

HANSOL: Hey! Time for lab.

PHIL: This is probably the hardest experiment, so--

[MUSIC PLAYING]

[MUSIC PLAYING]

NARRATOR: So far in 5.301, the students have learned many of the techniques that organic chemists use every day. Today they'll learn column chromatography. It's the last technique before their original research project next week. They are growing more comfortable in the lab, but Phil puts their new-found confidence in perspective.

PHIL: On an average day in my life, I'll set up two reactions. I'll do two extractions and run two columns. So when you think about all the things that you've done over the past two weeks, the goal is, essentially, to be able to do all of that in one day.

5.301 CLASS: One, two,three, chem!

[MUSIC PLAYING]

NARRATOR: And so it begins. But packing and running a column is not easy.

PHIL: Yeah, ideally for this experiment, you would have one mentor mentoring each student.

TENGFEI: I'm so nervous for them.

DAN: Feifei made me feel like this lab is much more difficult.

IKE: Hopefully, it's not as bad as they say it will be.

NARRATOR: Column chromatography is another way to separate mixtures. The students first pack the column with a special powder. Then, they load the mixture on top. The target molecule is benzylacetone, and it's contaminated with guaiazulene, a dark blue impurity.

As the mixture is washed down the column, the target sticks to the solid powder more strongly than the contaminant, so the mixture separates into two narrow bands which come out of the column at different times. As the TAs thought, everyone is stumbling over the first simple step. And the problems just keep coming.

FRED: The sand staticed itself all the way up my column, blew it out the top and into my face.

TENGFEI: Yeah, this is better. [Inaudible] is on the ball.

ANTHONY: I should have turned off the air, but it keeps going down. So the air's not on?

ROO-RA: Yeah.

PROFESSOR: That's not good. If there's bubbles in there, you're in trouble.

ROO-RA: It's barbaric.

TENGFEI: You're really bad.

NARRATOR: How do the students deal with the pressure?

PHIL: And so the silica gel does not... [Glass breaking].

NARRATOR: They break stuff, lots of stuff. How do the TAs deal with the pressure? Feifei gets giddy.

[LAUGHTER]

TENGFEI: Like in Chinese tradition--

ANTHONY: If we pour together?

TENGFEI: Yeah.

ANTHONY: What does it mean?

TENGFEI: When you are getting married.

[MUSIC PLAYING]

ANTHONY: I'm getting married, apparently. Take two cups and pour them into each other-- you wait. Thank you, finally. Are you sure that was 10 milliliters?

ROO-RA: Yes.

ANTHONY: Don't steal my-- (SINGING) The whole day through, just an old-- I'm not going to do that right now. No. She keeps me grounded.

[MUSIC PLAYING]

NARRATOR: And Phil? Phil just goes rogue.

PHIL: You could, like...There are some people I would love to [BLEEP] poke with this. Just like poke the [BLEEP]

[MUSIC PLAYING]

ANTHONY: This is exactly what I want, right?

PHIL: Yeah.

FRED: I'm finally finished.

IKE: Yeah, this collected my stuff.

NARRATOR: But in end, everyone runs a great column and purifies their product.

ANTHONY: My sample is pure. There are no other peaks where there shouldn't be peaks.

LINA: Actually, I think my favorite experiment was the flash chromatography.

ANTHONY: Even though it was hard, I felt like, I don't know, like a chemist, almost.

HANSOL: I liked watching the column and putting the air pressure down. And I loved switching the tubes. It was so fun.

[MUSIC PLAYING]

ANTHONY: Oh, I'm not wearing my goggles. That's bad. I really should have been wearing my goggles that day. There's no excuse.

[MUSIC PLAYING]