



GOOD HANDS
ANIMAL SHELTER

Reclaim – to bring into or return to a suitable condition for use, as in cultivation or habitation; to procure, or create useable substances, from refuse or waste products

“There is nothing to do in this town!” “I get so bored!” “I can’t wait to leave here when I go to college!” “Kids in other places are so lucky because they have stuff to do!” These are just a few of the comments I hear on a daily basis from my students. Hopefully, through this unit, students will see that the coal industry can be a great resource to reclaim land and create activities they will enjoy. Land reclamation is a giant step in the right direction to help restore a more positive image of the coal industry.

Introduction:

As a language arts teacher, I sometimes get funny looks when people discover that I am in charge of the coal study unit. First, I tell them that I used to teach science and that is when I became involved with the CEDAR organization. Second, I explain to them that the language arts curriculum is changing right now with a big shift towards nonfiction comprehension and analysis as well as persuasive and analytical writing. I find it easy to incorporate the topic of coal into my language arts classroom through reading fiction and nonfiction text; applying research skills; creating persuasive, informational, reflective, and creative writings; etc. You do not have to be a science teacher to incorporate coal education into your classroom curriculum.

During language arts class, students learned how to annotate by adding personal comments, including critical and explanatory notes, to various types of text. To begin our unit, each student received their own copy of “Governor Beshear: Intelligent Energy Choices for Kentucky’s Future” to annotate. Afterwards, students shared their notes using the classroom document camera and Smart Board. One important part of annotating a text is writing questions that arise as you read. In the past, I have used these questions as the essential questions in our unit; however, this year’s questions were

different. I noticed that many of them did not center on the energy plan itself but were based on preconceived notions and the students' own questions they had about coal. As we continued our discussion, a debate brewed between those students who were "pro-coal" and those students who were "anti-coal". I listened to their arguments and noticed that the majority of the "anti-coal" students were most concerned with environmental factors, and most of those factors centered on the beautiful, natural landscape of Eastern Kentucky. At first, I continued in the original direction and created a unit based on a small number of student questions that did relate to the energy plan, but I soon discovered that the majority of the students had greater concerns about the environmental disturbance that the actual act of mining created. They did not seem as concerned about how coal can improve Kentucky's energy demands. In the past, I have completed units on clean coal technologies but that did not seem to be their major concern either; disrupting the natural environment and wildlife was their top priority. As a result, coal reclamation became the focus of this unit. It was a different direction than originally planned but with middle schoolers I have found you must meet them halfway to get their attention and keep them interested so that they may learn the necessary content and achieve the set goals and expectations.

So this year's coal study unit took a giant U-turn in direction from our original plan...but if there is one thing I have learned in teaching middle schoolers the last 10 years it is that you sometimes just have to go with the flow. The following are questions the students most wanted to explore:

1. How can we protect our environment while mining the coal we need?
2. What is coal reclamation? What are the steps to successful reclamation?
3. How is reclaimed land used? How do they decide what an area of land is used for?
4. What laws regulate coal reclamation?

Activities:

When designing activities to help us answer these questions, I tried to focus on student interest and ability levels, since both vary greatly at this level. Students are very technology savvy and love working with computers, so I tried to incorporate that into each activity as much as possible, whether it was through research or the presentation of their data. My middle school students also appreciate hands-on activities and working with the older high school students so I collaborated with a high school science teacher to create a cooperative experiment.

Activity #1: *An Inconvenient Truth* and Propaganda

Because the main concern of so many students was the environmental impact of the coal industry, I decided to use the Al Gore documentary *An Inconvenient Truth* to show that much of the negative publicity about the coal industry is full of propaganda and half-truths. To begin this activity, students reviewed various propaganda techniques including bandwagon, nationalism, loaded language, red herring, testimonial, etc. Afterwards, we watched *An Inconvenient Truth* and students were instructed to take notes on all propaganda techniques used in the film. Students were able to use their notes to answer an open response question about propaganda techniques. Afterwards, we researched and discussed a variety of ways the coal industry was positively affecting the environment, with reclamation as our main focus. Students created their own sign promoting the coal industry using at least one propaganda technique.

Activity #2: The Reclamation Process

With the help of the Internet, I compiled a series of pictures showing reclaimed land. I was fortunate to find many before-and-after pictures and students were able to discuss the benefits of the reclamation. The major question during this activity was, "How did that (the before picture) turn into

this (the after picture)?” Students then used the *Mining Reclamation* newspaper and various websites to study the process of mine reclamation – pre-mining phase, mining phase, and post-mining phase. Students were also able to read about the regulations governing the reclamation process and new technologies available to the mining industry to assist in the reclamation process.

Activity #3: School Yard Reclamation

Students acted as reclamation specialists and collected data surrounding a given area, making observations about the reclaimability of that land. Students drew an illustration representing their plot of land and answered a variety of questions about what would happen if that plot of land were mined. Students then related their simulated process to the actual process of mine reclamation.

Activity #4: Decision Making for Mining Reclamation

Students participated in a simulated public hearing of a proposed surface mining operation near their community. Each student took on a specific role like mining company; federal, state, and local government representatives; geologist; lawyer; environmental ecologist; local farmer; etc. The hearing focused on the reclamation of the land that would be disturbed. To encourage new thinking, I placed students in the opposite roles they would expect. For example, if a student was against mining, I would assign them the role of mine company owner or economist. If a student was for mining, I would assign them the role of environmental ecologist or local farmer. This allowed the students to have a new perspective on the topic. Our end result was overwhelmingly in favor of surface mining and reclamation.

Activity #5: Creating Your Ideal Reclamation Site

Students were asked to think of their ideal reclamation site and were given the opportunity to draw the different features of their creation. Numerous ideas included skate parks, YMCA, golf course,

all-purpose sports complex, native species reserve, etc. Students then wrote persuasive letters and editorials describing their ideal reclamation site and how it would benefit our community.

Activity #6: Water Quality Sampling on Mine and Reclamation Sites

Students were trained in water quality sampling using the LaMotte series and measured the pH of various sources of water, including mine and reclamation sites. They learned about the regulations that govern mining practices, water quality, and reclamation. In addition, students designed their own experiments using the scientific method that examined the affect different amounts of coal particulates (dust) have on the pH of water. Students examined what coal companies are doing or will be doing in the future to improve water quality in and around their site. Students were also able to explore the possible career choices found within the environmental and geological sciences, and the coal industry. Misconceptions about mining and the environment were alleviated by giving students the opportunity to examine the facts more closely.

Activity #7: Coal Fair

The coal study unit culminated with the coal fair on April 15th. Many students were eager to demonstrate what had learned over the course of the coal study unit and through their own independent research. School administrators, board members, teachers, parents, and students (elementary, middle, and high school) toured the coal fair as the participating students stood by explaining their projects.

Summary:

Any time I see young people excited about learning, gathering information about hot topics to form their own opinions, and then educating others on their findings, I get excited! Was this unit a success? How could it not be! Students learned about the necessities and possibilities of the coal

mining industry and then in turn educated their fellow classmates, teachers, parents, and community. In total 11 teachers and approximately 160 students participated in the planning, implementation, and evaluation of this unit which spanned all content areas and several grade levels. All essential questions were answered and students exceeded our expectations in the products they produced. Throughout the unit, students were evaluated on performance events, writing assignments, and presentations. High-order thinking and meaningful, real-world learning was evident in daily discussions, activities, and assignments.

After the unit's activities and culminating coal fair, everyone involved was given the opportunity to evaluate the unit. Responses were overwhelmingly positive. Administrators once again enjoyed seeing the students actively learning; teachers appreciated the eagerness of the students; parents assisted their children in projects and were proud of their accomplishments; students actively participated in every aspect of the unit and then became educators, ambassadors, and supporters of coal...and perhaps future coal miners, engineers, and government officials that will continue the tradition of providing energy for America. The favorite activity seemed to depend on the interests of the particular student – some enjoyed the hands-on science investigation while other students enjoyed the creativity of individual projects.

Reclamation – the act or process of reclaiming; a restoration as to the productivity, usefulness, and morality

"I wish our town had more coal to mine." "How can we get coal companies to invest in our community?" "Neighboring communities are so lucky to have such great reclamation projects." "Wouldn't it be exciting to travel across Eastern Kentucky and look at all the reclamation sites?" Much knowledge was gained through the course of this unit. I am most proud that my students have demonstrated independent thinking – they have learned to question what they hear, not to blindly take it for fact. In addition, students are no longer seeing the coal industry as a destructive force but a helpful resource that can contribute to our communities in a number of ways.

COAL STUDY

UNIT

LESSON

PLAN 2010-

2011

(Given to all

cooperating

teachers)

Coal Study Unit 2010-2011 Lesson Plan

Objectives: Students will be able to...

1. read and analyze non-fiction text
2. annotate non-fiction text
3. research information using a variety of resources
4. write proficient/distinguished transactive pieces (letter, editorial, article, open response, research paper)
5. follow the scientific method and create a scientific investigation
6. create a variety of visual aids (table, pie chart, bar graph, map) to display information
7. calculate and convert a variety of mathematical expressions (percentages, ratios, fractions, money, etc.)
8. construct a variety of products (research papers, posters, power point presentations, videos, etc.) to demonstrate learning
9. identify a variety of propaganda techniques
10. identify problems and provide logical solutions to a variety of situations

*Students will be assessed on these objectives by a variety of rubrics and observations.

Essential Questions:

1. How can we protect our environment while mining the coal we need?
2. What is coal reclamation? What are the steps to successful reclamation?
3. How is reclaimed land used? How do they decide what an area of land is used for?
4. What laws regulate coal reclamation?

Connections:

Kentucky Learner Goals and Academic Expectations

Goal 1: Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives.

1.2 Students make sense of the variety of materials they read.

1.5 - 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.

1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

1.13 Students make sense of ideas and communicate ideas with the visual arts.

1.16 Students use computers and other types of technology to collect, organize, and communicate information and ideas.

Goal 2: Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives.

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

2.8 Students understand various mathematical procedures and use them appropriately and accurately.

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

2.15 Students can accurately describe various forms of government and analyze issues that relate to the rights and responsibilities of citizens in a democracy.

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

2.22 Students create works of art and make presentations to convey a point of view.

Core Content 4.1

- RD-O8-4.0.2 Students will use evidence from a passage to formulate opinions in response to a reading passage.
- WR-M-1.1.0 Students will establish and maintain a focused purpose to communicate with an authentic audience.
- SC-O8-4.7.2 Students will explain the interactions of the components of the Earth system (e.g., solid Earth, oceans, atmosphere, living organisms) and propose solutions to detrimental interactions.
- MA-O8-4.1.4 Students will construct data displays (Venn diagrams, tables, line graphs) and explain why the type of display is appropriate for the data.
- SS-HS-1.1.3 Students will evaluate how the U.S. government's response to contemporary issues and societal problems reflects the needs, wants and demands of its citizens.
- PL-O8-4.3.2 Students will use a variety of technology tools (e.g., multi-media, Internet, digital camera) to present and communicate information.
- AH-O8-4.4.1 Students will create art for specific purposes using the elements of art and principles of design to communicate ideas.

***This unit crosses many disciplines in order to give the students a broader understanding of the coal industry and how it affects all aspects of our lives.**

Differentiated Instruction:

1. IEP: extended time, reading assistance, shorter assignments, use of calculators, modified grading scale, cooperative learning groups
2. Gifted: independent research, enrichment activities
3. Multiple Intelligences: linguistic, spatial, logical, auditory, kinesthetic, naturalist, existential, interpersonal, intra-personal

Procedures/Resources:

This is only a BASIC outline of procedures. It is up to the individual teacher to decide how to implement the details of each lesson in their classroom. This will allow each teacher to create specific lessons that best suit their individual students.

Pre-activity (ALREADY COMPLETED)

1. Read "Governor Beshear: Intelligent Energy Choices for Kentucky's Future"
2. Annotate the text
3. Brainstorm essential questions to be answered throughout the unit

Activity 1: *An Inconvenient Truth* and propaganda

1. Discuss various propaganda techniques.
2. Watch *An Inconvenient Truth*. Have students take notes on the propaganda techniques used in the film.
3. Discuss the propaganda techniques used in the film and research the validity of these claims. Research what the coal industry is doing to be more "Earth-friendly" (focus on reclamation).
4. Complete the propaganda techniques open response.
5. Allow students to work in groups to create signs promoting the coal industry. Encourage students to use a variety of propaganda techniques.

Activity 2: The Reclamation Process

1. Watch the reclamation slide show that was e-mailed to you.
2. Read the Mining Reclamation newspaper which includes laws that impact mining regulations, the phases of mining reclamation, and technology and reclamation.

Activity 3: School Yard Reclamation

1. Create small groups and allow students to go outside to find a three feet square plot. Students will draw their plot and answer the following questions that represent what must be taken into consideration before mining can begin:
 - a. What is the general appearance of the plot?
 - b. What types of plants or vegetation are present?
 - c. Are there any insects or signs of animal life present?
 - d. What is the soil like?
 - e. Are there any rocks present?
 - f. Does the plot change as seasons change?
 - g. What environmental conditions are present (water, life, temperature, etc.)?
 - h. What is the surrounding land used for?
2. Now students will become reclamation specialists and will need to determine the reclaimability of the land.
 - a. If your plot were considered for a mini-mining exploration and you had to excavate an area 24 inches in diameter and 6 inches deep, how would your plot be affected?
 - b. What tools would you need?
 - c. Where would you put the excavated ground?
 - d. How would the mini-mining affect insect, animal, and/or human interaction?
 - e. Would mining produce long-term effects?
 - f. If the plot were mini-mined, could the ground be reclaimed to near its approximate original appearance?
 - g. What reclamation would need to be done?
 - h. Is the disturbance worth the economic gain made through jobs, taxes, and the quality of life and creation of wealth?
 - i. What factors present the greatest challenges?
3. As a whole group, share their findings and compare their small simulation to the actual process of mine reclamation.

Activity 4: Decision Making for Mining Reclamation

1. Review the four stages of decision making – identify and understand the problem, do additional research and assemble your information, formulate a plan, and carry out the plan.
2. Discuss the pre-mining, mining, and post-mining procedures that can be found in the Mining Reclamation newspaper.
3. Assign each student a role from “Group Role Guidelines”. Students should take on that role and examine the pros and cons of mining. For each con, encourage students to find solutions.
4. Hold a mock public hearing in which the proposed land is discussed. Students should come to a consensus as to whether mining is possible and the steps that will need to be followed to assure successful reclamation.

Activity 5: Creating Your Ideal Reclamation Site

1. Ask students to brainstorm ideas they would like to see added to our community. It can be business, recreation, education, etc. Students can discuss why we do not already have these services. Could the coal industry help make their idea possible?
2. Students will choose one idea and draw a visual representation of their idea.
3. Students will write letters to city council informing them of their idea and persuading them of its relevance to our community.

Activity 6: Water Quality Sampling on Mine and Reclamation Sites

1. All students will complete this activity with Mr. [REDACTED] in their science and/or ecology class. If you would like a copy of the activity, please see Mr. [REDACTED].

Culminating event:

School Coal Fair, Library, April 15th

Please see me for sign-up sheets and category packets

Assessment:

I have attached several rubrics that may be of interest to you in assessing your students. Please turn-in all writing samples to me so they may be placed in their writing folders.

Reflection/Refinement:

After you complete the unit, take a moment with your students to reflect on the lessons and the overall experience. Please, along with your students, complete the attached unit evaluation forms. Don't forget to include suggestions of changes you would like to see for next year's coal unit as well as what you liked best about the unit. Thank you for your support and participation!

LOOK

WHAT

WE

DID!

Dear Parents/Guardians:

I am pleased to announce that School is participating in the CEDAR (Coal Education Development and Resource) program. CEDAR is "an all-volunteer, not-for-profit corporation, began in July 1993 as a partnership between the Coal Industry, Business Community and Educators." CEDAR targets students grades K-12 in Johnson, Pike, Floyd, Harlan, Knott, Martin, Letcher, Lawrence, and Magoffin counties in an attempt "to form a knowledgeable, unbiased opinion of the coal industry." CEDAR'S motto is as follows: "Securing coal's future today by educating our leaders of tomorrow."

As part of the CEDAR program, our students will participate in the CEDAR coal fair. Your child and I have gone over this in class and now it is time for you to help your child determine their project category and topic. The topic can be **any aspect of the coal industry**, as long as the main focus of the project is something dealing with coal.

Students can compete in one of the following categories: science, math, language arts, music, technology - multimedia, or social studies. These projects will not only be scored and judged for class but will also be on display at our school's coal fair on April 15, 2011. Selected projects will be invited to compete in the Regional Coal Fair in Pikeville, where 63 cash prizes are awarded to category winners, with nine additional cash prizes being awarded to the overall grade level winners. A Project of the Year award, valued at \$2500, is awarded to the student having the overall best project at the Regional Fair.

Each category has its own guidelines and scoring sheet, which you can view at <http://cedarinc.org/coalfairinfo.htm>. I will give students a paper copy of the forms if they are unable to view or print them on-line. You can also see photos of previous coal projects on this website.

Remember, the most important things to consider when coming up with your project are originality and relevance to coal. Again, the topic can be anything about coal - the formation of coal, careers in coal, coal reclamation, coal safety, electricity from coal, famous people in coal, types of mining, coal and the environment, calculating coal, mine ventilation, etc. **Be specific, be creative, be original!**

Helping your child is not only allowed, it is encouraged. You may help brainstorm ideas and gather research, as well as assist with the neatness of the display. However, your child must be able to answer questions about his/her project during judging.

If you have any questions or concerns, please feel free to e-mail me and I will assist you as much as possible.

Thank you for your effort and support in this assignment,

Cc:

Our school will once again host a CEDAR Coal Fair. The competition will take place April 15th. The contest is for students grades K-12. There are 7 categories - science, math, social studies, English, music, art, technology. This is a great opportunity for students to put their skills and knowledge in practice. Students can take the math (or English or art or science...) concepts they learn in class and apply them to the coal industry. If you are interested in your students participating (as a requirement or bonus opportunity), please let me know today or tomorrow. I have all the information and guidelines and I will be more than happy to come to your class and speak to your students if you would like. I am always so impressed with the advanced concepts used by

...I would love for our students to showcase their talents!

Correspondence planning water quality investigation

From: [redacted] .nailto: [redacted] @ [redacted] .kyschools.us]

Sent: Monday, March 28, 2011 3:48 PM

To:

Subject: [redacted] school

"As part of the grant requirement with Cedar Coa. [redacted] agreed to take a group of Ecology students on a field trip to a local coal mine site.

