

The Physics Road Map

Road Maps are a very ‘in’ way to express a strategy, so I would like to bring physics teaching right up to the moment by considering what we should have in a physics Road Map. Every physics student needs a road map to success: finding your way through the slough of confusion and the maze of algebra, the fires of relativity and the despair of thermodynamics...it’s tough. A map and a good guide, a teacher in fact, are absolute necessities.

Paul Hewitt was a keynote speaker at the New Zealand Physics Teaching Conference *Physikos* last July (see News), speaking about Physics as the Rules of Nature. Hewitt’s enormously popular and successful philosophy of physics teaching is to Keep it Simple. That is not to say the physics should be dumbed down, but that we should stop making things any more complicated than they are. “Avoid the road blocks” says Hewitt—he insists on starting with the natural intuitive feel that we all have for nature and gently eases his students into a feel for physics. Yet any suggestion that ‘conceptual physics’ is non-mathematical is met with firm rebuttal—‘my physics is *very* mathematical—but it is not *computational*’ he asserts. The numbers are easy, so easy they are obvious; the idea is to stop students getting hung up on tricky numbers, trig and calculus. The student travels, therefore, towards basic physics down a wide, easy road with enormous road signs pointing the way.

‘But they’ve got to learn to think for themselves’ I hear critics mutter, ‘you mustn’t spoon-feed them’. This approach will produce excellent physicists, of course, having weeded out the weaklings, much as the Spartans left their babies on the mountainside so that only the fittest survived. Hansel and Gretel’s stepmother could have justified dumping the children in the middle of the forest on the same grounds. (She would have sounded so rea-



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sonable explaining that “they’ve got to learn to find their own way in life...”.)

Can’t we find challenges and incentives for the quick, bright intelligent thinkers without putting everyone else off?

Physics is about the world, and how it is. It is, as Paul Hewitt insists, the Rules of Nature, and to simplify it into something else would be to make it a different subject. (Some people would argue that school physics already does this.) In this issue of *Physics Education* we look at some of the areas of physics where there is controversy, random or chaotic behaviour: fuzzy physics. The Physics Road Map doesn’t have to circumnavigate these areas—they can be appealing as well as challenging. But, like all areas of physics, we must avoid unnecessary road blocks.

There isn’t just one way through physics. We should be developing different routes to suit different students, always remembering that the route must include more than just the path from A to B (via C, D and E). It is essential that students are given rest breaks and places for refuelling. If the only rest our students get in their physics journey is the recess and time with no physics, they are getting the wrong message. There should be motivating, fun physics times—and these are just as important as the hard-work theory lessons. Motivation is the energy that powers the journey. No-one will start with enough motivation to finish the course; if we forget this we will lose students one way or another.

This issue of *Physics Education* has some great suggestions for making physics fun—whether by debating Moon landings, singing about the ohm, watching ping-pong balls or making a ‘*Rough Science*’ thermometer. We hope you find it useful in helping your students make it through to the Land of Understanding and Opportunity without getting too badly lost!