**Physics**

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Physics

This is an inquiry based science class that incorporates the use of many different labs to help establish important concepts. During the course of this class students will be asked to solve many different types of physics problems with the concepts they learn through the course. It is impossible for any teacher to go over and work every type of problem the student may encounter on the test, instead it is my expectation for the students to develop and use problem solving strategies that can be implemented to solve any problem assigned to them.

Texts

Physics Principles and Problems, Glencoe McGraw Hill.

Schedule

This class will consist of one semester. With this calendar, it is necessary to organize the course within a tight schedule that includes assignments during some holiday breaks. I find it useful to lay out a calendar by which to measure progress through the material, in order to insure completion with time for sufficient review before the physics Final Exam.

**Teaching Strategies**

Lecture/Question-Answer Sessions

Other than lab experiments, class time is taken up with lecture and question-answer sessions. A “lecture” consumes 20 to 30 minutes in which a concept presented and the reading is reviewed, stressing important definitions and limitations. The remainder of the period usually involves showing relevant demonstrations (toys are frequently used), and then introducing an assigned problem or set of problems related to the demonstration. The students are then guided in a discussion (whole class or small group) to develop solutions to the problem(s). During all of these activities, I encourage discussion, questions, hypotheses, and proposals to flow among the students as many different “looks” at the application of a concept as possible, so an appreciation of the universality of physical concepts is developed. Live demonstrations with simple equipment, often done by the students themselves for the rest of the class, are preferred. Computer simulations and video demonstrations have their place when real equipment is not available. Whenever possible, I use the analogies, conceptual discoveries, and problem-solving techniques that helped my understanding when I was a student.

Problem Assignments

At the beginning of each unit, I give students a list of “what you should know and be able to do” by the end of the unit, a day-to-day schedule with assignments, the experiments scheduled, and when a quiz on the material can be expected. Providing this informs the students about the work required to master the objectives of the unit. As we begin each unit, it is assumed that you will read the chapter(s). As you read each chapter, work out each example along the way with your reasoning.

The assigned problems are either from the textbook or from a supplementary problem handout. Problems are chosen to give the students experience with a wide range of applications of the subject covered in the unit. When the textbook does not have a problem covering a particular application, I use one from another text or write one. I also make extensive use of worksheets that are designed to help students develop coherent problem-solving techniques. When working problems or in question-answer sessions, I always stress starting from a general principle and moving toward a specific application. Instead of spending class time on working a problem all the way through to the answer, we work on building a general-to-specific routine in solving problems. This is an important skill to develop for success in future course work in the long term and for success on the Exam in the short term, since most problems students encounter will not be a specific type they have worked before.

There will be a series of Problems and Challenge Problems specifically assigned for each chapter. These problems and challenges are the level of difficulty that you will encounter on the Exam in May. It is essential that you learn to complete problems and challenges of this type to ensure your success next May.

Lab Experiments

Approximately 20 percent of the class time is taken up by lab work. The experience gained by manipulating equipment, recording and organizing data, and drawing conclusion though data and error analysis should be a vital part of any physics course; most labs extend beyond one class period. The students will be expected to submit a lab portfolio throughout the semester.

Evaluation

Tests are given approximately every unit. A teacher-constructed “anti-memorization” sheet is permitted on all quizzes. While going through the course material, the stress is on developing concepts and problem-solving strategies, not on memorization.

The day after the tests are given, students score each other’s papers using a rubric similar to those used to score the free-response questions on the Exam. Before the students begin scoring papers, each section of the solution is carefully explained. This requires them to go through the solution carefully, perhaps recognizing their own mistakes and perhaps learning a little from the mistakes of others.

Homework

Homework is assigned through a semester long assignment sheet, which students are given at the beginning of the semester. Students will be given a chance to ask about homework problems at the beginning of each class. This encourages students to stay current in their homework assignments. Since they have had the chance to ask questions, the homework they hand in is expected to be correct. Extra assigned work will be taken up at random during this year as well and averaged into the homework grade.

Grading

The student will receive one grade for each semester.

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| Physics:  |
| Tests and Labs | 70% - Tests, Quizzes, Labs, and Reports |
| Homework | 30% - Homework, Mini-Labs, Classwork |
| Late Homework | 50% of original |