, Gateway Center, Mellon Square, a new airport, and a parkway to link the city with the Pennsylvania Turnpike.

In 1977, Pittsburgh entered a second renaissance. Renaissance II is linked to the leadership of Mayor Caliguri. Neighborhood revitalization peaked as well as development in the Golden Triangle. Cultural development was encouraged during Renaissance II. Pittsburgh's economy shifted from manufacturing to services. The region's largest employer is the University of Pittsburgh (including UPMC Health Systems.) The region's high-technology sector has grown, and pollution control and environmental cleanup firms are increasing. The number of workers in service jobs today far exceeds those in manufacturing.

As Pennsylvania was settled, grew and developed, several positive changes were evident. Pennsylvania, and more specifically, Pittsburgh, fueled the development of our nation. From the rich timber, to the coal deposits, to the steel mills, Pittsburgh provided goods and services that led our nation to economic prosperity. However, along with the economic development Pennsylvania has paid the price. Our environment has been exploited and destroyed in the quest for economic achievement. The next part of the unit will explore effects of industrialization on

the environment and the steps that have been taken to reclaim and revitalize Pennsylvania's resources.

The original timber industry was achieved by clear-cutting forests. Owners of the land worked from border to border to clear the area of all timber. After the trees were gone they moved west. After the timber was extracted, a second round of destruction began. Tree by products were taken from the ground and the saplings to produce products such as wood alcohol and turpentine. The forests were now complete cleared. Two men were instrumental in the effort to save Pennsylvania's once abundant resource. Dr. Joseph Rothrock was the first president of the Pennsylvania Forestry Association and the state's first commissioner of forestry. He purchased lands for State Forest Reserves. Gifford Pinchot was a Pennsylvania Governor who made the first systematic study of forestry. He served as chief of the Forest Service from 1898 to 1910. His goal was to develop methods of efficient and profitable timber production by teaching forest crews not to destroy the forest, but to use selective cutting. Today, state forests in Pennsylvania comprise over 2 million acres. Their purpose is to provide a continuous supply of lumber, protect watersheds, conserve water, regulate the flow of rivers and streams, and furnish opportunities for healthful recreation to the public.

Of great environmental concern is the protection of arable land. By reusing existing land rather than destroying undeveloped land, we are conserving one of our most precious resources. With the decline of heavy manufacturing, acres of land around Pittsburgh remain empty and contaminated. One way Pittsburgh has attempted to recycle land is through the revitalization of brownfields. The Environmental Protection Agency defines brownfields as "abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination." (Conservation Consultants). Pittsburgh has revitalized several brownfields for the purpose of retail development, housing, and industrial development. Land recycling provides many economic and environmental benefits for our region.

In the last 20 years, efforts have been made to correct mine damage and pollution caused by abandoned coal mines. This has included filling open, mined areas to create a more natural topography. Fly ash mixed with lime is layered with coal waste to fill in the land. The fly ash prohibits water from traveling through and causing more acidic drainage. Soil is the top layer which is planted with cover. A new artificial soil has been created to fill mines that has the necessary organic material and alkalinity to support plant growth. These efforts have thus far been successful in that they fill the abandoned mines, reclaim the topography, and prevent further acidic drainage.

The problem of abandoned mines affects us all. Every major water basin in Pennsylvania has been affected by abandoned mine drainage. Pennsylvania has taken many steps to help remedy this problem. In 1998, over \$26 million of state and federal funds were spent to reclaim land and treat discharges from abandoned mines. There are two major types of pollution, point source and nonpoint source pollution. Point sources of pollution are municipal and industrial wastewater coming from a distinct "point" such as a sewer outfall. Nonpoint sources of water pollution, however, cannot easily be traced back to a particular location. Some examples of nonpoint pollution include agricultural runoff, mining and resource extraction, urban runoff and storm

sewers. The leading cause of water pollution in Pennsylvania is agricultural runoff followed by mine drainage. It is everyone's responsibility to prevent nonpoint source pollution in our watersheds.

