

JOHN DOLHUN: You got the sock? OK. So I'm just going to put the sock in here. He's going to catch it. [LOUD POPPING NOISE] There it goes. Let's check his sock out. Is it still OK?

[MUSIC PLAYING]

NARRATOR: It's day one. MIT instructor John Dolhun introduces the course.

JOHN DOLHUN: You're going to learn basic skills that will form building blocks in your future adventures at MIT and outside of MIT.

NARRATOR: That is, if you pass. And what exactly does that take?

JOHN DOLHUN: You're going to get about 14 hours of lecture, about 52 to 75 hours of lab. We only have two and a half weeks. You have to be able to think out of the box, be creative, and most importantly, be mindful of your mistakes.

PHIL: The hoods are over there...

NARRATOR: Next, safety training. Remember, for many of the students this is their first time in the lab. No flip-flops, no shorts, no skirts, but most importantly, gloves and goggles starting tomorrow.

PHIL: They tell you to wear goggles and everything. And you don't really realize the importance until you have a piece of glass flying at your face.

NARRATOR: After four hours of lecture, the students finally check into the lab.

TENGFEI: My name is Tengfei. And this is Phil. And we will be the TAs for this class. This is all the equipment you should have in your drawer and the cabinet.

[MUSIC PLAYING]

AUDIENCE: Oh. Nevermind.

ETHAN: I guess I get the antique shelf or something. But we'll work around it.

NARRATOR: After checking in, the students get introduced to a technique called nuclear magnetic resonance, or NMR for short. NMR helps chemists piece together a molecule structure. The students put their mystery molecule into a thin tube and lower it into a very powerful magnetic field.

This forces certain atoms in the sample to align themselves either with or against the field. Aligning with the field takes less energy. So there are a few more atoms aligned with than against the field. A pulse of energy makes the extra atoms aligned with the field flip.

The computer measures how much energy this takes and produces a spectrum. The amount of energy it takes to flip an atom depends on what other atoms are next to it. That means you can tell which of the atoms are connected and put together a picture of what the whole molecule looks like. That's the theory. But the students are about to learn that dealing with a real live machine is not so simple.

ANNE RACHUPKA: Awful lot we're going to go over. These are live magnets. They are in field at all times. You cannot go anywhere near it with iPod, iPhone, any USB storage devices, no push pins, no staples, no bobby pins. We have our little sample? I have taken people to the hospital because they've put an NMR tube through their hand. Definitely don't bring your wallet anywhere near the instrument.

This costs probably more than one year tuition to MIT. Obviously, this is not going to work. Do not, under any circumstances, insert your sample without the air on. You guys have any burning questions? You're all going to be experts the first time you sit down [INAUDIBLE]. Right?

LEALIA: We were all like, uh--

ANTHONY: Mmm.

ETHAN: Oh dear God.

JULIE: Can we just not talk about this anymore?

NARRATOR: The day is finally over. And it's time to head home.

IKE: It was pretty intimidating because I walked into this class with all these smart people.

ETHAN: I felt, I guess, a little bit overwhelmed. I wasn't exactly sure what to expect from 5.301.

EMILY: I didn't expect it to be this much work. I'm kind of doubting whether I made the right choice to take this class.

ETHAN: Oh my God, what have I gotten into ?

ANTHONY: I am going to fail this class.

[MUSIC PLAYING]

SPEAKER: I've always been a fan of cupcakes. But now that they're popular, I'm a big fan of cupcakes.

ANTHONY: Oh, can you make us dessert?

SPEAKER: No.

ANTHONY: Why not?

SPEAKER: What is this, like an ice cream social?

[MUSIC PLAYING]