ANALYTICAL CHEMISTRY PROJECT IDEAS
Srch Broadly first: **Google, Google Scholar, Websites (*)**
Srch Broadly Chem. specific databases: **ACS J. Chemical Education (1); other Journals (2)**
Search more Narrow: **SciFinder Scholar & ACS**
(Optional) Search eBooks: **Thru EC Libraries research guide (e.g. eBooks)**

GROUP PROJECT FOCUS: Calcium and magnesium ions level in drinking water

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Project Idea: Measurement of calcium and magnesium ions from different sources of water; measuring pH levels of different source of water

Keywords used: Calcium, Magnesium, Water, pH

(A) 3-4 Sentences Project Goal:

What do you plan on doing?

- Testing levels of calcium and magnesium in water and observing how it affects pH for different samples

Do you have the context (water, air, soil, etc)?

- Water
    - Samples List:
        - Municipal Water Source: Earlham (reservoir)
        - Well Water: Grace's house
        - Glenn Miller Park
        - Bottled Water
        - Rain Water
        - Deionized distilled water (Control)

Do you have a question in mind?

- What are the amounts of calcium and magnesium present in different water sources, and what are the effects of excess or insufficient amounts of calcium on the human body?
- Effect concentration has on pH
- Do Ca and Mg affect each other in concentration? Are they in a set ratio or are they independent of each other?

Do you have a prediction?

- All sources of water will have some amount of calcium and magnesium present in them, but the Glenn Miller Fountain will have the highest amounts of calcium and magnesium due to a lack of extensive filtering.
- All sources of water will most likely be basic or alkaline to some degree, but the Glenn

Miller Fountain will be the most basic because it is not regulated with a filter, or by the local government.

(B) Background information:

About the context?

- Calcium is an essential ion for the human body. It aids in numerous biological and physiological processes such as muscle contraction, bone growth/development, and nerve impulses.
- Magnesium is a natural stabilizer and has applications with suppressing mental health issues.

About the chemical(s)?

- Calcium ions
- Magnesium ions

About Health Effects?

-Circulate blood flow
-Assist in muscles movement or contractions
-Assist the brain in transferring signals
-Assist in developing strong bones and making them dense.

About sources?

-https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2488164/ - general amounts of calcium from public sources
-https://academic.oup.com/nutritionreviews/article/55/1/1/1853700 - adverse effects of high calcium diets
-what changes calcium levels in water?
-https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3775162/ - potential health effects of hard water

About acceptable standards/levels?

-1,000 to 1,200 mg per day.

(C) Methods of Analysis

Do you know what you need to measure? - Measuring the amount of calcium and magnesium ions in drinking water and the pH levels of different sources of water.
Do you know which methods are used to detect? Atomic Absorption Spectroscopy (to measure ion concentration) and pH probe/phenol-red test (to measure pH)
Do you know if you will have access to this method? Yes, it is in Earlham College Chemistry Department lab

(D) References (Citation in ACS style and copy of abstract)

[Instructions and details:
1.You should have at least 8-10 relevant articles, 1 ebook, and 2-3 good websites.
2-In this section just write down the correct citation for all the articles you find (ACS style) followed by a

copy of the abstract. For example,
Melamed, D., 2005. Monitoring arsenic in the environment: a review of science and technologies with the potential for field measurements. Analytica Chimica Acta, 532(1), pp.1-13.
Abstract: This review examines available field assays and other technologies with the potential to measure and monitor arsenic in the environment. The strengths and weaknesses of the various assays are discussed with respect to their sensitivity, ability to detect the chemical states of arsenic, performance in various media, potential interferences, and ease of operation. The state of the science and development efforts of selected technologies is presented.
3. FOLLOW ACS guidelines for all citations.]

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