

>> Diane Jewell: Urine has a hydronium ion concentration of  $5.0 \times 10^{-6}$  molar. Calculate the hydroxide ion concentration. Is this solution acidic, basic or neutral? Okay, this should sound very similar to the last problem; it is. The information we have this time now is hydronium ion concentration is  $5.0 \times 10^{-6}$  molar. And we're looking for the hydroxide ion concentration, okay? It's the opposite of what we had last time. Now, we still know  $K_w$  is always going to be  $1 \times 10^{-14}$  and this value equals these two multiplied together. So we can use that to solve this problem. So, we'll go ahead and set this up. We have our  $1.0 \times 10^{-14}$  equals the hydronium ion concentration times the hydroxide ion concentration. Now, if we want to get this by itself, we need to isolate it, divide both sides by the hydronium ion concentration, we end up with a hydroxide equals the  $1.0 \times 10^{-14}$ , divided by hydronium ion concentration. Now, you can see I put, right away I put this in, instead of hydronium ion concentration, so that I can go ahead and solve that. And I get the hydroxide ion concentration is  $2.0 \times 10^{-9}$  molar. So now I can compare both. I've got this one, and I've got this one and I can see from the exponents that this one is the larger so I've listed it first. This is greater than this. Now, this concentration goes with hydronium, this one went with the hydroxide. So we had more hydronium ions in solution than we have hydroxide ions, which means that we have an acidic solution.