 

**MIDDLE SCHOOL**

**Green Chemistry**

**Shampoozled – Part 2: pH neutral**

**Goal:** Make a usable shampoo

**Objectives:** Students will…

* Accurately measure materials
* Monitor and maintain a set temperature range
* Follow a sequence of instructions
* Conduct mathematical calculations
* Follow classroom safety procedures

**Materials (for a class of 32 working in groups of 4):**

* 100ml H2O
* 150g Citric Acid
* 25g lecithin granules
* Balance
* Weighing paper
* 16 Stir rods
* 24 plastic cups
* Jars containing their soap
* 8 copies of lab directions

**Time Required:** 45–60 minute class period

**Standards Met:**

* Properties and changes of properties in matter

**Green Chemistry Principles Addressed:**

* Real-time Analysis for Pollution Prevention

**Procedure:**

PREP

Students will be making a large batch of shampoo and storing it in class. Determine where you’d like students to store their shampoo.

* Pour distilled water into 8 cups
* Label 8 cups “citric acid”
* Label 8 cups “lecithin”

IN CLASS

* Explain to students that they will be making their shampoo pH balanced.
* Hand out the student sheets.
* Review the lab instructions, reminding them of the pH neutral lab.
* Students should follow the directions on the lab sheet and clean up as directed.
* Optional: you may want to allow students to check the pH level of the shampoo before and after they add citric acid.

**Assessment:**

* Successful completion of shampoo
* Following lab and safety procedures

**Shampoozled 2: pH neutral – Lab Directions**

* 1. **Get a pair of safety glasses and gloves for each member of the group & put both on**
  2. One member of your group should obtain your lab materials:
     + Plastic cups of water
     + Plastic cup labeled “citric acid”
     + Plastic cup labeled “lecithin”
     + graduated cylinder
     + balance
     + spatula
     + 2 stir sticks
     + jar with soap made in previous lab
     + paper towel

Complete the following steps:

1. Place the plastic cup labeled “lecithin” on the balance and tare it. Using the balance and cup, find 3 g of lecithin.
2. Using the graduated cylinder, measure 5 ml if water. Pour it into the cup labeled “lecithin” and stir.
3. Place the plastic cup labeled “citric acid” on the balance and tare it. Using the balance and cup, find 13 g of citric acid.
4. Using the graduated cylinder, measure 10 ml distilled water and pour it into the citric acid and stir.
5. Stir both the citric acid and the lecithin until dissolved.
6. Add the citric acid to the lecithin and stir until mixed.
7. Pour the citric acid and lecithin into the glass jar containing the soap you made in the previous lab.
8. Put lid on glass jar**. Make sure the lid is on as tight as possible!**
9. Shake the mixture vigorously for at least 15 minutes.

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| **Table for quick reference** | |
| **Ingredient** | **Amount** |
| lecithin | 3 g |
| water | 5 ml |
| Citric acid | 13 g |
| water | 10 ml |

1. Clean up according to teacher instruction