During the past month I have trained my students in water quality sampling using the LaMotte series. My plan is to have these students measure the pH of various sources of water at a mine site. This way they can apply what they have learned about water quality in a real life setting while fulfilling our grant obligation with Cedar coal.

In addition students will design experiments that examine the affect different amounts of coal particulates (dust) have on the pH of water. Please be advised that our objectives are in no way to downplay or bring negative publicity to any partner, such as the coal industry; especially a mine site that has allowed us to visit them. We understand that without their cooperation we would not be able to provide students this type opportunity. In fact, our visit will actually be beneficial to both our students as well as the coal mine operators. People need to understand the facts of coal mining and the realities of how we obtain the energy we all consume. I believe it's possible to be good stewards of our environment while at the same time promote jobs that will allow Kentuckians the ability to provide a higher standard of living for their families and our citizenship.

There are several goals I hope to accomplish with our visit. First and foremost to give students the opportunity to visit a mine site. Many of our students have never been to a mine site.

You cannot substitute what one can learn at on an actual mine site with what's in a book.

Our visit will no doubt bring new light to student's understanding of the mining industry as well as the chance for our students to explore the possible career choices found within the environmental and geological sciences, and the coal industry. Hence a visit to mine site would truly give students a real- life perspective and an experience they will never forget.

Unfortunately many people lack understanding or receive misleading information about our environment, energy, and coal. Misconceptions about mining, energy production, and the environment can be avoided if we allow our students the opportunity to examine more closely the facts. Encouraging students (who are the leaders of the future) to think about solutions to these issues is vital since they no doubt will have to deal with the environmental and economic concerns of the near future.

Kentucky and several other states will feel a tremendous impact of recent government proposals and laws affecting its industry and citizens. Ultimately these affects will trickle down to hamper our economy and job base. Most agree that the young students of today will ultimately become the leaders of our future. Therefore it is essential to give these students the opportunities to examine the facts, dispel misconceptions, and to propose solutions that can remedy the environmental, social, and economic challenges we face today and those we are certain to have in the future.

Prior to our proposed visit students will learn about some of the mining regulations and procedures that pertain to water quality laws. Students will be trained on how to conduct water quality test. Students will design experiments to examine the effects coal dust particulates (gathered at the site or another source) have on the pH of water. Students will also research, collect data, analyze data, and draw conclusions. A summary and report of these findings will be available to give all stake holders. Although measuring the pH of water is our major focus students will also examine the water for dissolved oxygen, conductivity, and macro invertebrates (if present).

The experience promises to be one of the most educational fieldtrips that I have ever taken with my students during my five year tenure at . They will apply the scientific method, examine real life situations, and propose possible solutions to water quality issues. Furthermore students will learn about possible career choices from their research, experimentation, and their involvement with various people they come in contact during the project.

We hope to take our trip in the spring prior to state testing or shortly afterwards. Should there be any modifications that you recommend please let me know. I am willing to make adjustments to this proposal.

I look forward to the possibility of making this proposed field trip a reality. Your prompt attention to this matter will be greatly appreciated."

Sincerely,

Science Teacher/

PRIDE Sponsor

schools.us

**STUDENT
WORK
FOR
ACTIVITIES
1-6**

Governor Steve Beshear: Intelligent Energy Choices for Kentucky's Future

CHALLENGES

- Kentucky's energy use is projected to grow by slightly more than 40 percent between now and 2025. *How*
- Greenhouse gas (GHG) emissions could be more than 40 percent higher in 2025. *Are we going to though?*
- Coal-fired power generation in the state will not sufficiently support Kentucky's coal industry if other states cease purchase of Kentucky coal. *Why is this?*
- The nation's dependence on foreign energy supplies endangers our security. *How does it endanger our security?*

STRATEGIES

Strategy 1: Improve the energy efficiency of Kentucky's homes, buildings, industries and transportation fleet.

Goal: Energy efficiency will offset at least 18 percent of Kentucky's projected 2025 energy demand. *How will we do this?*

Strategy 2: Increase Kentucky's use of renewable energy

Goal: By 2025, Kentucky's renewable energy generation will triple to provide the equivalent of 1,000 megawatts of clean energy while continuing to produce safe, abundant and affordable food, feed and fiber. *How much is that?*

Strategy 3: Sustainably grow Kentucky's production of biofuels. *what are biofuels?*

Goal: By 2025, Kentucky will derive from biofuels 12 percent of its motor fuels demand, while continuing to produce safe, abundant and affordable food, feed and fiber. *what does this mean?*

Strategy 4: Develop a coal-to-liquids industry in Kentucky to replace petroleum-based liquids

Goal: Kentucky will develop a coal-to-liquids industry that will use 50 million tons of coal per year to produce four billion gallons of liquid fuel per year by 2025. *How?*

Strategy 5: Implement a major and comprehensive effort to increase gas supplies, including coal-to-gas in Kentucky

Goal: Kentucky will produce the equivalent of 100 percent of our annual natural gas requirement by 2025 by augmenting in-state natural gas production with synthetic natural gas from coal-to-gas processing. *process?* *What is that?* *fake?*

Strategy 6: Initiate aggressive carbon capture/sequestration projects for coal-generated electricity in Kentucky

Goal: By 2025, Kentucky will have evaluated and deployed technologies for carbon management, with use in 50 percent of our coal-based energy applications. *what kind of damage*

Strategy 7: Examine the use of nuclear power for electricity generation in Kentucky

Goal: Nuclear power will be an important and growing component of the nation's energy mix and Kentucky must decide whether nuclear power will become a significant part of meeting the state's energy needs by 2025. *Other 50% percent* *will this do to Kentucky?* *Why not decide now.*

Strategies 1, 2 & 3 are designed to help the commonwealth achieve a proposed Renewable and Efficiency Portfolio Standard, whereby 25 percent of Kentucky's energy needs in 2025 will be met by reductions through energy efficiency and conservation and through the use of renewable resources. *why these reductions?*

Strategies 1, 3 & 4 include strategies to help the commonwealth achieve an Alternative Transportation Fuel Standard (ATFS) to help transition away from dependence on foreign petroleum, utilizing fuels such as those derived from biomass and coal, plug-in hybrid vehicles and compressed natural gas. *How will this affect the people of certain countries?*

Will there be more damage than profit of the coal?

How will this damage affect Kentucky and other states?

RESULTS

If enacted, the plan will:

- Provide 30,000-40,000 new Kentucky jobs as a result of a booming diversified energy sector.
- Achieve energy independence for Kentucky from imported oil *why this independence*
- Produce annually approximately four billion gallons of liquid fuels from coal (utilizing about 50 million tons of coal annually).
- Produce annually 135 billion cubic feet of synthetic gas from coal (utilizing about nine million tons of coal annually) to augment Kentucky's natural gas supply *why do we need to do this*
- *what is that* Reduce the net per capita carbon emissions into the atmosphere by 50 percent, while ensuring Kentucky's economic viability by protecting Kentucky's coal industry against negative impacts of federally mandated carbon management legislation *why?*
- Optimize our renewable energy resources, utilizing wind, solar, hydropower, landfill gas, and biomass.
- Maintain current energy per capita use despite major energy growth requirements.

Propaganda Techniques

1. Bandwagon – using the argument that because everyone is doing it, you should, too.
2. Card stacking (also called slanting) – telling only one side of the story as though there is no opposing view.
3. Exigency – creating the impression that your action is required immediately or you opportunity will be lost forever.
4. Flag waving – connecting the person, product, or cause with patriotism.
5. Glittering Generality – using positive or idealistic words based on details or minor attributes to create an association in the reader's mind between the person or object and something that is good, valued, and desired.
6. Innuendo – causing the audience to become wary or suspicious of the product, person, or cause by hinting that negative information may be being kept secret.
7. Name calling – using negative or derogatory words to create an association in the reader's mind between that person or object and something that is bad, feared, or distasteful.
8. Plain folks – using a person who represents the “typical” target of the ad to communicate to the target audience the message that because we are all alike and I would use/buy/believe this, you should, too.
9. Prestige identification – showing a well-known person with the object, person, or cause in order to increase the audience's impression of the importance or prestige of the object, person, or cause.
10. Red herring – highlighting a minor detail as a way to draw attention away from more important details or issues.
11. Snob appeal – associating the product, person, or cause with successful, wealthy, admired people to give the audience the idea that if they buy or support the same things, they will also be one of the “in-crowd”.
12. Testimonial/Expert opinion – using the testimonial or statement of someone to persuade you to think or act as he or she does.
13. Transfer – linking a known personal goal or ideal with a product or cause in order to transfer the audience's positive feeling to the product or cause.

Propaganda in *An Inconvenient Truth*

- A. What is propaganda?
- B. Why do we use propaganda?
- C. How was propaganda used in *An Inconvenient Truth*?
- D. What is your impression on the movie? Did the propaganda work? Did your views of Global Warming change?

Propaganda in An Inconvenient Truth

Introduction: In An Inconvenient Truth by Al Gore, many propaganda techniques are used frequently.

Part A: Propaganda is techniques such as loaded language, slanting, and fancy graphics to convince the viewer to do something.

Part B: Propaganda is used to convince people to act a certain way, believe something, or use a certain product.