Pollution not only affects the environment, it also causes severe health problems in people who are exposed. Most people are aware of outdoor air pollution and the negative health effects it can have, but most do not realize that the air we breathe indoors can pose significant health risks also. Good indoor air quality in schools contributes to a favorable learning environment, increased productivity, and better health of students and faculty. The definition of good indoor air quality management includes control of airborne pollutants, introduction and distribution of adequate outdoor air, and maintenance of acceptable temperature and relative humidity. (Zimmerman, 2) The school acts like a sealed box containing pollutants from cleaning solvents, mold and moisture, chalk dust, lab and art supplies, and both human and mechanical exhaust. Opening windows to bring in fresh air also brings in pollen and allergens.

Pennsylvania has taken many steps to try to revitalize our region and renew our precious resources. The timber industry is more conscious of the need to create sustainable forests, abandoned mines are being filled, and streams and rivers are being cleaned. Industries now must meet standards to reduce the level of pollution they emit. One key to maintaining our environment is recycling. Neighborhoods have curbside collection programs for certain items, cities, towns and boroughs conduct programs for other items. Land recycling is important to our environment also. Revitalization of brownfields has shown how this can be accomplished. It is also up to individual citizens to make wise environmental choices. We need to recycle. We need to identify alternatives for energy and fuel. We need to conserve our resources, especially fuel and water. We need to make wise decisions and weigh the consequences of our choices. The key to a successful future is maintain a balance between economic and environmental concerns. We need to remember that for every action, there is a reaction; for each cause, an effect; for each decision, an outcome; and for every choice, a consequence. By examining our impact on the environment and making wise choices, we can ensure the maintenance and revitalization of our environment for future generations.

Objectives

The Use and Abuse of Pittsburgh's Environment seeks to achieve many objectives. Since most ninth graders are not familiar with environmental concerns, a goal of this unit is to give a survey of pertinent background information on the environment. The focus is on our use and abuse over the years of land, water and air. Students will also analyze the relationship between economic prosperity and environmental protection. A major focus will be on Pittsburgh's industrial development and its impact on our resources and environment. Students will apply several civics skills, including: communication skills, cooperative learning, research skills, decision-making, problem solving and critical thinking skills, in the completion of this unit.

Specific social studies content standards are addressed throughout the unit. The standards encompass citizenship, communications, and mathematics. A complete list of the social studies content standards is included at the end of this unit.

Strategies

Specific strategies employed to carry out the objectives for this unit are outlined in detail in the following lessons. The main goal is for students to recognize that all actions have consequences. This will be accomplished through a variety of classroom activities.

Classroom Activities

The following lessons are designed to complement the civics curriculum. They should be included when appropriate into the study of Pittsburgh's environmental history.

Lesson 1

As an introduction to the unit students should view the video, **Echoes Through Penn's Woods: A Second Chance for Pennsylvania**. This video examines Pennsylvania's industrial history and its effects on our environment. Through the actions of our forefathers, the video documents the rapid change experienced by our region, Pennsylvania's role in developing the nation, and the effects of these actions on the environment. The revitalization efforts of Pennsylvania's resources is also explored. This is a great way to introduce ninth graders to environmental concepts.

The video encompasses much of what this unit seeks to achieve. It includes a wealth of information yet is very appropriate for a viewing audience of ninth-graders.

Lesson 1 Objectives

Students will be able to describe how people interact with the natural environment when securing and using natural resources; and describe the rapid change in industry experienced in Pennsylvania and the environmental effects of that change. Students should also be able to explain the steps taken by Pennsylvania to restore our environment and encourage a balance between economic growth and environmental concerns.

Lesson 1 Materials/Procedure

Teachers should obtain a copy of the video, **Echoes Through Penn's Woods: A Second Chance for Pennsylvania**. The video may be obtained through the Pennsylvania DEP/DCNR Environmental Education and Information Center at 717-772-1828. The video can also be viewed on the internet at www.GreenWorks.tv.

