

# 7 Acids and bases – Part 2

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Vocabulary 词汇

*Write each word three times. 把每个单词抄写三遍。*

| English         | 中文   | Write it 3 times (English) |       |       |
|-----------------|------|----------------------------|-------|-------|
| acids           | 酸    | _____                      | _____ | _____ |
| alkalis         | 碱    | _____                      | _____ | _____ |
| protons         | 质子   | _____                      | _____ | _____ |
| acid            | 酸    | _____                      | _____ | _____ |
| proton donor    | 质子供体 | _____                      | _____ | _____ |
| base            | 碱    | _____                      | _____ | _____ |
| proton acceptor | 质子受体 | _____                      | _____ | _____ |
| alkali          | 碱    | _____                      | _____ | _____ |
| dissociates     | 解离   | _____                      | _____ | _____ |
| strong acid     | 强酸   | _____                      | _____ | _____ |
| weak acid       | 弱酸   | _____                      | _____ | _____ |
| Neutralisation  | 中和   | _____                      | _____ | _____ |
| salt            | 盐    | _____                      | _____ | _____ |
| titration curve | 滴定曲线 | _____                      | _____ | _____ |
| indicator       | 指示剂  | _____                      | _____ | _____ |

## Recall

At IGCSE you met **acids** 酸 and **alkalis** 碱 and the **pH** scale. Now we define them by what they do with **protons** 质子 ( $\text{H}^+$  ions).

- An acid gives away  $\text{H}^+$ ; a base takes it.
- "Strong" and "weak" are about how fully an acid splits up.

## New ideas

Read these first, then do the Practice.

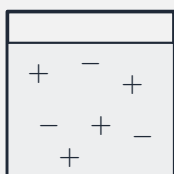
### ■ 1 Brønsted–Lowry acids and bases

- an **acid** 酸 is a **proton donor** 质子供体 (gives  $\text{H}^+$ ).
- a **base** 碱 is a **proton acceptor** 质子受体 (takes  $\text{H}^+$ ). A soluble base is an **alkali** 碱.

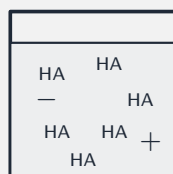
### ■ 2 Strong and weak

This is about how fully the acid **dissociates** 解离 (splits into ions) in water:

- a **strong acid** 强酸 is **fully** dissociated (almost all molecules split into ions).
- a **weak acid** 弱酸 is only **partly** dissociated (most stay whole).



strong (all ions)



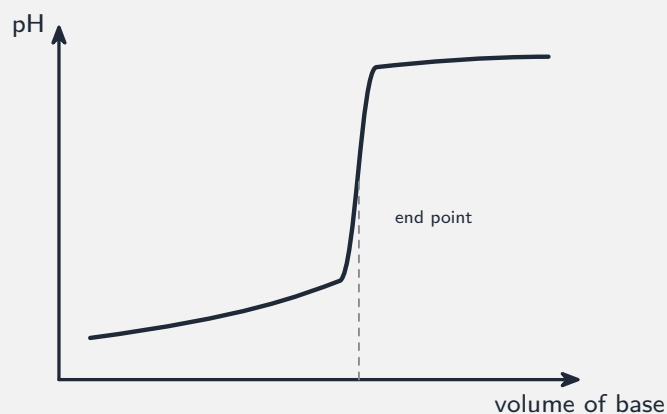
weak (mostly HA)

At the **same concentration**, a strong acid has a **lower pH** and conducts electricity better (more ions).

### ■ 3 Neutralisation and titration curves

**Neutralisation** 中和:  $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$ , also forming a **salt** 盐.

A **titration curve** 滴定曲线 (pH against volume added) has a steep, almost vertical jump at the **end point**. Choose an **indicator** 指示剂 that changes colour inside that jump.



**Watch out:** *strong* (fully dissociated) is not the same as *concentrated* (a lot dissolved). A weak acid can be concentrated, and a strong acid can be dilute.

## Practice

Try these in order.

**7.1** Define an acid and a base in the Brønsted–Lowry theory. [2]

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**7.2** What is the difference between a *strong* and a *weak* acid? [2]

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**7.3** At the same concentration, which has the lower pH —a strong or a weak acid? [1]

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**7.4** Give two ways you could tell a strong acid from a weak acid in the lab. [2]

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**7.5** Write the ionic equation for neutralisation. [1]

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**7.6** Why does a strong acid conduct electricity better than a weak acid of the same concentration? [1]

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**7.7 Challenge.** Equal concentrations of hydrochloric acid (strong) and ethanoic acid (weak) are compared. Explain why the hydrochloric acid has the lower pH. [2]

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