Lesson Practice on Conductivity and Acid-Base

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Introduction

Solution conductivity is one of basic concepts in science subject. This concept is found in the current Japanese science textbook and taught to students at junior high schools. Base on the concepts of solution conductivity, we developed a unit plan aim to help high school level students to investigate water salinity and acid-base neutralization by using a simple improvised conductivity tester. The unit plan was introduced to the students at Kurashiki Amaki High School, a Supper Science High School in Okayama prefecture of Japan as an additional science subject, called "*Environmental Chemistry in English*". The lessons were taught to student in pure English. In this presentation we report on the development of the unit plan, the lesson progression in the classroom and its impacts.

Objectives of unit planning

The unit planning was designed practically based on the following objectives:

1. Improving students' abilities of science in English with the concept of solution conductivity.
2. Involving students the experiences on water salinity determination by conductivity.
3. Enhancing students' investigations on acid-base neutralization by conductivity.
4. Encouraging students to use the conductivity method in the investigation of actual environmental issues such as salinity of water or soil.

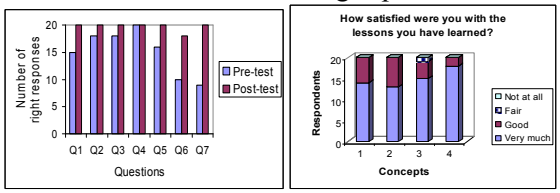
Lesson progress

The developed unit plan was implemented in the actual classroom and environment by the students bound with the schedule:

Date/periods	Contents/Activities
2006/June/24 3 periods	i) Pre-tests ii) Review the concept of conductivity iii) Demonstration of conductivity of some solutions through the bulb observation. iv) Identification of some solutions by observing their conductivity in milliampere. v) Determination of water salinity through water conductivity. vi) Homework assessment (students were required to use the conductivity of the solution to investigate the salinity of environmental water and soil)
2006/July/1 3 period	i) Review and analysis of students' homework results on water and soil salinity. (Group students' presentations) ii) Investigation of acid-base neutralization: (1) HCl(*aq*) and NaOH(*aq*) (2) CH_3COOH(*aq*) and NaOH(*aq*) (3) HCl(*aq*)-CH_3COOH(*aq*) mixture and NaOH(*aq*) iii) Group students' presentations iv) Post-tests and questionnaires

Impact Results

The impact results were analyzed according to the students' achievements which were obtained from the students' responses on pre/post tests and questionnaires. Almost every student achieved full scores in the post tests and they gave highly satisfactory on their achievements through questionnaires.



Concept1: Water salinity, Concept 2: Neutralization of HCl(*aq*) by NaOH(*aq*), Concept 3: Neutralization of CH_3COOH(*aq*) by NaOH(*aq*), Concept 4: Neutralization

In conclusion, the prepared unit plan would help Amaki High School students to improve not only scientific knowledge and skills, but also English ability in the scientific research. It is a recommendable and applicable challenge to Japanese high schools to provide opportunity to students to have science lessons and science activities in English which could help students to achieve the international standard in their future researches.