

The Physics of Seeing
with Mr. Miller
PHYSICS IV – 2007-2008

Name: _____

This class will deal with the mysterious and fascinating phenomena associated with Light. Some of the topics we may delve into include: virtual and reflected spaces, refraction, diffraction, parallax, color, lenses, shadows, mirages, the rainbow, optical sky phenomena, eye physiology, prisms, lenses, Newton's and Goethe's color theories, and phenomenology.

The focus of this class will be an experiential and experimental look at some of the most interesting and varied types of phenomena in the history of science – those dealing with light in all its manifestations. Emphasis will be placed on detailed observations and exact imaginations of observed phenomena.

Grading:

- 15% - Test #1
- 20% - Participation in discussions and labs, attendance
- 25% - Final Exam
- 40% - Main Lesson Book

Homework:

I will maintain a website for this class at: <http://www.alchemical.org/optics/>. The website will be updated daily, and you should check this it EVERY DAY, as it will contain the homework schedule as well as a main lesson book entry list and a few required assignments, as well as extra tools and information that will be useful to you.

Note: At least once during the block I will ask you to turn in your main lesson book to gauge your progress and provide you with feedback. These checks are not graded but if you are not sufficiently far along with the work you may receive a notice of concern if it looks like you are in danger of not passing.

Main Lesson Book:

You are expected to make a main lesson book that faithfully represents the concepts covered in class. Your main lesson book should be very *visual*, with one or more pictures for *every entry*, preferably in color if appropriate. The task for your entries is to take the major concepts from each day and to present them in written and visual form so that a third party could read your book and understand all the major concepts that we cover in class. Each entry should be accompanied with an appropriate amount of explanatory text that concisely and clearly communicates the concept(s) associated with that entry. The main lesson book can be hand-written or typed, but please stick to one or the other. In order to make a nice main lesson book, you must take complete and accurate notes in class.

Good main lesson book pages include:

1. having a background or introduction that links the concept to the rest of the class (previous observations or concepts, etcetera), and gives the *context* for the topic and some indication of why we are spending time on it.
2. explicit written details about any demonstrations or experiments that were done, with drawings
3. your observations from the demonstrations or experiments, both written and illustrated
4. an analysis and discussion of the observations and concepts, including:
 - a. definitions of new terms
 - b. written explanations of the concepts
 - c. inclusion of major points from in-class discussions
 - d. questions that arise from observations and discussions
 - e. other related and interesting things, including your own thoughts about the phenomenon
5. nice, aesthetic presentation of all elements (layout, color, diagrams, titles, etc)
6. lots of creativity!

Notice that although the above generally follows the standard 'lab-writeup' format, *formal lab writeups are not required for this block*. Instead, focus on capturing the *content* and *meaning* of the work that we do.

Late work:

Late work will not be accepted. If you know you will be absent the day something is due, *you must make arrangements with me beforehand, not afterwards*. It is your responsibility to know when something is due, and to have it done by that time. Anyone who comes to me the day before the main lesson book is due and asks for an extension will not get it, barring any exceptional circumstances. Exceptional circumstances do *NOT* include: printers not working, computers being 'down', forgetting to turn it in, having an appointment somewhere, etc. In other words, do not procrastinate, but write up the day's content *every evening*. The only homework you have for this class is the main lesson book.

If you miss a day of class you must get the notes from another student and myself. If something was due on the day of your absence, and your absence was excused, you must turn the assignment in the NEXT school-day.