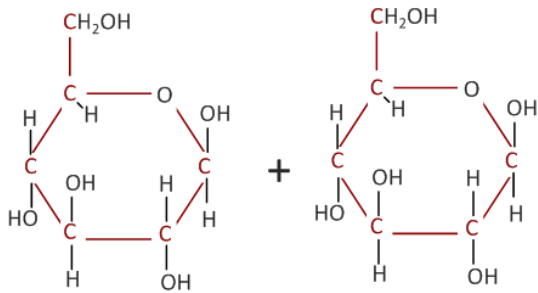


Topic 2.3: Carbohydrates and Lipids

2.3.U1 Monosaccharide monomers are linked together by condensation reactions to form disaccharides and polysaccharide polymers.

1. Condensation of monosaccharides is a polymerization reaction. It can continue to create a longer chain of saccharides (a carbohydrate). These building reactions are part of the anabolic metabolism.
 - a. Define polymer.
 - b. Monosaccharides are quickly and absorbed and readily used in cell respiration to release energy List the three key examples of 6-carbon monosaccharides.
 - c. Annotate and complete diagram below to outline how two monosaccharides are converted into a disaccharide through condensation, producing a glycosidic bond. Include a word equation.

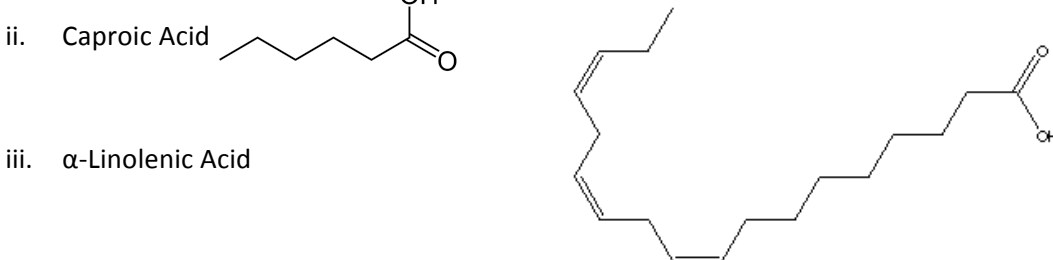
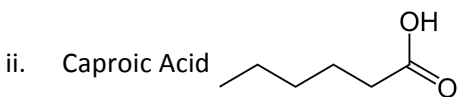
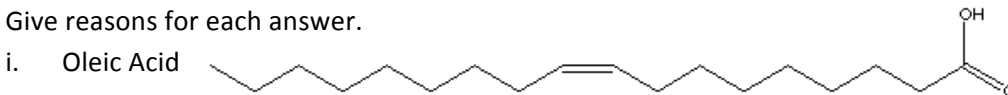


- d. What else is needed to make the reaction occur?
2. Complete the table to summarise the common forms of disaccharides.

Disaccharide	Produced by plants or animals?	Produced from which Monosaccharides?	Commonly found in
	plant		
Lactose	animal		milk
		glucose + fructose	sugar beet and sugar cane

2.3.U2 Fatty acids can be saturated, monounsaturated or polyunsaturated.

3. Fatty acids in the production of lipids.
 - a. Draw the generalized structure of a fatty acid.
 - b. Describe the term saturated when used in reference to fatty acids.
 - c. For each of the following fatty acids deduce whether it is saturated, monounsaturated or polyunsaturated, Give reasons for each answer.



2.3.U3 Unsaturated fatty acids can be cis or trans isomers

4. Unsaturated fatty acids are described as being cis or trans isomers depending on the structure of the double bonds in the fatty acids.
- a. Complete the table to compare and contrast cis and trans isomers.

	Cis-isomers	Trans-isomers
Structural diagram	$\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ -\text{C}=\text{C}- \\ \cdot \end{array}$	$\begin{array}{c} \text{H} \\ \\ -\text{C}=\text{C}- \\ \\ \text{H} \end{array}$
Natural / synthesised	Very common in nature	Rare in nature – usually artificially produced to produce solid fats, e.g. margarine from vegetable oils.
Positioning of the hydrogen atoms		
Shape of the fatty acid chain	The double bond causes a bend in the fatty acid chain	
Packing of the fatty acids (density)		Trans-isomers can be closely packed
Triglycerides formed are liquid or solid at room temperature?		

- b. Identify which isomer is cis and which is trans. Give reasons for your decisions.

