PROFESSOR: Well, 8.02 is, of course, largely about electricity and magnetism. And at the heart of electricity and magnetism are the four, the famous four, equations. We call them the Maxwell's equations.

It's quite a difficult course for students. And I go out of my way to also introduce many phenomena that they see around them and make those phenomena connect with electricity and magnetism, for instance, lightning. I do an electrocardiogram in class. I discuss metal detectors. I discuss musical instruments, magnetic levitation.

I talk about Northern Lights, which is very relevant to electricity and magnetism. I spent almost a whole lecture on particle accelerators. I tell them why the sunsets are red and why the skies are blue. I talk about rainbows, about halos, about glories. I talk about color perception. And since I do Doppler effect, I also talk about Big Bang cosmology.

And then during my very last lecture, I introduce them to my research, the research I did during my early days at MIT, when I was making X-ray observations from very high-flying balloons, altitude of 140,000, 150,000 feet. So my goal is, wherever possible, to make them see through the equations, to make you see the beauty all around them, and by doing that to make them love physics.

Well, the 8.02 course is the second course in physics. It's mandatory. It's what we call a General Institute Requirement. You either have to take this course, or you have to take one which is a slightly higher level, 8.02 II. So it is the basis that students get during their first year. 8.01, the Newtonian mechanics, and then 8.02, the electricity and magnetism.

And if they go into physics, of course, they get a lot more. But if they never go into physics, then this is all they will ever see about physics, which is quite a lot actually.

We evaluate the students through traditional exams. The lectures are given in the main lecture hall of MIT, and then the students meet in smaller groups with professors. We call those recitations, which is largely problem solving.

There are many events in this course. Every lecture is an event. And the students who have taken me, they'll tell you that, indeed, going to my lectures is an event. I'm not a very traditional lecturer. So therefore, I would really like to think that each lecture is an event.

We do have a contest, which is very, very popular. We hand to the students a piece of wood, some copper wire, a few paper clips, and two magnets. And the goal is to make an electric motor. And they get course credit depending upon how fast their motor is going. And this is really a real happening. It's an incredible event.

And some of the motors are extraordinary in their design. If you and I would try to build a motor, you'll be lucky if your motor rotates 400 revolutions per minute. But let me tell you, some students go through the 5,000 revolutions per minute mark. It's really quite amazing. And they spent so much time on that. It's a wonderful event. it's really a happening.

Well, my message to all educators is what counts is not what you cover, but what counts is what you uncover. And this is often forgotten. So there is a general tendency, not everyone, but a general tendency to ram too much down the throats of the students and overlook that that's very anti-productive. Because it goes one ear in, as we say in Holland, and it goes the other ear out again. So what you cover is not what matters. But what you uncover is what matters.

And if you can somehow do it so that there are parts of the course that they will remember for the rest of their lives, that's even more important. If a student has come to my lectures on rainbows and halos and glories, for the rest of their lives rainbows will never be the same. And they will always think of me when they see a

rainbow.

And in fact, sometimes 20 or 30 years after a lecture, they send me still pictures. And they say, Professor Lewin, I saw a rainbow, and I thought of you, and here is a picture. And the interesting thing is, they sometimes send me a picture which is not even a rainbow, which is a glory.

But that doesn't matter. What it shows is that I have succeeded in making them love physics, and that's my goal. And that should be the goal of every educator, to make them love physics.