All students should have a copy of the video questions to complete while viewing the tape. The quiz-like format of the questions helps to focus student attention on important concepts in the film. The questions, adapted from the teacher's guide that accompanies the video, can be found in **Appendix A**. After viewing the film, the teacher should lead a discussion using the discussion questions found in **Appendix B**. The discussion questions can be adapted to the level of the learner.

Lesson 2

As students begin to study Pennsylvania and Pittsburgh history, it is important that they understand some physical characteristics of the land and its resources. Labeling a map of Pennsylvania will enable students to become familiar with the composition of their state.

Lesson 2 Objectives

Students will be able to label a map of Pennsylvania showing major rivers, water sources, cities, mountains, and natural resources.

Lesson 2 Materials/Procedure

Students should be given a blank outline map of Pennsylvania with a list of items to identify. See **Appendix C**. The items can either be labeled together as a class or students can be provided with research materials to use to label the information by themselves. The teacher should review the map with the students.

Lesson 3

A critical component of the civics course is research and oral presentation. This lesson gives student the opportunity to work together in small groups to prepare a presentation on various time periods in Pennsylvania's history.

Lesson 3 Objectives

Students will be able to identify the major economic and environmental developments over a fifty-year period in Pennsylvania's history and create a presentation documenting the findings of their research.

Lesson 3 Materials/Procedures

The class should be divided into seven groups. Each group is responsible for identifying the major industrial developments and their environmental impacts during their specified time period. Students should focus on land, air and water usage and abuse. Basically, they are trying to answer the questions "What were people doing and what were they using (or abusing) to do it?"

The time periods should be divided as follows: prior to 1750, 1750-1800, 1800-1850, 1850-1900, 1900-1950, 1950-1980, and 1980-2000.

The following focus questions can be given to students to help them narrow the scope of their research.

1. Who were the major groups in Pennsylvania at the time? Describe their standard of living. Where were they living?

2. What were people using? What resources? What were the important industries? How did these industries consume resources?

3. How was the environment affected?

4. What, if any, reforms or legislation was in effect to protect the environment?

Various methods of presentation can be employed. Students may create a newsletter to share with the class or opt for a more traditional oral presentation. As a follow up to this activity, a speaker could be invited from "Sustainable Pittsburgh" to talk about the balance between environmental protection, equality and economic growth.

Lesson 4

Most students have heard stories about Pittsburgh's smoky past. They've heard that Pittsburgh was a "black town" that had to keep the streetlights burning twenty four hours a day; that businessmen had to take two and three shirts to the office everyday; and that windows and curtains had to be washed on a daily basis. To bring the idea to life for those that have only heard about that time in our history, students will examine the novel **Out of this Furnace** by Thomas Bell.

Lesson 4 Objectives

Students will be able to describe the experiences of immigrants who came to work in Pittsburgh during the late 1800s and describe the working conditions in the mills in the early 1900s.

Lesson 4 Materials/Procedure

Students should be provided with the novel, **Out of this Furnace** to read. If excerpts will be used instead, they should probably be read in class so that the teacher can facilitate understanding of the novel. Background information would have to be provided to fill in the missing text. Students should be able to understand the themes of the novel if this is done correctly.

After reading the novel or excerpts, students should respond to the following question, "Imagine that you are living during the time period you just read about in **Out of this Furnace**. Write a letter to your cousin back in Europe describing the immigrant experience, the steel mills and life in the smoky city." Letters should be at least one to two pages in length. While additional research is not required, it can certainly be encouraged, especially speaking to someone who lived during this time period.

Lesson 5

Studying charts and graphs and manipulating statistical data is an important civics skill. This lesson will introduce the student to various data on Pittsburgh's population and industry.

Lesson 5 Objectives

Students will be able to gather statistical data on Pittsburgh's population and industrial development, create table and graphs representing the information and speculate on the environmental effects relative to the data presented.

