**Procedure:**

We begun with two batches of waste cooking oil which each had a volume of about 500 mL each. These numbers were estimated as the oil was being heated in beakers and it was difficult to get an exact measurement. The TA has already performed the Acidic Esterification process and both of the batches had a Free Fatty Acids (FFA) concentration of less than 1%. The TA informed us that Batch 1 would need .35 grams of Sodium Hydroxide (NaOH) per 100 mL of oil and that Batch 2 would need .4 grams per 100 mL. We calculated that we would need 1.75 grams NaOH total for the first batch and 2.0 grams for the second. We measured out these amounts on the scale and then proceeded to add each to an individual beaker that we had measured methanol into. We used about 100 mL of methanol for each batch, which had been measured out by the TA. We then covered the beakers with foil to avoid splashing the solution and swirled the mixture for about 15 minutes until all of the Sodium Hydroxide was completely dissolved. The TA informed us that it is important to wait until *all* of it is dissolved and there are no bits of solid left in the mixture before it is added to the waste cooking oil.

We checked the temperature on each batch of waste cooking oil, and when each had reached about 61º-62º C we added the correct amount of Sodium Hydroxide-Methanol solution to each respective batch. We let it remain on the heating plate while the reaction took place over the next two hours. At this point we left the lab with plans to return the next day after the reaction was complete and the glycerin had settled.

When we returned to the lab our 2 batches of oil were in the plastic containers used to store the mixture while it settles. We each went to work on draining the glycerin that had settled to the bottom of the mixture. The biodiesel was a much lighter color and thinner consistency from the thick, dark glycerin and it was easy to tell when it had all been drained out of the container. We measured the glycerin and found that Batch 1 had 84 mL and Batch 2 had 88 mL. We then measured the remaining biodiesel from each batch and found that Batch 1 contained 545 mL and Batch 2 contained 512 mL. We emptied both Batches into the large bucket collecting oil to be washed in one large batch and used at the University of Cincinnati power generating facility. When we had finished our lab we cleaned up our station and materials. We then calculated the exact total volumes and approximate yield of each batch. We found that Batch 1 had a total volume of 629 mL and a yield of about 87% and Batch 2 had a total volume of 600 mL and a yield of about 85%.