

Vocabulary

English Write it 3 times (English)

conjugate acid–
base pair

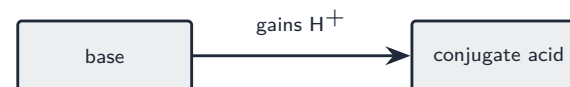
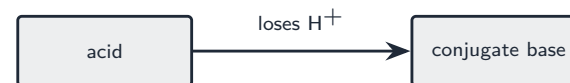
Recall

A Brønsted acid donates an H^+ (a proton); a base accepts one. This links acids and bases in pairs.

New ideas

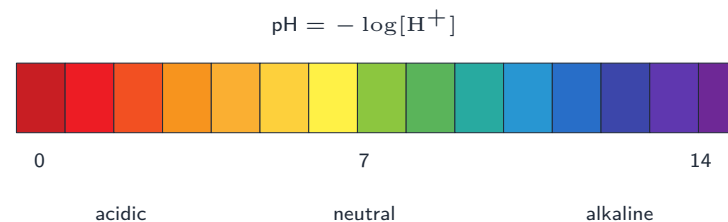
Read these first, then do the Practice.

- 1 Conjugate pairs



When an acid loses H^+ , what is left is its **conjugate base** . When a base gains H^+ , it becomes its **conjugate acid** . The two form a **conjugate acid–base pair** , differing by one H^+ .

■ 2 The pH scale



pH measures acidity: $\text{pH} = -\log[\text{H}^+]$. A low pH is acidic, 7 is neutral, a high pH is alkaline.

Worked example. A solution with $[\text{H}^+] = 1.0 \times 10^{-3} \text{ mol dm}^{-3}$ has $\text{pH} = -\log(1.0 \times 10^{-3}) = 3$.

Watch out: a conjugate pair differs by exactly *one* H^+ . A strong acid has a *weak* conjugate base – e.g. HCl (strong acid) gives Cl^- , which barely accepts a proton back.

Practice

Try these in order.

25.1 What is left when an acid loses H^+ ? [1]

25.2 What does a base become when it gains H^+ ? [1]

25.3 By how much do a *conjugate pair* differ? [1]

25.4 Write the formula for pH. [1]

25.5 What pH is neutral? [1]

25.6 Challenge. In the reaction $\text{NH}_3 + \text{H}_2\text{O} \rightleftharpoons \text{NH}_4^+ + \text{OH}^-$, identify the conjugate acid–base pair that contains nitrogen. [2]
