Name _____ Period _____ Date _____

The pH Scale

The pH scale is a numeric scale used to measure the acidity or alkalinity of a solution that contains water. The H stands for hydrogen ions. Acids produce a lot of hydrogen ions, while bases absorb them. For this reason, a low number, like 1 on the pH scale means something is very acidic, a high number such as 14 is very basic. Both are very corrosive, but in different ways. Water is neutral and has a pH of 7. The p stands for power, as in exponential numbers in math class. **Each step on the pH scale is a change of ten times the strength.** Lemon Juice has a pH of 2, and Sulfuric acid has a pH of 1. They are 1 step apart.

How many times stronger is Sulfuric Acid than Lemon Juice?

On the other side of the scale, the Sodium Hydroxide we used to make soap has a pH of 14. Bleach has a pH of only 12. These are two steps apart on the scale.

It is important to remember that the pH scale measures how substances interact with water. If a substance does not dissolve in water, it does not have a pH.

What is the pH of the fat we used to make soap? How do you know?

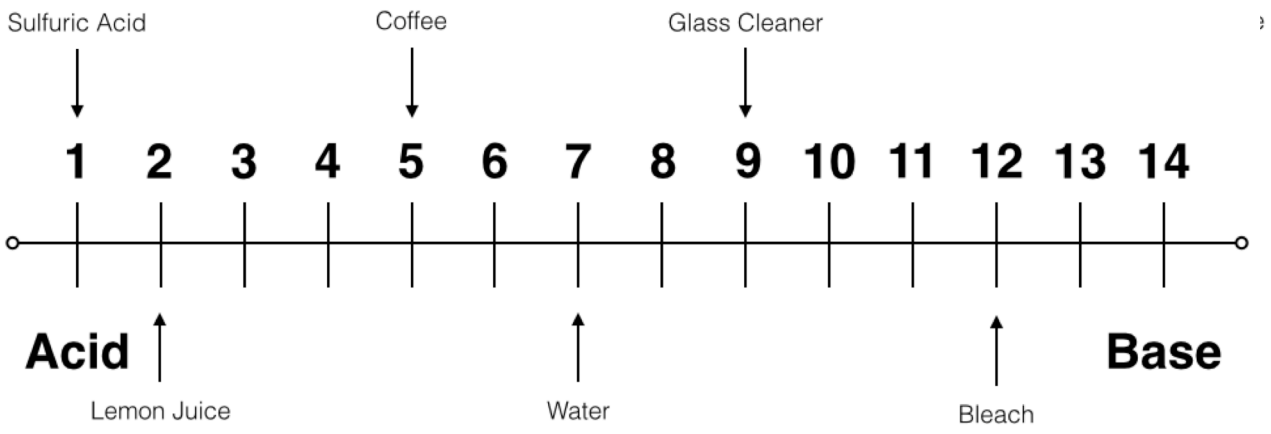
Testing pH

We will be testing the pH of several substances from this unit. The pH of a solution can be measured by dipping a piece of pH paper into it, and comparing the color to a numerical chart on the bottle. The paper has been treated with a mixture of different indicators that change color in the presence of acids and bases. To conserve paper, we will tear each strip into thirds and use tweezers to dip them into the substance on a spot plate. For the substances that are solids, dissolve these in a few drops of water first.

Substance	pH	Substance	pH
Vinegar		Road Salt	
Kool-Aid		Baking Soda	
Commercial Soap		Sodium Hydroxide	

The pH scale shows us the relationship between various substances. Some are more corrosive than others.

Add the substances you tested to the scale below:



Based on the results above above, what do you think the pH of your soap your soap that you made would be? Why?

Name _____ Period _____ Date _____

Your Progress:

- Mastery
- Proficient
- Developing
- Beginning

Lesson 14: Did we do a good job making soap?

Activity 14.1

✚ Safety

Your soap may be a little harsh on your skin. Do not attempt to wash yourself with your soap. Rinse your hands off completely when you have finished this lab.

Purpose

You will use a variety of tests to check to see how well your soap turned out.

Efficiency

You used 11 grams of fat and 24 grams of sodium hydroxide. What mass would you expect your soap to have?

11 grams Fat + 24 grams Sodium Hydroxide → _____ grams Soap

Carefully, place your soap on the scale. Find the mass of your soap.

Expected Mass:	Actual Mass	Amount Lost or Gained

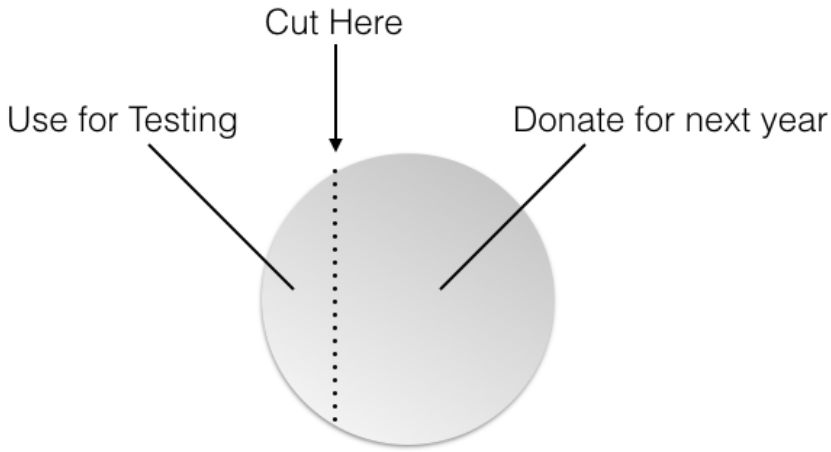
Thinking about what you expected the mass to be, and what it was, why might they be different?

_____

_____

Cutting Off a Sample

Use a plastic knife to cut off a sample to test. Make the cut about one fourth of the way across the sample as shown in the diagram. Take the smaller piece to do your testing with. The rest should be placed in the to be donated pile for next year's labs.



As you are cutting the sample make some observations about how hard it is to cut. Record these observations below.

Basic Properties

Carefully, look at your soap. Smell it and touch it. Record your observations below:

Hardness	
Malleability	
Color	
Smell	
Texture	

Solubility

Use the metal scoop to scrape a very small amount from three different locations on the sample. Add them in a small plastic cup to 10 ml of water. Stir this with the stirring rod for 2 minutes. Do not discard the solution.

Observations:	Solubility:

pH

Measure the pH of the soapy water you created above. Compare it to the value you recorded earlier in the pH Scale activity.

pH of Commercial Soap	pH of Your Soap

Thinking about the reactants, why might the pH of your soap be different?

_____

_____