The 2014 Coal Education Development and Resource (CEDAR) Coal Fair April 8-11 at the U Pike gymnasium has east KY students compete with posters and model displays of the coal industry. The exhibits are sorted by grades and broad courses including Science, Math, Social Studies, and English. The grades are K-4, 5-8, 9-12. The students’ projects are judged and the top three are awarded by grade and curriculum. The CAER field representative Greg Copley visited the coal fair and photographed the displays from the Science and Math categories. The displays varied from how coal is used to create electricity, how much coal a household uses, how mining provides economic opportunities to how coal can clean water. Please take a few minutes to review the pictures of the work the students and educators undertook to demonstrate how science and math are applied in real world situations.

Additional pictures of the 2014 fair and past fairs are online at http://www.cedarinc.org/default.htm
Coal Facts:
- Coal is a clean energy.
- Coal is a mineral of fossilized carbon.
- Coal is the largest source of energy for the generation of electricity worldwide.
- Coal has been used as an energy resource, primarily burned for the production of electricity.
- Coal is mined in over 100 countries.

I Support Coal Because Coal Supports Me

Preparation Plant

04/09/2014
COAL FIRED POWER PLANT

[Detailed information about the coal-fired power plant project, including diagrams and text explaining the process and benefits.]
GOD INVENTED The COAL MINER

COAL

Coal, also known as "BLACK GOLD"
How Coal Keeps the Lights On
CARBON CAPTURE

Problem
Hypothesis
Experiment
Data Analysis
Conclusion

Observation:
The water collected in the lab is filtrate of the coal.

Data Collected:
The data collected in the lab is filtrate of the coal.

Conclusion:
When the coal was crushed in the lab, the water collected was filtrate of the coal.

STATIC
ELECTRICITY
IN
COAL
PLANTS
PROBLEM
UNDERGROUND
AIR SAFETY

EXPERIMENT
RESULTS

FACT
CONCLUSION

QUESTION
HYPOTHESIS
DATA

COAL
DOES
THE
JOB

CONCLUSION

04/09/2014
HOW COAL KEEPS THE LIGHTS ON

HOW IS COAL FORMED?

04/09/2014
YOU'LL NEVER LEAVE HARLAN ALIVE

Kentucky Coal Miners

Coal

Lunch time down in the coalmine

The coal miners of Kentucky

04/09/2014
the coal song

Old Country Coal Songs

Loren Tucker and Lily Gardner

04/09/2014
Uses of Coal

1. Electricity
2. Heat
3. Minerals
4. Gas
5. Make steel
6. Plants
7. Coal beds
8. Limestone
9. Sandstone
10. Artifacts
11. Officials
12. Coal miner
13. Making sugar
14. Steel

Coal Mining

Coal starts off as plant matter at the bottom of the water. Over time, a change in form takes place.

Appropriate bitumen and other materials build up on top of it. Over many hundreds of years, this process forms the material called coal.

This is one way you can call me coal.

This is how they load coal and transport it.

This is all the steps that they went.
SURFACE MINING PROCESS

1. Strip Mining
2. Surface Mines
3. Pile of Coal
4. Shovel Loading Truck
5. Screen Cleaner and Sorting Coal in Truck

how To clean dirty water

04/09/2014
WHY IS COAL IMPORTANT?

Hypothesis

Experiment

My Results

COAL MINING

ELECTRICITY

COAL FACTS

Most Electricity is made from COAL

COAL that does not burn well is Pulverized

A lot of people use coal to heat their homes!

04/09/2014
1. **PURPOSE**
   - What type of mining is more damaging to the lungs—surface mining, underground mining, or the amount of dust you breathe driving a coal truck?

2. **HYPOTHESIS**

3. **DATA**

4. **INVESTIGATING**

5. **Hypothesis**
   - If you create water vapor or in a shadeless area, you can reduce the comfort in your body. Your comfort is determined by these factors:

   - **Experiment**
   - Coal (12042) My Results Coke

6. **COAL TO COKE**

**Date: 04/09/2014**
The role Coal plays in Electricity

Coal is a fuel source like wood or natural gas which is burned to produce heat.

The heat from the fire boils water which produces Steam. The Steam turns a Turbine constantly which is attached to a Generator. Inside the Generator are Big magnets and brushes that constant circulating motion creates Electricity.

The electricity goes through a series of power lines, ultimately reaching your home!
The pressure is on!

How many BTUs 4 you?
THE FUTURE OF CLEAN COAL

QUESTION:
What are the potential environmental problems with burning coal to be solved?

HYPOTHESIS:
The byproducts from burning coal can be converted into other forms.

EXPERIMENT:
Testing the ability to turn coal into other forms by using high pressure.

ANALYSIS:
Coal can be converted into a gas, liquid, or solid form.

CONCLUSION:
Converting coal into other forms can reduce the environmental impact.

COAL FORMS

How
SUBSTANCE ABUSE IN THE MINING INDUSTRY

CLEAN COAL

04/09/2014
MY WEIGHT IN COAL

COAL SHAPES OUR WORLD

04/09/2014
If you are not seeing Coal Trucks on the roads, our counties are not seeing money!!!
WHAT IS THE VOLUME AND SURFACE AREA OF A STOCKPILE OF COAL

What Coal Did Today
In just 24 hours

Produced over 80% of the power for 30 billion meals. 9 million "heats" and the activation of 500,000 homes.

What's the weight of the stockpile? 436 million tons of coal.

Generated less energy than the energy generated at the plasma arc.

Surveyed by the Chinese and the Japanese in 1930.
Coal Vs. Gas

Hope For The Future

WATT'S UP?

Coal Keeps the Lights On

How much coal is required to run a 100-watt light bulb for a year?

Step 1: Figure out how much energy in kilowatt-hours the light bulb uses per year.

100 watts x 24 hours x 365 days = 94,800 kWh/year

Step 2: Figure the amount of electricity generated per ton of coal.

100,000,000 kWh / 30.6 = 3,255 tons of coal

Step 3: Determine how many tons of coal burned for the light bulb.

94,800 kWh / 2,500 kWh/ton = 37.9 tons of coal

1 ton of coal is approximately 4,000 pounds.

37.9 tons x 4,000 pounds/ton = 151,600 pounds of coal

04/09/2014
How much coal does your home use?

Back in the Black

PLEASE DO NOT TOUCH EXHIBITS

04/09/2014
As the years go by, the coal runs dry.

By the Numbers:

On January 29, 2014, the Elk River Chemical Spill was estimated to have leaked from Freedom Industries facility into the Elk River (located near Charleston, West Virginia). The spill is on the priority list. It is estimated to have been due to corrosion in the pipeline. The cleanup is estimated to cost $1.6 million. During the cleanup, of the coal:

- 1.6 million tons of coal went down the river.
- 70.6 million tons remained.
- 15.014.169 tons were used.

Matthew Sancenon | Zach Rupes | Jacob Ethington

04/09/2014
**Mountain Top Removal**

**COAL DEPTH**

**Elk River Chemical Spill**

**The 2014 Elk River Chemical Spill**

On January 9, 2014, crude 4-methylcyclohexanol monomethyl ether (MCME) was discovered to have leaked from a Freedom Industries facility into the Elk River (located near Charleston, W.Va.). MCME is used in the production of coal, and it is used to remove impurities from coal. The leak led to serious health concerns for the residents of West Virginia. During the investigation, it was found that the facility had failed to properly contain and dispose of hazardous materials. This incident highlighted the need for better regulation and oversight of industrial operations to prevent such accidents in the future.
CALCULUS & Surface Mining

Mountain Top Removal