CHEMISTRY YEAR 12 - MODULE 6 - LESSON 14

Titration — Standard Solutions, Technique & Calculations

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

Winemakers have used acid-base titration to measure wine acidity for over a century — the same procedure you will perform in the HSC prescribed investigation, the same four-step calculation, and the same sources of error that professional oenologists manage every day in production laboratories.

- A standard solution has accurately known concentration
- Why NaOH and HCl cannot be primary standards

2. Success Criteria

By the end, you should be able to:

- A standard solution has accurately known concentration
- Primary standards must be: pure, stable, non-hygroscopic, soluble, high molar mass
- The four-step titration calculation: n = cV → mole ratio → n(unknown) → c(unknown)

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: "A standard solution has accurately known concentration". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "Primary standards must be: pure, stable, non-hygroscopic, soluble, high molar mass". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Titration — Standard Solutions, Technique & Calculations: "The four-step titration calculation: n = cV → mole ratio → n(unknown) → c(unknown)".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Titration — Standard Solutions, Technique & Calculations 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 Titration — Standard Solutions, Technique & Calculations?

- [ ] 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 Titration — Standard Solutions, Technique & Calculations?

- [ ] 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: A standard solution has accurately known concentration

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Primary standards must be: pure, stable, non-hygroscopic, soluble, high molar mass

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The four-step titration calculation: n = cV → mole ratio → n(unknown) → c(unknown)

BAND 5 4 MARKS

One thing I still need help with: