

>> Draw the dot structures. Okay, we're going to do a little bit more with multiple bonds. We're going to start with the nitrogen, N₂. Each nitrogen has five electrons, and so 2 times 5 is 10, we have 10 electrons to use. If you think about it, if you've got two of them, how many are you going to need to go around both of them? You're going to need more than ten, aren't you? So, automatically your antenna should be up and realizing we're going to have problems with this one too. Ten electrons: two, four, six, eight, ten. Oh yeah, we definitely have problems with that one. Because this one has an octet and this one's missing quite a few actually, it only has four. So, we're going to be requiring this one to share. So if they share one pair, an extra pair, now this one has two, four, six and eight, this one has two, four, six. Still not enough, is it? Okay, so this one has to do a little bit more sharing, and try another pair in here. Okay, let's see what happens now. This one has two, four, six, eight. That one has an octet. How about this one? Two, four, six, eight. This one has an octet. So, this is nitrogen, now. Each one of these two electrons is a single bond. We have one, two, three pairs, which means we have three bonds. It's called a triple bond. So you have a nitrogen triple bond represented by the six electrons, and a second nitrogen, and each one of these nitrogens have the nonbonding pair. Now, what do we have over here? We have another one. This one is an ion, it's one of our polyatomic ions, and I want to include this one to explain to you why polyatomic ions acquire the charge that they do. Besides, in your lab you're going to be working with drawing those structures for polyatomic ions. So let's take a look at how to work with these. Carbon has four electrons, nitrogen has five valence electrons. But there's a negative charge, that means we've thrown an extra electron into the system. There's my extra electron. Four plus 5 is 9, and 1 is 10. Imagine this: if I hadn't thrown that electron in, we would be putting nine electrons around. It's not real good to put nine electrons around anything, because you always want them paired up. How can you pair them up if there's an odd number? So, you bring in that extra electron, we have ten now, and we can have sets of two. So, here's our bare backbone, our two electrons. Again, if we did what we did there, four, six, eight, and ten. We just did what we did— and again we've got the same problem, that nitrogen here, remember it didn't have enough electrons, well neither does this one, it's only got four. So we're going to go ahead and share this one, this pair, that gives it six. Now we're going to share this pair, and look what we have now. Two, four, six, eight, that's around this one here. Two, four, six, eight, that's around this one here. By the way, we did give that— So we have to draw in brackets, and then give it a negative charge on the outside of the bracket. What that's saying is that this entire entity has an overall negative charge to it. So this is one way you can write the electron dot structure of a polyatomic ion cyanide, the other way would be of course like we said before, using the lines, you'll have your triple bond, nitrogen has a nonbonding pair, and carbon has a nonbonding pair. Again, put that in brackets, give it the negative one charge, and here's two different ways to write your dot structure of cyanide.