

Botany Student Portfolio
Department of Botany
Weber State University
Ogden, Utah 84408-2504
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What is a Student Portfolio?

A portfolio is a multidimensional collection of artifacts selected by both the student and the faculty. 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 as they select items and engage in self-assessment. Portfolios are used for assessment purposes in addition to serving as an incentive to the student to develop 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. Some materials will be used in more than one folder; such materials should be cross referenced rather than duplicated.

(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 (http://my.aspb.org/?page=EF_Principles). 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 which include sporic meiosis with its 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 their role in the oxygenation of the atmosphere and its consequences.
- (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. Knowledge and Comprehension Essay
In a well-organized 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. Evidence of advising.
- d. Copy of the most recent transcript. (An unofficial transcript from the eWeber portal is acceptable.)
- e. Optional: Results of GRE or similar exams.

(2) Skills Development

Upon graduation, Botany majors should have mastered a set of fundamental **skills** which are useful to function effectively as professionals and to continue 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 must demonstrate competence in communication, both written and oral.
 - (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 (see Science as a Way of Knowing folder).

(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, and evaluation.

b. Computer Skills- Botany graduates should be competent users of programs including, but not limited to, wordprocessing, spreadsheet, and presentation programs. Evidence may include any courses taken or training (certificate) received and a list of programs that the student can use. Cross reference to artifacts in other folders, such as Communication Skills, Research Skills, Information Seeking Skills, and Capstone Experiences.

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. They should also have a basic understanding of laboratory and field safety issues and demonstrate that such understanding has been achieved.

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 will be presented in 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 demonstrate 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. Other experiences include extracurricular service projects or courses designated CEL (Community Engaged Learning).

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 articles, university press releases, or university publicity items featuring the student
- c. Anything by the student that was published - newspaper article, book review, research paper (*Ergo*, etc.), *Metaphor*, etc.
- d. Presentation at a conference. We encourage students to participate at conferences like the WSU Undergraduate Research Symposium; the National Undergraduate Research Conference (NCUR); UCUR; the National Honors Conference; Utah Academy of Arts, Letters, and Sciences; Western Regional Honors Conference; West Coast Biological Sciences Undergraduate Research Conference; etc.
- f. Membership in professional societies such as the Botanical Society of America. (Most student rates for membership are so low there is no reason for an interested student not to belong.)

(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*. The artifacts shall include:

- a. an annotated list or summary of pertinent papers, books, notes, diaries, letters, etc., read in conjunction with the project
- b. laboratory notebook(s) &/or field notebook(s), with objectives, plans, procedures adopted, observations, measurements, graphs, tables, conclusions, etc. connected with the project
- c. title, abstract, and PowerPoint handout of oral presentation of senior project or thesis

b. Other Field and Laboratory Research: Records of field and/or laboratory research as part of upper division courses 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.

(5) Creativity

This folder provides the student with an opportunity to demonstrate his or her 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 he or she 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 photographs, 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.

(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; university-designated diversity courses; other 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 (or should have been paid), e.g. Botany tutor, Supplemental Instructor, Forest Service summer employment, internships, etc. Maintain a list of dates, places, duties/assignments, etc.

(ii) **Volunteer service** - Science fair judging, Expanding Your Horizons, Science Olympiad, Science Saturdays, 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, officer in the Botany Club or other university clubs, service on university committees, 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 a Way of Knowing (Science as a 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. For this folder of the portfolio, you will provide evidence of your understanding and appreciation of the nature of science as a way of knowing by preparing an **outline of a lecture** (with references) designed for a varied audience in terms of science background. The lecture would address: What is and is not science? How is scientific inquiry carried out, both observational and experimental studies? What significant botanical achievements were made using these techniques? How is evidence from basic scientific inquiry used in an applied context or in making community or public policy decisions?