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Jerry transcript

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[00:05:00.03] I: What was your first impression of M&I?

[00:05:07.14] J: The physics building is amazing, and the technology too

[00:05:33.19] I: Was there anything about the M&I curriculum that jumped out at you, once you were taking the class?

[00:05:42.19] J: Definitely, in high school I took mechanics (Phys C), and we did everything based on forces

[00:05:48.00] I really enjoyed the way that Prof. X taught it based on momentum

[00:05:53.14] That allowed for the relativity to be a lot easier, because it's based on momentum

[00:06:02.03] I'd never thought about momentum in so many different ways and it really helped me understand

[00:06:08.22] the whole concept in a lot better way

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[00:08:27.28] I: You were starting to do this a little bit, you were comparing M&I w/ the previous class you were taking. In the previous class, you were saying it's about forces, but in M&I it's about

[00:08:38.03] momentum - can you elaborate, or, in general, M&I compared to Physics C.

[00:08:48.08] J: OK, yeah, like I said, the forces, compared to momentum

[00:08:50.07] in high school, the equation $F=ma$, that's how we'd learn everything, acceleration

[00:08:57.03] into velocity and derivations through all of those - that's kind of how everything went

[00:09:05.05] just because it was on that smaller level, and then you'd start to think about

[00:09:06.22] things in space in this last class, we needed to have the relativity factor, so when we did the momentum principle, with the

[00:09:15.10] $F_{net} = \Delta t$, net, you still had the force in there, but

[00:09:22.05] it allowed for a lot different concepts to come in

[00:09:30.05] I: You mean outer space, like really fast stuff?

[00:09:35.04] J: Right, because you couldn't just do that with $F=ma$ - that doesn't necessarily make sense.

[00:09:43.13] I: Whereas the momentum principle, with the gamma included, still holds

[00:09:49.02] So what I hear you saying is that in the high school physics C class, you had $F=ma$ as your building block, and things were built upon that - you have acceleration off of that,

[00:09:56.28] you have velocity off of that, etc. etc.

[00:10:01.23] Whereas in this class, you have momentum as your, or momentum principle, the $F\Delta T = \Delta P$ as your building block, and you have things built upon that, and because

[00:10:12.29] of that, having that different building block, you can understand really fast-moving stuff, like in outer space, better

[00:10:19.07] J: Right, and they also still apply to the stuff we did in high school

[00:10:23.21] but, and in the Tutorials we could think about those same concepts that we learned in high school but in

[00:10:32.08] a different way, based upon momentum.

[00:10:38.15] It was learning the same thing and getting to the same answer,

[00:10:40.03] but thinking about it in a different way

[00:10:40.29] that applies to other things

[00:10:47.11] It was really interesting

[00:10:53.09] I: Do you think tutorials specifically were doing that, or were other parts of the class

[00:10:55.09] too, like the homework, the lectures?

[00:10:57.24] J: Yeah, definitely just the whole thing, because it was built upon that, but I think especially the tutorials

[00:11:02.13] because there we were getting to our answers on our own, so we could pull in the concepts

[00:11:09.20] from the high school or whatever that we already know, but then apply them in a different way, that applied to that class

[00:11:19.17] in regards to momentum and other things. So we could pull what we already knew and reach a new answer that just had a more solid foundation

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[00:02:07.22] I: So, uh, one of the things that M&I really tries to do is show a connectivity of physics, and you might have been talking about this to some degree, but do you

[00:02:16.03] feel like you kind of felt how topics are connected, how M&I strives to do this?

[00:02:19.18] J: Yeah, I definitely felt that

[00:02:23.02] especially like when we got towards the end and we talked about entropy and stuff, just random things about how atoms do random things and like, friction

[00:02:32.22] how they would go down a little bit and that makes the resistance force

[00:02:37.15] I: Because of the atoms

[00:02:40.26] J: Yeah, right, like you know that there's a friction force, but you're like

[00:02:44.14] "what would cause that?"

[00:02:48.08] so when we actually talked about things on a smaller level, it really helped to understand what was going on

[00:02:52.20] I: And then from that smaller level, you can apply it to a lot of different things, so you can see how it's kind of connected at that smaller level

[00:03:01.13] J: Exactly

[00:03:04.29] I: Did physics C also have that kind of connected structure?

[00:03:09.08] J: Not, not really. They would tell you "there's a force of friction" and they'd give you the formula and you'd just learn what's going on. But if you just sat there and think about it, you see a table, you'd be like "what is pushing back on it?" but then if you'd think about

[00:03:32.14] in the class, we learned that the force coming down, the gravitational force onto the atoms

[00:03:39.07] pushes it down because they have the electric force, the bond (in M&I) and that was

[00:03:52.16] exactly what was going on

[00:04:04.13] it had the cube picture, and it had a block sitting on it, and then the bonds would go down and then come back up

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[00:10:30.24] I: Was anything surprising to you about M&I? We've already discussed some things, but did any of them jump out at you as being surprising?

[00:10:41.19] J: Entropy

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[00:13:04.05] I: And what about the, the connectivity. It being more connected than before. Was that a surprise? Were you expecting it to be more, kind of like, equation, equation, equation, topic, topic, topic, and instead it's really striving to show how everything relates to everything else, was that kind of surprising or kind of a natural transition for you?

[00:13:20.12] J: Well I don't think it was necessarily a surprise but as it connected I just thought it was really neat how it all happened. So I don't know because I wasn't expecting it and it just felt so natural the way it was taught, I don't think I was quite surprised but I was just really interested by the way it all happened.

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[00:26:53.27] I: So another thing that we've talked about is kind of the $F=ma$ versus MP, did tutorials help make it easier to think in terms of the MP?

[00:27:07.09] J: We did a few at the beginning that had a lot more to do with the MP, and that helped, because you could fall back on what you already knew, but then apply it in a different way.

[00:27:19.07] I: What you already knew, you mean MP?

[00:27:21.28] J: Already knew the Force, that what I meant by that. You could pull that in and then see that in regards to the MP, so we would re-reach the conclusion that we were talking about in lecture, yea, but then you could fall back on what

makes sense in your brain, and be like "this happens and that's why this is true and this is what we learned". I know that everyone in the class has something else going on in their brain but they all reached the same thing of like "this has to be true".

[00:27:58.10] I: This being the MP?

[00:28:01.07] J: Yea just or anything that we learned like that--the Energy Principle or the Momentum Principle or something like that.

[00:28:07.04] I: Right, right. So like the early tutorials and later tutorials kind of built the MP for you maybe, saying... I guess my question is still about what the "this" is. Is the "this" the energy principle, or the "this" something else, like..

[00:28:36.28] J: More of like what we already knew would help us understand why the MP worked. and exactly what's going on.

[00:28:50.28] I: Because you know $F=ma$, and different applications of it, its easier for you to relate that knowledge and the tutorial to seeing how the MP leads to things about different topics?

[00:29:14.05] J: The concepts of force would be really ingrained in our brain and we would learn the MP and it may have just been a formula. Okay yea I'll accept that, but then when we went through the tutorial you kind of would be able to actually understand the concept of it and then be like "Okay this is what's going on, this is actually why that equals this". So you actually understand the whole concept and its not just a formula that you plug and chug.

[00:29:51.02] I: And the concept being something built upon, MP. "Right".