>> Diane Jewell: Let's write some electron configurations. First, let's work with chlorine. If you wrote the atomic symbol for chlorine, it would be Cl with a 35 and then the 17. The 17 is the number that we're interested in. The 17 tells us the number of the protons. It also tells us the number of electrons. So, there's 17 electrons. And if we look in the periodic table we find that the chlorine is in the third period of the periodic table. It's in group 7A, meaning that it's a halogen. Okay? So, if you go back to alpha, what were those numbers and orbitals we listed? We said they went first, 1S, 2S, 2P, 3S, 3P, 4S, 3D, 4P, 5S, 4D, 5P. Okay? And that's as far as we're going to go. Okay? How far do we have to go in order to work with chlorine? Well, it only goes to the third period which means we can stop right here because this is entering the fourth period here. Once you send your in 4S, you're in the fourth energy level. And that corresponds to the fourth period. And chlorine isn't even there, so we're just going to stick with these numbers here. So, I've rewritten them here. 1S, 2S, 2P, 3S and 3P. Now, if you recall, the S orbital is just a single orbital and each orbital can hold the most two electrons. So, for every place I see an S I can put two electrons. So, there's two and two and two and two no [inaudible] as superscripts. So, it's 1S2 meaning in the 1S orbital, there's two electrons, 2S2. In the 2S subshell we have two electrons; 3S2. In the 3S subshell we have two electrons, okay? All the P's remember the P orbitals, there were three P orbitals for every energy level. So, we had a maximum of six electrons that could go into the P subshell. So, I'm going to go ahead and put a 6 here because – and you know what we need to do is, go ahead and count. It's kind of hard to see that one and do that again. There we go. Okay. So, we have two, four, and six is ten and two more is twelve. Well, we have 17. 71 - 12 is 5. So, that means there's still five electrons, and those five electrons are going to go into the 3P orbital. That means it's not filled. Because remember, we said a P orbital can hold a maximum of 6? Doesn't mean it has to hold all six, because if there's only 17 you don't have enough electrons to finish filling this last subshell. Okay? So, this is now the electron configuration for chlorine. 1S2, 2S2, 2P6, 3S2, 3P5. It's called the full or complete electron configuration. There's another way you can write an electron configuration called the abbreviated. This is just the [inaudible] abbreviated electron configuration. It's a little bit faster. if you take a look at this here, we have two different kinds of electrons. These right here, let's see, are called inner-shell electrons. These right here are called valence electrons. Now how – why – how did I know where to start and stop this line? Well, we're talking about being in the third period, so we're looking at the highest number here. The highest number over here is the 3. And we're looking at S's and P's. 3S3P, that's the highest energy level we're talking about. These electrons are very special, okay? These are the ones that will actually participate in chemical reactions. These electrons are very close to the nucleus. They're very tightly held, but they're there and they're not going to participate. So, 6, 8, 10, the first 10 electrons are the inner shell electrons. They just sit there. So, these are you inner shell – oops. Inner shell electrons; these are your valence electrons. Valence electrons are the ones that do all the reacting, okay? If I look now – let's take a look. I've got six, eight, ten. My inner-shell electrons, there's 10

total. If I look on the periodic table for 10, I find that 10 is neon. neon has an atomic number of 10 – that's 10 electrons; 10 protons. Okay? So, I can take this right here and I can substitute neon in brackets for this whole part here. That way I don't have to write this. I just write neon. And then I'm going to write the valence electrons. 3S2; 3P5. This is called the abbreviated electron configuration because it is shorter than writing this. It may not seem like it's that much shorter, but when we get onto this one, you'll see that it's – the further down on the period table you go, the longer your electron configuration becomes and the more time you'll save by writing the abbreviated configuration, okay? So, this is the complete electron configuration; the abbreviated electron configuration. I want to show you a different one. This is [inaudible]. It has atomic number 38, which means it has 38 electrons. It happens to be on the fifth period. So, if we go back up now and take a look at this, we're going to be talking about all the way through the fifth period. Well, look at this. 5S24 – 5S4D and 5P, those are all in the third period. Which means that we're going to have to actually use this entire thing in order to write the electron configuration for strong TM [phonetic] or at least part of it. We don't know until we get there. Are we going to stop at the 5S or were we going to go into the 4D? The 5P? We'll find out. So, what I did is I wrote 1S, 2S, 2P, 3S, 3P, 4S, 3D, 4P, 5S. And what I want to do now is start putting those numbers in. The S's hold 2s – two electrons. So, there's a 2 here and 2 here. P orbitals hold 6 – I'm sorry, P subshell holds 6. Here's another S. That shell – subshell holds 2; this one holds 6. This one holds 2. Oh, we just got to the 3D. Remember, there's five of those orbitals; 2 electrons in each orbital, so 5 times 2 is 10. 10 electrons there. 4P is going to be a maximum of 6. I'm going to stop there and I'm going to count. Because I know we have to at least go up to 5S to be in the fifth energy level. Okay? So, in other words, in the fifth period. So, let's find out how much we have up to this point. We have 2, 4, 10, 12, 18, 20, 30, 36. Okay? So, so far we have 36. There's 38 electrons total. So, 38 - 36 leaves two more electrons; 5S2. Okay? When we add those numbers up again, 36 + 2 is 38, this is all the electrons that are in strong TM's electron configuration. Okay? Again, that's the full or complete electron configuration. If we just look at that last period, that's going to be this one right here. That's the valance electrons. And the rest of this is the inner-shell electrons. There were 36 of them. If I look on the periodic table, I notice the atomic number 36 is Krypton. So, instead of writing this whole thing, I can write KR for krypton in brackets. That represents this. And then all I have to do after that is to say, okay, if I take krypton and add on two more electrons now in this energy level, 5S2, now I have strong tm. So, here's my abbreviated; here's my complete. You can see how you save time writing something like this. And you might ask yourselves why? Why do we pick krypton? Why are we putting that there? Because what has 36 electrons? Krypton. Okay? And so we go to the end – the far end of the right of the periodic table and whatever that last column has, that's going to be the last element before you go into the valence electrons. And so you'll always get your –