

pH of Weak Acids & Bases — K_a , K_b & ICE Tables

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

Aspirin (acetylsalicylic acid) has $K_a = 3.0 \times 10^{-4}$ — and the ICE table you will build in this lesson predicts exactly how much H^+ aspirin releases in your stomach, why it irritates the gastric lining, and why enteric-coated tablets dissolve in the intestine instead.

- ICE tables track Initial, Change, and Equilibrium concentrations
- Why weak acids require ICE tables while strong acids do not

2. Success Criteria

By the end, you should be able to:

- ICE tables track Initial, Change, and Equilibrium concentrations
- The simplifying assumption $[HA]_{\text{initial}} - x \approx [HA]_{\text{initial}}$ is valid when $K_a/c < 0.0025$
- $K_b = K_w/K_a$ for conjugate acid-base pairs

3. Key Terms

Dynamic equilibrium

A state where forward and reverse reaction rates are equal.

Le Chatelier's Principle

A system at equilibrium shifts to minimise applied disturbances.

Equilibrium constant (K_{eq})

The ratio of product to reactant concentrations at equilibrium.

Reaction quotient (Q)

The ratio of product to reactant concentrations at any instant.

Closed system

A system where neither matter nor energy can escape to surroundings.

Reversible reaction

A reaction that can proceed in both forward and reverse directions.

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. Explain this lesson goal in your own words: "ICE tables track Initial, Change, and Equilibrium concentrations". Use one specific example from the lesson.

BAND 3 **2 MARKS**

2. Apply this idea to a new example: "The simplifying assumption $[HA]_{\text{initial}} - x \approx [HA]_{\text{initial}}$ is valid when $K_a/c < 0.0025$ ". Show your reasoning clearly.

BAND 4 **3 MARKS**

3. Analyse why this idea matters for understanding pH of Weak Acids & Bases — K_a , K_b & ICE Tables: " $K_b = K_w/K_a$ for conjugate acid-base pairs".

BAND 5 **4 MARKS**

6. Extend: Apply the Idea

BAND 5/6

5 MARKS

A student gives a memorised answer about pH of Weak Acids & Bases — K_a , K_b & ICE Tables but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about pH of Weak Acids & Bases — K_a , K_b & ICE Tables?

- A. Identify the key concept being tested
- B. Write every fact from memory
- C. Ignore the command word
- D. Skip examples and evidence

2. Which answer would show stronger understanding of pH of Weak Acids & Bases — K_a , K_b & ICE Tables?

- A. An answer with accurate terms and reasoning
- B. A copied definition only
- C. A single-word response
- D. An answer with no example

3. What should you do if a question asks you to explain?

- A. Link the idea to a reason or cause
- B. List unrelated facts
- C. Only draw a diagram
- D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: ICE tables track Initial, Change, and Equilibrium concentrations

BAND 3

2 MARKS

SUCCESS CRITERION 2

Prove that you can: The simplifying assumption $[HA]_{\text{initial}} - x \approx [HA]_{\text{initial}}$ is valid when $K_a/c < 0.0025$

BAND 4

3 MARKS

SUCCESS CRITERION 3

Prove that you can: $K_b = K_w/K_a$ for conjugate acid-base pairs

BAND 5

4 MARKS

One thing I still need help with:
