AP Physics 1 Student Syllabus

Dr. Melissa N. Ducey
Email: Melissa.Ducey@gmsdk12.org
Room 119 / Lab 133
“Office” hours: 6:30 – 7:00 am or by appointment.

Textbook

Course Overview
The AP Physics 1 course will meet for 41 minutes every day. Lab work is integral to the understanding of the concepts in this course. The AP Physics 1 course has been designed by the College Board as a course equivalent to the algebra-based college-level physics class. At the end of the course, students will take the AP Physics 1 Exam, which will test their knowledge of both the concepts taught in the classroom and their use of the correct formulas.

The course focuses on the interconnections between the various strands and units contained in the course syllabus and how each contributes to the “Big Ideas” that provide a core foundation for this science course. Problem solving techniques and strategies are fine-tuned throughout the year, and students are continually tasked with connecting physics applications learned in different units in order to synthesize solutions to complex problems. The emphasis on theoretical topics, critical thinking and problem solving makes this class challenging. Mathematics is used to illuminate physical situations rather than to show off a student’s manipulative abilities. Students must be strong in both math and science to be successful in this course. Conceptual understanding of the material is a requirement for success. Students will be expected to write justifications and explanations of physics concepts.

Students have the opportunity to meet the learning objectives in a variety of ways and to apply their knowledge to real world experiences and society issues. Instructional time involves a variety of student-centered activities. Students have the opportunity to work cooperatively to solve challenging problems and to present their solutions to the class. Throughout the year, connections to the world are explored in discussions, group projects, and class demonstrations. Laboratory work, described below, offers frequent opportunities to work collaboratively, explore ideas, and present information. Outside of class, students read the assigned text and complete homework assignments that support and reinforce each lesson as well as what has been learned in the laboratory setting.

The content for the course is based on six big ideas:

Big Idea 1 – Objects and systems have properties such as mass and charge. Systems may have internal structure.
Big Idea 2 – Fields existing in space can be used to explain interactions.
Big Idea 3 – The interactions of an object with other objects can be described by forces.
Big Idea 4 – Interactions between systems can result in changes in those systems.
Big Idea 5 – Changes that occurs as a result of interactions are constrained by conservation laws.
Big Idea 6 – Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomenon.

Grading/Evaluation
Students will earn grades on classwork, quizzes, laboratory work, projects, and tests. Tests are typically worth 100 – 150 points and will consist of questions similar to ones students will see on the AP Exam. Other assignments and quizzes will consist of problems and concepts from the textbook, supplements, and old AP Exams. Projects are long-term, and typically will involve groups developing a plan, collecting data and/or research, and presenting conclusions in a meaningful way. Laboratory work is student centered and inquiry based. Lab work is discussed in more detail in the section following the course outline. Grades are tabulated using the ratio of the total points earned to total points available.

Tests: 2-3 per quarter. 100 -150 points each (will be worth approximately 50% of quarter grade)
Labs: 1 per week (approximately), 20 – 50 points each (worth approximately 40% of quarter grade)
Quizzes: (worth approximately 10% of quarter grade)
Other assignments as deemed necessary (such as projects, etc.)
**4th quarter will have fewer labs, more projects, and more test prep activities.
## Course Outline

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<thead>
<tr>
<th>Unit</th>
<th>Chapter</th>
<th>Learning Objectives</th>
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<table>
<thead>
<tr>
<th>Block</th>
<th>Title</th>
<th>Big Ideas</th>
<th>Chs</th>
<th>Topics</th>
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</thead>
<tbody>
<tr>
<td>8</td>
<td>Mechanical Waves (Big Idea 6)</td>
<td>6</td>
<td>11, 12</td>
<td>Traveling waves, Wave characteristics, Sound, Superposition, Standing waves on a string, Standing sound waves</td>
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<tr>
<td>9</td>
<td>Electrostatics (Big Ideas 1, 3, 5)</td>
<td>1</td>
<td>16</td>
<td>Electric charge &amp; conservation of charge, Electric force: Coulomb’s Law</td>
</tr>
<tr>
<td>10</td>
<td>DC Circuits (Big Ideas 1, 5)</td>
<td>1</td>
<td>18, 19</td>
<td>Electric resistance, Ohm’s Law, DC Circuits, Series &amp; Parallel Circuits, Kirchhoff’s Laws</td>
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### Laboratory Investigations

Students spend at least 25% of the instructional time engaged in laboratory work (2 days per week for most labs). Experiments designed by the instructor are used to demonstrate procedural guidelines and to learn how to use specific laboratory equipment. The majority of labs are inquiry-based where students are given an objective and a set of materials. They are tasked with designing a procedure and collecting data to determine specific quantities, determine the relationship between variables, and/or to derive fundamental physics equations. Laboratory design, experimentation, data gathering, data presentation, analysis, drawing conclusions, and experimental error analysis are elements in these lab activities.

Laboratory work is recorded in a laboratory notebook/binder, and students will have opportunities to present their laboratory work to their peers. Lab reports will consist of the following components:

- Title
- Overview/Purpose
- Experimental Design/Procedure (for guided inquiry & open inquiry, the design must be created by the students and approved by the teacher before experimentation may begin)
- Data
- Calculations and/or graphs
- Conclusion (including data and error analysis, summary of results)

Labs are labeled as Open Inquiry (OI), Guided Inquiry (GI), or Directed (D). At least half of all labs will be inquiry-based. At the end of completing lab work for the investigations that are labeled “Guided-Inquiry,” the students will present their method, data, and conclusions on whiteboards. The class will then engage in peer critique of each group’s results, and discuss strategies to decrease error and suggest further investigations.
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Supplies
Dedicated binder (with a separate section for labs)
Graph paper (required for labs)
Ruler
Loose leaf paper
Black dry erase/Expo marker
Calculator, writing utensils, textbook

Classroom Rules
1. Students are to be respectful of all people, including themselves, their peers, and teachers. Hurtful comments or disrupting anyone at anytime is not allowed.
2. Students are to be respectful of their physical surroundings. This includes proper use of the materials supplied and the classroom environment. Gum, food, and drinks are prohibited, as they may lead to a pest problem or a dirty classroom.
3. Students will refrain from the usage of electronic devices, including cell phones and personal music players. Usage of these devices will be handled according to GMSD policy SP 6.312.
4. Students are expected to follow all rules printed in the school handbook and the system handbook at all times.
5. Behavior Plan: I will attempt to handle the problem as simply, yet effectively as possible.
   a. Offense 1: Private conversation with student
   b. Offense 2: Move seat, change group, or work alone (depending on situation)
   c. Offense 3: Contact parents (email, phone call, and/or conference)
   d. Offense 4: Discipline referral
   e. Serious offenses may require skipping steps in the behavior plan.

General Policies
1. All supplies should be brought to each class. Students will not be allowed to leave class to retrieve materials from their locker.
2. Students are not allowed to regularly leave class for any reason, including to use the bathroom.
3. Students are considered tardy if not in their assigned seat by the end of the tardy bell. If students drop off books before leaving to take care of personal business, they should be back before the bell rings or a tardy will result.
4. In the event a student has an excused absence, a time period proportional to the length of absence is allowed to make up any missed work (i.e. labs or quizzes). Make-up tests must be completed within a week of return to school. After this time period, a grade of “zero” will be assigned to any missing work. Responsibility lies with the STUDENT to find out what assignments were missed, and to schedule a quiz or test if necessary. Most make-up information should be on the unit plan.
5. Students will not be allowed to make up work in the event of an unexcused absence.
6. Projects, lab reports, etc. lose 10% PER DAY, up to 5 days late. After 5 days, the work is not accepted.
7. If a school documented medical condition requires exemption from any of the above stated rules and policies, it will be handled on a case by case basis.