CHEMISTRY YEAR 12 - MODULE 8 - LESSON 12

Acid-Base Properties of Drug Molecules

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

People are often told to take aspirin with food, but that advice connects directly to acid-base chemistry. A weakly acidic drug can exist in both ionised and unionised forms, and the balance between those forms changes with pH, which then affects solubility, membrane crossing and irritation risk.

- That many drugs are weak acids or weak bases in equilibrium between ionised and unionised forms
- How pH relative to pKa controls the ionised-to-unionised ratio

2. Success Criteria

By the end, you should be able to:

- That many drugs are weak acids or weak bases in equilibrium between ionised and unionised forms
- The Henderson-Hasselbalch equation for weak acids
- Why some drugs are formulated as salt forms

3. Key Terms

unionised form
generally less polar and therefore crosses lipid membranes more easily

ionised form
generally more water-soluble, but less able to cross hydrophobic barriers such as cell membranes

larger Ka
a stronger acid, while a

smaller pKa
a stronger acid

People
often told to take aspirin with food, but that advice connects directly to acid-base chemistry

The stomach
strongly acidic, while the small intestine is much less acidic

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: "That many drugs are weak acids or weak bases in equilibrium between ionised and unionised forms". Use one specific example from the lesson.

BAND 3 2 MARKS

2. Apply this idea to a new example: "The Henderson-Hasselbalch equation for weak acids". Show your reasoning clearly.

BAND 4 3 MARKS

3. Analyse why this idea matters for understanding Acid-Base Properties of Drug Molecules: "Why some drugs are formulated as salt forms".

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Acid-Base Properties of Drug Molecules 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 Properties of Drug Molecules?

- [ ] 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 Properties of Drug Molecules?

- [ ] 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: That many drugs are weak acids or weak bases in equilibrium between ionised and unionised forms

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The Henderson-Hasselbalch equation for weak acids

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: Why some drugs are formulated as salt forms

BAND 5 4 MARKS

One thing I still need help with: