Reading Primary Literature

Overview of the sections of a paper from primary literature:

Abstract
This is a brief overview of the results described in the paper. It is meant to help researchers quickly evaluate the content of a paper and how important that paper is to their research. Most journals have a word limit for the abstract and so it is very dense and only comprehensible if you are an expert in the field. I recommend you skip this section until you become more familiar with bacteriophage research.

Introduction
This sections provides all of the background a non-expert needs to understand the paper. This section will be very useful to you (an expert in the field will often skim this section). The introduction will also give the significance of this work and relate it to the field at large. It gives the rationale for why the research is important and the impact that it has on the rest of the field.

Methods
The methods section contains all of the nitty-gritty details about the experiments performed in the paper. This section sometimes follows the introduction, but can also sometimes be at the end of the article. Some journals put this information in the figure legends. The results section usually gives enough information to determine the experimental design so it is perfectly fine to skip this section as well. This section is written for researchers intending to perform similar experiments or repeat the experiments in the paper.

Results
Just as the title suggests, this section is where the authors describe and display their results. The results section can be broken down into smaller units (i.e. the figures). Each figure usually addresses a single question or a few related questions. Sometimes the first figure is dedicated to describing tools the researchers generated that will be used in the following experiments. In this exercise, we will consider each results section separately. The results section is sometimes combined with the discussion section (described below).

Discussion
This is the section where the authors interpret their results and often present a model that places these results into the context of the field. Sometimes authors can overstate the importance of their results or even make incorrect conclusions based on their own biases. When reading a paper, it is important for you to look at the data, and draw your own conclusions. Just because a paper makes it through the review process, does not make it a flawless paper that draws logical conclusions. Believe it or not, a lot of total crap gets through the review process.

For journal club, please read: **Integration-Dependent Bacteriophage Immunity Provides Insights into the Evolution of Genetic Switches** (Broussard et al., 2013). Before class, please provide answers to the questions below:

1. What purpose does Figure 1 serve?

2. For Figure 2A, answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.
    d. What were the authors' conclusions regarding these data?
    e. Do you agree with the authors' conclusions?
3. For Figure 2B, answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.
    d. What were the authors' conclusions regarding these data?
    e. Do you agree with the authors' conclusions?
4. What do Figures 2C-D show and why did the authors include this information?
5. For Figures 2E-G answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.
    d. What were the authors' conclusions regarding these data?
    e. Do you agree with the authors' conclusions?

6. For Figures 3B, 3D, 3E and 3F, answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.
    d. What were the authors' conclusions regarding these data?
    e. Do you agree with the authors' conclusions?

7. For Figures 4C and 4G answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.
    d. What were the authors' conclusions regarding these data?
    e. Do you agree with the authors' conclusions?

8. For Figure 5 A-B answer the following questions:
    a. What question is being addressed by this experiment?
    b. Draw a detailed flow chart that illustrates the researchers' experimental design.
    c. Describe their results.

d. What were the authors' conclusions regarding these data?
e. Do you agree with the authors' conclusions?

9. What data is shown in Figure 6? What major conclusions can be drawn from this data?
10. What effects did the clear plaque mutations have on P_R activity?

11. What is the big question addressed by this paper?
12. In a few sentences, describe how this question was answered by the researchers.