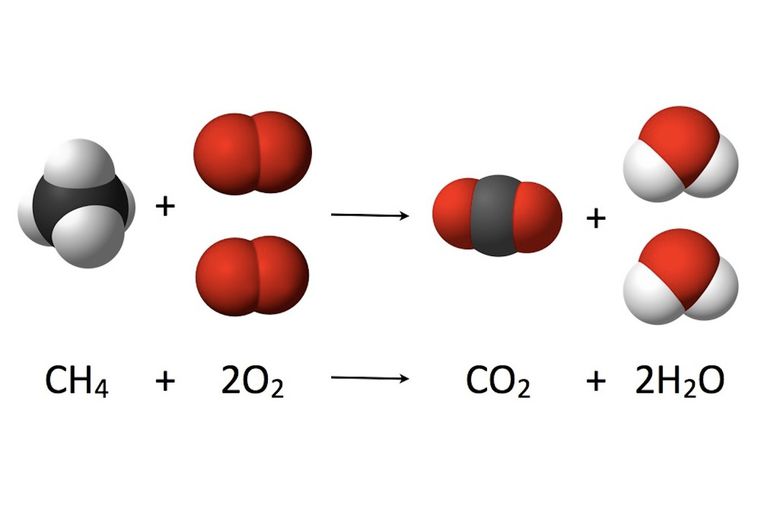
**Organic Reactions**



Reaction #1: Combustion

* Organic compound is burned in the presences of **oxygen** to produce **\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_**
* O2 is always a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Example: CH4 + 2O2 🡪 CO2 + 2H2O
  + *Question 1:* Which reaction best represents the complete combustion of ethene?
    1. C2H4 + HCl 🡪 C2H5Cl
    2. C2H4 + Cl2 🡪 C2H4Cl
    3. C2H4 + 3O2 🡪 2CO2 + 2H2O
    4. C2H4 + H2O 🡪 C2H5OH
  + *Question 2*: When C3H8 burns completely in an excess of oxygen, the products formed are
    1. CO and H2O
    2. CO2 and H2O
    3. CO and H2
    4. CO2 and H2

Reaction #2: Substitution

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** atoms are replaced by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** atom(s)
* Only happens in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Results in **\_\_\_\_\_\_\_\_\_\_\_\_\_** products
* One H is switched with one **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (group 17)
  + *Question 3*: Given the equation representing a reaction:

What type of reaction is represented by this equation?

* + 1. Addition
    2. Esterification
    3. Polymerization
    4. Substitution
  + *Question 4*: Given the balanced equation CH3CH2CH3 + Br2 🡪 CH3CH2CH2Br + HBr. This organic reaction is best classified as
    1. An addition reaction
    2. An esterification reaction
    3. A polymerization reaction
    4. A substitution reaction



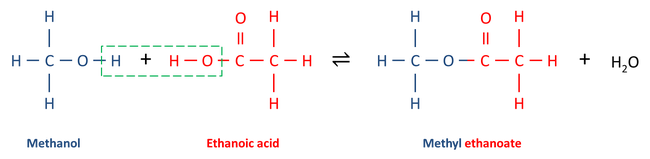
Reaction #3: Addition

* Adding one or more atoms at a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** bond
* Happens in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + *Question 5:* Which equation represents an addition reaction?
    1. C3H8 + Cl2 🡪 C3H7Cl + HCl
    2. C3H6 + Cl2 🡪 C3H6Cl2
    3. CaCl2 + Na2CO3 🡪 CaCO3 + 2NaCl
    4. CaCO3 🡪 CaO + CO2
  + *Question 6:* Given the balanced equation for an organic reaction C2H2 + 2Cl2 🡪 C2H2Cl4. This reaction is best classified as
    1. Addition
    2. Esterification
    3. Fermentation
    4. Substitution

Reaction #4: Fermentation

* Enzymatic breakdown of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (ethanol) and CO2
* Identify alcohol and CO2 as a product
* Example: C6H12O6 🡪 2C2H5OH + 2CO2
  + *Question 7:* What are the two main products of a fermentation reaction?
    1. Ethanol and carbon dioxide
    2. Ethanol and water
    3. Sugar and carbon dioxide
    4. Sugar and water
  + *Question 8:* Which equation represents fermentation?
    1. C2H6 + Cl2 🡪 C2H6Cl + HCl
    2. C6H12O6 🡪 2 C2H5OH + 2 CO2
    3. CH3COOH + CH3OH 🡪 CH3COOCH3 + H2O
    4. nC2H4 🡪 (C2H4)n

Reaction #5: Esterification



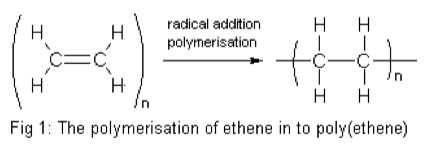
* The formation of a ester by reacting an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Esters are used in synthetic flavors, perfumes, and cosmetics
* Possible scents: bananas, wintergreen, and pineapples
  + *Question 9:* A reaction between an alcohol and an organic acid is classified as
    1. Esterification
    2. Fermentation
    3. Saponification
    4. Substitution
  + *Question 10:* Given the reaction:

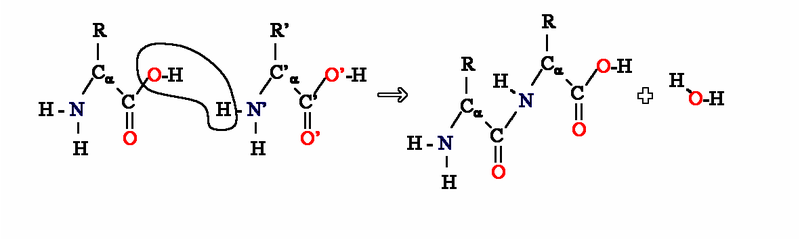


This reaction is an example of

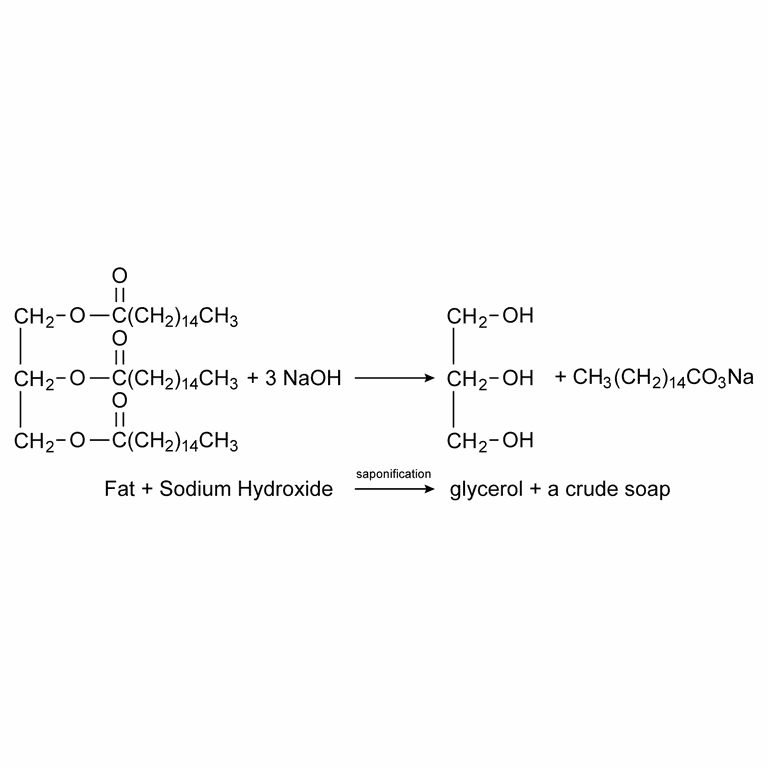
* + 1. Fermentation
    2. Saponification
    3. Hydrogenation
    4. Esterification

Reaction #6: Polymerization

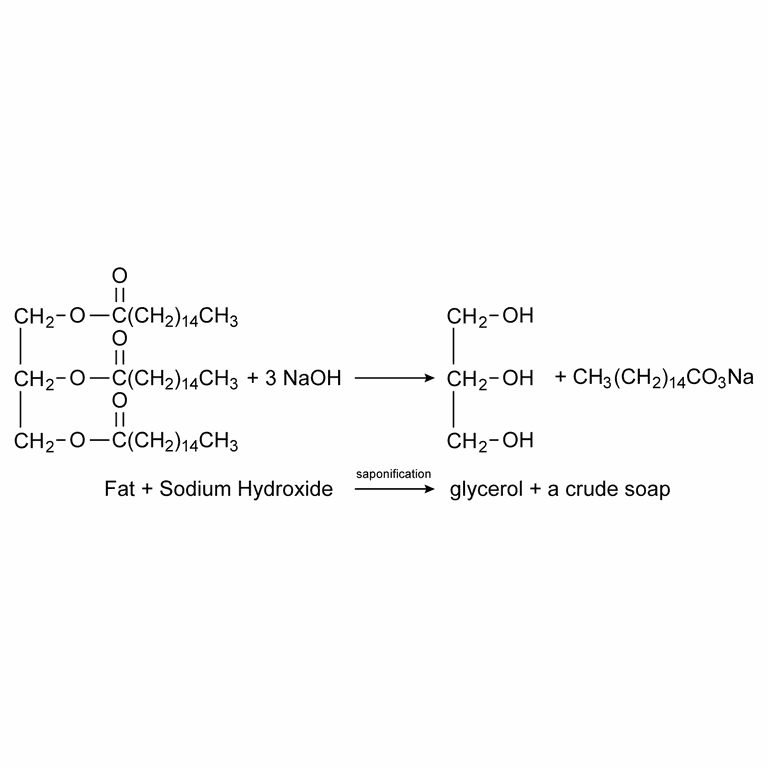
* Small molecules called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** bond together to form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Can be natural (proteins) or artificial (plastics)
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – long chains of sugars
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – long chains of amino acids
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – made of repeating units of sugar
* Addition Polymerization
  + Adding small **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** together by breaking the double bond, to create a large chain
  + Identify by “n” which represents a large number



* Condensation Polymerization
  + Joining **\_\_\_\_\_\_\_\_\_\_\_\_\_** molecules by removing **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (dehydration synthesis)
  + *Question 11:* The process of joining many small molecules into larger molecules is called
    1. Neutralization
    2. Polymerization
    3. Saponification
    4. Substitution



* + *Question 12:* Given the equation:





Which type of reaction is represented by this equation?

* + 1. Combustion
    2. Esterification
    3. Polymerization
    4. Substitution

Reaction #7: Saponification

* Ester breaking down into acid and alcohol
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Produces **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Fat + strong base 🡪 soap + glycerol
  + *Question 13:* In which reaction is soap a product?
    1. Addition
    2. Substitution
    3. Saponification
    4. Polymerization
  + *Question 14:* The hydrolysis of a fat by a base is called
    1. Saponification
    2. Esterification
    3. Polymerization
    4. Neutralization