

**COMPILATION: AP physics - B versus C**

Date: Fri, 10 May 2002

From: Mark J Hughes <mjhughes@HUGHESMARK.COM>

I am interested in speaking with a teacher who has experience teaching AP Physics C. I'll be starting an AP class next year (right now B) and am interested in the pros and cons of both. Also, does anyone have a cache of literature to back their decision up (either B or C)? I've found miscellaneous articles, but nothing that would compel the department chair whose current mantra is "if everyone else is teaching B, then that should tell you something."

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Date: Sat, 11 May 2002

From: Colleen Megowan <CKOZUMPLIK@AOL.COM>

In my experience, AP-C is much easier to teach than B...the calculus is simple and straightforward and can be taught concurrently if need be--for kids who have not completed calculus there's a little red paperback book called *Quick Calculus* that you can give them summer assignments in to make sure they're ready to go at the beginning of the school year...

*B has so many topics that to cover even most of them sufficiently you'll have too little time for labs or sufficient discourse...if you choose C you can do either mechanics or E&M and do it really thoroughly....the only way I would ever do B is if I had a double period to do it in, but most places won't make that available.*

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Date: Sun, 12 May 2002

From: Daniel Cervantes <DCervantes@PEORIAUD.K12.AZ.US>

I'm not a teacher with a heck of a lot of experience (first year), but I am finishing up my first go around with AP. I teach at Cactus High in Glendale, AZ where we are on block scheduling...so I see the kids every day for an hour and a half for one semester.

I was given a choice of teaching B or C, and after seeing how much material must be covered in B, *I chose to teach just the mechanics portion of C*. I've actually found that I had enough time to cover everything fairly well and I don't think the students found the class too terribly difficult.

About the calculus involved...about a third of the class had already taken calc, while the rest of the class took it concurrently. It seems like we use the calculus before they get to it in calc class, so I ended up having to teach that too. However, the kids have actually told me that the calculus is the easy part of the class and by learning it in physics it really made calc class a lot easier. I even had two students who were successful in the class who had no calc and were not in it this semester.

So overall I feel that *teaching C mechanics works great for block scheduling*, whereas teaching B or even both parts of C may be geared more towards a traditional schedule.

Date: Mon, 13 May 2002

From: Paul Gregg Swackhamer <pswackhamer@GLENBROOK.K12.IL.US>

One of the great things about modeling for me is that it has changed the way I look at physics. It used to be that I saw physics as the stuff that was in the textbooks. **Modeling, on the other hand, focuses the attention on the models and how they are used to describe and explain phenomena.** *Physics B doesn't allow much time for coming to a useful understanding, IMHO. The C course is better in that regard, but it is not an optimum course, either. It seems to avoid the real world to a pathological extent. But at least the explanations needed to do it are more complete.*

For a better opinion, look at what the US physics community has said in May 2002 *Physics Today*: Do AP Physics C mechanics, and then do what you deem to be best for your students. It is a good article, and the writers have done their homework.

As for a department head who looks at what everyone else is doing as his/her guide for what to do, I can only have sympathy for you. One would think an understanding of science would play a big role in the decision, too! But then again independent, well-grounded thinking has always been harder than the alternatives.

*I do not like the B course at all. Not from a content point of view (it's not model-centered and so is difficult to understand), and it is not easy to make it student-centered in 180 hours, so it is not likely to help students think like a physicist. In that time frame it really almost has to be a numbers game, kind of like Enron...."Here's what we have to do to make things look good."*

On the other hand, the British A-level physics course is more what the B course (and the C course) ought to be. If you can get hold of an A-level exam, you ought to take a look at it. It is about a wide range of phenomena. There are multiple choice questions, essay questions, and experimental situations to deal with. It even involves basic electronics, as our old physics books used to. The A-level course is a 50 week course, though, if I remember right.

Which brings me to my last point.

We hear a lot of public officials lament the level of science education in the U.S. It is not a mystery how one could make it better, yet, little is done, because it would require uncomfortable and unpopular changes. I have to think that we in the US do not yet have the political will to get the job done. So, we just have to keep plugging away, documenting our successes and our failures, so that we can make some progress. And also be ready to make our case when the opportunity presents itself.