Part C: Propaganda was used in the documentary, An Inconvenient Truth to persuade viewers to believe as Al Gore does about global warming and to take action to slow down the process. For example, in this film, fancy graphics were used. Al Gore used this propaganda technique because the complicated charts and diagrams gave the impression that Gore is very informed on the topic of Global warming and thoroughly understands it. Gore also used Emotional Appeals in An Inconvenient Truth. Emotional Appeal appeals to your emotions.

Most of the emotional appeals used are not related to global warming, such as the anecdotes about Gore's accident and his sister's death.

This propaganda technique is trying to get the viewer to have sympathy for Gore. The prestige identification technique can be found in the film, also. Viewers will likely think that Al Gore is an intelligent person who knows a great deal of information because he is the former vice president of the United States and also a well-known person.

part D: This movie did not change my opinion on global warming because I recognized that most of the movie was propaganda, not fully the truth.

Conclusion: In conclusion, many propaganda techniques, such as fancy graphics, emotional appeal, and prestige identification are used in Al Gore's An Inconvenient Truth.

Open Response Rubric

4

Great!

	1-Novice	2-Apprentice	3-Proficient	4-Distinguished
Correctness	Demonstrates a minimal understanding in discussion of concepts	Demonstrates a limited awareness of concepts	Demonstrates a general awareness of concepts	Demonstrates a thorough understanding of the subject matter
High-order thinking	Little to no evidence of elaboration, extension, high-order thinking, or relevant prior knowledge	Limited evidence of elaboration, extension, high-order thinking, or relevant prior knowledge	Some evidence of elaboration, extension, high-order thinking, or relevant prior knowledge	Contains elaboration, extension, high-order thinking, or relevant prior knowledge
Idea Development	Unfocused details	Poor development of topic; few supporting details	Adequate development of topic using appropriate details	Well-developed topic including pertinent details
Content vocabulary	Inappropriate vocabulary	Simplistic vocabulary; few content words defined	Acceptable vocabulary; majority of content terms defined	Strong use of terminology; defined terms
Organization	Weak to no organization; lapses interfere with compensation	Weak organization; lapses do not interfere with compensation	Appropriate organization; no lapses	Strong, subtle organization; no lapses
Conventions	Errors in English conventions interfere with communication	Errors in English conventions are disproportionate to length and interfere with communication	Minor errors in English conventions have little to no effect on communication	Strong control of English conventions

Mine Reclamation Process Notes:

Mine reclamation is the process of creating useful landscapes that meet a variety of goals, typically creating productive ecosystems (or sometimes industrial or municipal land) from mined land. It includes all aspects of this work, including material placement, stabilizing, capping, regrading, placing cover soils, revegetation, and maintenance.

Modern mine rehabilitation aims to minimize and mitigate the environmental effects of modern mining, which may in the case of open pit mining involve movement of significant volumes of rock. Rehabilitation management is an ongoing process, often resulting in open pit mines being backfilled.

After mining finishes, the mine area must undergo rehabilitation. Waste dumps are contoured to flatten them out, to further stabilize them against erosion. If the ore contains sulfides it is usually covered with a layer of clay to prevent access of rain and oxygen from the air, which can oxidize the sulfides to produce sulfuric acid. Landfills are covered with topsoil, and vegetation is planted to help consolidate the material. Dumps are usually fenced off to prevent livestock denuding them of vegetation.

The open pit is then surrounded with a fence, to prevent access, and it generally eventually fills up with groundwater.

Tailings dams are left to evaporate, then covered with waste rock, clay if need be, and soil, which is planted to stabilize it.

For underground mines, rehabilitation is not always a significant problem or cost. This is because of the higher grade of the ore and lower volumes of waste rock and tailings. In some situations, stopes are backfilled with concrete slurry using waste, so that minimal waste is left at surface.

The removal of plant and infrastructure is not always part of a rehabilitation program, as many old mine plants have cultural heritage and cultural value. Often in gold mines, rehabilitation is performed by scavenger operations which treat the soil within the plant area for spilled gold using modified placer mining gravity collection plants.

In the United States, mine reclamation is a regular part of modern mining practice.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) is the primary federal law that regulates the environmental effects of coal mining in the United States.

SMCRA created two programs: one for regulating active coal mines and a second for reclaiming abandoned mine lands. SMCRA also created the Office of Surface Mining, an agency within the Department of the Interior, to promulgate regulations, to fund state regulatory and reclamation efforts, and to ensure consistency among state regulatory programs.

Standards of Performance. SMCRA and its implementing regulations set environmental standards that mines must follow while operating, and achieve when reclaiming mined land.

Permitting. SMCRA requires that companies obtain permits before conducting surface mining. Permit applications must describe what the premining environmental conditions and land use are, what the proposed mining and reclamation will be, how the mine will meet the SMCRA performance standards, and how the land will be used after reclamation is complete. This information is intended to help the government determine whether to allow

The Reclamation Process Research Notes

Activity 2

17/20

Independent Research Rubric

	3	2	1
You research the entire time	You research the majority of the time	You research some of the time	You are looking around the room
You carefully select appropriate books and websites	You tend to select appropriate books and/or websites	You were not careful in selecting appropriate books and/or websites	You did not select appropriate books and websites
You respect the researchers around you	You tend to respect the researchers around you	You are often off-task	You are distracting to the researchers around you
You know when you come across good information and take notes	You select some good information to include in your notes	You scan too quickly and miss important information	You did not include important information in your notes
You document all resources appropriately	You document all resources	You document the majority of your research	You did not document your research

Be more selective,
only include relevant information

Follow MLA format

the mine and set requirements in the permit that will protect the environment.

Bonding. SMCRA requires that mining companies post a bond sufficient to cover the cost of reclaiming the site. This is meant to ensure that the mining site will be reclaimed even if the company goes out of business or fails to clean up the land for some other reason. The bond is not released until the mining site has been fully reclaimed and the government has (after five years in the East and ten years in the West) found that the reclamation was successful.

Inspection and Enforcement. SMCRA gives government regulators the authority to inspect mining operations, and to punish companies that violate SMCRA or an equivalent state statute. Inspectors can issue "notices of violation," which require operators to correct problems within a certain amount of time; levy fines; or order that mining cease.

Land Restrictions. SMCRA prohibits surface mining altogether on certain lands, such as in National Parks and wilderness areas. It also allows citizens to challenge proposed surface mining operations on the ground that they will cause too much environmental harm.

Mine closure planning involves planning effectively for the after-mining landscape – all activities required before, during, and after the operating life of a mine that are needed to produce an acceptable landscape economically. Closure performance refers to the activities near and after mine closure and how well activities listed in the closure plan are carried out.

A mine begins to close the day it opens. Decisions made during the mine planning and development phase – and even earlier, during the exploration phase – have profound effects on the ultimate closure plan, its cost, and the resulting landscape performance. These decisions need to be made within a framework of closure planning to realize successful land reclamation.

A critical element of successful reclamation and of good closure planning is stakeholder involvement. Generally, mines do a poor job of ongoing, meaningful stakeholder consultation, and many would benefit from professional assistance. A particularly useful consultation process involves forming a local committee to provide guidance to one or more mines in the region in their reclamation and closure activities with a focus on providing ongoing dialog with stakeholders and identifying the goals important to stakeholders.

The most important benefit of closure planning is identification of critical activities to achieve successful reclamation. Closure planning usually identifies areas of needed research. It also identifies planning constraints (and sometimes opportunities) especially identifying safe methods and locations for tailings storage. These plans provide some assurance that the mine is not "painting itself into a corner" and provide a starting basis to estimate financial assurance levels – important to both mines and regulators. It also forms a base case against which future planning changes can be compared. Much of this work falls under the concept of "design for closure" introduced 30 years ago.

Resources:

www.wikipedia.com

McKenna, G.T. Sustainable mine reclamation and landscape engineering

State and Federal Roles Under the Surface Mining Control and Reclamation Act of 1977

1. The general appearance of the plot is wet and grassy.
2. There are flowers and grass present on the plot.
3. Yes; there are ladybugs, butterflies, and ants.
4. The soil is wet and claylike.
5. Yes, there are rocks present; small pebbles.
6. The grass and flowers wilt, or die, as winter approaches and grow back as spring takes over.
7. The environmental conditions are as follows: the light is very strong, as the plot is right in the Sun's path; there is evidence of a small puddle due to rain; and there are dog prints, evidence of animal traffic.
8. The surrounding land is used for houses and places to park cars.

9. It would lose the soil and vegetation that are present.
10. You would need a small shovel and maybe a wheelbarrow.
11. You could put the excavated ground in a pot to plant flowers instead of using Miracle-Gro.
12. It would affect insects by destroying their habitat.
13. Yes, mining would produce long-term effects such as pyrite coming in contact with water and air composing sulfuric acid, it produces methane which causes global warming, and mining damages the value of surrounding land.
14. Yes, if it were mini-mined, it could be restored because it is a much smaller area.
15. Restoring topsoil and planting native grasses would have to be done in order to restore it to its original appearance.
16. No, it isn't. There is a plethora of other things that could be done to earn just as much money.
17. Factors that present the greatest challenges are dust, slope instability, erosion, or effects on vegetation.

Conclusion: Yes, this would be an easy area to reclaim! The flowers and grass could be transported to another location during mining. The soil and rocks could also easily be stored so they can be returned to the site after mining. As far as we know, there is nothing significant about this plot of land. We do not see any endangered plants or animals/insects. Instead of restoring this plot of land to its original state, it could be used to grow plants that are native to Kentucky. Students can learn about these plants and educate others on Kentucky's native plants like their special characteristics and uses.

