

Acid/Base Analysis Techniques — Industrial & Digital

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

A food laboratory analyses hundreds of vinegar samples per day — digital pH probes, automated titration instruments, and back titration all running simultaneously. Understanding which method to use when, and why the glass electrode works at all, is what distinguishes a trained analytical chemist from someone who just follows a protocol.

- How a glass electrode pH meter works physically and electrically.
- Why calibration is mandatory to correct for electrode aging and temperature.

2. Success Criteria

By the end, you should be able to:

- How a glass electrode pH meter works physically and electrically.
- The two-point calibration process using buffer solutions.
- Specific acid/base analysis techniques used in the food, pharmaceutical, and environmental industries.

3. Key Terms

Brønsted-Lowry acid

A proton (H^+) donor in an acid-base reaction.

Brønsted-Lowry base

A proton (H^+) acceptor in an acid-base reaction.

Conjugate acid-base pair

Two species differing by one H^+ that interconvert.

pH

The negative logarithm of hydronium ion concentration.

Buffer

A solution resisting pH change upon addition of small amounts of acid or base.

Titration

A technique to determine concentration by reaction with a standard solution.

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: "How a glass electrode pH meter works physically and electrically.". Use one specific example from the lesson.

BAND 3 **2 MARKS**

2. Apply this idea to a new example: "The two-point calibration process using buffer solutions.". Show your reasoning clearly.

BAND 4 **3 MARKS**

3. Analyse why this idea matters for understanding Acid/Base Analysis Techniques — Industrial & Digital: "Specific acid/base analysis techniques used in the food, pharmaceutical, and environmental industries.".

BAND 5 **4 MARKS**

6. Extend: Apply the Idea

BAND 5/6

5 MARKS

A student gives a memorised answer about Acid/Base Analysis Techniques — Industrial & Digital 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 Acid/Base Analysis Techniques — Industrial & Digital?

- 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 Acid/Base Analysis Techniques — Industrial & Digital?

- 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: How a glass electrode pH meter works physically and electrically.

BAND 3 **2 MARKS**

SUCCESS CRITERION 2

Prove that you can: The two-point calibration process using buffer solutions.

BAND 4 **3 MARKS**

SUCCESS CRITERION 3

Prove that you can: Specific acid/base analysis techniques used in the food, pharmaceutical, and environmental industries.

BAND 5 **4 MARKS**

One thing I still need help with:
