

# Chapter 18

## Linking Student Skill Building with Public Outreach and Education

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### 18.1 Introduction

As educators, we serve the common goal of not only teaching students the core curriculum, but also helping them to develop research and writing skills. Moreover, we aim to cultivate critical thinkers who will one day leave the university as responsible public citizens. Through educating, exciting, and inspiring our students, botany instructors can not only influence the state of plant knowledge in the classroom, but also reach out to improve public awareness concerning various issues of import to the botanical and environmental sciences at large. The aim of this chapter is to explore how botany instructors can bridge the gap from the classroom to the public through teaching students core skills in scientific writing and empowering them to communicate this knowledge to a broad audience.

#### *18.1.1 Fostering an Environment for Critical Thinking*

While traditional, standardized assessment methods continue to serve in the important role of measuring student acquisition and basic comprehension of course content, these methods do not account for higher-order thinking and integration of knowledge. On the other hand, authentic assessment techniques, which involve the use of authentic tasks and rubrics, can be very useful in measuring the application of knowledge. This process involves problem solving and critical thinking by the students, and the emphasis here is on the student's ability to demonstrate both the application and use of knowledge (Montgomery 2002).

The importance of authentic assessment is highlighted in the American Association for Advancement of Science (AAAS) and the US National Science Foundation

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(NSF) *Vision & Change (V&C) in Undergraduate Biology Education* document (Brewer and Smith 2011). Specifically, the concept of student engagement in the learning process, with students as active participants rather than passive recipients, is key here. The V&C document also challenges instructors to train students in how to “understand the processes and interdisciplinary nature of science” and to “appreciate the role of science in society and be able to communicate effectively about science with diverse audiences” (Brewer and Smith 2011). The Medicinal Plant Monograph (MPM) project (described below) aims to address these two challenges in the undergraduate classroom.

## 18.2 Medicinal Plant Monograph Paper Assignment

The MPM project is something that I began in 2010 when I designed and taught an online Medical Botany course for the University of Arkansas at Little Rock Department of Biology. I later expanded upon the project in 2011, when I joined Emory University’s Center for the Study of Human Health and began teaching Botanical Medicine and Health in a traditional classroom setting. Thus, this project has been “field tested” in two very different classroom environments—both an online/web-based course and a traditional lecture-based course. In this chapter, I will focus primarily on the implementation of this exercise in a traditional classroom setting, though all pieces are easily adaptable for use in an online course model. In particular, the use of technology such as Blackboard, Camtasia, and YouTube makes this project particularly well adapted for both classroom models.

### 18.2.1 *Providing Structure to the Assignment*

The MPM project is broken down into multiple smaller assignments with deadlines distributed throughout the semester in order to make the large amount of work required for a good final product more manageable for students (Table 18.1). Division of the project into smaller tranches has a number of advantages both for the instructor and students:

- Students are less intimidated by the expectations of the project when it is broken down into smaller parts.
- The instructor can provide students with feedback at the different steps, improving the overall quality of the final product and increasing the students’ chances of success in receiving a high grade.
- The instructor can work skill-building exercises into the lecture schedule as the various small assignment deadlines approach, helping students to acquire or improve upon important skills (e.g., how to find scientific resources, how to manage and cite references, how to conduct a peer review, how to give a good oral presentation, etc.).

**Table 18.1** The plant monograph project is broken down into a series of smaller assignments in order to help students manage the work load and be successful in meeting the learning objectives for the course. This table provides an example of due dates for the assignments during the spring semester, based on a semester start date of January 16 and end date of April 29

Due date	Assignment title	Details
January 25	Choice of plant	Students must post their choice of plant species onto a Blackboard discussion board, selected from a list of acceptable species provided by the instructor. The selection is first come, first served
February 6	Reference list	Students must go to <a href="http://www.ncbi.nlm.nih.gov/pubmed">http://www.ncbi.nlm.nih.gov/pubmed</a> to search for 15 references to use when drafting their final paper. Class time (~20 min) is also dedicated to teaching students how to search for and access scientific articles and books using the university library resources
March 4	1st draft	The first, well-written draft of the plant monograph is turned in and redistributed at random to classmates for peer review. Each paper is reviewed by two peers. Class time (~15 min) is dedicated to discussion of peer-review guidelines
March 27	Peer-review reports	Each student must turn in detailed peer-review reports on the papers of two classmates. While the draft itself is not graded by the instructor, the quality of the peer review report is. The reviews are then returned to the authors for use when revising the paper for final submission
April 12	Final paper	The final paper is turned in using the SafeAssign function in Blackboard, which checks for plagiarism
April 17	Slide deck	The PowerPoint slide deck is turned in. The instructor combines all of the submissions into a single PDF, and posts this onto Blackboard for students to use as a study tool and for note taking during the presentation week
April 19–26	Presentations	Students sign up for a time slot (or choice of using Camtasia Studio) for their oral presentations. The free online scheduling site Doodle ( <a href="http://www.doodle.com/">http://www.doodle.com/</a> ) is useful for this purpose. Depending on the size of the class, four–five class days are reserved for student presentations (10 min each)

As with any other assignment, the key to facilitating student success entails the provision of details concerning the parameters in which they can succeed. Thus, at the beginning of the semester, students are provided not only with detailed instructions concerning both the format and content of their research paper (Appendix 18.1), but they are also provided with the rubrics (Tables 18.2 and 18.3) with which their work will be graded. Moreover, we also spend time in class reviewing these instructions and covering the skill-building exercises mentioned above. The use of scoring rubrics in performance assessment has many benefits, including “increased consistency of scoring, the possibility to facilitate valid judgment of complex competencies, and promotion of learning” (Jonsson and Svingby 2007). As an added benefit, the use of structured rubrics leaves little room for argument concerning grade assignments, and in my own experience, students tend to feel more secure knowing that there are no surprise elements to the instructor’s assessment of their work.

**Table 18.2** Grading rubric for medicinal plant monograph final paper

Grading criteria	Possible points
Quality of grammar and written English	6
Structure of paper (sections and subsections) follows the formatting instructions	4
Appropriate use of tables	5
Appropriate use of figures (pictures and graphs)	5
Proper formatting of references (APA 6th from Endnote)	4
Citations are appropriately included for information presented throughout the text	8
References come from a variety of sources and the author does not rely too heavily on only a few sources. No websites (other than the USDA database, TROPICOS, Moerman's Native American Ethnobotany database, and Duke's Ethnobotanical Database or the sources of pictures included in the text) are used	10
Quality of the content of individual sections:	
Introduction	12
Botanical description	12
Traditional uses	12
Chemistry and pharmacology	12
Biological activity	12
Clinical studies	12
Contraindications	12
Current uses in allopathic and CAM therapies	12
Discussion	12
<i>Total points</i>	<i>150</i>

**Table 18.3** Grading rubric for medicinal plant monograph presentation

Grading criteria	Possible points
Presentation follows the required content format and order (addressing the ten slide sections outlined in the instructions)	4
Slides are well organized; use bullet pointed text rather than long sentences	4
Appropriate images are included (i.e., botanical drawings, people using the plant, photographs of the plant and its parts, plant products (commercial or traditional), distribution maps, etc.)	4
Thorough coverage of information in the following key content sections:	
Botanical description	4
Traditional uses	4
Chemistry and pharmacology	4
Biological activity	4
Clinical studies	4
Contraindications	4
Current uses	4
Presenter makes good eye contact with the audience, speaks clearly, shows enthusiasm during presentation, and does not rely heavily on reading notes	5
The central points as to why this plant is important as a medicinal species are clearly conveyed in the overview and reiterated in the conclusion	3
References are used appropriately in the presentation—listing the abbreviated reference or website (for photos) on the relevant slides	2
<i>Total Points</i>	<i>50</i>

## **18.2.2 *First Steps to the Assignment***

### **18.2.2.1 The Plant List**

At the beginning of the semester, students are provided with a list of medicinal plants to choose from. This spreadsheet includes both the scientific and common names of plants. They are required to post their choice of topic on a first-come, first-served basis using an online discussion board in the Blackboard online platform. Each year, the list is updated so that students do not write their papers on the same plants. This is of particular importance with regards to creation of the e-book (discussed in Sect. 18.2.5). Some basic rules of writing are also covered at this point. Specifically, we review how to format scientific names in class (including rules concerning italicization, capitalization of the genus, use of author epithets, etc.).

