**Chapter IV: Laboratory Terms**

**Learning Objectives**

* List and define the pertinent chemical, biological, and analytical terms.

1. **Introduction**

Many terms used in the laboratory are unique and not frequently used in normal conversation. Therefore, it is necessary to learn the meanings of these terms in order to function efficiently in the laboratory.

These terms are divided into three categories: chemical, biological, and analytical.

1. **Laboratory Terms**
   1. **Chemical**

There are numerous chemical terms used in the laboratory.

***A Buffer*** is a chemical or solution which can neutralize acids or bases with very little or no change to the pH of the solution.

***Buffer Capacity*** is the capacity of the solution or liquid to neutralize acids or bases OR the capacity of water or wastewater to resist a change in pH. The buffer capacity of a solution is determined by the alkalinity of the solution; a solution with high alkalinity has a large buffer capacity and a solution with a low alkalinity has very low or poor buffer capacity.

***Percent Saturation*** is the amount of a substance dissolved in a solution compared to the total amount of the substance that can be dissolved in a solution.

***Precipitate*** is a product of a chemical reaction which is insoluble and tends to separate from the solution.

***Reagent*** is a pure chemical substance that takes part in a reaction or is used in tests to detect or measure other substances.

***Reflux*** is a part of the distillation process. The substance condenses after heating or evaporation and flows back into the flask.

***Solution*** is a substance or mixture of substances dissolved in a solvent.

***Surfactant*** is a surface active agent. It is usually used to refer to detergents.

***Volatile*** is a term used to refer to a substance that evaporates at relatively low (ambient) temperatures.

* 1. **Biological**

The following are common biological terms you will encounter in a laboratory setting.

***Aerobic*** means with oxygen. It is a condition in which atmospheric oxygen is present in an aquatic environment.

***Anaerobic*** means without oxygen. It is a condition in which atmospheric oxygen is not present in an aquatic environment.

***Aseptic*** means sterile or an environment free of disease causing organisms. It is a technique which prevents the introduction of disease causing organisms.

***Facultative*** means capable of metabolizing in aerobic or anaerobic environments. It is typically used to describe certain types of bacteria.

***Most Probable Number*** (MPN) is an expression of the density of coliform bacteria in a sample.

* 1. **Analytical**

While conducting analyses, for example, a Wastewater Treatment Plant Operator may encounter analytical terms that he or she is not familiar with. The following are some of those terms.

***Aliquot*** is a representative portion of a larger sample.

***Ambient*** is the temperature of the surroundings. It is typically used to signify room temperature.

***Blank*** is a sample containing only distilled or dilution water. Tests are often run on the sample and the blank and the results are compared.

***Calibration*** is the “setup” of the analytical instrument. A calibration is done by analyzing the response of an instrument to known concentrations of the analytes. These responses are recorded and compared to the results obtained when analyzing the unknown sample. A calibration usually results in the creation of a calibration curve which is used during the analysis of the unknown. These curves are often stored in the instrument’s memory. Many instruments are pre-calibrated, but it is important to verify the accuracy of this calibration regularly.

***Distillate*** is the condensed portion of the sample after distillation.

***End Point*** is the completion of the chemical reaction. The term end point is often used to describe the color change that occurs during titration when the titrant has completely reacted with the sample. The end point is detected visually through a color change, formation of a precipitate, or with a pH meter.

***An Indicator*** is a substance that gives a visual indication that the end point has been reached.

***Standard Solution*** is a solution in which the exact concentration of the compound or chemical is known.

***Standardize*** means to use a standard to determine the exact concentration of a substance. Using a standard solution and recording the amount required to neutralize or react with a substance of unknown concentration, the unknown concentration can be determined.

***Titrate*** is the process of adding a titrant drop-by-drop to a sample. The titrant is of known concentration (standard solution) and the amount of titrant necessary to reach the end point is used to calculate the sample’s concentration.

***Volumetric*** is a measurement based on the volume of substance used. A titration is a volumetric analysis.