

11 Alcohols, acids and polymers – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	Write it 3 times (English)		
functional group	_____	_____	_____
alcohols	_____	_____	_____
carboxylic acids	_____	_____	_____
ethanol	_____	_____	_____
fermentation	_____	_____	_____
yeast	_____	_____	_____
glucose	_____	_____	_____
hydration	_____	_____	_____
solvent	_____	_____	_____
Ethanoic acid	_____	_____	_____
metals	_____	_____	_____
carbonates	_____	_____	_____
bases	_____	_____	_____
oxidation	_____	_____	_____
ester	_____	_____	_____

English	Write it 3 times (English)		
polymer	_____	_____	_____
monomers	_____	_____	_____
addition polymeri- sation	_____	_____	_____
poly(ethene)	_____	_____	_____
repeat unit	_____	_____	_____
plastics	_____	_____	_____
landfill	_____	_____	_____

Recall

A **functional group** is the part of a molecule that gives it its reactions. Two families share the spotlight here:

- **alcohols** have the –OH group;
- **carboxylic acids** have the –COOH group.

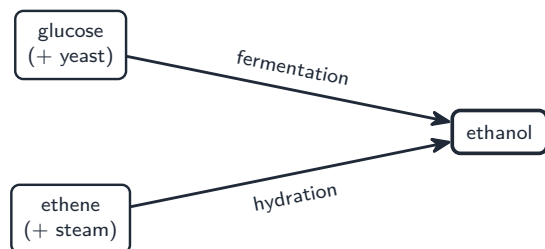
New ideas

Read these first, then do the Practice.

■ 1 Alcohols

The alcohol to know is **ethanol**. There are two ways to make it:

Method	What happens		Note
fermentation	yeast turns glucose into ethanol + CO ₂		renewable sugar; slow
hydration of ethene	steam adds to ethene (acid catalyst)		fast and pure; uses petroleum



Ethanol is used as a **fuel** (it burns well) and as a **solvent** (it dissolves many things).

■ 2 Carboxylic acids

Ethanoic acid is the one to know. Like other acids, it reacts with:

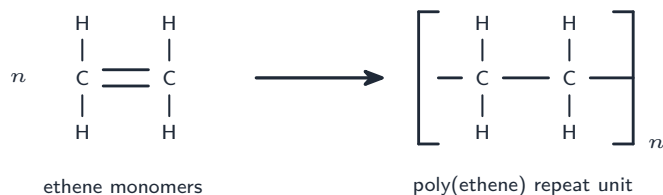
- **metals** → salt + hydrogen;
- **carbonates** → salt + water + carbon dioxide;
- **bases** → salt + water.

It is made by the **oxidation** of ethanol. When a carboxylic acid reacts with an alcohol (acid catalyst), it makes an **ester**.



■ 3 Polymers

A **polymer** is a very large molecule built from many small **monomers**. In **addition polymerisation**, many unsaturated monomers (with C=C) join up with no other product. Many ethene monomers join to make **poly(ethene)**. The small part that repeats along the chain is the **repeat unit**.



Many **plastics** do not break down, so they build up in **landfill** sites and harm sea life – a real environmental problem.

Watch out: fermentation (yeast on glucose) is renewable but slow; **hydration of ethene** (steam + catalyst) is fast and pure but uses petroleum – know one advantage of each. In **addition polymerisation** the monomers must have a C=C, and there is **no** other product.

Practice

Try these in order.

11.6 Name the functional group in (a) an alcohol and (b) a carboxylic acid. [2]

11.7 Name the two methods used to make ethanol. [2]

11.8 Give two uses of ethanol. [2]

11.9 Ethanoic acid reacts with magnesium carbonate. Name the three products. [2]

11.10 Many ethene monomers join together. Name the product and the process. [2]

11.11 Challenge. Ethene (C₂H₄) undergoes addition polymerisation. Name the polymer formed, and explain why ethane (C₂H₆) cannot be used to make a polymer this way. [3]