>> Chemistry, Diane Jewell: Name these compounds. Now we're taking a look at ionic compounds that are made with transition metals. You know, transition metals give us a little bit of grief sometimes because they don't behave like the rest of the metals in our periodic table. That's why they're not included with the representative element because they don't act the way everybody else does. They tend to act a little quirky sometimes and, in particular, these metals can form more than one – and so it makes a difference then how we name them. For instance, here's a compound made from iron and oxygen, and here's another one made from iron and oxygen. If I use our naming system for ionic compounds, I would call this iron oxide, and then I would call this one iron oxide. See where there's a problem? If I send you to the back room and I say, could you please bring the bottle of iron oxide? You're going to get there and go, well, which one does she want, okay? So something has to be added to this system in order to differentiate between the charges on the irons or any of the other transition elements, okay? And what we do is we look at the charge on the element itself and we say, like if it's a plus 1, we use a Roman numeral I in our naming system. If it has a plus 2, we use a Roman numeral II, etc. – 3 and 4, okay? So let's go ahead and take a look at how to work these. This is Fe2 O3. Now, remember what I said before is if you take your charge on both of them and then cross over like this and go down, you'll end up with the subscripts. You can do the same thing if you're starting with the subscripts, you cross over and go up and it tells you what the charges are. And so if we look at this, the 2 subscript for iron goes up for the oxygen, and oxygen is O2 minus. The 3 subscript for oxygen goes up to the iron, and the iron becomes 3 plus, okay? You want to check and make sure this is true. Is oxygen really O2 minus? Yeah, it is. And so as long as this is correct, that's correct also. And we said that if there's a 3 plus, we're going to give it the Roman numeral III. So here's the name of that compound. This is called iron (III) oxide, okay? So let's take a look at this one now. This one – look what happens. There's no subscripts, which means what? It means we've got a subscript 1 and 1, okay? And so those 1s and 1, we're going to go ahead and crisscross them over, and this is what we end up with – iron 1 plus, oxygen 1 minus. Does that look correct? Look at the one you know. We don't know the iron because there's more than one possibility, but we do know oxygen. Oxygen is always O2 minus. We've got an O1 minus here. So – but if we look – look what happens. Remember that it's a 1-to-1 ratio? A 1-to-1 ratio could be formed from a plus 1 and a minus 1. It could be formed from a plus 2 and a minus 2. It could be formed from a plus 3 and a minus 3, okay? As long as the charges – the magnitude of the charges are equal to each other, it's going to be a 1-to-1 ratio. So looking at this, we can see that – we know this one isn't right because oxygen isn't 1 minus, so let's go ahead and cross that out. But look what we have here, O2 minus – that is correct. So if this is an O2 minus and they're a 1-to-1 ratio, this has to be an Fe 2 plus. In other words, this right here is iron (II) oxide. Okay, a third one here. We have Sn Cl2. We're going to do the same thing. We're going to write it again, but now the 1 subscript for the tin. And then chlorine has 2. The 1 in the subscript for a tin goes up as the charge for chlorine. Chlorine becomes

negative 1. The 2 as the subscript for chlorine goes up as a charge for tin. Tin becomes 2 plus. So the 2 goes up here, the 1 goes here. Now, the next thing we have to ask ourselves is, yeah, we're not sure about this but we do know that a group 7A element forms a negative 1 charge. This is a negative 1 charge. That means the positive 2 is also correct, okay? So what is this called? Tin (II) chloride – written like this, where the II is a Roman numeral in parentheses. Always put that Roman numeral in parentheses. Always write it as a Roman numeral, okay? Here's another one. Again this is tin chloride – tin chloride – this would also be confusing. So again, rewriting the 1for tin, the 4 for chlorine – crisscrossing over. Now tin, again, will be minus 1, but now look what happens to – I'm sorry. Chlorine would be minus 1 but tin gives that 4. So tin becomes 4 plus, okay? What is this called now? Tin (IV) chloride. And so this is how we work with transition elements when we're naming ionic compounds. There's three of them you want to remember though: cadmium, silver, zinc – cadmium, silver, and zinc, okay? Those three elements only form 1 ion. And so whenever we work with naming elements that have these three ions in them, we don't use a Roman numeral because the only reason you would use a Roman numeral is if there's a possibility that there's more than one charge, and there isn't. Each one of those only has the one charge, okay? How do you remember those three out of all of them? The way I do it is, whenever I see this – and you might actually hear me mispronounce cadmium as Cadbury because Cadbury is one my favorite chocolates. But every time I see Cd that just pops into my mind – mmm, time for a Cadbury bar, okay? Cadbury – from A-to-Z, Cadbury's the best chocolate – A for silver, Z for zinc. It's the way I remember it. You can do however you want but it's just one of those mnemonics that helps me.