**BIOLOGY 445 -- PLANT PHYSIOLOGY LABORATORY -- 2009 -- SYLLABUS (1 credit)**

**Instructor:**
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Teaching Assistant: Jennifer Gremer, NS 117; phone: 243 4460. Email: jennifer.gremer@mso.umt.edu

**Laboratory Room:**
Natural Sciences 202

**Texts:**

**Electronic Resources:**
Mansfield Library Electronic Reserve (BIOL 445)

**Course Description:**
This course consists of a series of laboratory exercises to familiarize students with main concepts and techniques in plant physiology. The course is intended to complement the lecture course BIOL 444, which is an absolute pre-requisite. This is a ‘partial Writing Course’ where grades are based on writing assignments with at least one of the assignments revised based on instructor feedback.

**Course Objectives:**
- Learn some common methods and techniques used in plant physiology
- Learn how to identify areas of interest, gather information and formulate hypotheses
- Learn how to search and use the scientific plant physiology literature
- Learn how to develop a short formal research proposal in plant physiology
- Learn to write scientific reports and proposals
- Increase your appreciation for plants and their complex, integrated nature
- Increase your understanding of how plants grow, develop and sense their environment

**Course Structure:**
The course consists of a 2 h laboratory every week.

The exercises in this course are intended to help students visualize main concepts and common techniques in plant physiology (see Laboratory Schedule). Students will learn basic data analysis techniques and how to interpret results from simple experiments. At the end of each laboratory students are asked to answer the questions posted in the lab manual or to write a short scientific report with an introduction, methods, results and interpretation. Appendix 1 of the lab manual has guidelines on how to write a short report.

Students are also required to write a research proposal during the semester. The proposal should be for a simple research project that students could realistically complete during the semester. Undergraduate students will work in groups of two to prepare the proposal and graduate students will work individually. Students might elect to pursue their proposed research during the semester for extra credit in the course, or as an independent study. At the end of the course students will present their proposal to the rest of the class. Students will first submit a title and a one-page outline of their proposal. After instructor feedback on whether the proposed outline is on the right track, students will write a complete proposal draft which will be carefully reviewed by the instructor. Based on the instructor’s feedback on the proposed research and the writing style, students will write a final, revised version of the proposal. Lab reports together with the proposal serve to fulfill the writing requirements. The lab manual has a section on how to write a research proposal. Please, make sure to read this section. Ask for help to the instructors. Unfortunately, laboratories cannot be made up. If you have an extenuating circumstance that forces you to miss a lab, please talk to the instructors in advance to see if you can switch sections. Any student that misses 4 or more laboratory sessions will automatically fail the course.
Grading: 10 points for each of 4 lab worksheets, 20 for each of 5 short reports, 10 for the proposal outline, 50 for the proposal, and 20 for the oral presentation. Late work will lose 10% of the assigned points per day.

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>4 Laboratory worksheets (15 each)</td>
<td>60</td>
<td>90-100% = A</td>
</tr>
<tr>
<td>5 Laboratory short reports (20 each)</td>
<td>100</td>
<td>80-89%  = B</td>
</tr>
<tr>
<td>Proposal outline</td>
<td>10</td>
<td>70-79%  = C</td>
</tr>
<tr>
<td>Proposal</td>
<td>50</td>
<td>60-69%  = D</td>
</tr>
<tr>
<td>Proposal Presentation</td>
<td>20</td>
<td>&lt;60%    = F</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>240</strong></td>
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</table>

Adds, drops and changes of grade: University policies on drops, adds, changes of grade option, or change to audit status will be strictly enforced in this course. These policies are described on the current catalog. Students should specifically note that after the 30th day of the semester, such changes are NOT automatically approved. They may be requested by petition, but the petition MUST be accompanied by documentation of extenuating circumstances and approved by the instructor, the student’s advisor, an in some cases the Dean. Requests to drop a course or change the grade basis to benefit a student's grade point average will not be approved.
# PLANT PHYSIOLOGY LABORATORY (BIOL 445) SCHEDULE 2009

