CHEMISTRY YEAR 11 - MODULE 2 - LESSON 18

Working Scientifically Practical Investigations

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

Knowing the formulas is only half the job. Examiners also ask you to evaluate experiments — identify what went wrong, explain the effect on results, and suggest improvements. This lesson gives you the vocabulary and frameworks to answer those questions precisely.

- Difference between random and systematic errors
- Why overshooting the endpoint increases the titre and affects concentration

2. Success Criteria

By the end, you should be able to:

- Difference between random and systematic errors
- How to describe errors specifically (not "human error")
- Equipment accuracy: burette vs cylinder vs balance

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: "Difference between random and systematic errors". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "How to describe errors specifically (not "human error")". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Working Scientifically Practical Investigations: "Equipment accuracy: burette vs cylinder vs balance".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Working Scientifically Practical Investigations 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 Working Scientifically Practical Investigations?

☐ 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 Working Scientifically Practical Investigations?

☐ 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: Difference between random and systematic errors

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: How to describe errors specifically (not "human error")

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Equipment accuracy: burette vs cylinder vs balance

BAND 5 4 MARKS

One thing I still need help with: