

Honors Chemistry: Individual project

Goal: Design and carry out an experiment investigating an aspect of physical or chemical changes. This will be an experiment you can conduct with materials that can be obtained easily without very special precautions. We will communicate our results in a lab report.

Part 1: Writing the proposal

Before you begin your investigation, you must write down your proposed investigation and how you plan to collect your data. Your investigation must relate to one or more of the following chemistry topics:

- Conservation of mass
- Acid/base chemistry
- Energy of reactions
- Energy of phase changes
- Rates of reactions/kinetics (how fast a reaction takes place)
- Materials science (metal vs nonmetal, pure substance vs mixture, etc.)

Your proposal should be a paragraph that describes:

- 1) The question you wish to investigate
- 2) Basic overview of the experiment you will perform to investigate this question
- 3) How you will control for variables, your control or blank test, and how you will measure results (your experiment must include quantitative variables that you can measure)

Suggestions:

- Design an experiment that can be performed within your kitchen or outside where you live
- Take safety into consideration. The teacher will deny proposals if safety issues are not addressed or if the experiment is too dangerous
- Experiment is strong if you can get consistent results. Don't just try something once, but show that your results can be repeated
- Certain equipment can be loaned out, but only after the proposal is approved, not before

Proposal must be sent and approved by Mr. M before you start on any experiments. Your proposal is not all that can be done, but should serve as a starting point. You may find that you'll need to change your methods if your original plan runs into issues, or another question may come up in the course of your study.

Proposal Due March 27th 2020

Part 2: Experiment

Carry out your experiment. Note if you need to change any methods or if there are any sources of error you didn't anticipate:

Experiment Due April 24th 2020

Part 3: Report

Use the conventions of scientific and information writing. The biggest things to remember are the following:

- No first person pronouns (I, me, my, our, we, etc.)
- Abbreviations used only if you establish what they mean first
 - Example: Sodium chloride (NaCl) is the compound commonly known as table salt. NaCl is classified as an ionic compound due to the interaction between the metal cation and nonmetal anion.
- Not opinion writing. Your conclusions must be based on your results or the scientific results of others

Your paper must be divided into the following sections, each clearly labeled.

- **Introduction:** Give a short introduction to the topic and question you investigated. Connect how it relates to one of the chemistry topics we have learned about in class. This is also the place to define any terms that you will mention multiple times throughout your paper. Should be 1-2 paragraphs
- **Methods:** Describe how you set up your experiment(s) in a paragraph or two.
 - DO NOT write in a numbered list
 - DO NOT include any results or data from your experiments (that's for the next section)
 - DO make the methods clear enough so someone else could replicate the experiment from your description
- **Results:** Share your results from the experiment, including any quantitative measurements
 - May include tables or figures to make your data more clear
 - Label tables with Roman numerals (**Table I, Table II, etc**)
 - Label figures or pictures with Arabic numerals (**Figure 1, Figure 2, etc.**)
 - Do not make conclusions from your data...that's the next section
- **Discussion:** Also known as "Conclusions." Should be two to three paragraphs.
 - Describe the conclusion you reached based on your experiments and data
 - Discuss any difficulties you had how you addressed them
 - Discuss any changes you could make or what future studies could be done (if given access to whatever equipment you wanted)

Report Due May 22nd 2020