**Note:** Reading means reading *in advance*. Assignments are due the following week.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Reading</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 27</td>
<td>No Lab</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Feb. 3</td>
<td>Basics of Plant Anatomy Proposal</td>
<td>ERES Proposal</td>
<td>worksheet</td>
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<tr>
<td>3</td>
<td>Feb. 10</td>
<td>Data Analysis and Graphs Explore research topics</td>
<td>Lab 1</td>
<td>Short report</td>
</tr>
<tr>
<td>4</td>
<td>Feb. 17</td>
<td>Tissue Water Potential Select Proposal Topic</td>
<td>Lab 2</td>
<td>worksheet</td>
</tr>
<tr>
<td>5</td>
<td>Feb. 24</td>
<td>Mineral Nutrition set up</td>
<td>Lab 3</td>
<td>proposal title and outline due</td>
</tr>
<tr>
<td>6</td>
<td>Mar. 3</td>
<td>Stomatal Conductance &amp; Transpiration</td>
<td>Lab 4</td>
<td>short report</td>
</tr>
<tr>
<td>7</td>
<td>Mar. 10</td>
<td>Xylem Water Potential</td>
<td>Lab 5</td>
<td>worksheet</td>
</tr>
<tr>
<td>8</td>
<td>Mar. 17</td>
<td>Mineral Nutrition: Harvest</td>
<td>Lab 3</td>
<td>short report</td>
</tr>
<tr>
<td>9</td>
<td>Mar. 24</td>
<td>Hill Reaction</td>
<td>Lab 6</td>
<td>short report</td>
</tr>
<tr>
<td>10</td>
<td>Mar. 31</td>
<td>SPRING BREAK</td>
<td></td>
<td>Proposal draft due</td>
</tr>
<tr>
<td>11</td>
<td>Apr. 7</td>
<td>Measurement of Photosynthesis</td>
<td>Lab 7</td>
<td>worksheet</td>
</tr>
<tr>
<td>12</td>
<td>Apr. 14</td>
<td>Plant Hormones</td>
<td>Lab 8</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Apr. 21</td>
<td>Plant Hormones. Follow up Tips for oral presentations</td>
<td>Lab 8</td>
<td>short report</td>
</tr>
<tr>
<td>14</td>
<td>Apr. 28</td>
<td>Research Proposal</td>
<td>Proposal</td>
<td>Proposal due today Oral Presentations</td>
</tr>
<tr>
<td>15</td>
<td>May. 5</td>
<td>Research Proposal</td>
<td>Proposal</td>
<td>Oral Presentations</td>
</tr>
</tbody>
</table>
LAB REPORTS

The lab portion of this course will require a short lab report for each of the experiments or exercises. Some experiments only require answers to questions posed in the lab manual and presentation of the results as requested. Other exercises require a short written scientific report. These reports need only be 2 pages in length at the most (excluding figures and tables) and should be typed. All reports are due at the laboratory session following the one in which the exercise was completed. Late reports will be penalized. The short scientific reports must follow the following format. It should have the following five main sections clearly labeled: Introduction, Materials and methods, Results and Discussion. If you use bibliographic references (I strongly encourage you to do so) list them in alphabetical order at the end of your paper under an additional “References Cited” section. Do not include a cover page. For the purpose of this class it would be an unnecessary waste of paper.

The **Title** should be as short but as informative as possible.

The **Introduction** should provide some conceptual background and include a general description of the problem or topic being studied. Also make sure to identify the objectives or purposes of the experiment. When appropriate, outline the specific hypotheses the experiment is designed to test (a proposed explanation of the phenomenon under investigation). Hypothesis should never come as a surprise. Rather, they are a natural progression from the background provided. Hypothesis should be followed by a specific prediction. A prediction is a more specific statement forecasting what will happen under certain conditions, typically expressed in the form *If X ..., then B ....* For instance: Hypothesis: The size of tomatoes produced by a tomato plant is positively related to light availability. Prediction: tomato plants grown under low light will produce smaller tomatoes than plants grown under high light.

The **Materials and Methods** of a scientific paper usually describe the methods in enough detail to allow someone else to duplicate the experiment. There is no point in duplicating the lab manual. Rather, provide a brief explanation of the methods that outlines the basic idea. If appropriate, include any modifications you made to the procedures (both deliberate and accidental).