Activity 4

Public Hearing / Local Farmer

The pro's and con's of a strip mine on a farm is losing your lively hood for 3 years, and the possibility of your soil never being the same.

The pro's of this is benefitting your local economy, and being able to gain money for the coal on your land.

If you are concerned about the financial situation then you should settle for no less than a large sum over the span of these three years. The soil is a problem in which the mining company is aware of if you don't like the terms don't sign anything unless they meet your standards.

Mining reclamation does not actually occur only after the mining process. It is little known that it occurs before, during, and after the mining process. The ecosystems of the surrounding ~~ecosystem~~ area, water is studied so any kind of pollution that occurs can be easily noted. The air quality is studied for the same reason.

along with the soil to also ensure
fertility is kept. The cost of this land
to be reclaimed is then projected.

During the mining phase the most important
step is waste management to make sure
that the environment isn't harmed unnecessarily.
Also air quality and water quality is
studied so that the air remains breathable
and the water remains drinkable.

After the mining is over the land is
in the ending process of being reclaimed,
local plants are planted. Local plants are planted
because foreign plants may become parasitic
and wipe out the local species. Local
animals are reintroduced into the area.
Local animals are introduced again because
foreign animals might disrupt the food chain.

Reclamation does not end there. Studies are
conducted for years later to ensure
everything is still intact,

On-Demand Outline

- I. Introduction
 - a. Attention getter/Hook – rhetorical question, quote, repetition/anaphora, imagery, string of adjectives/adverbs, anecdote, allusion
 - b. THESIS statement/Opinion
- II. Background Information (optional based on audience)
 - a. Context for the reader
 - b. What has happened that caused you to care about the topic?
- III. First Argument
 - a. State why you are right and what needs to be done
 - b. Provide support – logical, emotional, and/or ethical appeal! (Refer to Venn Diagram)
 - c. Anticipate the needs of the reader – what information can you share to convince the reader that you are right?
- IV. Second Argument
 - a. Refer to First Argument
- V. Third Argument
 - a. Refer to First Argument
- VI. Recognize the opposing side
 - a. Use a transition to contrast: “Of course, I understand you may think/believe..., but....”
 - b. Challenge their opinion and provide counterarguments
- VII. Conclusion
 - a. Restate your thesis
 - b. Connect back to your introduction
 - c. Summarize your arguments
 - d. Call to action, a prediction (“If we don’t..., then...will happen”), rhetorical question/fragments

On Demand

4-07-11

Dear City Council Members,

Imagine this: a beautiful, natural garden oasis. Birds are flying overhead and butterflies are dancing all around. Deer are frolicking in the meadow. The delightful aroma of hyacinth and honeysuckle fills the air. You may ask yourself, "Is this dream a reality? Is there a way that we can have one of these beautiful escapes?" The answer is yes! I believe that we should reclaim the mine site and turn it into a nature reserve.

One reason that we should turn the strip mine into a nature reserve is that it would become a safe place to plant native Kentucky plants. Many native plants and animals in Kentucky are becoming endangered and extinct due to the fact that invasive species are taking over. Human interaction in the environment is also making these plants more scarce. By providing an area for native Kentucky plants to grow, we would be assuring that these plants survive for many generations to come.

Another reason that we should turn the strip mine area into a nature reserve is that it would provide jobs for the jobless. Many people in our area are having trouble finding jobs in today's tough economy. Adding a nature reserve to our area would increase the amount of jobs available because we would need groundskeepers to take care of the... →

~~of course, I see how you may think~~ our guides to give tours of the area. If more people were working, it would boost their confidence because they would no longer have to rely on our tax dollars to provide for their families. Also, the amount of crime in our area would also drop because less people would have to steal to meet their basic needs. The number one reason for crime in Kentucky is that people cannot afford to provide for themselves.

A third reason that we should turn the strip mine into a nature reserve is that it would be a safe and educational place for kids to go hang out after school. Currently, there are no places in our community for children to go to after school and just hang out. Without a safe and fun place for us to go after school, many of us are tempted to do drugs and participate in vandalism. If we provide a nature reserve, the amount of adolescent injury and the crime rates will reduce.

Of course, I see how you may think that building a nature reserve is too costly for our community, but I feel like the reserve will pay for itself in no time. We could charge a small fee to visit the reserve, and, since many schools would take field trips to the educational yet fun nature reserve, we would make lots of money for the community. As a middle school student, I feel that taking a fieldtrip to a nature reserve would help me better learn the aspects of botany and natural science.

Therefore, City Council members, I feel that turning the strip mine into a nature reserve would really help our community. I feel that it would create a safe place for our natural Kentucky plants, create jobs for our community, and serve as a safe place for adolescents to hang out after school. So, if you don't want our future to be plantless, jobless, and vandalized, take action and create a nature reserve!

Sincerely,

Activity 4

Determining the density of an unknown sample of coal

Density is a physical property of matter. The **mass density** or **density** of a material is defined as its **mass per unit volume**. Density is classified as a physical property because the density of a substance can change when the substance changes state. Example: When water evaporates it is a physical change and the density changes. A chemical property is a property that describes its ability to react chemically with other substances and THEREFORE density is not a chemical property. However all substances have their own unique densities. Thus the density of iron is different than the same amount (mass) of gold.

Purpose: To use the displacement method to determine the density of an unknown sample of coal. Method was discussed prior to investigation. Show all calculations on this page. Be sure to observe your sample prior to testing its density. Record your findings under observations/ data section of this report.

Data:

mass of coal sample 2.2 g

Initial volume of water in graduated cylinder 40 mL = 40 cm³ 20 mL = 2.0 cm³

Final volume of water in graduated cylinder 42 mL = 42 cm³

$$D = m/v$$

$$42 \text{ cm}^3 - 40.0 \text{ cm}^3 = 2.0 \text{ cm}^3$$

final volume initial volume volume of sample

Other observations

$$D = \frac{m}{V} =$$

Data/Analysis:

What was the density of the sample of coal you tested? Show how you calculated this value.

$$\frac{m}{V} = \frac{2.2 \text{ g}}{2.0 \text{ mL}} = 1.1 \text{ g/mL}$$

Ecology
Coal Dust Lab

4th period

Hypothesis

On day three of this experiment, I believe the pH of the water will have changed a substantial amount. The container with coal and the lid off will be a small amount lower than the control, while the container with coal and the lid on will be much lower. The coal dust will lower the pH of the water and the air may raise the pH. The pH of the container with the coal and lid off will be 4-5, while the other will be a pH of about 3-4.

Laboratory Report:

Effects of coal dust on the pH of freshwater

Instructor Ecology, _____, Author
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Research Assistants: _____ Ecology Students
Science Department

_____, K³

Draft Manuscript Submitted for the
CEDAR COAL 2011 Annual
May 1, 2011

Effects of coal dust on the pH of freshwater
By: _____, and _____ Ecology Students

Effects of coal dust on the pH of freshwater

ABSTRACT

This paper aims to provide a better understanding of adverse impacts, if any, that coal dust has on the pH of freshwater. First, the type of coal mined, some of the physical and chemical properties of coal dust were investigated. The type of coal used in this study was identified as bituminous coal. Next grain size and density of the coal was analyzed. The density was 1.05-1.4 g/cm³. Other properties such as compaction, moisture holding capacities specific gravity, moisture-density compaction relationships, and shear strength properties were not considered in this study. Various amounts of coal dust was added to both distilled and freshwater samples respectively. The different percentages by weight of coal dust/water solutions were prepared to represent coal dust in the field. When these samples were tested for pH, it was found that increasing the percentage of coal dust did not lower the pH but rather raise the pH slightly. The effects of this particular sample would need to be analyzed In order to obtain a definite chemical composition.

PURPOSE

The purpose of this investigation is to determine the effect, if any, that various concentrations of coal dust has on the pH of freshwater.

BACKGROUND

Acid mine drainage has a rather significant effect on the environment, and is one of the biggest mining issues. The mining industry along with several other agencies are working to reduce the effects of acid rock drainage. . The pH refers to the hydrogen ion concentration in a solution. In this study the source of freshwater was taken from a farm pond while distilled water was used as the control. There are a few methods being used to to raise the pH of freshwaters close to 7; the optimum for most freshwater ecosystems in the United States. One method is carbonate neutralization, in which limestone chips are introduced into sites, neutralizing the water. Another method is ion exchange, in which the ion exchangers would remove potentially toxic heavy metals from mine runoff, as well as making money from it. For this reason this method is not frequently used. Some people think that current technology cannot effectively deal with large amounts of mine discharge, but at least they are trying! Constructed wetlands work very well in raising the pH, and they are also cost-effective. Bacteria and archaea work with wetland plants to filter out heavy metals and raise pH.

When time and money are put into them, the wetlands can become very beautiful indeed. So mining companies know the problem is there, and they must continue to accept that as well as continue to do what they can to reverse it. A major concern in regard to mine water is that associated pH levels often fall below an organism's range of tolerance. This water must be treated or "reclaimed". The restoration and prevention of poor water quality in freshwater streams, lakes, etc is vital in maintaining healthy freshwater ecosystems; especially for the organisms that live within and depend upon these somewhat fragile ecosystems.

