12: 6th_Science_Atoms_Main

Teacher: All right you guys you need to get out your periodic tables.

I totally know what you're going through. That's why I stay up till 3:00 in the morning because I have to finish the book.

Student: I love how [inaudible 00:15].

Teacher: It's so good, yeah, you don't want to put it down.

Student: Oh, wrong one.

Teacher: “student”. Okay, yesterday we talked about the protons, neutrons, and electrons and just by looking at one element on the periodic table, you can tell lots and lots of different things about it, right?

Student: Yep.

Teacher: We were able to draw the model of the atom, correct? Why would we have to do a model of an atom? [“student” 00:54]

Student: So we know what it looks like so we could do that.

Teacher: So we know that so we can do that?

Student: Yeah.

Teacher: Okay, why can't I just look at it so I know what it is, what it looks like?

Student: Because of the math and stuff...

Teacher: Because it has the math and stuff. How come I just can't say, "Oh yeah, look. There's the atom. I got it. I know what it looks already because I can see it. Bam"?

Student: You got to look at these. Oh, no, no, no. Look at all these [block 00:01:20] things.

Student: Symbols.

Teacher: You have to look at the block thing?

Student: The elements.

Teacher: The elements? Okay, but why do I have to draw the model of it? Why can't I just look at it?

Student: Because ...

Teacher: “student”?

Student: It's easier to remember what it looks like?

Teacher: It's easier to remember what it looks like, okay. Have any of us ever seen an atom?

Student: No.

Student: No.

Teacher: Why?

Student: Because they're so small.

Teacher: A really tall building. Okay, so sometimes we have really tall buildings and they make smaller models of it so you can get better idea of looks like. Okay.

Student: The world.

Teacher: The world, exactly, because we can't really see our world. [00:02:00] We can't like, "Let me go back in space and, 'Oh, there's our world.' Right?" What do we do in order to see the world? What's the model of the world that we use?

Student: A globe.

Teacher: A globe. Okay, so when we have something really tiny like an atom we have to make a bigger model of it but when we have something ginormous like the world we have to use a smaller model of it. Here's what we going to do today ... Kind of works, so you guys are going to be designing your own atom. Now what made this one not as great as it could be? “student”?

Student: The electrons are bigger than the protons and neutrons.

Teacher: Okay, electrons are bigger than the protons and neutrons. Well, what's wrong with that?

Student: The electrons are 1/2000 of a AMU.

Teacher: Okay, the electrons are actually 1/2000 of an AMU. Which one of these particles is supposed to be 1 AMU? “student”?

Student: The proton.

Teacher: The proton. Can you even tell by looking at this which one is a proton?

Class: No.

Student: I think the green.

Teacher: Either the red or the green. We're not sure.

Student: [crosstalk 00:03:02] the green.

Teacher: The green maybe? Okay, why would you think the green? [“student” 00:03:03].

Student: Because the purple looks a little bit and the green look a little bit and the red is a lot.

Teacher: Okay, what else?

Student: Because there's more reds than there is greens because from the looks.

Teacher: Okay, it looks more red than there's green?

Student: Yeah and then ...

Teacher: I guess we could sit down and count it. Well, this is supposed to be chlorine. There's supposed to be seventeen protons and eighteen neutrons.

Student: The red is the proton.

Teacher: Because you counted them and they're seventeen of them?

Student: I don't know.

Teacher: “student”.

Student: I think it's because usually there's more neutrons than protons.

Teacher: Okay, usually there's more neutrons than protons. There's usually the same amount or little bit more. How do we figure out the neutrons again? You guys remember? How do we do neutrons? [00:04:00] [“student” 00:04:00].

Student: You would take the atomic number and you would ...

Teacher: Who left?

Student: [inaudible 00:04:02] not here.

Teacher: Who was your fourth? There was only three of you?

Student: Only three.

Teacher: Only three? Okay we'll move someone else, because she switched classes, yeah.

Student: Yeah.

Teacher: Okay, you're there and I am not so not putting you over there.

Student: Oh, put them or them or [crosstalk 00:04:24].

Teacher: “student”, go with the girls.

Class: [crosstalk 00:04:28].

Teacher: That just means you get to be the boss of someone else, right?

Student: I don't like being bossy.

Teacher: Sure.

Student: I love being the boss.

Teacher: Yeah, we know. Okay, boss them around. Figure it out.

Class: [crosstalk 00:04:43].

Teacher: What are you going to do? Proton, neutron, electron.

Student: Proton.

Teacher: Proton?

Student: Electron.

Teacher: Electron. I guess you're a neutrons, okay.

Student: Wait ...

Teacher: I didn't give you an element yet. You just start making them.

Student: Okay, we just ...

Teacher: You might have to ... Yeah. See.

Student: Oh.

Student: Huh, I don't want to do that. I don't have the ...

Teacher: Okay, what are you doing?

Student: Electrons.

Teacher: What are you doing?

Student: Protons.

Student: Neutrons.

Teacher: Is it that stinky?

Student: Yeah, it's stinky.

Student: Oh no, he was doing [inaudible 00:05:14].

Teacher: Oh, okay.

Student: I'm electron.

Student: How big is the [crosstalk 00:05:21]?

Teacher: Okay, so what is that?

Student: These are the electrons.

Student: These are neutrons.

Teacher: Those are neutrons? What is that?

Student: Electrons.

Teacher: Really? Okay, put them next to each other. Put them next to each other. Okay, this is a proton. This is an electron.

Student: Make it smaller.

Student: Make it bigger.

Teacher: How come?

Student: It can't be the same or ... Yeah.

Teacher: What size should that be compared to this?

Student: Smaller.

Student: Smaller.

Teacher: Yeah, because this is one and what's that? The size?

Student: 1/2000th.

Teacher: 1/2000th so that's way not the same.

Student: All right.

Teacher: Okay, [06:00] so what are these?

Student: Protons.

Teacher: Those are protons. Let me see your electrons. Are these way smaller than those?

Student: Oh no.

Teacher: Okay.

Student: This size?

Teacher: Ok, so if this is a proton. What would an ...

Student: That's a neutron.

Teacher: That's a neutron?

Student: Yeah.

Teacher: Okay, you need to still to compare it to a proton and an electron and see if it's reasonable.

Student: Okay.

Student: Okay, I guess I could have this [inaudible 00:06:25].

Student: Protons.

Teacher: Got it. You're helping with protons? Let me see your proton. Let me see your proton.

Student: [inaudible 00:06:33] something.

Student: Oh wow.

Teacher: Are you protons or neutrons?

Student: Neutrons.

Teacher: Neutrons? Okay, let's see. Do your neutrons look a little bigger than the protons?

Student: That [inaudible 00:06:47] it.

Teacher: Yeah? Okay. How about our electrons? Are they pretty tiny compared to the ...

Student: Yes.

Student: Yes.

Teacher: Okay, then that looks pretty good.

Student: That looks like [inaudible 00:06:56].

Teacher: Awesome, but you only have two made. You need to get going. Look at Jo- ...

Student: I got three made right now.

Teacher: Okay, sorry you got three. Good job. Keep going. Electrons?

Student: Yeah.

Teacher: Okay.

Student: It's hard. It's so tiny ...

Teacher: Yeah.

Student: Protons are the yellow ones. Neutrons is the [inaudible 00:07:14] ...

Student: The pink ones.

Teacher: Okay, so why are the pink ones a little bit bigger?

Student: Because they're ...

Student: Because the neutrons are a little ...

Student: Big one.

Teacher: Okay.

Student: They're so cute and tiny.

Teacher: They're so cute. Okay, keep going because right now you only have four protons. The only atom that you can make is beryllium because you only have four protons.

Student: Oh, okay.

Teacher: What if I want you to make my favorite element?

Student: Potassium.

Teacher: Do you have enough protons for my favorite element?

Class: [crosstalk 00:07:45].

Teacher: Okay, how we doing?

Student: It's too big.

Teacher: What are those?

Student: Protons.

Teacher: Okay, those are protons. She's asking if those are too big.

Student: [inaudible 00:07:56].

Teacher: Are they [00:08:00] okay compared to our electrons? Yeah? Okay, so those are what?

Student: That's protons.

Teacher: Those are protons.

Student: Electrons.

Teacher: Those are electron. Those are neutrons? Now what can you guys tell me about the mass of a neutron?

Student: Little over one.

Teacher: It's a little over one, so what does that mean when you compare that one to that one? How should it look?

Student: I think that one should be a neutron because that one's bigger.

Teacher: Okay, so your neutrons now are a little bigger than the pink ones? Okay, so those became protons and those became neutrons. Why did we have to change it?

Student: Because these are bigger than [inaudible 00:08:38].

Teacher: Because neutrons are bigger than protons. Okay, so that proton next to you looks a little tiny compared to the other one. No not the [mashed 00:08:47] one. The one right there. Look at that one compared to those. Yeah, look. Put it down.

Student: No, this one isn't done.

Teacher: Okay, just checking.

Student: Is that a microphone?

Teacher: Yes.

Student: Hello.

Class: [crosstalk 00:09:03].

Student: Didn't even notice that.

Student: It doesn't [crosstalk 00:09:11].

Teacher: Okay, it looks like you guys have enough to get started le- ...

Student: I'm neutro- ... Oh, wait.

Student: At least three.

Student: Yeah.

Student: One.

Student: How many do I [crosstalk 00:09:20]?

Teacher: Raise your hand when you think you've got your atom ready.

Student: Atom ready.

Student: I got it.

Teacher: You guys got it?

Student: Yeah.

Teacher: You've got three ... Your green is your neutrons?

Student: Yeah.

Teacher: Okay, three protons, three ... Why is this electron not on this energy level?

Student: Because there's eight on the X energy ...

Student: There can only be two on the first one.

Student: Yeah, this one ...

Teacher: Good. “student”, start looking at lithium and figure out what you can tell me about it. Done?

Student: Nope.

Student: [10:00] Three [crosstalk 00:10:01].

Teacher: Come on. Got it?

Student: Yes, we're done.

Student: I did it.

Teacher: Good. Oh, your electrons are getting bigger.

Student: My electrons are ...

Student: My [inaudible 00:10:16].

Teacher: You need to tell me, don't sit on your hands but don't touch the Play-Doh or I'm going to make you sit on your hands.

Student: Thank you.

Teacher: You're welcome. Give me something you can tell me about lithium just by looking at the periodic table. Yes?

Student: It has three electrons ...

Teacher: Three electrons.

Student: It's chemical symbol is LI.

Teacher: Symbol LI.

Student: It's solid.

Teacher: It's a solid. Are you sure?

Student: Yes, it's ...

Teacher: Okay, just checking.

Student: Four neutrons.

Teacher: Four neutrons. [“student” 00:10:42]?

Student: It's in family one.

Teacher: It's in family one. Families are this way. “student”?

Student: It's period two ...

Teacher: [“student” 00:10:52]?

Student: It has two energy levels.

Teacher: It has two energy levels. Good. How come it had to go to two energy levels?

Student: Because there were three protons and the first energy level can only hold two.

Teacher: The first energy level can only have two electrons so we had to go a second level. We still got more from that one little box?

Student: Yeah, yeah, yeah.

Teacher: Really?

Student: Yes.

Teacher: “student”?

Student: It's not man made.

Teacher: Okay. Hands started going down. Got one?

Student: It's a gas.

Teacher: I thought we said it's a solid.

Student: It's a solid.

Student: Oh sorry.

Student: Oh, they're looking at hydrogen.

Teacher: Yeah, it's the one right underneath it. “student”.

Student: Not radioactive.

Teacher: Not radioactive, okay.

Student: It's on the ri- ... No, left of the zigzag line.

Teacher: It's on the left on the zigzag line which makes it a metal.

Student: It's not happy.

Teacher: It’s not happy. Why is it not happy?

Student: Because the second energy level.

Teacher: It's second energy level. “student”.

