

## Lab 09 – pH and Buffers

### A. Objectives:

1. Calculate the proper molarities and concentrations.
2. Understand and explain how the pH scale works.
3. Understand and describe the concept of acids, bases, and buffers.
4. Prepare acids and bases in their correct amounts.
5. Calculate the pH of various acids/bases/solutions.
6. Calculate equilibrium pHs, molarities, and concentrations of acids and bases.

### B. Background: Theoretical Concepts and Calculations

#### 1. Strong Acids

Strong acids are those that completely dissociate in water. The most common strong acids are hydrochloric acid (HCl), sulfuric acid (H<sub>2</sub>SO<sub>4</sub>), and nitric acid (HNO<sub>3</sub>). In this lab, we will be using hydrochloric acid (HCl).

1.1. Strong acids and their conjugate bases. A strong acid is one that completely dissociates in water. The conjugate base of a strong acid is a weak base. For example, the conjugate base of HCl is Cl<sup>-</sup>. The conjugate base of H<sub>2</sub>SO<sub>4</sub> is HSO<sub>4</sub><sup>-</sup>. The conjugate base of HNO<sub>3</sub> is NO<sub>3</sub><sup>-</sup>. The conjugate base of a strong acid is a weak base because it does not completely dissociate in water. The conjugate base of a strong acid is a weak base because it does not completely dissociate in water.

1.2. Calculate the equilibrium concentrations of the acids and bases. In this lab, we will be using hydrochloric acid (HCl). The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal.

1.3. Calculate the equilibrium concentrations of the acids and bases. In this lab, we will be using hydrochloric acid (HCl). The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal. The equilibrium concentrations of HCl and Cl<sup>-</sup> are equal.

Concentration (M)	Initial [H <sup>+</sup> ]	Initial [OH <sup>-</sup> ]	Initial [H <sub>2</sub> O]	Initial [H <sub>2</sub> O]	Initial [H <sub>2</sub> O]
Hydrochloric acid (HCl)					
Hydrochloric acid (HCl)					
Hydrochloric acid (HCl)					

# Lab Manual Bio 150 Dccc

**Victor M. Corman**



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**Cells and Genetics Biology I Lab Manual 6E - BIO 150** Justin Topp, Craig Story, 2013      **Foundations of Scientific Research** Greg Bole, Sherryl Broverman, Joan Miyeko Miyazaki, State University of New York at Stony Brook. Division of Biological Sciences, 2000      **Biology 150 Lab Manual**, 2013      **Biology 150: Laboratory Manual** University of Chicago. College, 1963      **Laboratory Manual for Biology in Contemporary Life** Western Illinois University. Department of Biological Sciences, 1978      **Biological Concepts: a Laboratory Manual** Western Illinois University. Department of Biological Sciences, 1981      **A Laboratory Manual for BIOL 150**, 2016      **Lab Manual for Essentials of Biology** Sylvia Mader, 2011-01-21

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Geddis,2016-08-18      Lab Manual for Essentials of Biology Sylvia S. Mader, Dr.,2020-01-03 The 25 laboratory sessions in this manual have been designed to introduce beginning students to the major concepts of biology while keeping in mind minimal preparation for sequential laboratory use The laboratories are coordinated with Essentials of Biology a general biology text that covers all fields of biology In addition this Laboratory Manual can be adapted to a variety of course orientations and designs There are a sufficient number of laboratories and exercises within each lab to tailor the laboratory experience as desired Then too many exercises may be performed as demonstrations rather than as student activities thereby shortening the time required to cover a particular concept      **Principles of Biology I** Nancy Gilbert,Shirley

Colvin,2009-04-15      Lab Manual for Biology Sylvia Mader,2012-01-30 The Biology Laboratory Manual 11 e is written by Dr Sylvia Mader With few exceptions each chapter in the text has an accompanying laboratory exercise in the manual Every laboratory has been written to help students learn the fundamental concepts of biology and the specific content of the chapter to which the lab relates and to gain a better understanding of the scientific method

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