

18 Carboxylic acids – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)		
ethanoic acid	_____	_____	_____
carboxylic acid	_____	_____	_____
weak acid	_____	_____	_____
alcohol	_____	_____	_____
aldehyde	_____	_____	_____
reflux	_____	_____	_____
nitrile	_____	_____	_____
ester	_____	_____	_____
salt	_____	_____	_____
alkali	_____	_____	_____
carbonate	_____	_____	_____

Recall

At IGCSE you met **ethanoic acid** in vinegar – a **carboxylic acid**. It has the **–COOH** (carboxyl) functional group and is a **weak acid**.

- It reacts like any acid – with metals, alkalis and carbonates.
- It is made by oxidising a primary alcohol or an aldehyde.

Nothing here is harder than IGCSE – it just organises the reactions.

New ideas

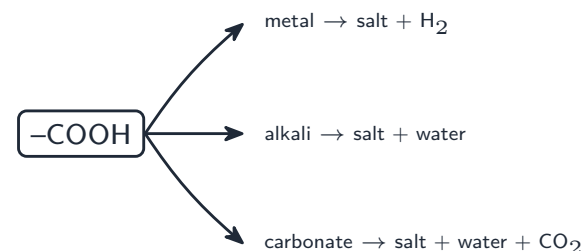
Read these first, then do the Practice.

■ 1 Making carboxylic acids

- **oxidise** a primary **alcohol** or an **aldehyde** (acidified $\text{K}_2\text{Cr}_2\text{O}_7$, with **reflux**).
- **hydrolyse** a **nitrile** or an **ester**, then acidify.

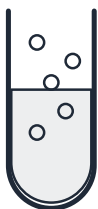
■ 2 Carboxylic acids behave as acids

Reacts with	Products
a reactive metal	a salt + hydrogen
an alkali	a salt + water
a carbonate	a salt + water + CO₂ (the fizz is a test)



■ 3 The carbonate test

Add a carboxylic acid to a carbonate: it **fizzes**, giving off carbon dioxide. This is a test for the **–COOH** group.



CO₂ fizz

acid + carbonate

Watch out: carboxylic acids are *weak* acids (only partly dissociated), yet they still react with metals, alkalis and carbonates. The fizz with a carbonate is a useful test for the –COOH group.

Practice

Try these in order.

18.1 Name the functional group of a carboxylic acid. [1]

18.2 How is a carboxylic acid made from a primary alcohol? [2]

18.3 Name the products when a carboxylic acid reacts with (a) a reactive metal, (b) an alkali. [2]

18.4 Write the equation for ethanoic acid reacting with sodium carbonate. [2]

18.5 Describe the test for a carboxylic acid using a carbonate. [2]

18.6 Challenge. Ethanoic acid is a weak acid, yet it still fizzes with sodium carbonate. Explain how a weak acid can still react in this way. [2]
