Lesson Plan

Date: 12th January, 2005

Class: 1st Grade of Amaki Super Science High School

Subject: "Environmental Chemistry in English"

Lesson 4: Determination of detergent in sample solution through PONAL KIT and Cloth Dyeing Method

Duration: 50 nim <First Period>

Objective: - To analyze the experimental results obtained in the previous lesson.

Lesson Development:

Time	Key Contents	Teacher's activity	Students' activity
5 min	The two methods that students experienced to determine the amount of detergent in sample water in the previous lesson are: (1) PONAL KIT and (2) Cloth dyeing method	**Revision of the previous lesson:** In the previous lesson, you experienced with the two methods of determination of detergent in sample solution. Do you rememeber? Can you tell me the names of those two methods?	Students try to remember what they learned in the previous lesson and give the names of two methods they leant in the previous lesson individualy.
15 min	**PONAL KIT method:** When the amount of detergent increases, the absorbance also increases. **Dyeing cloth method:** When the amount of detergent increases, the color intensity on the dyed cloth also increases.	Experimental result analysis: -Show the results obtained by students in the previous lesson. - Facilitate students to analyze the results. According to the graph results, ask one or two student to interprete the graph resutls.	 Interprete the graph results

15 min	In the solution, big-anion compounds will assiociate with big-cation compounds to form neutral compounds. In this case, detergent molecules are combined with cobalt complex or methylene violet molecules to form neutral ones, whereas small ions such as Na^+ and Cl^- are still free in th solution.	Experimental principle discussion: - Introduce to students the nature of detergent molecule (anion), cobalt complex and methylene violet molecules (cation). Ask students to discuss in group to show what would happen if the reagents (cation) is mixed in the detergent solution. Facilitate students' answers	Work in group and give the answers
15 min	Benzene plays the role as solvent to dissolve and to extract the neutral compounds formed by detergent anion and cobalt complex. Cloth is not a solvent, but still it can adsorb the neutral compounds. The amount of detergent can be detected by absorbance of extracted solution for PONAL KIT method or by color intensity of dyed cloth for dyeing cloth method.	In the methods, after detergent solution was mixed with cation reagents, Benzene or piece of cloth is added. Now, let discuss in group to find "what is the role of benzene and colth in the solution?" Facilitate students' answers - Explain the term of "Solvent". - Re-demontration the PONAL KIT method to show that benzene can extract neutral compounds from aquous solution. - Review why we developed dyeing cloth method.	Discuss in group and give the ideas

Lesson Review

Date: 12th January, 2005

Duration: 50 min <Second Period>

Time	Key Contents	Teacher's activity	Students' activity
20 min		Provide questionnaires to students.	Filling out Questionnaires
15 min	1. Detergent is seen as very important for daily life consumption. Detergent has good cleaning propterties. It can remove dirt from objects effectively. Detergent play very important role for washing. 2. However, its potential to contaminate water is also high. Detergent can affect appearance of water, lower surface tension of water, deflocculation of coloid, prevent grease and oil removal, toxic to aquatic life, distruction of useful bacteria, eutrophication… 3. Therefore, the limitation of detergent amount in water is one of necessities for environment protection. In this case, the methods to determine detergent amount presenting in water sample are very useful. The methods can be applied as a part to determine pollution of water by detergent.	**The topics and the environmental issues** **Detergent function:** Ask students to discuss in groups about the function of *detergent*. 1. How is detergent useful to daily life? 2. How does detergent affect to the environment? 3. How is the methods to determine detergent amount in sample water useful and can be applied to every day life? - Conclude the students' answers - Conclude the lesson by a drawing diagram about the issues of detergent on evironment and its importance.	Discuss in group and provide answers to questions.

15 min	- Soil is the surface of earth containing dead organic matter where plants have their roots and where many small animals made their home. It is made up of various clay minerals such as kaolinite, montmorillonite, vermiculite, humus. Black soil contains several amounts of microorganisms which helps in the decomposition of dead organic matter such as trees, leaves and animal remains which are used as plant nutrients and also in the clean-up of sewage and other wastes disposals. - Activated charcoal has a higher adsorption capacity than any other clay minerals and therefore used in the purification of water for town supply. Soil is viewed as a natural filter for wastes. It plays a vital role in the purification of underground water. Most organic matter in the soil is readily degraded. Soil has physical, chemical and biological characteristic that can enable waste detoxification, biodegradation, chemical decomposition, physical and chemical fixation.	**Functions of soil:** Ask students to discuss in groups about the function and importance of soil to man. 1. How is soil useful to our daily life? 2. What role do microbes play in the soil for plants nutrients? 3. Which role do soil plays in the purification of underground water? 4. How can we apply activities of microbes and adsorption capacity of soil and activated charcoal in our everyday life activities? Summarize the whole lesson by using diagrams to establish the relationship between detergents in water as pollutants and the purification action of soil.	Discuss in group and provide answers to questions.