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Date: Mon, 13 May 2002

From: Joseph Vanderway <jvanderway@CSUN.EDU>

I just thought that I'd say I agree with others who have posted: *AP-C is the way to go. As far as the course, I teach modeling in what I think a freshman college level physics course for physical science/engineering majors should be. Lots of paradigm labs, whiteboard presentations, etc.*

Date: Mon, 13 May 2002

From: "Richard J. McNamara, M.Ed." <richmcn@EARTHLINK.NET>

I agree with Joseph and others who believe that *AP-C is the way to go. My AP course is a second year, so that the kids already know how to whiteboard, design labs, etc. When we start reviewing, I do A LOT of whiteboarding.* It can be a real advantage with some of the more complicated multi-step problems that show up in the Free Response section.

I like to have students who chose alternative methods of solving the problem present. They can see that there is 'more than one way to skin a cat', but we can also debate the efficiency of how the problems were solved. Given that you get an average of 15 minutes per problem, picking the most time efficient solution method can be a huge advantage.

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Date: Mon, 13 May 2002

From: consuelo rogers <mcr@LAVA.NET>

The answer to the question as to which AP physics to offer in school should be based on the purpose of offering such a course, and the constraints that arise from other factors such as scheduling, staffing, etc.

At our school, we chose *AP physics B because we want our students to have (at least) explored the content areas of physics other than (Newtonian) mechanics which they study in Grade 9.*

*We offer AP physics B as a second course in physics,* and it is not a requirement for graduation, the way Grade 9 physics is.

If we had a larger population, it would be nice to offer AP physics C for a more specialized knowledge in mechanics, or new knowledge about electricity.

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Date:

From: mitchell johnson <mitchjohnson@EARTHLINK.NET>

I look at the decision as which course will do the student more good. Most of my AP students are going into science and engineering, for which B would do little good. *B is way too much material to model.* If I had higher ability students I might be tempted to do E & M, but mine think mechanics all year is hard, so I am happy to get 3,4,5's instead of 1,2,3's

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Date: Mon, 20 May 2002

From: Gregory Groeschl <ggroeschl@MTSD.K12.WI.US>

*If your AP course is a second year course, the B exam is the way to go.* That is what I have got going here.

Date: Tue, 21 May 2002

From: Paul Gregg Swackhamer <pswackhamer@GLENBROOK.K12.IL.US>

OK. Greg has got a point. *If AP B is a second course, then I can see it. Hey, I would even enjoy teaching it as a second course. But not much repeat from the first year. MODEL ON!!!*

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Date: Tue, 21 May 2002

From: stan hutto <fizwiz2@YAHOO.COM>

Here at Alamo Heights, *I teach an AP-B course* mainly because I also have to teach the course as Dual Credit with the local Community College and it was already in place when I took on the job three years ago.

*Positive points are that it is a second-year course, so I get most of the modeling in the first year. We review our models at the beginning and then move on to the other topics of Heat, Waves, Light, Geo Optics, E & M, Modern Physics - and it is very easy to see why so many students do poorly in their freshman physics course in college.*

The negative point is that approximately one-third of my students are planning on entering an Engineering degree plan and Physics B-level will not be accepted. True, the course expands their overall view, but the goal of getting AP credit or Dual Credit is shot.

*In a perfect world, you would offer a second-year course and have a choice of AP-B or AP-C for the students and there would be no scheduling problems and you would have an additional block of time each week for labs. If you have that situation, I envy you.*

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Jane's note: Rex Rice is an expert modeler at a public high school near St. Louis where the "Physics First" sequence is used. Every 9<sup>th</sup> grader has physics, and 4 of the 5 teachers use Modeling Instruction. Rex's AP-B students do superbly on standardized tests. Rex wrote:

"In my AP-B class, virtually every student has completed the Honors Freshman Physics course. Some of the students are juniors, some are seniors. [We keep] the students' laboratory portfolios until they get to the later physics course and I give these back to them at the start of the course. We make some serious time through kinematics and dynamics and require no review of graphical analysis techniques. We revisit experiments from the freshman year, and use these as a starting point. There are units in each of the major areas which are part of the AP Physics B syllabus, but *kinematics and Newton's laws go fairly quickly*. Students have a firm foundation for the rest of Mechanics. The other place that I gain ground from the freshman course is of course in Geometric Optics. *I give them a two-day review of the full semester of optics that they have already had*. I then give them a set of exercises to work over spring break and then a killer optics test after spring break. They do well.

That course is the only way that I am able to do an AP physics B course that hits all of the topics on the syllabus and is still taught with the laboratory as the focus. *The course has a*

*definite modeling flavor* although whiteboarding (especially of problems) is minimized severely to save time."