CHEMISTRY YEAR 12 - MODULE 7 - LESSON 7

Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion

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

Alkynes react twice where alkenes react once — and alkanes, despite being the least reactive organic class, react in two ways that produce the haloalkane and CO_2 chemistry that connects the whole module.

- Alkyne addition is a two-step process — each pi bond of the triple bond reacts separately
- Why alkynes need 2 equivalents of reagent for full addition but only 1 equivalent to stop at the alkene

2. Success Criteria

By the end, you should be able to:

- Alkyne addition is a two-step process — each pi bond of the triple bond reacts separately
- Alkyne hydration requires dilute H 2 SO 4 AND Hg^{2+}; the product is a ketone (not an alcohol)
- UV light is an energy source for alkane halogenation — it is NOT a catalyst

3. Key Terms

Key idea
The central concept from Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion.

Evidence
Information, observations or calculations used to support an answer.

Explain
Give a reasoned answer that links cause and effect.

Apply
Use a learned idea in a new example, problem or scenario.

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: "Alkyne addition is a two-step process — each pi bond of the triple bond reacts separately". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "Alkyne hydration requires dilute H 2 SO 4 AND Hg^{2+}; the product is a ketone (not an alcohol)". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion: "UV light is an energy source for alkane halogenation — it is NOT a catalyst".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion 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 Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion?

☐ 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 Reactions of Alkynes & Alkanes — Two-Step Addition, Ketone Formation & Combustion?

☐ 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: Alkyne addition is a two-step process — each pi bond of the triple bond reacts separately

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: Alkyne hydration requires dilute H 2 SO 4 AND Hg^{2+}; the product is a ketone (not an alcohol)

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: UV light is an energy source for alkane halogenation — it is NOT a catalyst

BAND 5 4 MARKS

One thing I still need help with: