

Botany Student Portfolio

Department of Botany
Weber State University
Ogden, Utah 84408-2504
(Last Revised: 8 November 2001)

What is a Student Portfolio?

A portfolio is a multidimensional collection of both student and faculty selected educational works. This collection contains both developmental as well as representational materials and is well-organized and readily revisable. The material represents knowledge literacy, skills mastery, and affective development. This collecting exercise empowers students while giving new dimensions to the purpose of their education. Portfolios are used for assessment purposes in addition to serving as an incentive to the student for developing good habits in assembling and organizing materials of relevance to themselves and others, such as personnel managers or graduate school selection committees. "Folder" topics of the Botany Portfolio are listed below but be mindful of the fact that some materials will be used in more than one folder, therefore, cross-reference such material rather than duplicate it.

(1) KNOWLEDGE AND COMPREHENSION

Upon graduation, Botany majors should have a thorough **knowledge and comprehension** of the **core concepts** in the discipline of Plant Biology. These include the fact that:

(a) Plants are *like* other organisms in regard to: basic metabolism, sexual reproduction, clonal reproduction, hormonally regulated development, ability to respond to the environment, diversity and evolution.

(b) Plants are *unique* organisms in: their varied life histories - especially a sporic one with alternation of generations; their role as primary producers in food webs, serving as the interface organisms between the organic and inorganic worlds *via* mineral assimilation and photosynthesis; and the oxygenation of the atmosphere.

(c) Plants serve as an important source of products: food, fiber, flavorings, feed, fuel, pharmaceuticals, etc.

The following should be included in this "*folder*" of the Portfolio:

a. Pre-test and Post-test scores and reviewer comments. The Pre- & Post-test question appears below. Throughout your studies in Botany you should compose and revise a response to the following:

"In a well-organized English essay, with detailed illustrative supporting materials such

as graphs, lists, tables, and/or drawings, demonstrate that you have a thorough knowledge and comprehension of the above core concepts of Plant Biology."

- b. Course syllabi for all Botany and Support courses.
- c. Completed "*Advising Summary*" Sheet.
- d. Copy of the most recent *TRANSCRIPT*.
- e. Exit interview summary.
- f. Optional: If a GRE (or similar) exam is taken, a copy of the record received should be included in the portfolio.

(2) SKILLS DEVELOPMENT

Upon graduation, Botany majors should have mastered a set of fundamental **skills** which would be useful to function effectively as professionals and to their continued development and learning within the field of Plant Biology. Evidence of mastery of each skill must be presented. These skills include the following:

a. Communication Skills: Botany graduates will be required to demonstrate competence in communication, both written and oral, and present the results of their research in senior theses, senior capstone courses, and in all upper-division courses where such communication is expected and evaluated by both their peers and the instructor.

(i) Writing Skills - any graded written assignments, in Botany courses or other, such as poems or short stories in an English class. Included shall be date, course number and title, instructor, purpose of the assignment (if known), etc. Included here shall be an annotated reading list, with abstracts of papers, articles, or books that were both read and had a significant impact upon the student. We believe that such reflections causes us to identify with the *pivotal* impacts in our lives that changed our paradigm. This component shall also demonstrate **critical thinking, reasoning, and effective argument skills**. CRITICAL THINKING as used here contains the following elements:

- Determining cause-and-effect relationships
- Differentiating between fact and opinion
- Recognizing and evaluating author bias and rhetoric
- Determining the accuracy and completeness of information presented
- Recognizing logical fallacies and faulty reasoning
- Comparing and contrasting information and points of view
- Developing inferential skills
- Making decisions and sound judgments by drawing logical conclusions using quantitative or statistically-based reasoning

Critical thinking does not exclude imaginative and speculative thinking as it applies to science in general and botany specifically. To the extent that critical

thinking skills are discipline-specific, students should understand that science and its methodology is a way of knowing.

(ii) **Speaking Skills** - any oral presentation(s) given in courses or extracurricular events. Include title of talk, abstract, date, location of talk, & type of audience. Sample of evaluations using the *Oral Presentation Evaluation Form* as used by the Department of Botany should be included.

b. Computer Skills- Botany graduates should be competent users of computer software including, but not limited to, wordprocessing, spreadsheet, graphing, and web-search programs. Such skills are also imperative for organizing their required portfolios. Evidence may include any courses taken or training (certificate) received. List of programs student can use, including version (WP 9.0 vs. 8.0, Mac vs. PC, etc.) Include hard copy of work.

c. Field and Laboratory Research Skills: Majors should be competent observers and experimentalists, whether such research takes place in the field or in the laboratory. They should be able to design & execute experiments, collect and analyze data, and interpret the results using logic.

d. Problem-Solving Skills: Botany majors should be competent problem-solvers. They should be able to assess the elements of a problem and develop and test a solution based on logic and the best possible information. Evidence of problem-solving skills development should appear in the capstone experience portion of the portfolio, however, draw specific attention to the evidence at this point in the portfolio.

e. Self-Assessment Skills: Graduates should be able to demonstrate progress in the development of their ability to make a realistic appraisal of growth in all three domains of learning (cognitive, conative, and affective). They should be able to identify, evaluate and explain major, if not pivotal, influences in their development as a botanist. Evidence of such skill development might be a statement of personal and professional goals, assessment of progress toward these goals, assessment of major accomplishments, individual strengths and weaknesses, etc. What experiences have you had that demonstrates strengths and weaknesses. Written evaluation of experiences should be made, for example: was a particular course or relevant experience useful, enjoyable, and why (include support courses as well as Botany courses.) What was science fair judging like and what did you learn from that experience? If you attended a conference and presented a paper, how did you do? How did the audience react and why? Giving this area considerable thought will pay enormous dividends.

f. Cooperation/Social Responsibility Skills: Graduates ought to understand and appreciate the value of cooperating and working effectively with peers and be able to demonstrate a commitment to the process of developing such skills. Included here also is valuing: democracy, equal opportunity, work ethic and ongoing personal growth and renewal. Students might consider as evidence such things as written recommendations

from those with knowledge of such skills, assessments by supervisors on cooperative work experiences, employers who have placed students in a position to gain such skills on the job, etc.

g. Information Seeking Skills: For success in college and for lifelong learning, graduates must be able: to recognize when information is needed; to identify appropriate types of information; and to locate, evaluate, and use information effectively, ethically, and legally.

(3) SPECIAL ACHIEVEMENTS

- a. Letters/Certificates of commendation, recognition, special achievements, awards, etc.
- b. Newspaper clippings of articles featuring the student
- c. Anything by the student that was published - newspaper article, book review, research paper, etc.
- d. Letters of recommendations which are not confidential
- e. Presentation at a conference. We encourage students to participate at regional conferences like the National Undergraduate Research Conference; the National Honors Conference; Utah Academy of Arts, Letters, and Sciences; Western Regional Honors Conference; Weber State Chapter of Tri-Beta Honor Society; Weber State Chapter of Sigma Xi; West Coast Biological Sciences Undergraduate Research Conference; etc.
- f. Membership in professional societies (Most student rates for membership are so low there is no reason for an interested student not to belong. Examples include Sigma Xi and Tri-Beta). Botany students have an opportunity to hold office in the local chapter of Tri-Beta or other organizations on campus.

(4) CAPSTONE EXPERIENCES

a. Senior Project/Thesis: To be written according to the guidelines in the “*Botany Senior Thesis*” section of the “*Botany Student Handbook*”. This shall include an annotated list or summary of pertinent papers, books, notes, diaries, letters, etc., read in conjunction with the project. Laboratory notebook(s), field notebook(s), with objectives, plans, procedures adopted, observations, measurements, graphs, tables, conclusions, etc. connected with the project should be included. Include title and abstract of oral presentation of senior project or thesis given at the senior seminar or formal presentation before your thesis advisory committee.

b. Other Field and Laboratory Research: As records of field and/or laboratory research as part of senior courses are kept, select ones should be used as evidence of research

skills gained. Botany majors should be competent observers and experimentalists, whether such research takes place in the field or in the laboratory. They should be able to design and execute experiments, systematically collect and analyze data, identify sources of error, and interpret the results and reach logical conclusions. They should also have a basic understanding of laboratory and field safety issues and demonstrate that such understanding has been achieved.

(5) CREATIVITY

This folder provides the student with an opportunity to demonstrate their creative talents and individuality using whatever medium the student selects. This could be related or unrelated to Botany. Considerable overlap with other folders could be expected. If the student feels that there is no possibility for meeting this requirement, at a minimum, the student shall write a paper wherein s/he demonstrates the ability to apply some mathematical skill or principle in solving a botanical problem. Any *Unique Skills* development should be included here such as special training or hobby development. Evidence of any workshop attended, including subject, date, location, presenter, and synopsis. Catalogs of collections of photographic slides or prints, microscope slides, herbarium specimens, etc. could be used. Include photographs of representative samples of such work since some projects are difficult to store in a folder, such as a display made for a museum cabinet, special laboratory apparatus, etc. A particularly well maintained laboratory and/or field notebook might qualify as well.

(6) AFFECTIVE DOMAIN DEVELOPMENT

Upon graduation, Botany majors should demonstrate significant value-added progress in developing the following **values**:

- (a) *Appreciation* of the *diversity* of cultures and intellectual points of view.
- (b) *Understanding* of *ethical issues* and responsibilities such as the environmental costs of excessive consumerism, impacts of technology upon society, etc.
- (c) *Commitment* to the development of cultural perspectives that do not disparage others solely on the basis of an individual's or group's ethnicity, gender, religion, sexual orientation, marital status, age or disability.
- (d) *Appreciation* that Botany follows the *Liberal Arts* tradition which is based upon the notion that, in a world of ideas, a person is not free or liberated from the bonds of ignorance if s/he makes decisions based upon closed-minded habits, prejudices, or unconscious emotions that preclude critical thinking. Additionally, graduates will need to demonstrate growth in their social obligation to communicate with the public on scientific and technical issues.
- (e) *Appreciation* of the *aesthetic* attributes of nature, whether their studies are primarily in the field where entire ecosystems or biomes are investigated or in the laboratory

where the microscope and biochemical techniques are used as tools for observing nature.

Evidence of growth in the development of the affective domain is likely to be the most difficult to gather. Creativity and considerable thought will need to be exercised to meet this criterion. Experiences gained from such things as travel, either domestic or foreign; working with minority or disadvantaged groups of people; courses taken which address ethics or aesthetics, particularly as it relates to you as a Botanist; etc. upon reflection could be written up and become supporting evidence of such growth.

(7) CAREER PLANNING

a. **EMPLOYMENT/GRADUATE SCHOOL ASSESSMENT:** Students shall provide evidence that they have researched the job market, have knowledge of careers for Botanists and professionals in allied plant sciences, or have researched graduate school programs and assessed their suitability for advanced degree studies relative to their own professional interests and strengths. This evidence may take various forms left to the discretion of the student.

b. **RÉSUMÉ:**

(i) **Work experience** - Any activity for which the student was paid, e.g. Botany LS1105 tutor, Supplemental Instructor, Forest Service summer employment, museum curating, etc. Maintain a list of dates, places, duties/assignments, etc.

(ii) **Volunteer service** - Science fair judging, Expanding Your Horizons conference, Science Olympiad, Botany Laboratory, Center for Environmental Services Conference, etc. are examples. This should not simply be a list of activities, but include details of when and where it was done, and what the student actually did.

(iii) **Extracurricular activities** - Botany Club plant sale, Botany Club officer, ECOS officer, etc. (Including achievements and duties - e.g. arranged for the following speakers, chaired the following sub-committees, etc.)

c. **CURRICULUM VITA:** A current, updated and neatly printed vita, essentially representing a selection of materials from each of the other folders would be expected of the student. This would assist greatly in future employment searches or graduate school placement.

(8) SCIENCE AS PROCESS

All students who are exposed to Botany courses (majors, minors, support, and General Education students) should **understand and appreciate**, in addition to the core knowledge of Plant Biology, the nature of science, how science is applied to everyday problems, and significant botanical achievements. Teaching majors and minors should become aware of teaching strategies that accommodate multiple learning styles of their prospective students. For

this folder of the portfolio a suggested means of providing evidence of understanding and appreciation of the nature of science as a process and a way of knowing, along with applications to everyday problems might be to prepare an *outline of a lecture*, designed for a varied audience in terms of science background that would deal with these topics. The outline would address: What is science? How is scientific inquiry carried out? How do we apply scientific methodology to solving everyday problems? What significant botanical achievements were made using these techniques? Those students who are contemplating teaching biology should, in addition, address current teaching strategies, through lesson plans, that not only deliver life science to students but demonstrates some understanding and sensitivity to the need for multiple learning styles of these prospective students.