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Title: Floating Coal: A Density Experiment
Level: Primary - Middle (2 - 6)
Time: 30 minute initial activity followed by a 24 hour observation period
KERA Goals: 1.13, 1.3, 2.1, 2.3, 5.1, and 5.3
Objective:
1. Determine the amount of clean coal in a sample by separating the mineral matter from the clean coal.
2. Compare the test sample with a control.

Materials:

Coal, 2g or ½ tsp. (finely ground)
2 Baby food jars with lids
Eye dropper
Salt solution (4g salt/50mL of water or 1 tsp. Salt/ ¼ cup water)
Liquid soap (Murphy's Oil Soap works well)

Activity 1:

1. Make the salt solution by mixing the salt and water in the proportions given above, and place it in one of the jars.
2. Fill another jar with water to the same level as the first.
3. The coal must be very fine (the consistency of sugar) for this experiment. If ground coal is not available, wrap pieces of coal in a cloth and smash them with a hammer. Grind them with a mortar and pestle.
4. Add a drop of liquid soap to each jar to break the surface tension.
5. Add 1g of fine coal to each of the two jars. Mix by shaking the two jars thoroughly, and allow them to sit undisturbed for ten minutes.
6. After ten minutes, compare the solutions in the two jars and record your findings. Let the two solutions sit overnight. Compare the two solutions again, and again record your findings.

Teacher's Note:

Heavy particles fall to the bottom. Why? Since mineral matter and pyrite (Fool's gold) are more dense than salt water, they fall to the bottom of the solution. Less dense particles (clean coal) will float. The suspended particles are minerals lighter than pyrite, but heavier than clean coal.

Coal scientists want to separate clean coal from pyrite because when pyrite is burned, it gives off sulfur dioxide, which can cause acid rain.

Activity 2: Floating Coal: A Density Experiment Observation Sheet

After the solutions have settled for ten minutes, compare the coal/water solution with the coal/salt water solution. Write and/or draw your observations and comparisons of the solutions. Look carefully! Observe and compare the solutions again after 24 hours. Are there any differences?

	Coal/ Water	Coal/ Salt Water
10 min		
24 hours		

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