The **Results** section should contain a brief description of your findings. Use the past tense. This section should include tables or figures of the elaborated data attached at the end of the paper. Do not include raw data in the results, only final, interpretable data (e.g. treatment averages). The text should briefly describe the information in the tables or figures. For example: 'nitrogen deficiency reduced growth in all species tested (Table 1). If more than one table or figure are necessary, number them sequentially (e.g. Table 1, Table 2 etc., or Figure 1, Figure 2, etc.). Unless unitless, all results need to be reported according to the SI units (see appendix). Results in tables and figures should be presented clearly. A table legend appears above the table and a figure legend appears below. A graph is referred to in the text as a figure (not graph, chart or any other term). A list of numbers or attributes should, likewise, be called a table and not anything else. Do not interpret your results in this section. Just describe what they are.

The **Discussion** section should include a summary of your principal findings together with an explanation or interpretation. What conclusions can you draw with regard to the objectives described in the Introduction? Did the results come out as you expected in the hypotheses? If the experiment did not work or produced unclear or questionable results, try do discuss what might have gone wrong and how could have affected the results. You may also discuss what would you do differently in the future to improve the results or additional experiments to test your hypothesis.
Red onion cells are sensitive to osmotic potential

**Introduction:** The presence of solutes in water causes the osmotic potential to decrease which reduces the free energy of water. This is because water molecules will tend to bind to the solutes rather than moving freely and away from the solution. If cells are surrounded by a solution with an osmotic potential more negative (lower) than that inside the cell, water will move from inside the cell (higher water potential) to the outside solution (lower water potential) by osmosis. Such loss of water causes a decrease of the protoplast cell volume and eventually leads to plasmolysis in cells in a solution (the separation of the plasma membrane from the cell wall). The objective of this exercise is to estimate the osmotic potential of the external solution that causes 50% plasmolysis in red onion epidermal cells.

**Materials and Methods:** Epidermal sections of red onion were placed in a series of sucrose solutions of increasing sucrose concentration. After a treatment period, pigmented cells in the sections were examined for plasmolysis under the microscope. The percentage of plasmolyzed cells in each solution was plotted against the sucrose concentration. The concentration that caused 50% plasmolysis was visually estimated from the graph. The osmotic potential of the solution that caused 50% plasmolysis was calculated using the van't Hoff equation.

**Results:** The osmotic potentials of the sucrose solutions are reported in Table 1. At low sucrose concentrations (less negative osmotic potential) plasmolysis of epidermal red onion cells was not apparent. However, as sucrose concentration increased (osmotic potential became more negative) plasmolysis increased reaching 50% of plasmolyzed cells at \(-1.34\) MPa (Figure 1). Other students reported values from \(-0.85\) to \(-1.5\) MPa.

**Discussion:** As expected, high osmotic potential (low sucrose concentration) did not induce plasmolysis suggesting that the external solution was in equilibrium with the protoplasm inside the cell. However, as sucrose concentration of the external solution increased, plasmolysis became apparent indicating that the concentration of solutes in the cell protoplasm was lower than in the
outside solution. The differences in the value at which 50% plasmolysis occurs observed by different students may have been due to several factors. First, failure to obtain just one layer or so of cells from the sections would cause difficulty in seeing plasmolysis. Second, differences in the number of cell layers of the epidermal peel between students combined with variations in the osmotic potential of different layers of the onion may also result in variable results. Insufficient time for the tissue to reach equilibrium with the solution may also result in errors. Finally, variation may have been due to inherent differences between the onions used.

Highly negative (low) osmotic potentials in plants may be advantageous in certain environments where lowering total tissue water potential (as a result of low osmotic potential) allows roots to extract water from dry or saline soils. In other words, lowering the water potential allows plants to remain ‘drier’ than the soil and therefore continue extracting water from it.
Table 1. Osmotic potentials of varying sucrose solutions.

