Return to Primary Lesson Plans

**Title**: Oxidation of Coal
**Level**: Primary - Middle ( 2 - 6 )
**Time**: 30 minute initial activity followed by a 24 hour observation period
**KERA Goals**: 1.3, 1.4, 2.1, 2.3, and 5.1
**Objective**:
Observe the teacher's demonstration of oxidation.

**Background Information:**

Oxidation is a chemical change involving the valence (outermost) electrons of an element. During the oxidation process, the positive valence of an element ion is increased, or the negative valence of an element ion is decreased, resulting in a chemical change or breakdown of the compound. Using the oxidation process, a coal research scientist can check for impurities in coal and then prepare the coal to be burned "cleanly."

**Materials:**

Small test tube with a cork or a jar with a lid
Finely ground coal—about 0.4g or 1/8 tsp.
Eye dropper
Clorox or Drano
Safety goggles
Scoop/spatula

**Activity:**

1. Grind coal finely for this experiment. If ground coal is not available, smash pieces in a sturdy, doubled cloth with a hammer. (This is best done on concrete or asphalt.) Grind the crushed pieces into a powder with a mortar and pestle.
2. Scoop a small amount (1/8 tsp.) of the fine coal into the test tube or jar.
3. Using the pipette, the teacher should fill the test tube/jar half full with Clorox or liquid Drano.
4. Cork the test tube, and shake it carefully. The solvent and the coal will form a (slurry). Let this sit for ten minutes.
5. Check the solution after ten minutes. It should be a little brighter in color than before. If it is not, add more solvent until the test tube is ¾ full.
6. Let the test tube sit overnight. Hold the test tube to the light the next day. Is the solution the same color as you left it?
7. Inspect the bottom of the test tube. What do you see?

**Oxidation of Coal**
**Observation Sheet**

Write and/or draw your observations of the coal in Clorox or Drano. What do you see after ten minutes? After 24 hours?

| | Clorox | Drano |
|---|---|---|
| 10 min. | | |
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| 24 hours | | |
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*Provided by Pittsburgh Energy Technology Center*

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