

Introduction to Energy: Coal

I. Theme: Physical Science, Second Grade

II. Performance Standard (s) Covered:

- S2CS1
 - **Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.**
 - A. Raise questions about the world around them and be willing to seek answers to some of the questions by making careful observations and measurements and trying to figure things out.
- S2CS3
 - **Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.**
 - A. Use ordinary hand tools and instruments to construct, measure, and look at objects.
- S2CS6
 - **Students will be familiar with the character of scientific knowledge and how it is achieved.**

Students will recognize that:

 - A. When a science investigation is done the way it was done before, we expect to get a similar result.
 - C. Scientists often repeat experiments multiple times and subject their ideas to criticism by other scientists who may disagree with them and do further tests.
 - D. All different kinds of people can be and are scientists.
- S2P2
 - **Students will identify sources of energy and how the energy is used.**
 - A. Identify sources of light energy, heat energy, and energy of motion.
 - B. Describe how light, heat, and motion energy are used.

III. Enduring Standards

- Asks questions and seeks answers by observation
- Uses numbers to quantify
- Assembles and takes apart
- Communicates ideas
- Questions and attempts answers
- Can repeat an activity and get similar results
- Gives accurate descriptions

IV. Content ((key terms and topics covered)

- Energy, Potential Energy, Kinetic Energy, Electricity (and coal as a main resource)

V. Learning Activity

- Warm-up/ Mini-lesson
 - The standard for the day will be read leading into a discussion about energy
 - What exactly energy? Where does it “come” from?
 - The two main types of energy, potential and kinetic will be discussed
 - A roller coaster experiment will be conducted in which potential and kinetic energy will be further explored and visualized
 - A. Using a yard stick, place a small ball at the top and explain that it possesses potential energy
 - Allow the ball to roll down the incline and then explain that the potential energy turns into kinetic energy as it begins to move
 - Once the ball has stopped, explain that the ball’s kinetic energy is once again potential
 - Coal will be introduced as one of the main sources of electricity we will be covering
 - A. Where it comes from (how is it mined)
 - B. How do we use it/why is it important

VI. Work Period

- The students will be mining for chocolate chips in two cookies, recording various assigned observations
 - How many chips can you see in cookie “A” and “B” before you begin mining
 - Starting with cookie “A”, see count how many chips you can mine out and then do the same with cookie “B”
- This activity is supposed to serve as a visualization of the mining process

VII. Closing/Evaluation

- At the conclusion of the work session, there will be a short discussion about the importance of coal and the difficulties surrounding the acquisition of it
 - Was it easier to mine in one of the cookies?
 - Were there more chips in one cookie compared to the other one?
 - Did the cookies look the same before and after? Why?
 - A. This will lead into a discussion about land reclamation

- In order to assess the students understanding of the difference between potential and kinetic energy, a motion activity worksheet will be handed out to be completed individually and turned in to me before they leave for the day

VIII. Materials Needed (per student)

- 2 chocolate chip cookies
- 2 toothpicks
- 2 napkins
- 1 piece of paper

IX. Safety Concerns

- Make sure the students know how to properly hold the toothpicks so that they do not poke themselves

X. Modifications

- This lesson went really well as I followed these guidelines and there are not many things I would change about it. However the only thing that needs to be considered is that although it may seem that this activity will not take that long, it can in fact be quite lengthy with second graders; therefore time should be managed wisely. Also, make sure that you do not use soft chocolate chip cookies. I thought that it would be too hard for the students if I used hard cookies however it worked perfectly! (especially in demonstrating how the land is changed)

*over the next three (or four) class periods I will be discussing three main sources of energy/electricity: coal, wind, solar (and possibly hydropower)