

AP Physics C Mechanics Summer Work Packet For Mr. Mullins

Welcome all to AP Physics 2 with Calculus.

Three Goals for this course

(i) Complete all material for the course by Spring Break. Emphasis on Free Response Questions (FRQ's). We hope that you retain about 60% of the material during these three quarters.

(ii) Use fourth quarter to prepare for the multiple-choice (MCQ's) portion of the exam which is 35 items in 45 minutes. We will use this time to recognize different types of MCQ's and develop strategies for each type. The MCQ's will cover all units in the course so that individual weaknesses for each student can be simultaneously addressed. We hope that you recover 60% of the remaining 40% not mastered in the first three quarters. That puts each of you at 84% for a 5.

(iii) Use two physics contests sponsored by American Association of Physics Teachers (AAPT) to represent WSHS and the greater Shelby County area in a positive light. (1) *United States Physics Olympiad* first round contest known as $F=ma$ covers classical mechanics and fluid mechanics. This serves as an opportunity to review your former AP Physics C Mechanics course and fill in any weak areas in the post-Covid pandemic era. The contest will be in late January of 2024. (2) AAPT's *Physics Bowl* contest in early April is an excellent warm up for the

Textbook references

I have notes already constructed for the entire course using a pdf version of Fundamentals of Physics, 9th ed., by Halliday, Resnick, and Walker. If you can find a free, legal, pdf version of this textbook online during the summer, try to download it for future references.

Calculator Needs and Skills

Most of my notes from the above text will use images imported from a TI-83+ calculator with a DOS that is now outdated. We will have a set of 30 TI-Inspires in the classroom. I will use a new and improved TI-84 Plus. Plan to get a graphing calculator for use with homework. TI-84's are better for calculus and physics.

Mechanics Review and Research Project

Construct a compare (similarities and differences) essay addressing the level of mechanics questions tested for the three different tests.

1. AP Physics C Mechanics using <https://secure-media.collegeboard.org/digitalServices/pdf/ap/ap-physics-c-mechanics-practice-exam-2012.pdf>

2. AAPT Physics Bowl using the Physics Bowl contest from the same year.
https://www.aapt.org/programs/physicsbowl/upload/PhysicsBowl_2012.pdf

*Only about one-third of the questions in Physics Bowl are mechanics.

3. AAPT USPO $F = ma$ contest from the same year.
<https://www.aapt.org/physicsteam/2013/upload/exam1-2012-unlocked.pdf>

Hints-

Include a table in WORD would be the easiest way to include the raw data. I would imagine four columns or rows with type of test, time allotment for test, number of questions, and avg seconds per question as labels.

I would also expect a degree of difficulty paragraph. Keep in mind that you make a claim or claims in this case in AP Physics 2. You provide supporting evidence like a mechanics question from each source on a similar topic. You end with sound reasoning to support the claim using the evidence. We use the abbreviation of C.E.R. a lot in AP Physics 1 and in AP Physics 2.

More reference materials:

$F = ma$ USPO contests from several years plus solutions are found at
<https://www.aapt.org/Common2022/pastexams.cfm>

AAPT Physics Bowl Contests past exams plus solutions can be found at
<https://www.aapt.org/Programs/PhysicsBowl/printexams.cfm>

Other AP Physics Mechanics FRQ's can be located online in FRQ format. You may even find a 15-minute FRQ for AP Physics C Mechanics that is a 3-minute question in the $F = ma$ contest. Gravity, harmonic oscillators, and rotational mechanics come to mind.
<https://apcentral.collegeboard.org/courses/ap-physics-c-mechanics/exam/past-exam-questions>

Other AP Physics Electromagnetism FRQ's can be located online in FRQ format. You may even find a 15-minute FRQ for AP Physics C E&M that is a 1-minute question in Physics Bowl.
<https://apcentral.collegeboard.org/courses/ap-physics-c-electricity-and-magnetism/exam/past-exam-questions>

I expect your essay to be constructed using WORD so that it can be e-mailed to me. You can create a new folder for AP Physics 2 that will contain most of your lab reports and images of your hand-written homework solutions.