Student: Sorry.

Teacher: Its second [00:12:00] energy level is not full. Two and five.

Student: I was thinking.

Teacher: Okay, you think about that and get ... It is [inaudible 00:12:04].

Student: If lithium mixed with fluorine, it's going to be ...

Teacher: Fluorine.

Student: For that family.

Teacher: Fluorine family because the fluorine family needs what?

Student: Seven.

Student: One more.

Student: It needs one more to be complete, right? They need one more to be complete. Good job, “student”. Okay, so that fluorine family, which is what I know you're totally going to ... In that blob of a nucleus, what do you have?

Student: Thirteen.

Teacher: Thirteen.

Student: Thirteen protons and seven neutrons so far.

Teacher: How many?

Student: Four.

Teacher: Oh, okay. What are you trying to get in there?

Student: Fourteen.

Teacher: Fourteen neutrons? Okay.

Student: I worked [inaudible 00:12:40]. I wish I didn't need electrons. Fourteen.

Teacher: Fourteen? Okay.

Student: I would say eight electrons. I did a little fart.

Teacher: I didn't think I needed to tell this class but I guess I do. Play-Doh is only for protons, neutrons and electrons. It's not for forming other items, pancakes, flat whatever that is, snakes.

Student: Doughnuts.

Teacher: Doughnuts. Protons, neutrons and electrons. That's it. You've all got your aluminum made. What do you notice the difference between the nucleus of an aluminum compared to lithium? Lithium was atomic number of three and aluminum is thirteen, right?

Student: Yeah.

Teacher: This was what? Twenty-seven and this was seven, I think.

Student: Yes.

Teacher: Okay. What happened? What happens when you compare the nucleus? “student”.

Student: There's ten more protons than neutrons [14:00] and stuff in the nucleus.

Teacher: Okay, so the nucleus has a lot more protons and neutrons in it. When you look at it, does it look bigger?

Student: Yes.

Student: Fat.

Teacher: Yeah, it's fatter.

Student: It's stacked.

Teacher: It's stacked, like my body? Okay, what if I told you to make radon eighty-six? Don't do it but what if I told you to?

Class: [crosstalk 14:28].

Student: That's hard.

Student: I won't do it.

Student: I can tell.

Student: It'd be like this size.

Teacher: You would actually need 222 little pieces of Play-Doh trying to shove onto that plate.

Student: Oh my god.

Student: You would not like ...

Student: This is [crosstalk 00:14:47].

Teacher: Yeah, you'd be like, "No. No torture, please."

Student: It would more torture.

Teacher: You would be more tortured because you should have done the electrons. That would be a lot of neutrons for you to make. Okay, so as you go up in atomic number what happens to the nucleus?

Student: It gets big ...

Teacher: The nucleus gets lar- ... If I give you ... What happened to your guys' one? Did you destroy it or you didn't finish yet?

Student: Didn't finish yet.

Teacher: Still working on it.

Student: Yeah, because they started making a mountain.

Teacher: Mountains are fine. Look, they've got mountains. Oh, there's is done. Look it. They've got a mountain over there. It's okay. It's all right.

Student: They stuffed it in one little ...

Student: Yeah, it looks like a ball.

Teacher: Okay.

Student: Hill. It's a hill.

Teacher: Okay, it's a hill. Okay, not a mountain but a hill?

Student: Yes.

Teacher: Okay.

Student: There you go.

Teacher: What I want you to see is that as we get larger and larger on the periodic table, the atomic number, the atomic mass gets bigger which means your nucleus gets bigger. If you had to take a radon and compare it to a hydrogen, hydrogen, it would be ...

Student: Hydrogen and stuff?

Teacher: Hydrogen would be ... You'd done. Done, [00:16:00] right?

Student: Radon [inaudible 00:16:01].

Teacher: Radon. You'd be here till tomorrow, especially if certain people who were making particles because they take forever to roll it up. What can you tell me ... Nah, we did aluminum before, didn't we? You guys can you tell me everything ... Okay.

Class: [crosstalk 00:16:17].

