

**EXPERIMENT 12**  
**Interesting Molecules:**  
**Soap and Polymers**

**Purpose:** To make some molecules that have some unique properties and to relate their structure to their properties

**Procedure and Observations and Data:** (To be done in groups of two)

**1. Make soap**

Weigh out 25 g of lard in your clean and dry evaporating dish. Make sure that you clean the scoop, scale and counter of any lard.

Be careful! Obtain 10 ml of 50 % NaOH solution in your clean graduated cylinder. Do not get any NaOH on your hands. If you have extra NaOH give it to someone.

Set up a steam bath with your 250 ml beaker.. Using your evaporating dish tongs place the evaporating dish and lard on the steam bath. Melt the Lard.

Slowly add the NaOH to the melted lard, while stirring with your stirring rod. Stir for 20–50 minutes until the mixture looks just like mashed potatoes. Turn off the flame.

Pour about 25 ml of the hot water from your steam bath into another beaker. Using your spatula remove the soap mixture into this hot water. Disperse the soap in the water as best you can. Get a piece of Universal indicator paper and test the pH of the soap. It should be blue.

What is the pH? \_\_\_\_\_

In a beaker obtain about 10 ml of dilute HCl. Add the acid to your soap with your medicine dropper, a small amount at a time. Stir after each amount of HCl that you add. Try to get it mixed in well with your glass stirring rod. Get some Universal indicator paper and touch your stirring rod to it. Add and stir in the HCl until the pH is about 8. Do not add too much HCl. If you do add too much acid the pH will be less than 8. You will have to add some dilute NaOH to get the pH back to 8.

In a small beaker get 15 ml of saturated NaCl solution. Try not to get any of the solid NaCl that is on the bottom of the bottle. Mix the NaCl solution into your soap thoroughly.

Set up a filtering system. Pour your soap mixture into the filter. Rinse the soap with 2 portions of 15 ml of de-ionized water. After each rinsing squeeze as much solution out of your soap as you can with your spatula. Test the pH of your soap with the universal indicator paper.

If the pH is 8 or less you can wash your hands with your soap.

Put your soap in a clean beaker. You may add 1 drop of food coloring and 1 drop of perfume.

## 2. Make a fun polymer

- Measure out the amount of glue your instructor tells you. Put the glue in a zip lock bag. Try not to make a mess. You can add food 1-2 drops of coloring at this time
- Add 4 ml of 10% borax to the guar gum solution.
- Mix together in the bag.

**CLEAN UP!**

### Questions and Answers:

**1. What are unique properties of the polymer that you made.**

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**2. Is your polymer a liquid or solid? Give reasons for your answer.**

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**3. What are the unique properties of soap?**

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**4. What is it about the molecular structure of soap that gives it its properties?**

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**5. What is it about the molecular structure of polymers that gives them their properties?**

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**6. Where do the starting materials for all of the chemical products we use everyday come from?**

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### Conclusions and Reflections

What did you think about the substances you made and the instructor made in lab today?

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What did this teach you about Chemistry?

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