### **18.2.2.2 The Reference List**

Following selection of their plant, classroom time (~30 min) is dedicated to teaching the students how to search for appropriate scientific peer-reviewed articles to include in their review paper. Typically, this is accomplished by using the classroom computer and projector to walk the students through a search for resources on some of the different plants that they are working on. Students are provided with a list of websites to use in this search (i.e., pubmed.gov, sciencedirect.com, JSTOR.org, and other in-house library databases). This can also be a good occasion to invite a university librarian or resource specialist to come talk to the class about the literature research resources available to them. Following this exercise, students are tasked with finding at least 15 references to address the various sections of the structured paper. Instructor feedback on this assignment is focused on identifying any gaps in information and suggesting other keywords or databases for students to use in their search. For example, I have found that while students can often find a lot of information on the phytochemistry of a plant, they may have more difficulty in finding resources for basic botanical descriptions of the species or information concerning traditional uses by different cultures.

At this stage in class, we cover how to properly cite a reference resource for both in-text citations and the References Cited section at the end of the document. We also discuss technology options that can facilitate this process. For example, Emory University students can download the reference citation software Endnote (Thomson-Reuters) for free with the university license or use it in the university computer labs. Many students opt to use this or other software options to assist in the streamlined incorporation of references in their papers.

### 18.2.2.3 The First Draft

Around midsemester, the first draft of the paper is due. While the actual content of the paper is not graded by the instructor at this point, students are expected to have a near-final version of the paper ready. The draft submission is accomplished electronically using the SafeAssign function in Blackboard with the aim of identifying any areas of the paper where the student may have unintentionally (or intentionally) plagiarized (see Sect. 18.2.4 for more on use of this technology resource). This gives them the opportunity to correct any potential issues prior to turning in the final version of the paper. Following submission of the draft, each document is then redistributed at random to two classmates for peer review.

One complication in this process that I regularly face is that at least one person will fail to turn in their draft by the deadline. As waiting for them to turn in a late draft puts unfair time constraints on whoever is assigned the paper for review, I have found that the best solution is to stick to a strict policy of no late submissions being accepted. Thus, for those students that do not turn in their drafts on time, they do not receive peer feedback. Unfortunately, this does put them at a disadvantage in comparison to the students receiving feedback before revising the final paper. To account for the disproportionate number of papers submitted and students required to review papers, other randomly selected student papers will then be reviewed by three peers instead of two.

### 18.2.3 Peer Review

In addition to being responsible for writing their own review paper, students are also required to complete a peer-review report on two of their classmates' papers. This activity not only benefits the students receiving the review of their work, but also benefits the reviewer. In fact, a number of studies have shown that the peer-review process stimulates both learning and critical thinking (Herrington and Gadman 1991; Liu et al. 2002). Moreover, engagement in a reciprocal review process also boosts recognition of how to improve students' own papers (Palmer and Major 2008). General outcomes of this process that I have observed in the classroom include improvement of the quality and integrity of the final papers, expansion of discussion concerning the science under review, increased knowledge concerning the paper topics by both the paper authors and reviewers, and increased confidence concerning writing skills among students.

Successful implementation of the peer-review process is dependent on the use of clear instructions (Appendix 18.2) and grading rubrics (Table 18.2) for the students to follow. Provision of a structured outline in how to conduct the review helps to teach students how to critique key elements of the manuscript and can serve as a guide for the systematic critical analysis of the work (Palmer and Major 2008). The peer-review criteria used in this exercise are modeled after standard scientific journal reviewer instructions, including the categorization of suggested changes by

major, minor, and discretionary revisions. In addition to writing a comments sections in this style, students are also required to use the “track changes” function in Microsoft Word to correct any minor grammatical or spelling errors and “insert comments” to make note of suggested changes to specific sections of the paper. The assignment expectations are that students should go beyond simple copyediting, and rather do research of their own (by reviewing the scientific literature) to provide feedback on the scientific content of the review paper. While students are certainly not expected to write sections of the peer’s paper, they are expected to find any major deficiencies in scientific content and provide constructive feedback on this aspect, which might include indications of articles that the peer should read and include in the manuscript citations. With regards to the grading structure for this exercise, the instructor does not grade the draft submissions, but rather the quality and thoroughness of the peer reviews completed by each student. Thus, students also benefit from instructor feedback on their critical analysis process.

### **18.2.4 Controlling for Plagiarism**

Unfortunately, plagiarism continues to be an issue for instructors that include writing assignments in their grading scheme. In some cases, this is done intentionally; there are even websites dedicated to selling “recycled” college papers on common topics to students, whereas other sites advertise unethical services to write essays for a fee (see, e.g., <http://www.unemployedprofessors.com/>). However, in my experience, most cases have been much less nefarious and more often due to students’ lack of understanding concerning the definition of plagiarism. For example, some students will copy a sentence or two from one source, and combine that with something from another source, with the mistaken belief that this is an acceptable means of pulling together “research” for their written assignment. The first step that an instructor should take to prevent this from happening is to dedicate class time to demonstrating to students how to perform a literature search (providing a list of relevant databases and campus library resources to search) with a focus on primary literature sources, reviewing proper citation techniques, and emphasizing the need to write “in their own words” (see Sect. 18.2.2.2).

#### **18.2.4.1 Technological Resources**

With the transition that many universities have taken to using Blackboard for online course management (<http://www.blackboard.com/>), many professors now also have access to “SafeAssign” tools (including *Safe Assignment* and *Direct Submit*) available on the Blackboard platform. These tools streamline the process of checking paper submissions for plagiarism by automatically comparing the submitted paper with an extensive database of published literature, websites, and other previously submitted student papers (from all universities that use this platform). This screen-

ing process, in particular, is very useful in identifying paper submissions that have been submitted by a prior student (even if at a different university!). The advantage of this software is that the report provides web links to the original matching content, which allows the instructor to easily investigate whether or not the student copied material from the source. Most submissions may have a hit rate of anywhere from 0 to 20%. I have found that the References Cited sections of papers tend to artificially elevate the percentage. In most cases, papers with phrase-matching scores of 20% or less do not indicate plagiarism. As a general rule, I take a closer look at any paper with a score over 20%.

With regards to other manners of unethical behavior, unfortunately there are no technological resources (that I know of) that can detect whether or not the student bought a new paper from an online service or peer. In this case, the instructor's knowledge of the individual student's writing style and capabilities is still the best resource.

### ***18.2.5 Creating an E-book for Public Outreach and Education***

The MPM e-book serves many important purposes in this project. Most relevant to the students at the beginning of the semester, it provides them with examples of successful papers from past semesters and establishes the bar for the quality of the final product that is expected. As we progress through the semester, the meaning of the e-book changes for students as it becomes a point of personal pride for them as evidence of their hard work. Although this is an individual assignment, the fact that they are all contributing to a single end-product gives them a sense of teamwork. Moreover, upon completion of the new edition each semester that the course is taught, many students proudly share the MPM e-book with their family and friends through personal correspondence and social media.

The e-book is publically available year-round online as a PDF document. Although I currently host the file on my personal research website (<http://etnobotanica.us/teaching/teaching-materials-and-resources/medicinal-plant-monograph-project>), I have also used free online resources such as Google Docs (<https://drive.google.com/>) to host the file in prior years. The links to the book are updated each semester that the course is taught. In addition to being useful as a static document if printed, the PDF has built-in hyperlinks in the Table of Contents and Index to take the reader directly to the plant profile of interest (listed both under scientific and common names) if viewed on a computer or tablet.

## **18.3 Student Presentations**

The presentation assignment is really just an extension of their final paper. Students do not have to conduct additional research; instead, they are simply presenting the information in a different way. The focus here is on their ability to communicate an



interdisciplinary body of knowledge to a broad audience. By the end of the semester, most students are so well acquainted with the details concerning their chosen medicinal plant that the presentation is something that they look forward to as a chance to share their enthusiasm and knowledge with their peers. Moreover, peers are encouraged to engage the presenters both after the talk in a Q&A format and in follow-up discussion boards hosted on Blackboard. The slide decks for each presentation are also posted on Blackboard for students to use them as study tools as they are tested on this material in the final exam.

### ***18.3.1 Providing Structure to the Presentation Assignment***

As with the research paper assignment, students are provided with detailed instructions concerning both the format and content of their PowerPoint slide deck (Appendix 18.3) and the rubric (Table 18.3) with which their work will be graded. Moreover, we also spend time in class reviewing these instructions and discussing the “do’s and don’ts” of public speaking. Students are encouraged to practice their presentations with peers or friends and even to videotape themselves and watch their performance to improve upon their technique before the presentation day in class.

### ***18.3.2 YouTube as a Public Outreach Tool***

YouTube was founded in 2005, and since its introduction has become one of the biggest hosts for online video content and the third most popular site after Google and Facebook (Tan and Pearce 2012). One of the great advantages to using YouTube in the classroom is that both the creation of YouTube accounts and access to video content are free. Moreover, content can be easily shared via social media and even incorporated into learning modules of web-based educational platforms like Blackboard. Another benefit of integrating YouTube in the classroom is the improvement of student engagement in course material (Roodt 2013).

#### **18.3.2.1 Ethnobotany and the Internet**

One of the most frustrating things to encounter as an educator specializing in ethnobotany is the abundance of misinformation concerning this science on the Internet. Today’s students rely on the web as an educational tool, and when conducting searches on keywords like “ethnobotany” or “medicinal plants,” more often than not, links to videos and blogs on psychoactive drugs or advertisements for herbal supplements and “miracle cures” fill the top of the search engine list. It occurred to me that while we may not be able to remove such misleading information from the Internet, perhaps we could “drown it out” by loading more scientific information

concerning medicinal plants and ethnobotany in general onto the web. Thus, the TeachEthnobotany YouTube channel (<http://www.youtube.com/user/TeachEthnobotany>) was created to fill this void in the scientific basis of ethnobotany on the web and to serve as an educational portal for both students and the general public alike.

Since its inception, I have used this platform to post videos of the student MPM PowerPoint presentations that were taped in class or through the use of the screen recording software Camtasia Studio (TechSmith, <http://www.techsmith.com/camtasia.html>). The use of Camstasia Studio solved two major problems encountered in this process: (1) Some students do not feel comfortable presenting in front of a classroom and/or do not want to be filmed and have their image on the Internet (Camtasia Studio records only their voice over the slides in video format); and (2) there is not enough class time for all students to present in class (I generally reserve four class days for presentations and the rest are submitted as Camstasia Studio recordings). This software was available to the students for free in the computer lab stations at the university, and they also had the option of downloading it to their personal computers for use during its free trial period. This software also allowed for the inclusion of presentations by students enrolled in my web-based course on medical botany, which does not have a traditional classroom setting to accommodate student presentations.

In addition to posting videos of student presentations in the “Medicinal Plant Monograph” playlist on the TeachEthnobotany YouTube channel, I have also created playlists where other educational videos are posted. For example, there is a playlist for:

- Guest speakers who come to present in class and agree to be filmed
- My own lectures created with Camstasia Studio (useful for providing students with a lecture on days that I am away from the university and have to cancel an in-class meeting)
- A selection of favorite videos found on YouTube that meet the scientific and educational prerequisites of the channel
- Interviews with prominent ethnobiologists, recorded at scientific congresses
- Scientific presentations recorded at relevant congresses with the speakers’ permission (e.g., Society for Economic Botany and Society of Ethnobiology)
- Other student video projects from my classes taught on the topics of food and health

An important element of managing the channel has been in monitoring comments posted by the video audience. In order to protect the integrity of the channel, all comments must be approved by the moderator (Quave) before being posted on the site. This is to ensure that feedback is constructive and positive, so as not to discourage the students, and to prevent comments that would be highly inappropriate (sexually explicit, profane, or other spam content) from being associated with this educational resource.

These videos have been incredibly useful as supplementary material for my classes. Many of them go to this resource to view short videos on specific medicinal plants that have captured their interest in their reading assignments or lecture. They also use this resource to better understand how to formulate and successfully present their own reports at the end of the semester.

Regarding public use of this educational resource, the number of visitors and subscribers increases on a regular basis. In 2013, just 2 years after its initial launch in July 2011, the channel had 290 subscribers and the collection of videos had been viewed more than 45,000 times by both visitors and subscribers to the channel. Many of the individual student MPM presentations have been viewed several hundred times and a few have even been viewed several thousand times! Knowing that their contribution to the site will influence public understanding of this field has reinforced student dedication and preparation for this project.

### ***18.3.3 Using Social Media***

Social media can be an incredibly powerful tool when used strategically to support educational outreach initiatives. People around the world tune in to hugely popular social media platforms like Facebook on a daily basis. Students, likewise, use various social media platforms to stay connected with friends and family. Most relevant to this class, I have found that students who regularly use these platforms are also frequently eager to share their academic accomplishments, and the MPM e-book and YouTube videos provide a simple way for them to do so. The added bonus here is that a wider audience is exposed to lessons in botany with every student that shares their work. Students and the instructor can appreciate that the proverbial “fruits of their labor” can actually have a direct impact on public awareness concerning the plant sciences.

## **18.4 Conclusions**

The MPM project can serve as a robust example of how instructors can utilize technology to (1) improve student competencies in core curriculum material, (2) build a broader skill set in scientific research, writing, and communication, and (3) impact public awareness of botany. The lessons learned here have revealed the importance of using a highly structured model to ensuring student success. The public outreach incentives involved in this process also serve as motivators for students to put their best effort into the project.