Lesson 5 Materials/Procedure

One class period should be devoted to this lesson. In class, students should be given various reference materials in which they can locate information on Pittsburgh. See **Appendix D** for an outline of information to be gathered as well as questions for completion. Students should then be given time to complete the worksheet questions with teacher guidance if necessary.

Lesson 6

Watersheds are areas of land that drain to a common river, stream or lake. There are several pollution problems that directly affect the watershed and some solutions in place to try to combat these problems.

Lesson 6 Objectives

Students will be able to identify the 6 watersheds in Pennsylvania and label them on their map of Pennsylvania; students will also be able to identify the sources of water pollution in Pennsylvania's streams and rivers.

Lesson 6 Materials/Procedure

A poster entitled, "Clean Watersheds! Clean Water!" produced by Pennsylvania's DEP is available to educators. It shows the six watersheds in Pennsylvania and potential sources of pollution to these watersheds. It is a helpful tool for this lesson. All students should receive a copy of the assignment, "Clean Watersheds! Clean Water! Questions for Review." See **Appendix E** for this handout. Look at the poster together and have students label the six watersheds on their individual map of Pennsylvania. A discussion should incorporate this information as well as sources of pollution for the watersheds. Students should complete the worksheet independently or in small groups using their maps, information presented in class, and the tables provided. As a follow-up activity to this lesson, the teacher can organize a field trip to Frick Environmental Center to examine a local watershed.

Lesson 7

Now that students are familiar with watersheds and water pollution, they will personalize the information and decide how they can be responsible water consumers. There are several tips that students can follow that will help conserve water on a daily basis. By education the students, hopefully they will share these tips with their families and friends.

Lesson 7 Objectives

Students will be able to identify their current water usage and describe actions they could take to conserve water.

Lesson 7 Materials/Procedure

Students should be given the handout, "How much water do you use?" a few days in advance of this lesson. See **Appendix F** for this handout. Have the students chart the amount of water that they use in a 24 hour period. After students complete the handout, have a discussion on how much water people use. Then, brainstorm ideas on how everyone can conserve their water usage. Students should then be given the handout, "Be Water Wise!" (**Appendix G**) and discuss the reasons why it is important to conserve water. Strategies for implementing a water conservation plan are included on the handout. As an extension of the lesson, students can make posters advocating water conservation to be hung around the school.

Conclusion

The purpose of this unit is to give civics students a general background on the economic development of Pittsburgh and its effects on the environment. Once students are familiar with this basic information the unit can be expanded in many ways. An excellent idea to expand on would be indoor air quality. The EPA's Tools For Schools Kit is available is available to educators and helps students develop a plan to increase air quality within the school. As part of this unit, students can write letters to their representatives urging for passage of legislation to establish indoor air quality guidelines for schools. The Tools for Schools kit includes surveys, guidelines and step by step solutions to create a safer environment within the school. This could be expanded as time permits.

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Appendix A

Echoes Through Penn's Woods: A Second Chance for Pennsylvania

Video Questions

1. Historically, resource use, progress and environmental degradation went hand in hand as Pennsylvanian's standard of living increased. True or False?

2. The first widely used natural resource in Pennsylvania was
A. Timber B. Coal C. Iron D. Oil
3. The first of Pennsylvania's timber was cut to support which industry?
A. Agriculture B. Railroads C. Iron D. Oil
4. In the 19th century, much of Pennsylvania's original timber was
A. pine and hemlock. B. logged by clear cutting methods.
C. selectively logged. D. hardwood - oaks and hickory.
E. A and B only. F. C and D only.
5. What percentage of Pennsylvania's forests were cut during the 1800s and the first five decades of the 1900s?
A. 30% B. 50% C. 70% D. 90%
6. Which industries contributed to the heavy deforestation of Pennsylvania during the 150-year period mentioned in the previous question?
A. Agriculture B. Iron industry
C. Railroad industry D. Mining Industry
E. Chemical industry F. All of the above
7. Modern forestry methods, due to advances in science, technology and education, are much less environmentally damaging than they were 100 years ago. True or False?
8. Why was coal important in Pennsylvania's history?
9. Fifty years ago, Pennsylvania's air and water quality were better than they are today. True or False?
10. What caused the Knox Mine disaster?

- A. The mine caved in trapping miners behind hundreds of feet of rubble.
- B. Dynamite was exploded improperly.
- C. The mining tunnel collapsed underneath the Susquehanna River, flooding the mine.
- D. Canaries were not kept as air quality sensors.

11. What did old, abandoned mines leave behind that was/is environmentally harmful?

- A. Dangerous pits, shafts and high walls
- B. Acid drainage
- C. Underground fires
- D. Culm banks
- E. Scarred landscapes
- F. Damaged habitat
- G. All of the above

12. Modern mining practices eliminate most of the environmental damage that could be created by the less sound practices used historically. True or False?

13. What are some potential technologies to correct the effects of past mining practices?

- A. re-mining
- B. diversion wells
- C. settling ponds
- D. All of the above
- E. B and C only

14. Pennsylvania's steel industry was fairly insignificant at the national level? True or False?

15. What caused the environmental disaster in Donora, Pennsylvania?

- A. A broken dam.
- B. A collapsed mine tunnel.
- C. A temperature inversion that trapped air pollutants.
- D. An explosion and subsequent fire in an iron foundry.

16. The incident in Donora was a turning point for

- A. steel's role in driving the economy.
- B. complacency on the health effects of industrial pollution.
- C. public acceptance of acid mine drainage.
- D. complacency on industrial safety regulations.

17. The incident in Donora gave rise to the nation's

- A. clean air movement
- B. clean water movement
- C. dam safety act
- D. fire codes

18. The transformation of Pittsburgh from the "Smoky City" of the 1920s and 1930s to its current, cleaner status is one of America's most amazing environmental transformations. True or False?

19. The book written by Pennsylvania native Rachel Carson that led to our modern environmental clean up efforts is titled

- A. Earth in the Balance: Ecology and the Human Spirit
- B. The Official Earth Day Guide to Planet Repair
- C. Silent Spring
- D. Return from the Land of the Doomed

20. Fifty years ago, Lake Erie was known as the most ecologically abused of all of the Great Lakes. True or False?

21. Part of the recovery of Pennsylvania's environment has been the realization that

- A. The economy and the environment can go hand in hand.
- B. Resources began to be viewed as limited instead of limitless.
- C. Education and community action are key elements in environmental protection.
- D. All of the above.

22. A bio-indicator of clean water is

- A. Mayflies
- B. Zebra Mussels
- C. A relatively high dissolved oxygen concentration.
- D. Blood worms

23. Exotic species are noted for

- A. displacing native species.
- B. having few or no regional natural enemies.
- C. providing excellent cover and food for natural enemies.
- D. All of the above.
- E. A and B only.

24. Since 1970, the population of Pennsylvania's towns and cities has grown by 13 percent but the amount of land consumed for homes, businesses and factories has skyrocketed to 81 percent. True or False?

25. Open space provides for

- A. groundwater recharge. B. habitat.
- C. recreation. D. All of the above.

26. The heart of the matter in preserving open space could be said to be

- A. population control B. a matter of money
- C. a matter of values D. All of the above

27. Urban sprawl is a more modern environmental problem that was tied to social changes after

- A. World War I
- B. World War II
- C. invention of plastics in 1950s
- D. the first Earth Day in 1970

28. Pennsylvania's most pressing environmental problem in the new millennium is identified by environmental leaders in the state as

- A. global warming
- B. population growth
- C. land use
- D. air pollution in transportation corridors.

29. Land use decisions in Pennsylvania are made at what level of government?

- A. local
- B. county
- C. state
- D. federal

30. Which one of the following is not considered a tool for preserving open space?

- A. regional planning
- B. purchase of development rights
- C. preservation programs
- D. avoidance of zoning regulations
- E. identifying and using brownfields

Appendix B

Echoes Through Penn's Woods A Second Chance for Pennsylvania

General Discussion Questions

1. As rain falls and then flows over the ground and/or filters into the ground to continue its movement toward a stream, what is your understanding of the effect that each of these human activities might have on the quality of water in the stream: harvesting timber, extracting coal, producing steel and expanding communities onto previously unbuilt land?

2. Evaluate the trade-offs between the environment/conservation and the human use of each of the five activities listed in question one above.

3. Reviewing the list of environmental impacts that you formulated in question one above, and remembering the documentary, list the environmental health issues that surfaced during the securing and use of the timber, coal and steel.

4. What environmental health effects do you think might be encountered as a result of polluted water and reduced habitat due to expanding land use?

5. What relationship existed between environmental disasters and environmental laws in the documentary (remember the Knox Mine disaster and the Donora temperature inversion)? Do you think this relationship still exists today between events in general and regulations that spring from such events? Give an example. Do you think that this is a sound relationship (between disasters and regulations) or do you feel there should be a better way to effect protective regulations? What might slow the initiation of protective regulations not stemming from disaster-type events?

6. As environmental understanding, technology and environmental laws have evolved, list what you know and learned from the documentary about the technologically more protective ways of securing and using timber, coal and steel, water and the land. You may compare your current understanding to what was generally accepted as common practice during the early part of the 1900s.

Appendix C

Map of Pennsylvania

Directions: Label the following features on a blank map of Pennsylvania.

Cities: Allentown

Erie

Harrisburg

Philadelphia

Pittsburgh

Scranton

State College

Mountain Ranges: Allegheny

Appalachian

Blue Ridge

Pocono

Water: Allegheny Reservoir

Allegheny River

Chesapeake Bay
Delaware Estuary
Delaware River
Juniata River
Lake Erie
Monongahela River
Ohio River
Pymatuning Reservoir
Raystown Lake

Susquehanna River (East and West Branches)

Shade the areas on your map that are rich in coal deposits. Use one color for bituminous fields and another color for anthracite fields.

Identify on your map the areas that have natural gas and oil deposits. Create a symbol to identify these areas.

Appendix D

Statistical Data on Pittsburgh

I. Population

Research the population figures for Pittsburgh. Complete the following table:

Year	Population	Year	Population
1794	_____	1900	_____
1800	_____	1910	_____
1810	_____	1920	_____
1820	_____	1930	_____
1830	_____	1940	_____
1840	_____	1950	_____
1850	_____	1960	_____
1860	_____	1970	_____

1870 _____ 1980 _____

1880 _____ 1990 _____

1890 _____ 2000 _____

II. Industry

Research the leading industries in Pittsburgh spanning the years 1794-2000. Create a table showing the major Pittsburgh industries and the time frame in which they were prevalent.

III. Questions

1. Describe the trend in population for the years 1794-2000. In which year did Pittsburgh's population peak?
2. What was the leading industry in Pittsburgh when population was at its peak?
3. Choose two major industries in Pittsburgh and speculate on the environmental effects of each of these industries.
4. On the back of this handout, create a line or bar graph to show population in Pittsburgh for the years 1790-2000.
5. In what ways are population growth and industrial development related?

Appendix E

(Clean Watersheds! Clean Water!)

2 pages

Appendix F

(How Much Water Do You Use?)

Appendix G

Be Water Wise!

Why Save Water?

Water saved is money saved because you'll pay less water and sewer taxes. As an added bonus, when you use less hot water, your fuel bills go down as well. Even if you are on well water,

saving water reduces electric costs of pump operation and also reduces amount of waste going to septic tank. Clean drinking water is also a vanishing resource.

How Much Water Are We Using?

The average American uses 60 gallons of water in the house each day. That doesn't include car washing, lawn watering and other outdoor uses. Flushing, bathing, and laundering are the largest in-house uses.

Water Saving Devices

A number of inexpensive devices are now available that will enable you to save even more water and energy. For more information, contact your plumber or hardware store or your local government environmental office.

Water Saving Ideas

Potential water waster: Kitchen sink

What you can do:

Clean fruit and vegetables efficiently. Use a vegetable brush and a hand sprayer with short bursts of water.

Do not thaw food under running water.

Use fewer dishes, scrape dishes, soak dirty pots and pans overnight.

Dishwasher Scrape dishes, wash only full loads, experiment to discover least possible detergent necessary to cut down on suds residue.

Drinking water Keep a bottle of drinking water in the refrigerator. Use ice cubes to cool water, do not let the faucet run.

Recycle leftover drinking water. Do not let a waiter in a restaurant bring you drinking water unless you request it.

Bathroom sink Shave and brush teeth in a water saving way. Use an electric razor, do not run the water continuously.

Bathtub/shower Do not overfill the tub. Don't waste initial cold water.

Put the stopper in the tub before you turn on the water.

Take shorter, lighter showers. Use low consumption shower heads.

Toilet Flush less often, use low consumption toilets. Repair leaks.

Washing machine Wash only full loads, use load selector for large or small loads. Use cold water. Choose a machine that is energy efficient.

Household cleaning Use less water. Recycled water is great for heavy cleaning followed by a clean rinse. Use least possible soap or cleaning agent. To cut down on rinse water, presoak.

Driveway or street Wash car sensibly. Wash with buckets and sponge. Use the hose only to rinse. Use a broom instead of a hose to clean the driveway or sidewalk.

Lawn/garden Water slowly, thoroughly and as infrequently as possible. Water at night to minimize evaporation. Aerate lawn, use drip irrigation systems and water timers. Use mulch and let grass grow higher in dry weather.

Backyard pool Cover when not in use to prevent evaporation and to keep clean. Don't fill up, high water splashes easily.

Faucets Repair leaks. Check all faucets, including outside hose connections for leaks. Replace worn washers, O rings, packing and faulty fixtures.

Pipes Insulate hot water pipes, to avoid having to wait for hot water.

Taylor Allderdice High School

Department of Social Studies

Content Standards

Citizenship

1. All students demonstrate an understanding of major events, cultures, groups and individuals in the historical development of Pennsylvania, the United States, and other nations and describe the patterns of historical development.
2. All students demonstrate an understanding of themes and patterns of geography, know the locations of major bodies of water, land masses, and nations, and describe the relationships between geography and historical, economic, and cultural development.
3. All students describe the development and operation of the economic, political, legal and governmental systems in the United States.
4. All students examine and evaluate problems facing citizens in their communities, state, nation, and world by incorporating concepts and methods of inquiry of the various social sciences.
5. All students develop and defend a position on current issues confronting the United States and other nations by conducting research, analyzing alternatives, organizing evidence and arguments, and making oral presentations.

6. All students explain basic economic concepts and the development and operation of economic systems in the United States and other nations and make informed decisions about economic issues.

7. All students demonstrate their skills of communicating, negotiating, and cooperating with others.

8. All students demonstrate that they can work effectively with others.

9. All students demonstrate an understanding of the history and nature of prejudice and relate their knowledge to current issues facing their communities, the United States, and other nations.

11. All students demonstrate the ability to resolve conflicts in peaceful ways, including but not limited to peer mediation, anger management, interpersonal skills, and problem solving.

Communications

4. All students write for a variety of purposes, including to narrate, to inform, and to persuade.

8. All students compose and make oral presentations that are designed to persuade, inform, or describe.

Mathematics

6. All students evaluate, infer, and draw appropriate conclusions from charts, tables, and graphs showing the relationships between data and real-world situations.