Some Like it Hot!
Observing Energy in Chemical Reactions

Heads up! You will need to know this vocabulary and background information for this experiment.

Types of reactions:
1) **endothermic reaction**: a chemical reaction that absorbs heat.
2) **exothermic reaction**: a chemical change that is accompanied by a release of heat

Types of energy:
1. Light energy:
2. **thermal energy**: every substance contains energy from the movement of its particles. The higher the temperature of a substance, the greater its thermal energy (heat).
3. **chemical energy**: energy from chemical bonds within matter.

How Energy is Used:
1. Matter changes whenever energy is added or taken away.
2. **law of the conservation of energy**: in every physical or chemical change, the total amount of energy stays the same. Energy can change from one form to another, but energy can never be lost.

Example:
1) Remember, the elements in a compound are held together by chemical bonds. These bonds store energy.
2) An unlit lighter contains chemical energy. When a spark hits the butane a chemical reaction occurs which releases that chemical energy (in chemical bonds) into light energy and heat energy.
Be careful, do not start experimenting with H2O2 at home! Some materials can decompose peroxide with EXPLOSIVE violence.

Background Information:

In this lab, you will study an enzyme that is found in the cells of many living tissues. The name of the enzyme is catalase (KAT-uh-LAYSS); it speeds up a reaction which breaks down hydrogen peroxide, a toxic chemical, into 2 harmless substances--water and oxygen. The reaction is as follows:

\[ 2\text{H}_2\text{O}_2 \xrightarrow{\text{catalase}} 2\text{H}_2\text{O} + \text{O}_2 \]

This reaction is important to cells because hydrogen peroxide (H$_2$O$_2$) is produced as a byproduct of many normal cellular reactions. If the cells did not break down the hydrogen peroxide, they would be poisoned and die.

In this lab, you will study the catalase found in liver cells. You will be using chicken or beef liver. It might seem strange to use dead cells to study the function of enzymes. This is possible because when a cell dies, the enzymes remain intact and active for several weeks, as long as the tissue is kept refrigerated.