### ***18.4.1 Challenges Associated with Project Implementation***

Many of the challenges encountered, especially in the initial stages of designing this project, were due to erroneous assumptions made on my part with regards to the students’ existing degree of competency in the various skills required for successful completion of this assignment. In fact, for many of the students that I have taught so far, this was the first time that they were required to write a thorough scientific review paper. They needed to be taught how to search for appropriate peer-reviewed

scientific literature resources, properly use and cite the resources, give structure to their papers, and present their findings to an audience. However, I quickly found that by breaking down the assignment into many small parts, as discussed in Sect. 18.3, much of the risk for failure on the part of individual students was mitigated and the overall quality of the final papers and presentations was vastly improved.

Students that stay on task with the schedule in this course typically do very well. However, for those who are in the habit of last-minute preparation of assignments or who typically remain disengaged from this and other courses and try to get by through cramming for exams alone do not do well with this model. Unfortunately, I have not found a way to better engage this type of student. However, most students tend to fall in the former category and thrive in this highly structured environment where the expectations and pathway to success are clearly demarcated.

### ***18.4.2 Achievements and Final Remarks***

While the implementation of the MPM project does take a considerable amount of effort on the part of both the instructor and students, the end result is something that goes beyond the classroom and that, over time, can impact public awareness concerning topics in botany and the plant sciences at large. Project achievements can be gauged in terms of student performance and public reach. While we do not have any scientific data on how this project has influenced public awareness of the science of medicinal plants, the growing number of subscribers to the YouTube TeachEthnobotany channel and actual number of video views is very promising. A common theme in student evaluations of the course has also been an appreciation of the acquisition of these skills in writing and communicating about interdisciplinary science. As we look to the future of education in the plant sciences, the number and diversity of technologies and educational platforms will surely grow. I believe that creative use of technology in teaching can be highly beneficial to all parties involved, and can contribute to the implementation of new, innovative strategies for teaching and learning in the classroom and beyond.

## **18.5 Appendix 18.1**

Students are provided with the following detailed instructions on how to structure their final paper.

### ***18.5.1 Format of Your Paper***

*Please follow these instructions very carefully. At the end of this project, the class should be able to produce a set of medicinal plant monographs that adhere to the same formatting and setup.*

### 18.5.1.1 Technical Formatting Guidelines

- Use 11 point Arial font. The entire document should be single spaced and in single column (Dr. Quave will format all final papers to double columns in the final document). The outer margins should be 1".
- All tables and figures should be placed at the end of the document after the References Cited section. Refer to the tables and/or figures in numerical order throughout the text. For example, Table 1, Table 2...etc.
- Include a description of all tables and legends with the figure or table at the end of the document.
- The monograph should be 3,500–5,000 words in length (not including references). Submission of papers that do not meet the minimum word requirement will result in the deduction of points.
- Download Endnote (free from Emory Software Express) using the link provided in the Monograph folder. Use the APA 6th format style.
- Resources for help with writing are available at the Emory Writing center: <http://writingcenter.emory.edu/index.html>
- Regarding the scientific name of the plant: Write out the full genus and species name at the beginning of each subsection, and then use the abbreviated genus for the remainder of each subsection. See the current *Medicinal Plant Monograph* e-book for examples.

### 18.5.2 Headings and Sections for the Paper

Your monograph will be divided into several predetermined sections that must be adhered to. Each section heading will be on a line of its own and highlighted in bold. Subheadings (if any are needed) will be highlighted in bold and italicized.

#### **Genus Species Author Epithet, Family**

Your Name

**Introduction** In this section, you should give an introduction to the plant by listing its scientific name and family, common names, and a brief overview of how it is used, what are its main constituents, etc. This should serve as a brief introductory summary about the plant, and the following sections will be used to describe the detailed information.

**Botanical Description** In this section, you should describe the morphological characteristics of the plant. For example, describe its habit (tree, shrub, herb, etc.), its habitat (marshy areas, arid plains, etc.), its flower and fruit characteristics (color, smell, shape...be detailed in giving a thorough botanical description). What are its relationships with other species? For example, is the pollinator known? You should include a picture of the plant as a figure. Make note of the figure here and place the actual figure (picture) at the end of the document. Remember to cite the source of the figure in the figure legend.

**Traditional Uses** In addition to writing about ethnomedical uses of the species, there may be some other documented ethnobotanical uses (food, decorative, construction, clothing, etc.). You should mention this here and you may wish to create a subheading for this to separate it from the section on traditional medicinal applications. When discussing traditional medical uses—please specify which culture(s) use this. Do they use it in the same way, or different? How so? How is the remedy prepared traditionally? Is it boiled, or steeped in alcohol? Is it drunk or rubbed on the body? Is the use of this plant documented in ancient texts? Usually, this kind of information can be found in current scientific articles. Has the use changed over time? Is the traditional use relevant to the modern CAM applications?

