AP Chemistry- Lab Practical

Lab	Primary Learning Objective (LO)
1. Spectroscopy: *What Is the Relationship Between the Concentration of a Solution and the Amount of Transmitted Light Through the Solution?*	The student can justify the selection of a particular type of spectroscopy to measure properties associated with vibrational or electronic motions of molecules.
2. Spectrophotometry: *How Can Color Be Used to Determine the Mass Percent of Copper in Brass?*	The student can design and/or interpret the results of an experiment regarding the absorption of light to determine the concentration of an absorbing species in a solution.
3. Gravimetric Analysis: *What Makes Hard Water Hard?*	The student can design, and/or interpret data from, an experiment that uses gravimetric analysis to determine the concentration of an analyte in a solution.
4. Titration: *How Much Acid Is in Fruit Juice and Soft Drinks?*	The student can design, and/or interpret data from, an experiment that uses titration to determine the concentration of an analyte in a solution.
5. Chromatography: *Sticky Question: How Do You Separate Molecules That Are Attracted to One Another?*	The student can design and/or interpret the results of a separation experiment (filtration, paper chromatography, column chromatography, or distillation) in terms of the relative strength of interactions among and between the components.
6. Bonding in Solids: *What's in That Bottle?*	The student is able to design or evaluate a plan to collect and/or interpret data needed to deduce the type of bonding in a sample of a solid.
7. Stoichiometry: *Using the Principle That Each Substance Has Unique Properties to Purify a Mixture: An Experiment in Applying Green Chemistry to Purification*	The student is able to design a plan in order to collect data on the synthesis or decomposition of a compound to confirm the conservation of matter and the law of definite proportions.
8. Redox Titration: *How Can We Determine the Actual Percentage of H2O2 in a Drugstore Bottle of Hydrogen Peroxide?*	The student is able to design and/or interpret the results of an experiment involving a redox titration.
9. Physical and Chemical Changes: *Can the Individual Components of Quick Ache Relief Be Used to Resolve Consumer Complaints?*	The student is able to evaluate the classification of a process as a physical change, chemical change, or ambiguous change based on both macroscopic observations and the distinction between rearrangement of covalent interactions and noncovalent interactions.
10. Kinetics: Rate of Reaction: *How Long Will That Marble Statue Last?*	The student is able to design and/or interpret the results of an experiment regarding the factors (i.e., temperature, concentration, surface area) that may influence the rate of a reaction.
11. Kinetics: Rate Laws: *What Is the Rate Law of the Fading of Crystal Violet Using Beer's Law?*	The student is able to analyze concentration vs. time data to determine the rate law for a zeroth-, first-, or second-order reaction. In cases in which the concentration of any other reactants remains essentially constant during the course of the reaction, the order of a reaction with respect to a reactant concentration can be inferred from plots of the concentration of reactant versus time.
12. Calorimetry: *The Hand Warmer Design Challenge: Where Does the Heat Come From?*	The student is able to design and/or interpret the results of an experiment in which calorimetry is used to determine the change in enthalpy of a chemical process (heating/cooling, phase transition, or chemical reaction) at constant pressure
13. Equilibrium: *Can We Make the Colors of the Rainbow? An Application of Le Châtelier's Principle*	The student is able to use LeChâtelier's principle to design a set of conditions that will optimize a desired outcome, such as product yield.
14. Acid-Base Titration: *How Do the Structure and the Initial Concentration of an Acid and a Base Influence the pH of the Resultant Solution During a Titration?*	The student can interpret titration data for monoprotic or polyprotic acids involving titration of a weak or strong acid by a strong base (or a weak or strong base by a strong acid) to determine the concentration of the titrant and the p*Ka* for a weak acid, or the p*Kb* for a weak base.
15. Buffering Activity: *To What Extent Do Common Household Products Have Buffering Activity?*	The student can identify a solution as being a buffer solution and explain the buffer mechanism in terms of the reactions that would occur on addition of acid or base.
16. Buffer Design: *The Preparation and Testing of an Effective Buffer: How Do Components Influence a Buffer's pH and Capacity?*	The student can design a buffer solution with a target pH and buffer capacity by selecting an appropriate conjugate acid-base pair and estimating the concentrations needed to achieve the desired capacity.