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

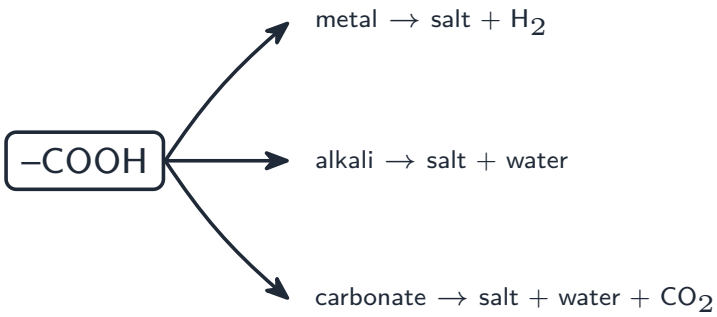
Read these first, then do the Practice.

1 Making carboxylic acids

- **oxidise** a primary **alcohol** or an **aldehyde** (acidified $K_2Cr_2O_7$, with **reflux**).
- **hydrolyse** a **nitrile** or an **ester**, then acidify.

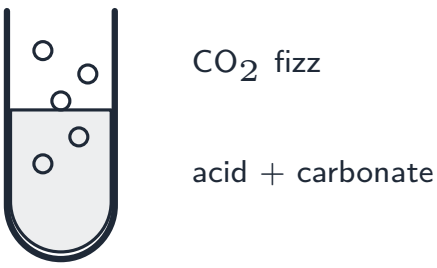
2 Carboxylic acids behave as acids

Reacts with	Products
a reactive **metal**	a **salt** + hydrogen
an **alkali**	a salt + water
a **carbonate**	a salt + water + **CO_2** (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.



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]