**Chemistry and Pharmacology** What are the main known chemical constituents of this plant? If available, also describe the percent in which they occur. You should present this in a table format. You should include images of the chemical structures as a figure at the end of the document.

**Biological Activity** In this section, you should discuss any *in vitro* and *in vivo* (animal) laboratory studies conducted on extracts or fractions or purified compounds from this species. Is a mechanism of action for the drug's activity known? If not, is there a basic understanding of how it may work? Are there any issues with the development of drug resistance?

**Clinical Studies** Have any clinical studies been conducted? Specifically, what studies have included tests on human subjects? If so, what were the findings and recommendations?

**Contraindications** Are there any dangers associated with the use of medicines from this plant? Toxicities? What are they? Have any interactions with other drugs been documented? For example, some drugs interact with grapefruit juice.

**Current Use in Allopathic and CAM Therapies** Are there any drugs currently on the market that were derived from this plant? This can include over-the-counter or prescription drugs. Were any drugs created by modifying the original plant compound's structure? Are there any herbal supplements on the market based on this plant? How are they sold? What are they marketed as? Is there a recommended dosage for either the prescription form of single compounds or herbal supplement mixtures?

**Discussion** Summarize your findings. How does this all piece together? Explain why this particular plant has been important to human health and what role do you think it will play in the future of human health.

**References Cited** Use the APA 6th style for reference citations (selected from drop-down box in Endnote). Do not cite websites (other than the USDA database, TROPICOS, Moerman's Native American Ethnobotany database, and Duke's Ethnobotanical Database or the sources of pictures included in the text) in your paper. Do not cite any of Dr. Quave's lectures. Your paper is to be a thorough review of the scientific literature concerning your plant and should include peer-reviewed journal articles and scientific texts/books.

**Tables** Give your table a description and title. Tables will be placed at the end of the manuscript. Do not embed them in the main text. Do not cut and paste an image

of a table from another source. Create your own table using the information and cite the source(s) appropriately in the table description.

**Figures** Give your figure a description and title. Figures will be placed at the end of the manuscript. Do not embed them in the main text. Cite the source of the figure in the figure legend. For example: (Source: website address).

## 18.6 Appendix 18.2

Students are provided with the following detailed guidance on how to conduct peer reviews of student plant monograph papers.

### *18.6.1 Introduction to Peer Review*

Learning how to give a thorough peer review is almost as important as learning how to write a paper yourself. In making a critical assessment of someone else's work, you will often find that the experience helps you to view your own writing in a different way and helps to improve your scientific writing skills. For this exercise, I will randomly select two papers from two of your classmates and email them to you for your review. You have two main tasks when reviewing these papers:

1. Create a peer-review report with comments and constructive criticisms with the goal of helping your classmate improve the manuscript.
2. Make changes to the manuscripts using the "track changes" option under the Tools menu in Word. You should also enter comments into the document by using the "add comment" function. Your classmate can then view the changes and choose whether or not to keep them.

Your peer review of these two papers is worth 50 points (~6% of your final grade), and you will need to take the time to give each paper a thorough review, specifically with regards to the scientific content. This is not just an exercise in copyediting. Take the time to do some literature searches (using <http://www.PubMed.gov>) of your own to check the validity of the information presented in the monograph. Focus on identifying any gaps in information that should be included. If you feel that the author should incorporate findings from specific studies into their paper, provide them with the name of the paper in your review comments.

### *18.6.2 Your Peer-Review Report Should Follow the Following Format*

1. **Major compulsory revisions** (which the author must respond to before turning in the final version)

2. **Minor essential revisions** (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
3. **Discretionary revisions** (which are recommendations for improvement but which the author can choose to ignore)

*When assessing the work, please consider the following points:*

1. Is the grammar and quality of written English acceptable? Please make suggested changes using the track changes function in Word.
2. Does the author adequately address all of the required sections (i.e., introduction, traditional uses, clinical studies, etc.)?
3. Does the author's review seem to be accurate? You will need to do some brief literature searches of your own to verify this.
4. Are figures and tables used appropriately in the paper? Are figure legends included?
5. Is the information reported properly referenced? Please make note of any statements that need to have references added.
6. Is the length of the manuscript appropriate? Are the sections well balanced? Is the content clear and understandable?

Overall, please make detailed suggestions in a constructive manner to help the author improve the manuscript. *Use an encouraging tone in your review.* The goal of this exercise is to help your classmates improve their monographs—*not to discourage or insult them.* At the end of the semester, an electronic book of all of your papers will be made and distributed to all of the authors. This is your opportunity to help improve the overall quality of the e-book. You should also use the criteria in Dr. Quave's final paper grading rubric as a guide when writing your critiques.

## **18.7 Appendix 18.3**

Students are provided with the following detailed guidance on how to structure their class presentations.

### ***18.7.1 Medicinal Plant Monograph Presentation Instructions***

All students will give a class presentation on their plant monograph, worth 50 points (~6%) of the final grade. Each presentation and Q&A session must fit within a 10 min time slot. Each presentation will be either videotaped or recorded using Camstasia Studio software for posting on the TeachEthnobotany YouTube channel. This is your chance to shine and educate others on all of the interesting things that you have learned about your chosen plant! Information from the student presentations will also be included in the Final Exam. PDFs of all slide decks will also be posted in the Monograph folder as a study reference.



### **18.7.2 General Guidelines**

- PowerPoint slides must be submitted via the submission link by the deadline posted in Blackboard.
- Use solid colors for the background. Typically a plain white background with dark colored text (black is best) for visibility. Keep the slides crisp and organized. Do not add a lot of special effects as this can make it look cluttered. Do not use special transition effects (such as text that flies in/out) as this is distracting to the viewer.
- Do not include long sentences on your slide; summarize your information with bullet points and verbally expand on the key information.
- You may bring notes up to the podium, but please do not just read from them—use them as a guide instead.
- Dress professionally on the day of your presentation.
- Include source information and references (especially for photos of your plant found online) in smaller print at the bottom of the relevant slide.
- Use the information already compiled in your full plant monograph when creating your slide deck. You should not have to do any extra research when creating this. It is just another way to present the information.
- Practice, practice, practice! Practice giving your presentation to your friends or classmates. Another very helpful way to improve your presentation delivery is to videotape yourself, and then watch how you perform. Pay attention to the amount of time that you spend on each slide, your body movements, and the fluency of your speech. Never turn your back to the audience to look at the screen. You may wish to watch some presentation training videos on YouTube to get some additional tips. Lastly, do not be nervous about this. Remember that you are presenting to a room of friends and you are going to talk about something that you know a lot about.
- Try to limit the number of slides to no more than 12, and then spend the time on each slide to verbally expand upon and describe the main points in your bullet list.

### **18.7.3 Number and Type of Slides**

Note: this will follow the flow of the sections in your monograph. The goal here is to summarize the monograph info for the class. Use the subheading titles from your monograph as the slide title (in bold here):

1. **Introduction** slide with your plant's full scientific name (including author epithet and family), common English name, and your name. You may also include a picture of the plant or a relevant product here. In this first slide, you should introduce yourself (your name, major, your anticipated graduation year, etc.).
2. **Overview** What is so special about your plant? Tell us what you will be presenting—in other words, set the stage...

3. **Botanical Description** Go over the main botanical characteristics of the plant (pictures are a great addition here). Distribution maps for the growth habitat would also be appropriate.
4. **Traditional Uses** You may need more than one slide to go over this section. This is often one of the most interesting sections. Use it to lead into the chemistry and bioactivity slides.
5. **Chemistry and Pharmacology** This is a great area to showcase the chemical structures of those compounds associated with its activity.
6. **Biological Activity** Review what we know from *in vitro* and *in vivo* (animal) studies. You may include graphs (with appropriate paper citation) if available. This section may require two slides.
7. **Clinical Studies** Review main points of what we know from clinical trials.
8. **Contraindications** Address any dangers associated with the plant.
9. **Current Use in Allopathic and CAM Therapies** How is it used today (outside of traditional practice)? Is it sold in herbal products or supplements? Are chemicals isolated from it included in modern pharmaceutical drugs? Pictures of products would be a nice addition here.
10. **Conclusions** This is the discussion section from the monograph paper. Wrap it all up, tying together what you introduced in the overview. What are the take-home points on this medicinal plant?
11. **References** Include a list of the scientific references cited in the presentation. Citations for figures (usually websites), on the other hand, should go directly under the images on the other slides.

Post any questions about this assignment on the class Blackboard Q&A discussion page so that your classmates can also benefit from further explanations.

## References

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