Journal Club Exercises

I. Project overview. These exercises are rooted in the belief that the ability to critically read, understand, and discuss the scientific literature are valuable and essential outcomes of a good undergraduate science education. To accomplish these goals, I have structured several kinds of activities (see directions below) to accompany our reading of scientific papers from the genetics literature. These activities are intended to promote a high degree of preparation for our discussion of specific papers, their results, and the implications thereof. They are aimed at encouraging a high level of participation and providing a unique and high quality Journal Club experience.

II. Learning Objectives.

- Develop depth in selected topics by reading milestone papers
- Learn to critically read the primary literature in genetics and related fields
- Develop proficiency at discussing the primary literature and applying genetic principles to addressing problems and proposing experimental ideas

III. Directions.

The week for which you signed up. For each Journal Club meeting, a team of you will serve as a resource for the class discussion. When it is your turn, you will need to prepare to be a resident expert on the assigned paper through background research on the topic and paper. Depending on your individual preparation in the topic you choose, this may involve some additional reading in our genetics and/or other texts. However, it should also involve working with your team to identify key background and/or follow-up papers from your reading of the assigned paper, to obtain these papers, and for each of you to read them in preparation for your role in the Journal Club. You may consider me a consultant for the difficult aspects of these papers. Your group must produce an annotated bibliography of the papers you have read as preparation on the day of the journal club. In addition, your team should compose a three-question quiz (that can be answered from having read the assigned paper) and a corresponding key. Your quiz should have a very straightforward question, a question of medium difficulty, and a more difficult one. This should be readily grade-able (developing the key helps in assessing this quality). You may consult with me in person or via e-mail in this development process, and I would like to preview the final draft of your quiz not later than the day before Journal Club. During the meeting, you will administer the quiz over the first 10 minutes or so. During this time, you may review questions (see below) of participants to identify useful themes. Once the discussion begins, your team should start with a review of your quiz key, note any question themes and, as the discussion proceeds, serve as the resident experts on the paper/subject as needed. While you may need to re-start the discussion during a lull, it is by no means your role to carry the discussion or to provide an immediate answer to every question. You may defer questions to the group.

The weeks you are a participant. For the weeks you are not a resident expert, you will be required to provide two questions about the paper. These are due at the beginning of class to encourage and assess your preparation. The two questions about the paper should be good ones. If they could be answered by a glance at our text, they won't receive full credit. Vast, unsearchable questions will also not receive full credit. Solid, legitimate questions originating from your reading of the paper will receive full credit. They should be of the type focusing on whether the data support the conclusions, why the conclusions are important, and what to do next.

You will be part of a small group (2-3) that takes the short 3 question quizzes developed by the week's expert team. In addition to encouraging preparation, quizzes are intended to promote your participation in group work and initiate discussion about the paper. Following review of the quiz key, you will come together as a large group with your resident experts and, for the rest of the meeting, discuss the paper.

Discussion. Discussion should be aimed at understanding the context, content, and significance of the paper. This includes critically thinking and sharing ideas about the appropriateness of the conceptual and/or experimental approach, the appropriate controls, the implications of the results and resulting research, and future conceptual and/or experimental directions for the research. The goal is ultimately to add to your knowledge, increase your understanding, and critically evaluate the merits of the paper. Your full participation will **require** that you prepare in advance for these discussions by reading the papers carefully (and probably repeatedly). You are welcome to consult with me in your preparation.

IV. Assessment.

Point Breakdown

Preparation summary & questions (4 pts @ x 5)	20 pts
Quizzes, 3 questions answered by group, (6 pts @ x 5)	30 pts
Annotated bibliography (preparation) of resident experts (10 pts)	10 pts
Performance as resident experts (10 & 16 pts)	16 pts
Quiz written for peers and key (6 pts @)	12 pts
Peer and self evaluation (6 pts @)	12 pts
Total	100 pts

The guidelines for the nature and quality of the preparative questions are addressed above.

You, individually, will receive the quiz score of your group for a particular week's Journal Club. My consultations with the week's team of experts about their quiz should monitor the quality of the quiz to insure that it is feasible, *with good preparation*, of the assigned paper. Good preparation should include using our text to answer basic questions, thorough and (likely) repeated ($\geq$ 2 times) reading of the assigned paper, consultation with me if necessary (*but not necessarily reading additional supporting papers - although you may*).

The team of experts will each receive the team's score for the bibliography, quiz, and key, and for performance as resident experts. This will include being able to answer reasonable questions about the paper based on additional reading of supporting papers. A peer and self-evaluation complete the assessment of the expert group performance.

Notes: This exercise continues to develop each time I try it. I expect that some tweaking of the particulars on the fly may be helpful, as we discover points for improvement. Please feel free to make suggestions; I'll incorporate them when possible to improve your experience.

I've provided a web reference to "How to read a scientific paper" found at the URL: http://www.biochem.arizona.edu/classes/bioc568/papers.htm You may want to review the reference as you find yourself reading new papers.