IB Year Assignment 2

One of the major components of the second year in the IB programme is the completion of the independent assessment (IA). This assessment is a laboratory investigation in which the diploma candidate must propose a research question, design a laboratory experiment to answer the question, and then write a paper to showcase your findings.

Laboratory work will not be new to you as a third-year chemistry student, but some aspects of the data collection and analysis will be. For instance, you must show all recorded data with proper precision and uncertainties.

Read "11.1 Uncertainty and errors in measurement and results" that is linked here and posted on the LMS under the topic Summer Assignment: IA preparation.

Complete the exercises within the reading.

One of our first labs will be a group research project based on this research question:

How does the pH of the stomach affect the solubility of aspirin?

Complete the following:

(1) Identify the independent and dependent variables in the research question?
(2) What other variables do you have to consider and keep constant? Why is it important to keep them constant? (Hint: What other factors affect your independent or dependent variable?)
(3) Aspirin is a weak organic acid, namely acetylsalicylic acid. As such, aspirin establishes equilibrium when it in solution. Use this information and what you know about weak acid systems to formulate a hypothesis. Support your assertion with concepts learned from acid-base chemistry, solutions and solubility, and equilibrium.
    - Your hypothesis should include your independent and dependent variables: The solubility of aspirin in the stomach increases/decreases as the pH increases/decreases.
    - Identify concepts discussed in sophomore chemistry or IB Year 1 to support your claim. Identify the concepts or principles by name, if there is a specific name.
(4) Outline an experimental procedure that would let you answer the research question. By "outline the procedure" I mean broadly state what you would need to do in order to gather information to test your hypothesis. For instance, brewing coffee at different temperatures and extracting the caffeine would be an appropriate outline to test whether brewing temperature affects caffeine content in a cup of coffee.