Teacher: More neutrons. You can do it.

Student: Oh, actually I [crosstalk 00:16:29].

Teacher: You had nothing to add onto. Okay, so it doesn't have to be a hill but it can be like a blob altogether.

Student: No, they were trying to fit it in here until I told them that we could fit in there. That's why [crosstalk 16:45].

Student: That's why it was a mountain.

Teacher: Okay, so now you get what you can do?

Student: Well, we need ...

Teacher: You're going to ... That, ooo.

Student: Yeah but we have twelve right here so ...

Teacher: How many do you need? How many do you need?

Student: Yeah, the question I ask a lot ...

Teacher: What are those protons or ...

Student: We need nineteen neutrons.

Teacher: ... neutrons. Are those protons or neutrons? How many protons do you need, “student”? Why?

Student: One, two, three.

Teacher: It's right here. This is potassium. We're doing protons, yes? Okay, so how many proton? How do we find the number of protons?

Student: You have to subtract.

Teacher: Subtracting gives you the neutrons. How do you find the protons?

Student: Okay, I did it.

Student: For the protons...

Teacher: Hey guys, help out “student”. How do we find the protons?

Student: You find the protons by looking at the atomic number.

Teacher: Okay, where's the atomic number?

Student: Up here.

Teacher: Okay, so how many protons do we need?

Student: [inaudible 00:17:37].

Teacher: Yeah.

Student: Oh.

Teacher: I think you're doing neutrons right? Can you tell “student” how many neutrons he better make sure he has?

Student: Twenty.

Teacher: You got twenty, “student”? No? You're working on it. Okay.

Student: I got mine.

Teacher: How many electrons do you need?

Student: I need nineteen.

Teacher: You need nineteen and you put them on already? [00:18:00] We waiting for the boys?

Student: Mm-hmm (affirmative).

Teacher: Typical, right?

Student: That's how girls rock.

Teacher: That how it rocks.

Student: We need five more.

Student: What?

Student: Five more?

Student: Yeah.

Teacher: Keep going and then you might want start helping them stack the neutrons and stuff in there that they have. Just count them as you go. Did we get it?

Student: Yeah.

Teacher: Ah, I like it. Okay, so what do you have in here.

Student: Twenty neutrons and ...

Teacher: Twenty neutrons.

Student: Protons, protons.

Student: Nineteen protons.

Teacher: Nineteen protons. Why did she put nineteen protons in there?

Student: Because ...

Student: Because that's the atomic number.

Teacher: That's the atomic number. Okay, who did the electrons?

Student: Me.

Teacher: How many did you put?

Student: Nineteen.

Teacher: Why?

Student: Because electrons the same as protons.

Teacher: Okay, good.

Class: [crosstalk 00:18:45].

Teacher: Did we get it?

Student: It looks like a [inaudible 00:18:50].

Teacher: “student” actually made enough neutrons without whining or did he whine the whole time?

Student: He whined.

Student: Nope.

Teacher: He whined? You must be getting good at it though, huh? It's a solid.

Student: The symbol is K.

Teacher: Symbol is K. “student”? “student”?

Student: It is not radioactive.

Teacher: Not radioactive.

Student: It's not man made.

Teacher: Not man made.

Student: Twenty neutrons.

Teacher: Twenty neutrons.

Student: Four energy levels.

Teacher: Four energy levels. We're repeating already, guys. It's a metal. I think that's new.

Announcer: Interruption.

Teacher: Of course.

Announcer: Boys' and girls' basketball games have been cancelled this afternoon. Again, boys' and girls' basketball games cancelled this afternoon. Coach Mr....

Student: Is sick.

Announcer: ... is asking for girls' basketball team to meet him in his room after school today. Again, girls' basketball team, please report to Mr. after school. Boys' [00:20:00] basketball practice for sixth, seventh, and eighth graders cancelled due to weather. Thank you.

Teacher: Wait, maybe there's something else.

Student: No.

Teacher: Okay, guess not. All right, go.

Student: It's not happy.

Teacher: Why?

Student: Oh.