**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