INNOVATIVE TEACHING METHODOLOGY-PRACTICAL APPROACH

SUBJECT CODE/NAME : **CY8151/ ENGINEERING CHEMISTRY**
DEPARTMENT : **ECE**
YEAR/SEMESTER : **I/I**
UNIT-1 : **WATER AND ITS TREATMENT**
TOPIC : **HARDNESS OF WATER**

Testing the hardness of water

Method

1. Collect about 75 cm^3 of soap solution in a small beaker.
2. Set up a burette and, using the small funnel, fill it with soap solution.
3. Use a measuring cylinder to measure out 10 cm^3 of one of the samples of water from the list below into a conical flask.
   A. Rain water
   B. Sea-water
   C. Temporarily hard water
   D. Boiled temporarily hard water
   E. Boiled sea-water
4. Read the burette. Add 1 cm^3 of soap solution to the water in the conical flask. Stopper the flask and shake it. If a lather appears that lasts , stop and read the burette.
5. If no lather forms, add another 1 cm^3 of soap solution. Shake the flask. Repeat the process until a lather forms that lasts for 30 seconds. Read the burette.
6. Rinse out the flask with distilled water. Repeat the experiment with 10 cm^3 of another water sample, until you have tested them all. Make a note of the volumes of soap solution that were needed in each case to produce a lather.

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INNOVATIVE TEACHING METHODOLOGY-STUDENT ACTIVITY

SUBJECT CODE/NAME : CY8151/ ENGINEERING CHEMISTRY
DEPARTMENT : ECE
YEAR/SEMESTER : I/I
UNIT-2 : SURFACE CHEMISTRY
TOPIC : ADSORPTION

Objectives:

- ✓ The students will be able to prepare and demonstrate adsorption through critically thinking about the concepts involved and implementing them through the experiment.
- ✓ At the end of the experiment, the students will be able to compare the differences between adsorption and absorption.

Examples of adsorptive processes and materials include air fresheners, charcoal (activated carbon), silica gel, and air conditioning (adsorption chillers).

Purpose: To demonstrate how air is cleaned by adsorbent chemicals.

Materials:
1 cup (250 ml) baking soda
Shoe box with a lid
Measuring tablespoon (15 ml)
2 pint-size Ziploc® bags
A marking pen
onion
saucer
1 Plastic Cup

Preparation Time: Approximately 30-45 minutes
Group Size: 2-3 students
Experiment Time: 2 class periods

Preparation: To save time and unwanted injuries, cut the onion into four quarters. Measure the baking soda out before the class period and place in a plastic cup to avoid any large messes that may occur.

Safety: The use of a sharp knife by the students may pose a safety concern. To avoid getting baking soda in the eyes, students should wear protective glasses.

Procedure:
1. Pair the students together.

2. Inform the students that they will have one class period to prepare their experiment

and another to measure their results.
3. Give the students a tray of materials (pre-measured baking soda, shoe box, tablespoon, Ziploc bag, marker, whole onion, and saucer).
4. The students should be told to make a control of unused baking soda.
5. The students should then be instructed to create an adsorbent apparatus, contained in the shoe box, out of the remaining materials. They should also be informed that the onion quarters can not touch the baking soda.
6. When the students feel as though they have prepared an adequate apparatus the teacher can then observe it and offer suggestions to the design. When it is adequately prepared, the onion can then be cut into quarters and placed in the box.
7. After approximately 24 hours, the students should open the apparatus and remove a tablespoon of the baking soda; used to qualify the results.
8. Students should be asked to qualify the results compared to the control.

Assessment: In one or two paragraphs summarize the data that you collected. Discuss the adsorptive properties of the baking soda. Then discuss the practical uses of both adsorption and absorption that occur in everyday life. How are these processes similar or different?

Questions:
1. Why is baking soda considered an adsorbent product?
2. How did you and your partner go about constructing your apparatus?
3. What is the purpose of the control?
4. Why is the onion used in this experiment?
5. Would it be more beneficial to spread the baking soda out evenly across the bottom of the box or all collected into one corner of the shoe box? Why?
6. What are some practical applications of adsorption in everyday life?
7. What are other materials that can be used in an adsorption experiment?

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INNOVATIVE TEACHING METHODOLOGY-QUIZ

SUBJECT CODE/NAME : **CY8151/ ENGINEERING CHEMISTRY**
DEPARTMENT : **ECE**
YEAR/SEMESTER : **I/I**
UNIT-3 : **ALLOYS & PHASE RULE**
TOPIC : **STAINLESS STEEL**

1. Which of the following metal is not used in alloying stainless steel?
   A: chromium
   B: nickel
   C: aluminum
   D: platinum
2. Stainless steel is useful in making kitchen utensils because...
   A: it is corrosive
   B: it is toxic
   C: it is flammable
   D: it doesn't affect food
3. Which of the following is not a property of stainless steel?
   A: luster
   B: flammability
   C: ductility
   D: hardness
4. Which of the following is not a type of stainless steel?
   A: Austenitic
   B: Ferritic
   C: Suplex
   D: Martensic
5. Ferritic stainless steel contains what percentage of chromium?
   A: 10%
   B: 20%
   C: 30%
   D: 40%
6. Martensic stainless steel contains what percentage of chromium?
   A: 25%
   B: 18%
   C: 10%
   D: 1%

7. Duplex stainless steel is a combination of which two types?

   A: Austenitic and Martensitic

   B: Martensitic and Ferritic

   C: Precipitation Hardening and Austenitic

   D: Austenitic and Ferritic

8. Austenitic stainless steel contains approximately what percentage of chromium?

   A: 21%

   B: 38%

   C: 56%

   D: 78%

9. Which type of steel can be hardened by heat treatments?

   A: Martensitic

   B: Duplex

   C: Ferritic

   D: Austenitic

10. True or false? Stainless steel is stain-proof.

    A: true

    B: false

AT THE END OF THIS BRAIN TEASER, STUDENTS

- ✓ GAIN INTEREST IN PARTICULAR TOPIC.
- ✓ MOTIVATES STUDENTS FOR ACTIVE PARTICIPATION.

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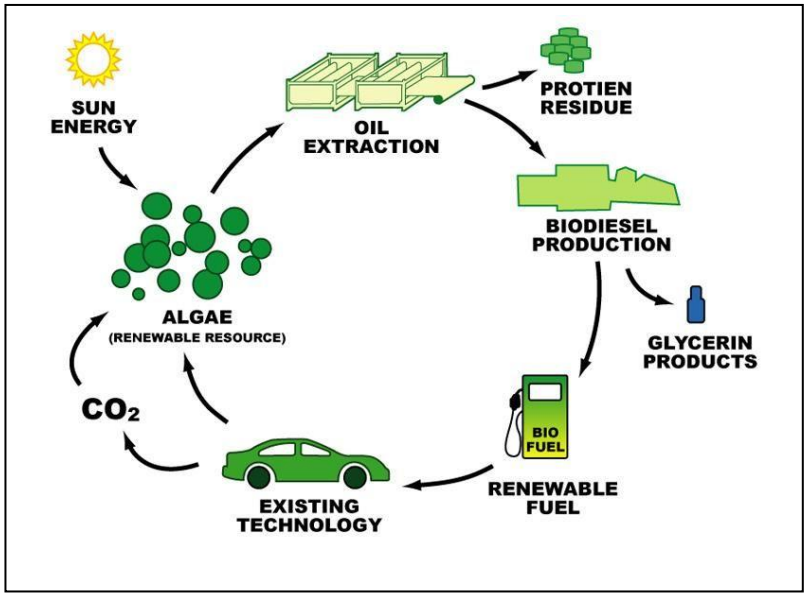
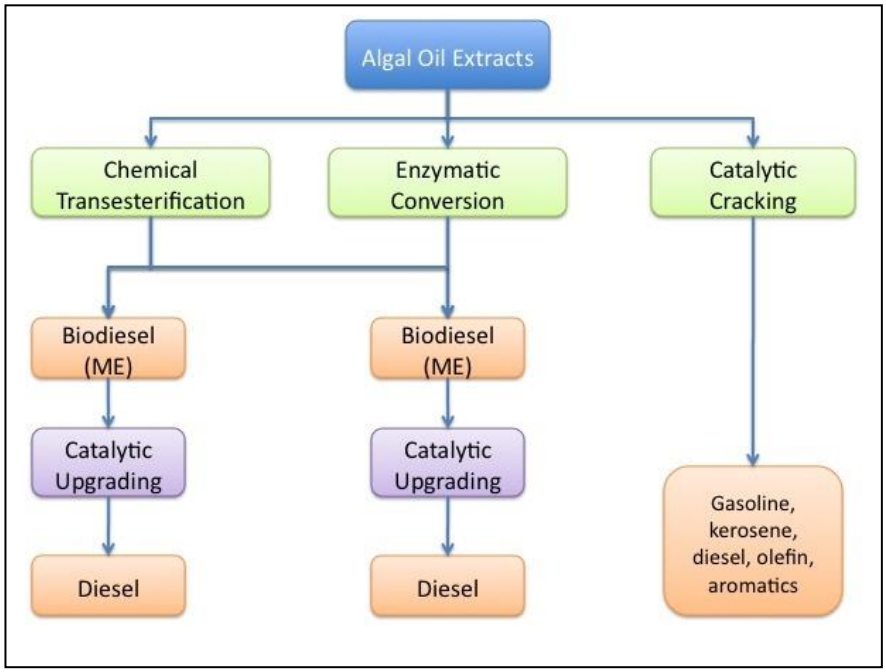
INNOVATIVE TEACHING METHODOLOGY-MIND MAP

SUBJECT CODE/NAME : **CY8151/ ENGINEERING CHEMISTRY**
DEPARTMENT : **ECE**
YEAR/SEMESTER : **I/I**
UNIT-4 : **FUELS & COMBUSTION**
TOPIC : **BIODIESEL PRODUCTION**





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INNOVATIVE TEACHING METHODOLOGY-REAL OBJECTS

SUBJECT CODE/NAME : **CY8151/ ENGINEERING CHEMISTRY**
DEPARTMENT : **ECE**
YEAR/SEMESTER : **I/I**
UNIT-5 : **ENERGY SOURCES & STORAGE DEVICES**
TOPIC : **BATTERIES & ITS TYPES**

Batteries are everywhere. The modern world is dependent on these portable sources of energy, which are found in everything from mobile devices to hearing aids to cars. By showing the real objects we can link our lessons to real world learning.

- Infusing real world experiences into our instructions will make teaching moments fresh and enrich classroom learning.
- Relating and demonstrating through real life situations, will make the material easy to understand and easy to learn.
- It will spark their interest and get the students excited and involved.
- By make use of smart apps and real objects for students can make the sessions almost interesting.

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