HYPOTHESIS

Coal dust, when added to freshwater, will lower the pH of the water. The greater the concentration of coal dust the lower the pH (more acidic) the water will become.

Materials

sieves (#60,)	wash bottles (with distilled water)
100 mL Plastic Sampling Cups	scoopula
Electronic Balance (precision .01 g)	Eyedroppers/plastic pipettes
Distilled water	pH paper, pH meter (precision .01pH unit
Freshwater (Clean source with no contaminates)	Coal (Bituminous coal sample)
Wax pencils/Labels	500 mL Collecting Bottles
100 mL Graduated cylinders	Mortar and Pestle

Procedure To be sent at later date

Data (See Data Table 1&2)

% of Coal Dust	pH of Freshwater With Lid	pH of Freshwater Without Lid	Average temp. in °C
0.5 g/100mL	Trial 1- 6.20 Trial 2- 6.27 Average- 6.24	Trial 1- 6.34 Trial 2- 6.35 Average- 6.33	22.8
1.0 g/100mL	Trial 1- 6.88 Trial 2- 6.83 Average- 6.83	Trial 1- 6.65 Trial 2- 6.59 Average- 6.62	22.5
2.0 g/100 mL	Trial 1- 6.26 Trial 2- 6.36 Average- 6.31	Trial 1- 6.78 Trial 2- 6.77 Average- 6.77	21.8
3.0 g/100 mL	Trial 1- 7.11 Trial 2- 7.18 Average- 7.15	Trial 1- 6.68 Trial 2- 6.73 Average- 6.71	21.9
4.0 g/100 mL	Trial 1- 7.22 Trial 2- 7.17 Average- 7.20	Trial 1- 7.18 Trial 2- 6.99 Average-7.07	22.1
5.0 g/100 mL	Trial 1- 6.70 Trial 2- 6.72 Average- 6.7	Trial 1- 7.05 Trial 2- 7.12 Average- 7.08	22.3
0.00 g/ mL	Control	Trial 1- 6.18 Trial 2- 6.09 Average 6.14	Control 22.1

4/25/2011
after 24 hours

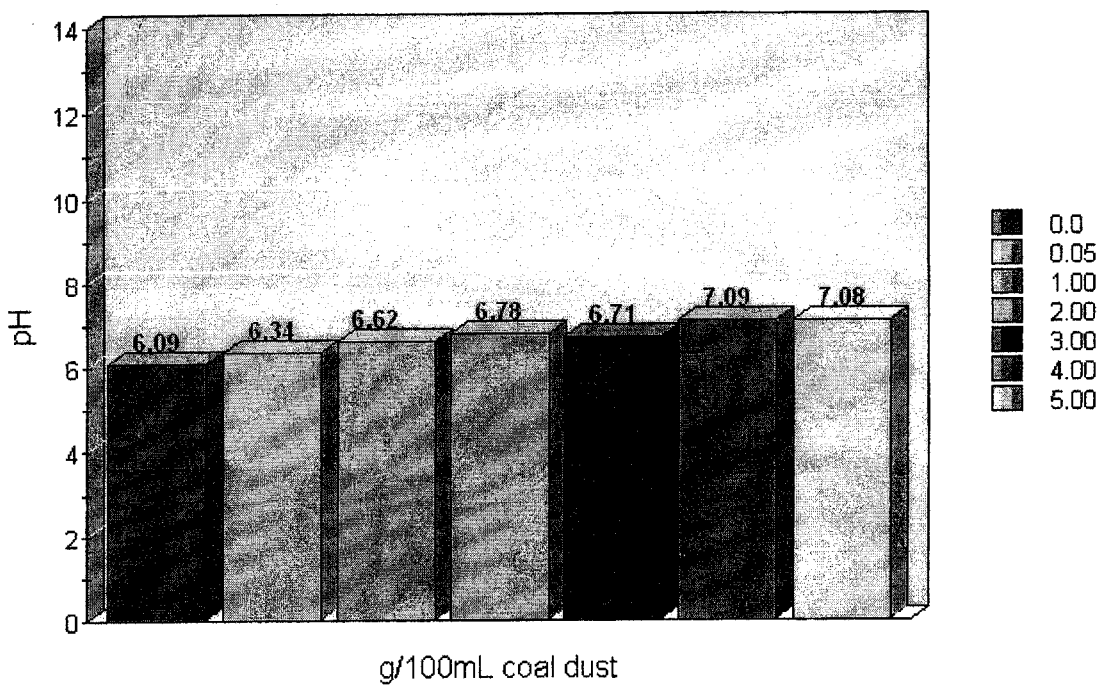
Friday April 29, 2011 Data (day 3)

% of Coal Dust	pH of Freshwater With Lid	pH of Freshwater Without Lid	Average temp. in °C
0.5 g/100mL	Trial 1- 6.41	Trial 1- 6.38	19.5
	Trial 2-6.11	Trial 2- 6.59	
	Average-6.26	Average- 6.49	
1.0 g/100mL	Trial 1- 6.18	Trial 1- 6.38	19.4
	Trial 2- 5.98	Trial 2- 6.05	
	Average- 6.08	Average- 6.21	
2.0 g/100 mL	Trial 1- 5.59	Trial 1- 5.27	19.4
	Trial 2- 5.65	Trial 2- 5.29	
	Average- 5.62	Average- 5.28	
3.0 g/100 mL	Trial 1- 6.28	Trial 1- 6.36	19.0
	Trial 2- 6.27	Trial 2- 6.38	
	Average- 6.26	Average- 6.30	
4.0 g/100 mL	Trial 1- 6.48	Trial 1- 6.32	19.05
	Trial 2- 6.12	Trial 2- 6.68	
	Average- 6.30	Average-6.50	
5.0 g/100 mL	*Trial 1- 6.70	Trial 1- 7.05	22.9
	Trial 2- 6.72	Trial 2- 7.04	
	Average- 6.71	Average- 7.05	
0.00 g/ mL	Control	Trial 1- 6.18	Control 22.1
		Trial 2- 6.09	
		Average 6.14	



CREATE A GRAPH CLASSIC

Effects of coal dust concentrations on pH of freshwater *without lid*



4/28/11 Class Results

% of Coal Dust	pH of Freshwater With Lid	pH of Freshwater Without Lid	Average temp. in °C
0.5 g/100mL	Trial 1- 6.20 Trial 2- 6.27 Average- 6.24	Trial 1- 6.34 Trial 2- 6.35 Average- 6.33	22.8
1.0 g/100mL	Trial 1- 6.88 Trial 2- 6.83 Average- 6.83	Trial 1- 6.65 Trial 2- 6.59 Average- 6.62	22.5
2.0 g/100 mL	Trial 1- 6.26 Trial 2- 6.36 Average- 6.31	Trial 1- 6.78 Trial 2- 6.77 Average- 6.77	21.8
3.0 g/100 mL	Trial 1- 7.11 Trial 2- 7.18 Average- 7.15	Trial 1- 6.68 Trial 2- 6.73 Average- 6.71	21.9
4.0 g/100 mL	Trial 1- 7.22 Trial 2- 7.17 Average- 7.20	Trial 1- 7.18 Trial 2- 6.99 Average- 7.07	22.1
5.0 g/100 mL	Trial 1- 6.70 Trial 2- 6.72 Average- 6.7	Trial 1- 7.05 Trial 2- 7.12 Average- 7.08	22.3
0.00 g/ mL	Control	Trial 1- 6.18 ✱ Trial 2- 6.09 Average 6.14	Control 22.1

Data (continued)

Data Table 2

Freshwater with lid

Freshwater without lid

Trial #	% Coal Dust per 100 mL	pH	Temperature in C ⁰	Trial #	% Coal Dust per 100 mL	pH	Temperature in C ⁰
1	0.00			1	0.00		2
2	0.00			2	0.00	7.12	2
Average *Control	0.00			Average *Control	0.00	7.14	2
1				1			
2				2			
Average				Average			

Analysis - Graphs

Conclusion According to these data the pH of freshwater was raised from a slightly acidic state to a neutral and slightly basic. These data suggest that the coal itself (without burning) does not have as great an effect on pH than initially suspected. More experimentation is warranted in order to that the reliability of these findings can be accepted.

STUDENT EVALUATION

Coal Study Unit 2010-2011

1. What was the most important piece of information that you learned from this year's coal unit?
How can you use this information in the future?

I learned that the coal industry really does care about the environment. Reclamation not only benefits the environment, it benefits the community as well.

2. What was your favorite activity from the unit? Why?

Water quality experiment because we had so much fun. We actually got to do the experiment, not just watch a demonstration.

3. What was your least favorite activity from the unit? Why?

An Inconvenient Truth. Not a fan of open responses.

4. On a scale of 1 to 10 (10 being the best), how would you rank this unit?

Water quality 10

An Inconvenient Truth 3

5. What would you change in order to make this unit better?

More experiments, less writing

6. What coal topics would you like to learn more about, perhaps for next year's unit?

The new things they are doing with coal.
What all is it used for and how do they prepare it for that use?

Teacher Evaluation

Coal Study Unit 2010-2011

1. What was the most important piece of information that you learned from this year's coal unit?
How can you use this information in the future?

Students do understand cause and effect relationships. They not only see the problems in situations, they also like to find solutions. This can be used in other areas of the classroom.

2. What was your favorite activity from the unit? Why?

My favorite activity was creating your own reclamation site because I like to see what my students are interested in. I received some very creative ideas.

