CHEMISTRY YEAR 12 - MODULE 6 - LESSON 11

★ IQ2 Mastery — pH Calculations, Mixing & Band 6 Explanations

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

Three students have each been given a different acid solution and asked to calculate the pH. Each has chosen a different method. Only one method is correct for their acid. Before reading on — can you identify which student has chosen the right method, and precisely why each wrong method fails?

- The decision tree: strong/weak → acid/base → given concentration or Ka → select method
- Why method selection depends on what information is given and what is asked

2. Success Criteria

By the end, you should be able to:

- The decision tree: strong/weak → acid/base → given concentration or Ka → select method
- Common error patterns in IQ2 calculations and their diagnoses
- The six strong acids: HCl, H_2SO_4 (1st), HNO_3, $HClO_4$, HBr, HI

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 (Keq)
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: "The decision tree: strong/weak → acid/base → given concentration or Ka → select method". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "Common error patterns in IQ2 calculations and their diagnoses". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding ★ IQ2 Mastery — pH Calculations, Mixing & Band 6 Explanations: "The six strong acids: HCl, H_2SO_4 (1st), HNO_3, $HClO_4$, HBr, HI".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about ★ IQ2 Mastery — pH Calculations, Mixing & Band 6 Explanations 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 ★ IQ2 Mastery — pH Calculations, Mixing & Band 6 Explanations?

☐ 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 ★ IQ2 Mastery — pH Calculations, Mixing & Band 6 Explanations?

☐ 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: The decision tree: strong/weak → acid/base → given concentration or Ka → select method

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Common error patterns in IQ2 calculations and their diagnoses

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The six strong acids: HCl, H_2SO_4 (1st), HNO_3, $HClO_4$, HBr, HI

BAND 5 4 MARKS

One thing I still need help with: