

## Ch15: Chemical Equilibrium and Analysis Laboratory

Fall 2007

### Potential Ideas for Independent Projects

For your independent study project, you may choose any project that you like. At each step of the proposal phase, we'll help you form the project objectives so that you'll likely be successful when executing your idea in the laboratory time allotted. We cannot guarantee success, but we'll do our best to improve your chances of success.

If you are having difficulties deciding on a project, you may choose any one of the following general concepts:

1. Quantify lead and VOCs in non-aqueous paint to find which brand is most environmentally friendly.
2. Quantify lead and VOCs in soil.
3. Quantify chemical differences of water contaminants at various locations in a river, lake, pond, bay or ocean or for various rivers, lakes, ponds, bays or harbors.
4. Quantify contaminants in water runoff from buildings or lawns.
5. Quantify differences in tap water between different communities.
6. Quantify differences in bottled water between different brands.
7. Quantify differences in bottled water between products of the same brand. (Water bottlers have different ways of washing five-gallon water bottles before refilling.)
8. Quantify the effectiveness of a Brita filter.
9. Quantify differences in ice from different producers.
10. Quantify differences between organic and conventional produce.
11. Quantify differences between different types of fish, such as canned tuna.
12. Quantify differences between non-diet, non-cola soft drinks.
13. Quantify differences in soft drinks between different packaging materials.
14. Quantify differences in soft drinks from different geographic regions.
15. Quantify differences between canned, frozen and fresh green vegetables.
16. Quantify differences in similar cereals between different manufacturers.
17. Quantify differences between different brands of the same over-the-counter medication, such as cough syrup or aspirin.
18. Quantify chemicals that leach out of plastic containers that are used for frozen, prepared meals.
19. Quantify differences between different brands of common oral or topical consumer products, such as mouthwash or lotion.
20. Quantify differences between different brands of contact solution.
21. Quantify differences between sand from various beaches.
22. Quantify composition of cigarettes or differences between different brands of cigarettes.
23. Quantify contaminants (e.g., benzene) in drinks, such as fruit juices.
24. Quantify potential health hazards (e.g., nitrates, heavy metals) in pond water.

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Of course, your concept proposal needs to be more specific about the types of chemicals that you intend to quantify since you must select which instruments you plan to use. You cannot simply write that you want to analyze trace metals—you should list one or more metals that you intend to analyze. You cannot just state that you'll measure anion concentration—you must include a short list of anions.

Your initial list of target chemicals may change between your concept proposal and your full proposal, but you should think about the problem enough that you have good reason for your initial choice of target chemicals. (You are not required to do a full literature search for the concept proposal, but you should perform a cursory search.)

If your project requires significant sample preparation compared to other projects, you will likely analyze fewer elements or compounds than other students. Sample preparation may be a significant portion of your full proposal since you really need to understand the length of time each portion of your project will likely require.