3. What was your least favorite activity from the unit? Why?

My least favorite activity was the public hearing. To be done correctly students needed more time to research and prepare their arguments.

4. On a scale of 1 to 10 (10 being the best), how would you rank this unit?

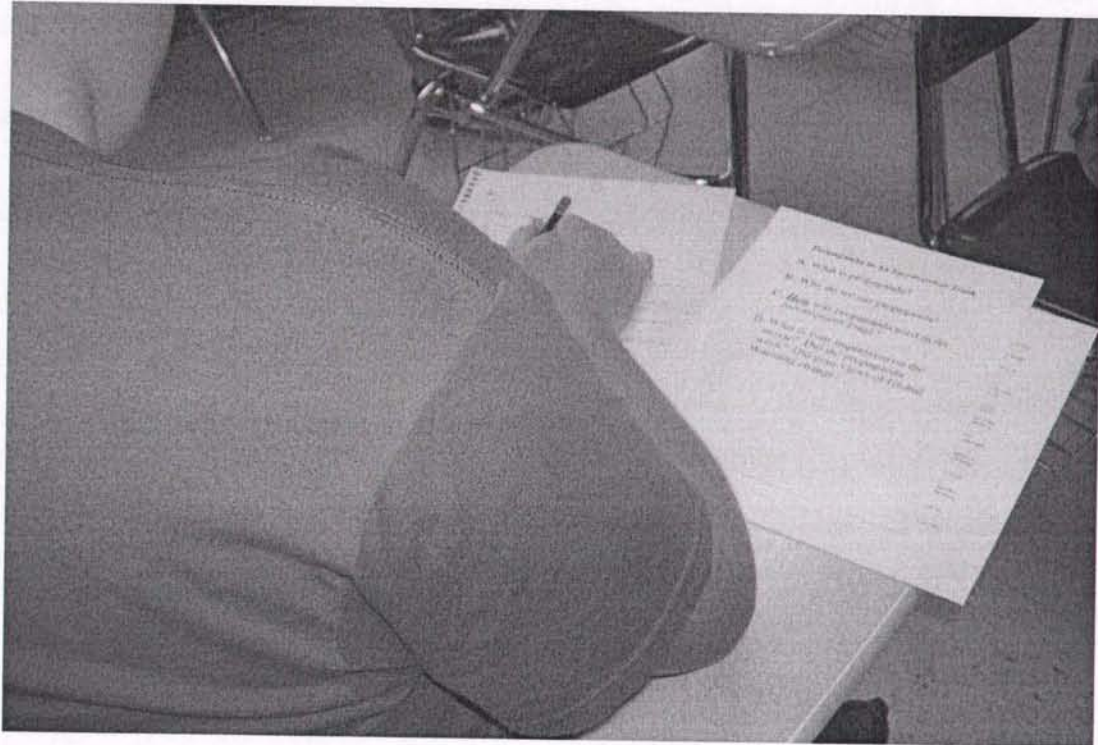
9

5. What would you change in order to make this unit better?

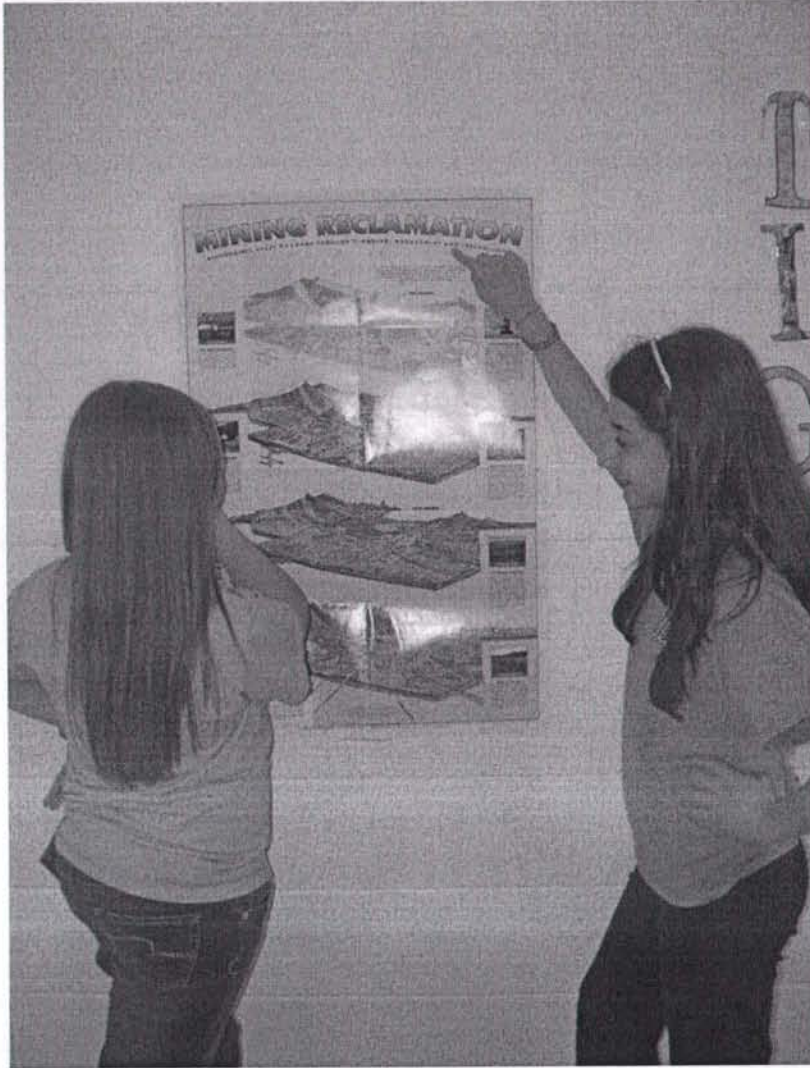
As with everything I wish we had more time to do it all.

6. What coal topics would you like to learn more about, perhaps for next year's unit?

How coal affects your every day life



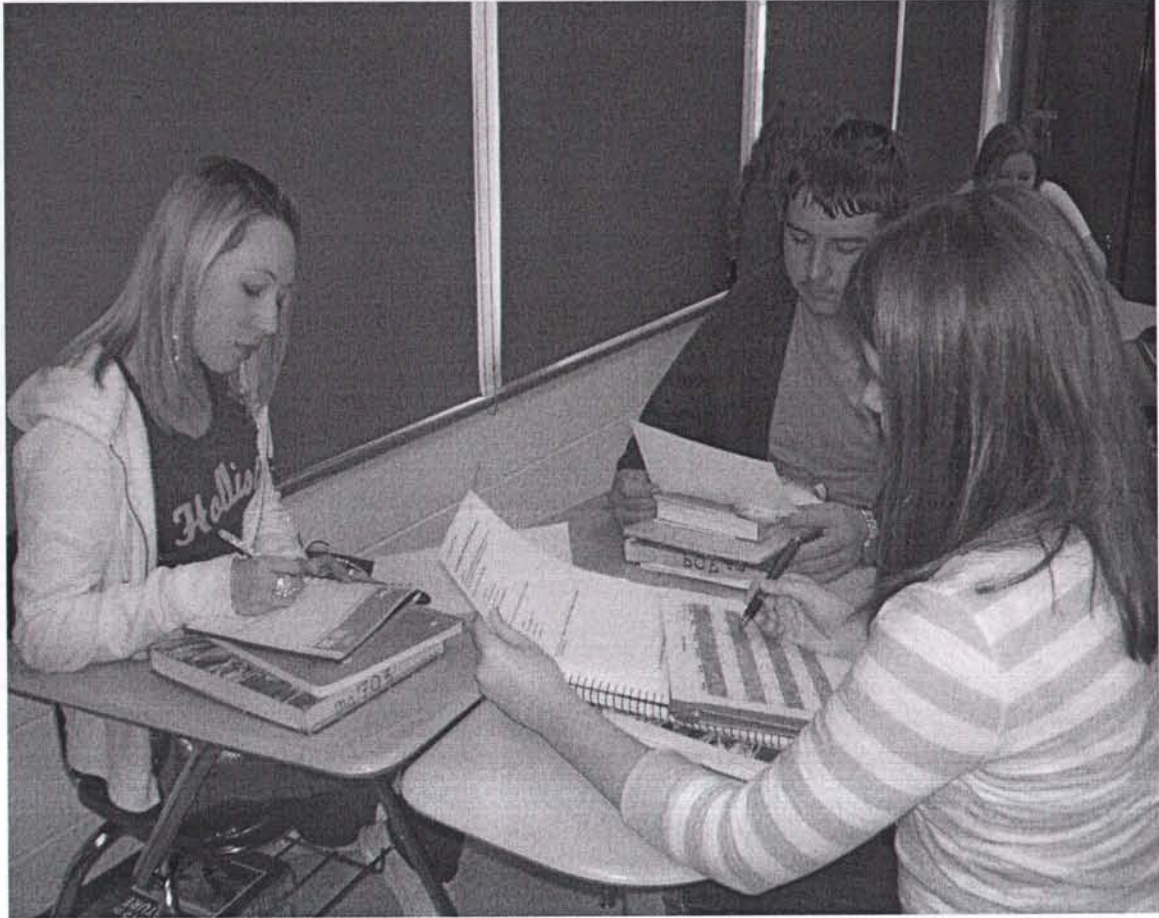
Students learned about the different propaganda techniques that can be used to persuade an audience. Afterwards, students watched *An Inconvenient Truth* and looked for propaganda techniques used, specifically ones that did not actually relate to the topic or presented information in a false way. Students were then encouraged to further research the topic and form their own opinions based on facts and evidence.



