

Science and Environment
pH and solutions

1. Complete the following table:

[H ⁺], mol/L	pH	[OH ⁻], mol/L	nature
1 x 10 ⁻¹			acidic
			neutral
	6.0		
		1 x 10 ⁻⁴	

- Beaker A contains HCl (aq) with pH = 4.0 and beaker B contains a sample of acid rain with pH = 5.0.
 - How many times is solution A more acidic than solution B?
 - What is the effect of solution A on litmus paper?
- Beer is approximately 100 times more acidic than distilled water. What is the (approximate) pH of beer?
- What is the effect on the pH of an aqueous solution of acid as distilled water is added to it?
 - The solution becomes diluted and the pH decreases.
 - The solution becomes diluted and the pH increases.
 - The pH does not change.
- A lab technician adds 10mL of 1 mol/L HCl (aq) to 990 mL of distilled water. What is the pH of the resulting solution?
- Select the substances that have a pH < 7.0.

antacid _____	0.1 mol/L Ca(OH) ₂ _____
vinegar and soft drinks _____	bleach _____
car battery acid _____	rubbing alcohol, C ₃ H ₇ OH _____
cleaning solutions for contact lenses _____	
- Rain is considered "acid rain" when its pH drops below 5. Name one human activity that is responsible for the production of acid rain.

For the pros

8. How are 1 M HCl and 1 M CH₃COOH similar?
a) Both solutions are acidic and turn litmus paper blue.
b) Both solutions are electrolytes and react with magnesium.
c) Both solutions are acidic and have the same pH.
9. What is the effect on the pH of water as a large chunk of sodium, Na, is dropped into the water? Support your answer with a balanced equation.
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10. Complete the following table:

[H ⁺], mol/L	[OH ⁻], mol/L
1.5×10^{-2}	
8.0×10^{-3}	
	2.5×10^{-2}

11. Beaker A contains 0.5 M HCl (aq). Beaker B contains an aqueous solution of HCl that is 5 times less concentrated. What is the pH of the solution in beaker B?
12. A technician dissolves 3.65 g HCl in enough water to prepare 1.0 L of solution. What is the pH of the solution?
13. What is the pH of a solution made by dissolving 5.60 g KOH in water to form 1.0 L of solution?