Week 2 Lab Instructions
Chemistry Basics

Activity	Deliverable	Points
Part A	Measuring pH using pH Strip	11
Part B	Strong Acids as Buffers	9
Part C	Comparing Antacids	10

Step 1: Read the Entire Lab Packet

1.0– Read through the laboratory packet – SEE ATTACHED SHEETS

Step 2: Come to the Lab with Proper PPE

BACKGROUND:

Acids and Bases

The pH scale is a way to measure how acidic or basic a solution is. It tells us how many hydrogen ions (H+) are in the solution. The pH scale has a range from 0 to 14.

- Acids have a pH less than 7. They have more hydrogen ions.
  - Examples include lemon juice and stomach acid.
- Bases have a pH greater than 7. They have fewer hydrogen ions.
  - Examples include bleach and baking soda.
- A pH of 7 is neutral, like pure water.

Buffers

Buffers are special solutions that help keep the pH stable. They resist changes in pH when small amounts of acids or bases are added. For example, phosphate buffers are used in contact lens solutions to match the natural pH of the eye, which helps prevent irritation.

Solutions

A solution is made up of two parts: the solute and the solvent.

- The **solute** is the smaller part that gets dissolved. For example, salt in saltwater.
- The **solvent** is the larger part that does the dissolving. For example, water in saltwater. In a solution, the solute and solvent mix completely and do not separate when left standing.

Importance of pH in the Human Body

Understanding pH is very important for nursing students because the pH level in different parts of the body affects how the body functions. Here are some key points:

- **Blood pH:** The normal pH range for blood is 7.35 to 7.45. If the blood pH goes outside this range, it can be dangerous. For example, if the blood becomes too acidic (a condition called acidosis) or too basic (a condition called alkalosis), it can affect how organs work and can be life-threatening.
- **Stomach pH:** The stomach has a very acidic pH, around 1.5 to 3.5. This acidity helps break down food and kill harmful bacteria. However, if the stomach acid flows back into the esophagus, it can cause heartburn.
- **Urine pH:** The pH of urine can vary from 4.5 to 8.0. It helps the body get rid of excess acids or bases. By measuring urine pH, healthcare providers can get clues about a person's health, such as their kidney function or the presence of certain diseases.
- **Skin pH:** The skin has a slightly acidic pH, around 4.5 to 5.5. This acidity helps protect the skin from harmful bacteria and fungi.

By understanding pH, nursing students can better understand how the body maintains balance and how different treatments can help restore this balance when it is disrupted.

PURPOSE:

In this lab, you will explore important chemicals and their properties. You will learn how to measure the pH of different solutions using various techniques and compare the results. Understanding pH is crucial because it affects many processes in the human body. Here are the main goals of this lab:

1. **Measuring pH:** You will learn how to measure the pH of different solutions using pH strips. This will help you understand which solutions are acidic, basic, or neutral. Knowing the pH of different substances is important in healthcare because it can affect how the body functions.
2. **Understanding Buffers:** Buffers are solutions that help maintain a stable pH. You will see how buffers work by adding a strong acid to a buffer solution and observing how the pH changes. This is important because buffers help keep the pH in our bodies stable, which is essential for our health.
3. **Comparing Antacids:** You will compare different antacids to see which one is most effective at neutralizing stomach acid. This is important because antacids are commonly used to treat heartburn and other digestive issues. By understanding how they work, you can make better choices about which antacids to use.
4. **Preparing Solutions:** You will learn how to prepare solutions of different concentrations. This is a fundamental skill in chemistry and healthcare, as it is important to know how to mix solutions correctly for various treatments and experiments.

By the end of this lab, you will have a better understanding of pH and its importance in the human body. You will also gain practical skills in measuring pH, understanding buffers, comparing antacids, and preparing solutions. These skills are essential for your future studies and career in nursing.

MATERIALS:

Each lab group will observe demonstrations prepared by your instructor. You will also need to print off a copy of this lab document.

- A copy of the lab report for each member of your group
- A writing utensil