<table>
<thead>
<tr>
<th>Molarity</th>
<th>Osmotic Potential (MPa)</th>
<th>Percent plasmolyzed cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>.35 M</td>
<td>-0.852</td>
<td>0</td>
</tr>
<tr>
<td>.40 M</td>
<td>-0.974</td>
<td>.15</td>
</tr>
<tr>
<td>.45 M</td>
<td>-1.090</td>
<td>.25</td>
</tr>
<tr>
<td>.50 M</td>
<td>-1.217</td>
<td>.40</td>
</tr>
<tr>
<td>.55 M</td>
<td>-1.340</td>
<td>.50</td>
</tr>
<tr>
<td>.60 M</td>
<td>-1.461</td>
<td>.55</td>
</tr>
<tr>
<td>.65 M</td>
<td>-1.583</td>
<td>.65</td>
</tr>
</tbody>
</table>

Figure 1. The percent plasmolyzed cells as a function of osmotic potential.
Writing a Research Proposal

The purpose of a research proposal is to convince your target audience (i.e., a funding agency, a thesis committee, or yourself) that a research project is doable, relevant, and worth time and money. The format for a research proposal varies depending on who is funding it. Major funding agencies include the US Department of Agriculture (USDA), Forest Service, National Institute of Health (NIH) and the National Science Foundation (NSF). The format for a proposal typically includes a title, an introduction, a section on preliminary results that support your proposed research, research methods, data analysis, rationale and significance and broad implications of the proposed research, references and budget.

You are required to write a research proposal for BIOL 445, with a length of approximately 8-10 double-spaced pages (no more than 12) The proposal should have the following sections clearly identified: Title, Introduction, Objectives, Hypotheses or Questions, Methods, Significance, and References (see below for specific guidelines on proposal development and format). Students taking the course for undergraduate credit will work with a partner on the proposal. Graduate students will work individually.

The topic of the research paper should be related to plant development or stress physiology.

Development of a Proposal. How to start

1) Chose a topic. First, identify a general area that interests you (e.g. ‘seed dormancy and germination’) and then narrow it down a little (e.g. ‘environmental and hormonal control of seed dormancy in wild plants’). If you do not have specific research ideas, do not try to define specific questions at this point. Just keep it general. The direction of your research will change as you browse and read recent literature.

Some tips on how to select a current topic:

Check your textbook and other Plant Physiology books available in the library to give you a preliminary idea of the main areas of study in stress physiology and plant development and of the issues that might be interesting to you.

Browse the index of recent review journals available in the library as hard copies or in electronic format (make sure to check with the librarian as the library has lots of electronic resources!). Read the abstracts of the reviews most appealing to you. You will find comprehensive reviews in: Annual Review of Plant Physiology and Molecular Biology, Botanical Review, Critical Reviews in Plant Science, Advances in Botanical Research and Progress in Botany. Many other regular plant journals (see below) have also very useful mini-reviews.

Browse the last two years or so of the main journals in plant physiology available as hard copies in the Mansfield Library or in electronic format accessible from the library. Examples are: Plant Physiology, The Plant Cell, Australian Journal of Plant Physiology, Plant Cell and Environment, Planta, Journal of Experimental Botany, American Journal of Botany, Annals of Botany, Tree
Physiology, New Phytologist and Physiologia Plantarum. If your topic is of current physiological interest, you should find a relevant article in these journals. Read the abstracts of the articles most appealing to you.

Once you have selected a general topic try to identify more specific questions (e.g. Do seeds of high altitude plants require longer cold periods to germinate relative to seeds from low elevation plants? For propagation purposes, can cold periods be substituted with hormonal applications?)

2) Literature Review. A literature review is very important part of your research proposal. Writing a research proposal is an iterative process where you keep redefining your specific research questions as you read and learn more about the topic. Although not all of what you have read will be relevant to your final proposal, most of your proposal will be based on what you have learned during the literature review.

Do a literature search using the Biological Abstracts or other data bases available electronically in the Mansfield library or from any other campus networked computer. Librarians are always around the computers to help. The trick is to make your search list selective, but not too selective. You can print or save your search results on disc. You can also e-mail the results of the search to yourself. Ask the librarian. A recent paper on your topic will give you many other leads from the reference list at the back of that paper.

It is useful to start with recent review articles because they have lots of background information and a synthesis of the current state of knowledge on the subject at the time the review was written. They will also lead you to many original research papers.

For the purposes of this class, the literature review must be based on current research: at least five core original research articles from the recent literature (five to 10 years back) must be referenced in your proposal introduction (see below). You can cite textbooks and review articles but they will not count as your five core original references.

3) Based on the literature review you will be able to set your overall objectives, formulate your specific questions and/or hypotheses, make predictions, and plan the experiments. Your objectives should be unambiguous. Avoid statements like “the objective of this study is to compare the growth of plant A and B under cold stress”, or “… to measure the growth …” Your objectives are not to compare or measure, but to determine whether and why plants A and B grow differently under a given situation. Be sure that your hypotheses are testable. If necessary, consult more specific literature to elaborate the methods. Remember that you can use email to get feedback from the instructors.

There will be sample proposals on the Library Reserve. If you need help, see the lab instructor.

Suggestion
Design your research such that it could be used in full or in part as a Plant Physiology Laboratory for teaching purposes. Let me know if you are interested in trying this out.
Proposal Format

Your proposal should include the following distinct and clearly labeled sections. If necessary, you might add additional sections in each of the main sections. An excellent proposal clearly identifies the general research area and its overall significance (it provides a conceptual background and highlights areas in need of additional research), and convinces the reader why the specific research questions asked are important and worth pursuing. Write an outline of your proposal. Note that it is very hard to write an outline unless you have a clear idea in your mind of what you want to study and why. When this is the case, write the outline and revise it to make sure it makes sense and it flows logically and smoothly from beginning to end. Then use the outline to develop the proposal. Writing and conceptual clarity (focus) are fundamental. Avoid information not directly relevant to your proposed research.

Title
The title should state the subject of the research. It should be short but as informative as possible about the issue studied. The title is very important to capture the interest of the reader. Avoid vague phrases like “Studies of” or “Investigation of”.

Introduction
The introduction is a fundamental part of your proposal. An excellent introduction starts by highlighting the conceptual and/or practical significance of the general research area pursued. This should be a few sentences followed by a summary and justification of important outstanding issues or questions in this area. This, in turn, leads to the general goal of your research. Excellent proposals usually state the general (nothing specific yet) goal right away (in the first paragraph).

Start with a new paragraph where you go back to the general conceptual framework of your research. Based on the literature review, the introduction should gradually narrow down, by first identifying and justifying areas in need of further research, and then gradually moving to your specific research questions. This gradual progression will be based on your literature review, which should elaborate on what is known and what is not known on the topic of interest and lead to the specific issue or issues that need further investigation. You should clearly identify these issues and why it is important to conduct additional research. In your introduction it should be clear that you have carefully read your core research papers and that you understand the key concepts involved in the research discussed. If you have succeeded in your introduction, the reader will be able to anticipate the questions of your study before you have specifically stated them in the next section.

Objectives
Provide a clear statement of the overall objectives or goals of the proposed project. It is very important that your proposal is feasible. Although this is only a proposal, pretend that you will have reasonable facilities (reasonably well equipped laboratory, growth chambers and greenhouse space) and that you have two semesters at the most to complete your project. (Hint: keep it simple and remain focused!).
Questions or Hypotheses In a separate paragraph, explicitly state the specific question or hypothesis within your general objectives. If you have more than one hypothesis or question you should state them sequentially. Hypotheses provide a general explanation for a given phenomenon (e.g. “the size of tomatoes in tomato plants increases with light availability”). You should also offer a prediction based on the hypothesis. Predictions are more specific statements on expected results from your experiments (“e.g. tomato plants grown under high light will produce larger tomatoes relative to tomato plants grown under low light”). When formulating hypotheses it is very important to consider all possible alternative hypotheses.

Methods
The methods section should have enough detail (or provide sufficient bibliographic references) to allow the reader to repeat your study.

First, provide a general overview of your approach and experimental design. Then move to explain your particular study system (natural history of the species). Make sure to justify why your choice is relevant. Then move to the specifics.

- Describe the experiment(s) (in sequence if there is more than one). If you have outlined more than one question and/or experiment, make sure to identify which question/hypothesis each experiment specifically addresses.
- Describe the specific design: what do you plan to do and how, number of replicates, materials and techniques, feasibility, and whatever else is necessary. Specify growth conditions (type of pots, soils, watering regimes, fertilization, etc.) and how you plan to measure the necessary variables.
  Make sure your design is sufficiently robust to distinguish between main and alternative hypotheses.

Significance In the introduction it should be clear that based on current research certain issues need further investigation. It should also be clear why your investigation is important. Here you should elaborate on how your results will help answer the questions/hypotheses asked and what are the potential broader implications of your research beyond the justification specified in the Introduction.

References. List all the references cited in the text at the end of your proposal. To cite and list the references follow the format in The Experimental Journal of Botany.

Oral Presentations
You will have 10-15 minutes (depending on the number of students) to give an oral presentation of your proposal. Students and instructors will ask questions during the next 5 minutes. The oral presentation is a communication exercise. Your goal is to effectively communicate to your audience (in this case the rest of the class) what you will be studying, why is it important, what your specific goals are, your hypotheses, and how are you going to test them.
Make a general outline to determine the main structure and flow of the talk (from introductory statements, to specific hypothesis, to methods). You should study your outline to make sure that at the end of your talk the audience can take home one or very few messages. Prepare your visuals and handouts (if needed). *Avoid complexity in your visuals* (large tables with too many numbers, complex figures, excessive text, etc.) and make sure they are visible (e.g. use large fonts). Keep your visuals very simple and clear (sometimes excessively fancy slides are more confusing than anything else). Write what you plan to say word by word. Read your text aloud while going through the visuals (this will help determine the correct wording). If needed, memorize the text, but avoid reading your talk during the presentation. If you needed to memorize the text, pretend that you have not (i.e. rehearse to talk confidently and naturally). Rehearse the talk to ensure it flows smoothly and that your timing is correct (it is extremely important to finish your talk on time and that you do not have to rush through the last slides). Make sure to talk slowly and to explain in detail all your visuals (e.g. all axes in figures, legends, etc.). Do not assume that the audience knows what you know and explain all concepts and terms used, even if they seem obvious to you. Even when dealing with complex issues simplicity and clarity result in good presentations. It is much better to present less material but clearly than rushing through lots of material.

**Due dates**

**WEEK 5:** Title and outline of your research proposal topic, including your hypothesis or question and proposed research approach. It should be 2 pages maximum (but no less than 1). This will be a chance to get feedback on your topic before you do too much work.

**WEEK 9:** Draft proposal due (approximately 6-8 double-spaced pages). All work cited should be referenced (e.g. Sala 1998, Beerling and Kelly 1996), with a complete list of references at the end. This draft is extremely important so we can provide you feedback on your objectives, methods and writing. Your draft will be graded and returned to you with corrections and comments. You will need to revise this draft.

**WEEK 14:** Your final revised proposal is due. Proposals should be 8-12 typed, double-spaced pages long, following the format described above. You will be asked to give a brief (10 minute) presentation of the research you propose, and to answer questions from a scrutinizing audience (the rest of the class). The two last lab meetings will be devoted to proposal presentations.

**Grading Criteria for Research Proposals**

**Title and outline**

It must be clear that you have given thought to the proposal and that you have made an effort to identify a feasible research project

Is the topic narrow enough and doable?

Is the topic creative?

Does the title summarize concisely what the project is about?

Are the tentative hypotheses and research approach reasonable?

Is the outline logical and coherent to someone not familiar with your proposal?
Proposal (revised version)
Have you clearly identified the conceptual/practical significance of your general research area and justified why it is significant?
Have you identified what specific areas require further research and justified why?
Have you narrowed down to your specific research area following a logical flow?
Have you stated your overall goals in the first paragraph or so?
Do you provide a literature background leading to your specific questions/hypotheses?
Have you included at least 5 recent original research articles (excluding reviews)?
Are articles properly referenced?
Are articles relevant to your research topic?
Is there evidence that you have critically read the articles?
Does the background logically lead to the specific questions?
Are the specific questions or hypotheses explicitly stated?
Are they testable? Are they realistic? (i.e. could you implement the research at the University of Montana in no more than one year?)
Did you consider alternative hypotheses?
Is the study design appropriate to unequivocally answer your questions?
Do methods clearly explain how each hypothesis will be addressed?
Are the methods appropriate?
Does the proposal conform to the format guidelines provided above?
Have you revised the grammar and spelling? (note that grammar and spelling are very important; a brilliant, but poorly written proposal (with grammar and spelling mistakes) has much lower chances to get funded than an acceptable proposal which is very well written.

Oral Presentation
Did you clearly communicate to the audience the scope of your research, your specific questions, why are they relevant, methods, and the significance of your research?
Was your talk clearly organized?
Where the visuals clear and simple?
Did you rehearse the presentation?
Did you have enough time?