CHEMISTRY YEAR 11 - MODULE 2 - LESSON 17

Back Calculations & Unknown Concentrations

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

In quantitative analysis chemists often know the product and need to work backwards — using a precipitate mass or titration result to find the concentration of an unknown solution. This appears in nearly every HSC Chemistry exam.

- Back-calc starts with known product/standard, finds unknown
- Why excess reagent guarantees complete reaction in gravimetric analysis

2. Success Criteria

By the end, you should be able to:

- Back-calc starts with known product/standard, finds unknown
- Concordant = titres within 0.10 mL of each other
- Rough titre is always discarded

3. Key Terms

Mole
The SI unit for amount of substance; contains exactly 6.022×10^{23} particles.

Avogadro's Number
6.022×10^{23} — the number of particles in one mole of a substance.

Molar Mass
The mass of one mole of a substance, measured in g/mol.

Limiting Reagent
The reactant that is completely consumed first, limiting the amount of product formed.

Empirical Formula
The simplest whole-number ratio of atoms in a compound.

Molecular Formula
The actual number of atoms of each element in a molecule of a compound.

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: "Back-calc starts with known product/standard, finds unknown". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "Concordant = titres within 0.10 mL of each other". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Back Calculations & Unknown Concentrations: "Rough titre is always discarded".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Back Calculations & Unknown Concentrations 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 Back Calculations & Unknown Concentrations?

☐ 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 Back Calculations & Unknown Concentrations?

☐ 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: Back-calc starts with known product/standard, finds unknown

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Concordant = titres within 0.10 mL of each other

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Rough titre is always discarded

BAND 5 4 MARKS

One thing I still need help with: