

# Rising Charcoal Log

<b><u>The Action</u></b>	Mix table sugar with sulfuric acid and stand back. The mixture turns from yellow to brown and then black, from the beaker rises a huge charcoal log.
<b><u>Grade Level</u></b>	Grade 6 – Chemicals and Reactions Grade 7 – Temperature and Heat Grade 9 – Chemistry and You Grade 10 – Physical Science: Chemical Change Chemistry 20 – Chemical Reactions Chemistry 30 – Energy Changes in Chemical Reactions
<b><u>Materials</u></b>	~125 mL Granulated table sugar ( $C_{12}H_{22}O_{11}$ – Sucrose) ~70 mL Concentrated sulfuric acid ( $H_2SO_4$ – 18 M) 250 mL Beaker 1 Stirring Rod Paper towels Gloves
<b><u>Instructions</u></b>	In the fume hood, fill beaker with 125 mL of sugar. Add sulfuric acid to the 200 mL mark of the same beaker. Stir with the stirring rod ensuring that all sugar is coated by the acid Take the stirring rod and watch what happens – it will take about a minute to get going.
<b><u>Safety</u></b>	Use as a demonstration ONLY! $SO_2$ fumes are released (contributor of acid rain) so use a fume hood. Lab coat, goggles, and gloves are recommended. After the chemical reaction the beaker is very hot. The charcoal log produced may contain unreacted acid and/or diluted acid. Do not touch it. Do not allow students to handle it.
<b><u>Hints</u></b>	When cleaning the beaker, wait until cool. Remove the charcoal log with paper towels. Soak the beaker in hot water and soap for a day or two before attempting to clean it. Sulfuric acid spills should be neutralized with the appropriate agent ( $NaHCO_3$ ) and then wiped up.
<b><u>Science</u></b>	$C_{12}H_{22}O_{11} (s) \rightarrow 12C_{(graphite)} + 11H_2O (l)$

**Principle**

Sulfuric acid is a strong acid and dehydrating agent. As the sulfuric acid becomes hydrated, there is a large energy change. The dehydration of sucrose is an exothermic reaction. Sulfuric acid pulls water from the sucrose and because of the heat produced in this reaction, it boils. Carbon is left behind and due to the boiling water and great heat it foams up creating an aerated log of carbon, many times its original size.