

<b>Title of Lesson Plan</b>	How Much Energy is Stored in Wood?
<b>Prepared By</b>	Kristin Pullyblank
<b>City and State</b>	Cooperstown, NY
<b>Grade Level(s)</b>	8-12
<b>Keywords (subjects covered)</b>	Energy, calorimetry, renewable resources
<b>Brief Description</b>	Students will determine how much energy is stored in various types of wood.
<b>Total Time Required</b>	2-4 40 minute periods
<b>Setting</b>	Physical science laboratory
<b>Lesson Objectives/Goals</b>	To help students understand conservation of energy, renewable resources, and to demonstrate proficiency in the lab
<b>Materials Needed</b>	Homemade calorimeters, balances, thermometer, wood shavings from different species of wood, lab notebook
<b>Standards Addressed</b>	Conservation of energy, renewable energy sources, lab techniques, graphing techniques (NYS intermediate science standards: 4.3a, 4.5a, T1.5, 1.4a, 1.4b, 1.4c S2.1, S2.2, S2.3, S3.1, S3.2, S3.3)
<b>Procedure</b>	<ol style="list-style-type: none"> <li>1. Students will construct their soda can calorimeters (they are familiar with this apparatus from a previous lab)</li> <li>2. Students will mass each of their wood shavings</li> <li>3. Students will record the initial temperature of the water.</li> <li>4. Following appropriate safety procedures, students will light the wood shaving, noticing the temperature change of the water.</li> <li>5. Students will record the highest temperature that the water reached.</li> <li>6. Students will mass the ash from the wood shaving</li> <li>7. Students will calculate the amount of energy stored in each type of wood using the following equation: Energy = mass of water x change in temp of water x specific heat of water</li> <li>8. Repeat twice with each type of wood shaving, totally 3 trials for each type of shaving (at least 6 trials total).</li> <li>9. Find the average energy stored for each type of shaving.</li> </ol>
<b>Assessment</b>	Formal lab report discussing their findings, including the following components: Title; Problem; Hypothesis; Independent Variable; Dependent variable; Constants (Controlled Variables); Control Group; Procedure; Qualitative Data (observations); Quantitative Data (Data Table); Statistical Analysis of Data (calculations); Analysis of Results; Conclusion; Sources of Possible Error/Recommendations for Further Study/Practical Applications
<b>Literature Cited/References</b>	N/A
<b>Forestry Tour Attended</b>	Northeast 2008

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