>> Diane Jewell: Which make good buffer systems? When we want to talk about buffer systems, we're looking for two things. We're looking for something that has a weak acid, and we're also looking for the conjugate base to that acid. Sometimes somebody might refer to that as the salt of the conjugate base, okay? So, a good buffer has a weak acid and a salt of the conjugate base. We can just call it conjugate base. That's good enough. Okay, so let's look at our first system and determine if that would make a good buffering system. We have HCl, and we have sodium sulfate. HCl, hydrochloric acid, yep, that makes an acid. You can always tell an acid because there's a hydrogen in there, but is that a weak acid? The answer is no. Hydrochloric acid is one of our strongest acid. So, this would be a no for that reason. It would not make a good buffer system, but I want to show you something else wrong with this system. If this were going to be a weak acid, we would want it to be with its conjugate base. What is the conjugate base of HCl? Well, that would be Cl minus, and so, the salt of the conjugate base might be NaCl. That would be the salt of this conjugate – this would be the conjugate base to this acid. This is not the conjugate base. So, for actually two different reasons, that would not make a good buffering system. First off, because it's a strong acid. Secondly, this is not even the conjugate to this acid. So, that's a no. Okay, our second choice is hydroflouric acid and sodium fluoride. HF, if we look on the chart, we find that that is a weak acid. So, that's good so far. The question now is, is this the conjugate base of this acid? Okay, so, let's take a look. HF, if we take off the H, we would be left simply with F minus. Put on a salt like a cation like sodium. Now you have sodium fluoride. Yes, this is then the conjugate base of this acid. So, this is going to be a yes. This is a good system here. This is a good buffer. Okay, so here's our third choice, acetic acid. We know acetic acid is a weak acid. So that would make a good system if it had a conjugate base to it, but look what's missing. Its conjugate base is missing, and so, this would not be a good buffering system, because it's missing its conjugate base. It's not there. It has to have two components. Okay, fourth one, sodium fluoride, calcium sulfate. Okay, first off let's find a weak acid. There's no weak acid. A weak acid has to have – any acid has to have hydrogen. Do you see a single hydrogen listed here? There is not a single hydrogen, and so, therefore, we don't even have an acid here. It can't be a buffering system. So, out of these four choices, we only have one buffering system, and that would be the one in part b.