Lab 15: Service Learning II

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Objectives

By the end of this laboratory, you should have developed the skills to do the following:

- Write a project proposal.
- Design a chemistry project that addresses a community problem.

Recommended Resources

- Website ~ What is Service Learning or Community Engagement?
  http://cft.vanderbilt.edu/guides-sub-pages/teaching-through-community-engagement/
- Any material related to your project

Background

Service learning is a teaching and learning strategy that integrates community service with course objectives to enrich the learning experience. Ideally, participation in service learning will increase discipline-specific knowledge while at the same time addressing a community problem.

In this service learning project, you will be proposing, designing, and conducting a project that addresses a community issue. You will be expected to maintain a record of your project and your experience in your lab notebook. Your team must submit a lab report that includes not only a discussion of the chemistry, but also addresses the success of the project and your team's personal reflections. Where appropriate, you will perform your service learning project. You will also prepare a handout that is appropriate to the audience the activity is designed for.

While you are welcome to propose other ideas, here are some suggestions (keep in mind that all projects must include organic chemistry in some way):

- Design a hands-on chemistry activity that is suitable for children
- Develop a new and/or improved chemistry laboratory to add the curriculum
- Design a demonstration that incorporates chemistry which can be used for GE/general chemistry courses and/or outreach events

If you choose to design a hands-on chemistry activity that is suitable for children, you can conduct your activity in a classroom, afterschool program, or community event (e.g., Celebrate CSUB). You will prepare a handout describing how to do the activity that is for appropriate for kids but also includes enough information for parents/teachers. Here are some project suggestions:

- Free radicals (determine antioxidant activity with glow sticks and/or fruit)
- Extraction (make perfume or isolate DNA from strawberries)

- Hydrophilic and hydrophobic interactions (how soap works)

If you choose to develop a new and/or improved chemistry laboratory to add to the curriculum, you will then prepare a handout for students similar to the ones currently provided for labs. Ways your project may be an improvement on existing labs:

- It teaches students new techniques (or more techniques)
- It has interesting applications
- It is cheaper
- It is "greener" and/or safer (uses less toxic materials, uses less material, etc.)

Project ideas (suggested by faculty members and previous organic chemistry students):

- Preparation of azo dyes
- Synthesis of creatine
- Aromaticity and directors
- Kinetics of S_N1 and/or S_N2 reactions
- Friedel-Crafts acylation
- Antibiotic drug discovery
- Isolation and structure determination of piperine
- Visual acid/base extraction

If you choose to design a demonstration, you can conduct your activity in the appropriate GE/general chemistry laboratory or during an outreach event. You will prepare a handout describing the chemistry behind the activity and how to do the activity that is for an introductory chemistry student.

It is recommended that you discuss any project ideas not listed here with the instructor prior to writing up your project proposal.

Please note: Project proposals that include the use of highly toxic or highly air/water reactive chemicals (e.g., hydrazine, super-hydride, or lithium aluminum hydride) will not be approved.

Project Proposal Guidelines

In lieu on an online prelab, you will be submitting a formal proposal for your project. Include the following sections:

1. Proposal Title
2. List of Investigators (i.e., all group members)
3. Abstract: Summarize your proposal plans. (Two to four sentences.)
4. Proposed Budget: List all required chemicals and supplies not available in your drawer (including those available in the stockroom). You will also need to provide an estimated cost for any specialized chemicals/supplies. You do not need to estimate costs for common lab solvents and solutions. Your estimated total cost for your project should not exceed $100.

5. Statement of the Problem and Significance of the Proposed Research: Provide a summary of your proposed service learning project. State succinctly the problem that is to be addressed. Clearly outline the significance of the problem, the impact it may have if successful, and the hypothesis or primary idea that underpins the proposed work (cite appropriate references where applicable). For example, if you are proposing a hands-on chemistry activity that is suitable for children, you should clearly explain how the project relates to organic chemistry and what children are expected to get out of the project. If you are proposing a new and/or improved chemistry laboratory, you should clearly identify how it is an improvement on existing labs and what students are expected to get out of the project. (Two or more paragraphs.)
6. Plan of Procedure: Outline your plan of attack and its feasibility, providing details sufficient to support feasibility. Explain in detail the chemical principles involved and support your explanation and feasibility by citing pertinent references. Indicate how this plan will contribute to the solution of the problem being addressed. Be sure to include a detailed description of your experimental procedure. (Two or more paragraphs.)
7. List of References: Use appropriate ACS formatting. (Don't forget to use in-text citations for your references in the body of your proposal.)

Lab Notebook Preparation

Before coming to lab, the following items must be in your lab notebook:

1. Title of experiment
2. Date the experiment is to be performed
3. Brief description of the project
4. Any applicable chemical reactions, tables, relevant physical properties, or hazards
5. References

Safety Notes

- Be sure to review the MSDS of any chemicals you are working with to determine their hazards (if any).

Directions

1. Submit your project proposal to your instructor by the due date indicated.
2. Once your project has been approved, make sure that any needed items are ordered and/or purchased well in advance of when you need to begin the lab.
3. Once your items have arrived, start working on your project whenever you have free time during the lab period. Communicate with your instructor frequently about how the project is progressing and ask questions if any issues arise.
4. If your project involves a presentation or demonstration, work with your instructor to coordinate a time that works for all members of your team.

5. If any additional items need to be ordered or purchased, let your instructor know as soon as possible.

Reporting your Results

While you should write your report according to the guidelines described in "Topic 4: Writing an Organic Chemistry Lab Report", your report will more strongly resemble a Journal of Chemical Education article than it will a Journal of Organic Chemistry article. Work with your team on this report. Here are some tips for getting full credit:

1. Use your project proposal to help with your introduction. Don't forget to explain the chemistry behind your activity.
2. In your results and discussion, include a discussion on audience response as well as the typical explanation of the experiment to address the success of your project. Also include personal reflections (i.e, what you as a team learned).
3. Include at least one (more if necessary) picture, scheme, or table.
4. In addition to the typical experimental details, include information such as where you presented/performed the project and how many people were in attendance. Also include any observations you made regarding the participants/audience.
5. Don't forget to include all the typical aspects of a chemistry lab report (i.e., abstract, references, etc.).