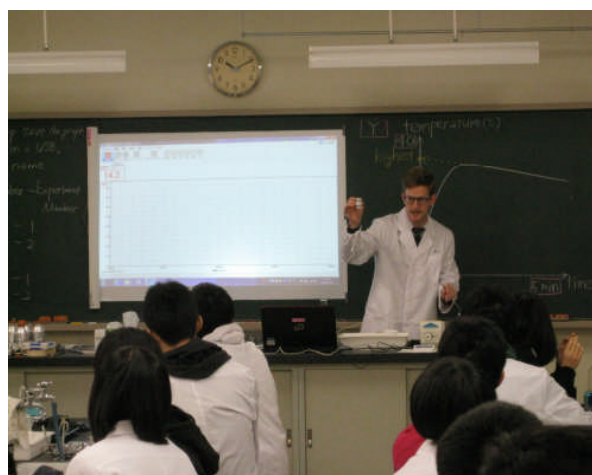
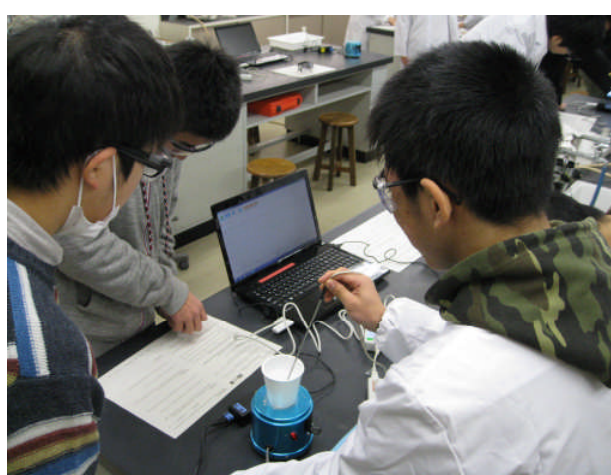


平成27年度 長岡高校スーパーサイエンスハイスクール

名 称	「Chemistry experiments in English」 (ALT の英語による化学実験)
期 日	平成28年1月21日(木)
対 象	2年生理数科
目 的	<ul style="list-style-type: none"> 科学英語の表現方法を学び、科学英語への関心・意欲を持たせるとともに、「科学英語」表現の知識を深める。 科学が諸外国ではどのように授業されているかを体験し、授業形態の差異や日本人と外国人の科学概念の差異を体験させる。
内 容	<p>本校ALTが英語を使って、理科実験を行う。</p> <p>実験内容：化学「反応熱（融解熱と中和熱）の測定」</p> <p>～温度センサーを用いた温度計測，パソコンで反応熱のグラフを描こう～</p>



本校ALTが、英語教員・理科教員とともに、英語で理科実験を指導します。



反応の温度変化を温度センサーで計測し、パソコンでグラフを描きます。



ALTへの質問も英語で行います。

Chemistry experiments in English

SSW 2012

Measurement of Heat of Reaction

Based on the graphs, analyze how many degrees (K) the temperature rose in Experiment 1 and 2.

Experiment 1 _____ K, Experiment 2 _____ K

Objective:
To understand the generation and absorption of heat during chemical reactions by measuring the heat of solution and neutralization of a sodium hydroxide solution.

Experiment 1
I. Calculate the calorific value (heat / heat energy) generated in this experiment.
specific heat of water and solution: 4.18(kJ·K⁻¹) density of water and solution: 1.0(g/ml)³

Experiment 2
I. Calculate the heat energy generated in this experiment.
specific heat of water and solution: 4.18(kJ·K⁻¹) density of water and solution: 1.0(g/ml)³

Experiment 3
I. Calculate the heat of neutralization per 1mol of H⁺ and OH⁻.

II. Write a thermochemical equation which expresses the heat of neutralization.

Impressions

Date _____ Class _____ Student Number _____ Class Number _____ Name _____

Reagents:
1.0mol/L hydrochloric acid and sodium hydroxide (solid)

Caution:
III. You need to wear safety glasses during the experiment.
III. If you touch some reagents with your hands, you need to wash them immediately.

Procedure:
Experiment 1: Measuring heat of solution of sodium hydroxide
I. Measure 100ml of distilled water using a graduated cylinder and put it into a polystyrene cup with a stirring bar.
II. Begin measuring the temperature of water inside the cup using a temperature sensor attached to a PC.
III. Put sodium hydroxide (4.0g, already prepared in a film case) into the cup and dissolve it using a magnetic stirrer.
IV. After finishing the measurement, stop the temperature sensor and save the graph(s) in a USB memory.
Experiment 2: Measuring heat of neutralization
I. Measure 50ml of hydrochloric acid using a graduated cylinder and put it into a polystyrene cup.
II. Put a stirring bar into the cup and stir the solution with a magnetic stirrer.
III. Measure the temperature of the solution inside the cup.
IV. Using a graduated cylinder, prepare 50ml of the sodium hydroxide solution you made in Experiment 1.
V. Bring the rest of the solution to the teacher's desk.
VI. Slowly pour the sodium hydroxide solution into the polystyrene cup little by little.
VII. After finishing measurement, stop the temperature sensor and save the graph(s) in a USB memory.
Data Processing

実験プリントも英語です。グラフから温度差を読み取り、溶解熱と中和熱を計算します。