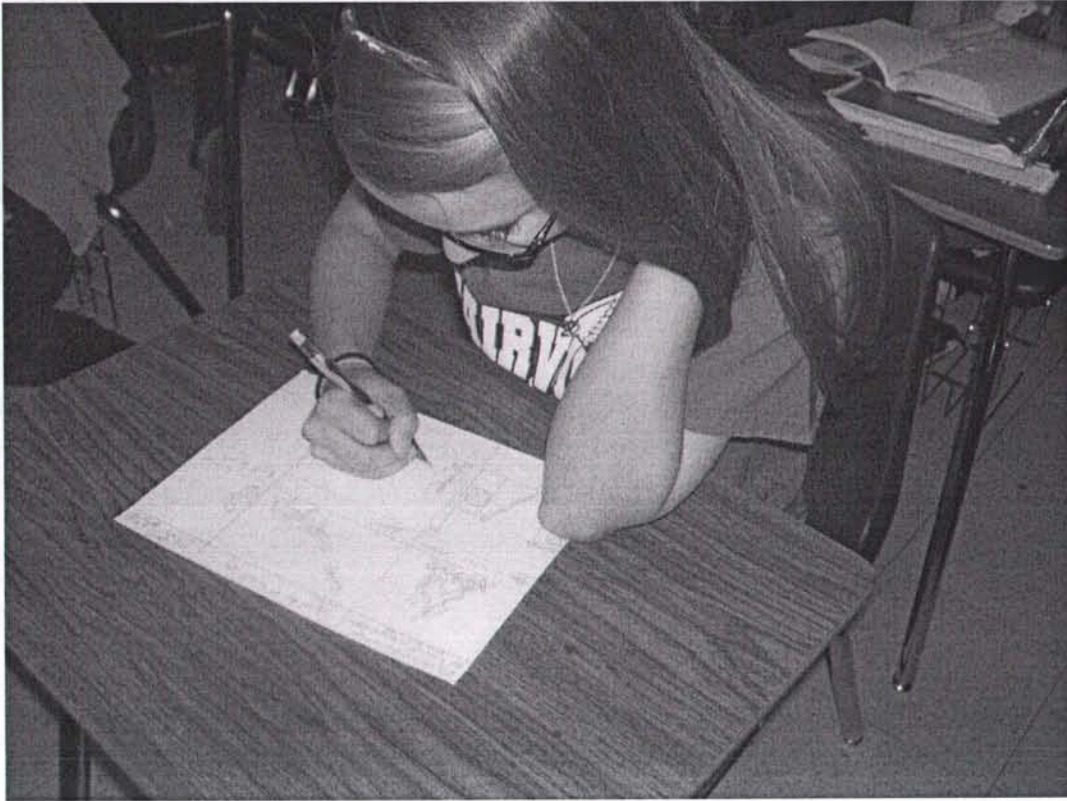
After watching a slide show of various reclamation sites, students were interested in learning about the reclamation process. Here, two students present the class with information about the different mining phases – from pre-mining to reclaimed land. Other students then gave presentations about the regulations governing reclamation and the new technology used to assist in the reclamation process.



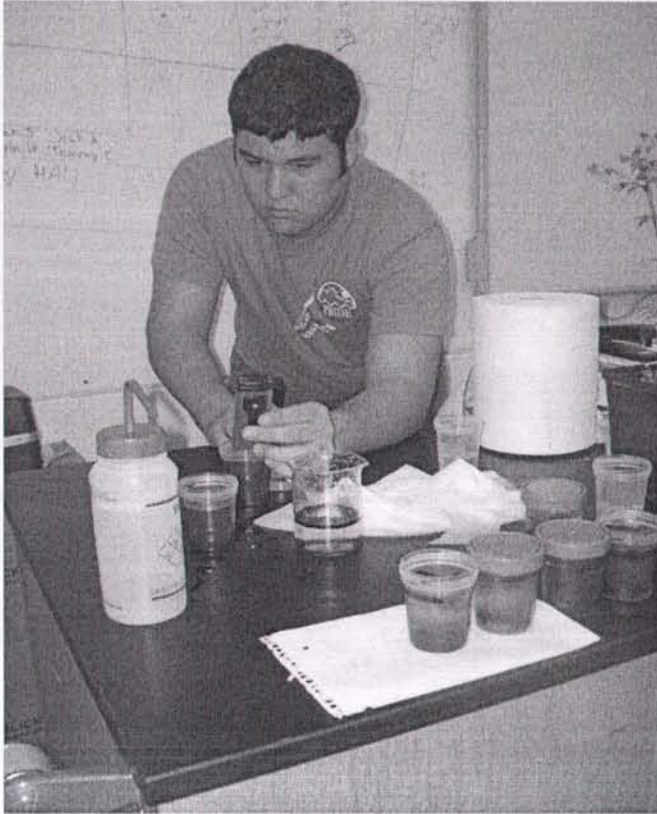
Students became reclamation specialists as they chose their plot of land and collected data surrounding their area. Students had to make observations about the reclaimability of that land. Students learned that most land can be reclaimed to its original state...if not made better.



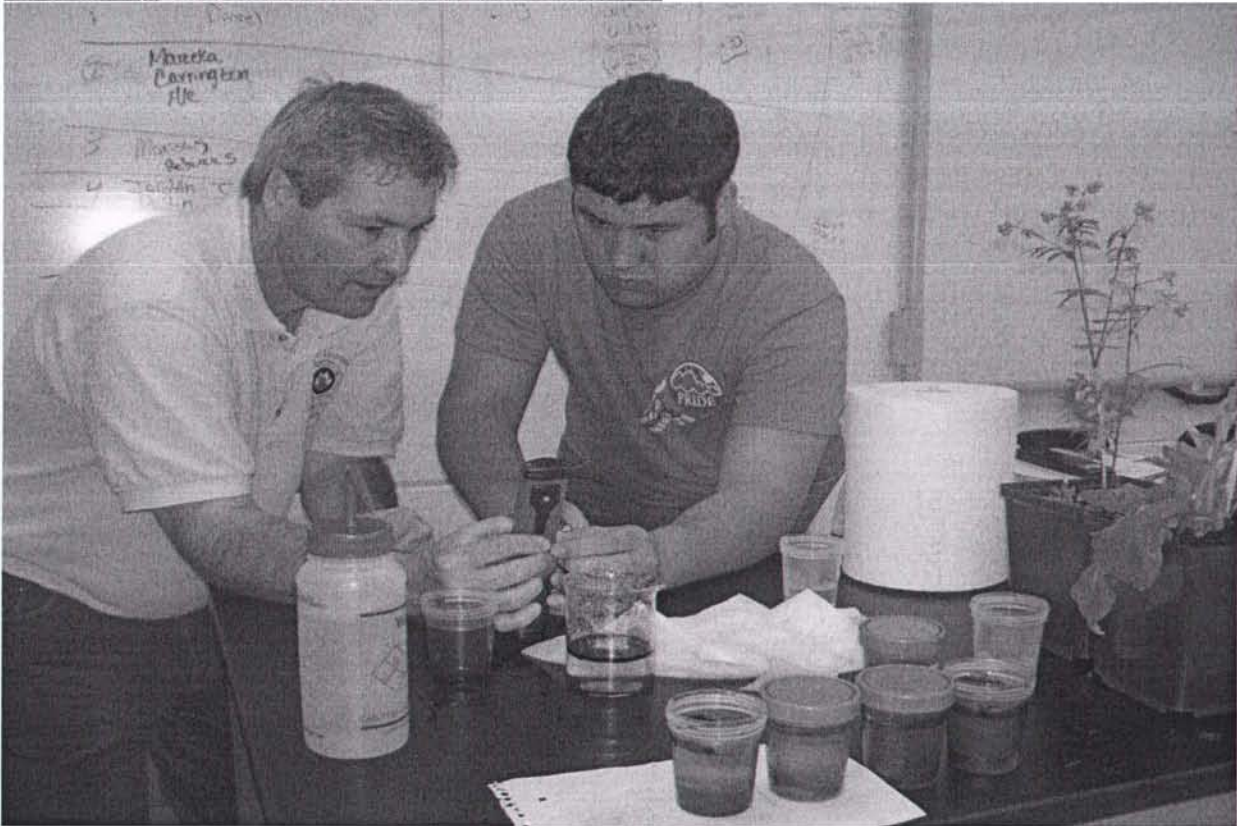
Students participated in a simulated hearing of a proposed surface mining operation near their community. After being assigned a role, students worked in groups to gather information to present at the hearing.



Because students feel like our community is lacking in recreational, industrial, and educational activities, they were given the opportunity to come up with their own suggestions on what they would like to see developed from reclaimed land. Students first drew a picture of their idea and then wrote letters or editorials to a variety of audiences to promote their idea.



Students measured the pH of various sources of water as teachers assisted them with the new equipment. Students also designed their own experiments, examining the affect different amounts of coal particulates have on the pH of water. Some students also examined the effect this pH has on surrounding wildlife. Afterwards, students researched the numerous ways coal companies improve and protect water quality.





Coal:

America's Fuel