

Selected Tags for Discussion: PERG/Sci.-Ed. 4/22/15

1 **08.31.2011 [00:48:02;02] Nature of Science**

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3 *I: "So how can we decide to get things right? And what science is about- the whole*
4 *process of science- is about our trying to uh figure out what we know and how do we*
5 *know it and working together as a community, as a group over historical periods to*
6 *create knowledge."*

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9 **08.29.2012 [00:26:13;00] Nature of Science/ Nature of the Course**

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11 *I: "What science is about is figuring stuff out. But it's not individuals that figure stuff*
12 *out. It is communities that figure stuff out. So somebody does something and says, 'Oh,*
13 *I got this new great result.' And somebody looks at it and says, 'you are full of it. That*
14 *is wrong. I don't believe it.' And then they have to argue it out. And figure out, 'is he*
15 *right? Is she right? Who's-What's going on?' And having that discussion- trying to*
16 *figure out how do you know whether you are right, what are the possibilities, what is*
17 *contributing, that discussion- that talk- that dialogue- that's what science is.*

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19 *And you very rarely get an opportunity to participate in that. So one of the things we*
20 *want you to do here is to work in groups on your homework. "*

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23 **09.07.2011 [00:19:34;29] Nature of Physics**

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25 *I: "He basically explained that with a very simple- though once you get to the phys-the*
26 *mathematics it was pretty complicated- but a very simple model, throwing away most*
27 *of the biology, just focusing- this is the way physicist do biology, and this is the way*
28 *physicists do physics."*

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31 **09.28.2012 [00:34:14.19] Nature of Physics**

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33 *I: "Physics does hyper simplified examples. We do these hyper simplified examples*
34 *because you can understand them completely, not because they work everywhere. And*
35 *then you have to embed those examples in the real world and make them more*
36 *complicated. But starting with them is uh is something that gives you a better sense."*

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39 **09.07.2011 [00:15:48;00] Nature of Course / Nature of Biology**

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41 *I: "You're supposed to have had biology before you take this course so I'm gonna feel*
42 *free to toss in questions like that. Uh and since I'm not a biologist, but only have*
43 *consulting biologists who try to keep me honest, like Professor X in the back, um but*

44 *sometimes I scathe their chains, and so you'll have to keep me honest if I go astray on*
45 *the biology. Okay? Because you probably know a lot more biology than I do."*

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48 **09.07.2012 [00:27:12;24] Nature of Physics/Nature of Biology/ Nature of**
49 **Medicine**

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51 *I: "Equations like this where the quantity is related to the rate of change in the*
52 *quantity just occurs in science all over the place. And you'll see it in biology. You'll see*
53 *it in medicine. You'll see it in physics."*

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56 **08.31.2012 [00:07:42.24] Nature of Physics/ Nature of Biology**

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58 *I: "A critical point about the whole process of using math--and it's not it's not just math*
59 *'cause once we talk about this you will be able to see that this is very much the same as*
60 *a lot of what you do in qualitative biology--um is that we are going to begin with some*
61 *physical system. And it could be a biological system. All systems are physical systems.*
62 *Right. Uh. And then we are going to look at that, and say we want to describe*
63 *something about that."*

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66 **08.31.2011 [00:22:31;26] Nature of Math**

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68 *I: "We are going to assume you've had a calculus course. I'm not actually going to use a*
69 *lot of calculus because my experience is that the students who have had calculus*
70 *courses don't understand it in the way they need to for the physics. And therefore the*
71 *calculus we do, we're going to build up from scratch, and we're gonna-it's going to*
72 *look a little bit different from the way that it looked in your calculus class. And I'm*
73 *gonna say some things which I would prefer you not pass on to your mathematician*
74 *professors." (Class snickers)*

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77 **08.31.2012 [00:06:07;26] Nature of Math/ Nature of Science**

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79 *I: "A big deal in what we're doing in physics, and one of the reasons that we have the*
80 *physics class for you folks is that math is extremely important in science. And this is*
81 *why they make you take math classes. But in a lot of their classes, you don't get to the*
82 *way that the math is used in the science until quite late, like junior, sometimes even*
83 *senior year. Sometimes you 'en get to see it in graduate school. It is really too late.*
84 *That-you need to build your sense of how it works because it is not at all like it works*
85 *in the math class. Its-its- there's lot of things that is really important about the science*
86 *that is added on top of the math that makes it much more challenging uh than the way*
87 *the math is done in the math classes."*