

Subject: Science

Grade: Tenth - Chemistry

Standard: #3 The Physical Setting

Key Concept: Heat energy in a material consists of the disordered motion of its atoms or molecules.

Generalization: Heat changes in reactions can be measured.

Background:

Students have been studying thermochemistry. They have covered the flow of heat energy, measuring and expressing heat changes, and heat in changes of state. This lesson provides students with investigations that address changes in heat in chemical reaction. Students choose the investigation they wish to perform based on their interest. Most lab-based chemistry books and/or lab manuals will have activities that can be used with this lesson.

This lesson is tiered in *content* according to *interest*.

Students should work in pairs or triads. You may have several groups within each tier.

Tier I: ***Heat of Fusion***

These students should perform an investigation that demonstrates heat of fusion. Heat of fusion of ice is a good example. Students should calculate the heat of fusion as part of the investigation.

Tier II: ***Heat of Combustion***

These students should perform an investigation that demonstrates heat of combustion. Heat of combustion of a candle is a good choice. Students should calculate the heat of combustion as part of the investigation.

Tier III: ***Designing a Calorimeter***

These students should design and assemble a working calorimeter. Most laboratory manuals or supplemental materials will assist with this

investigation.

Assessment:

Teacher observation and student interviews during the investigation will serve as formative assessments. Laboratory journals can be assessed according to your established laboratory requirements. Students should also have time allotted to share their results with each other through class discussion/presentation.