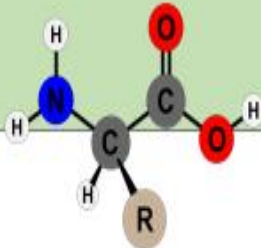
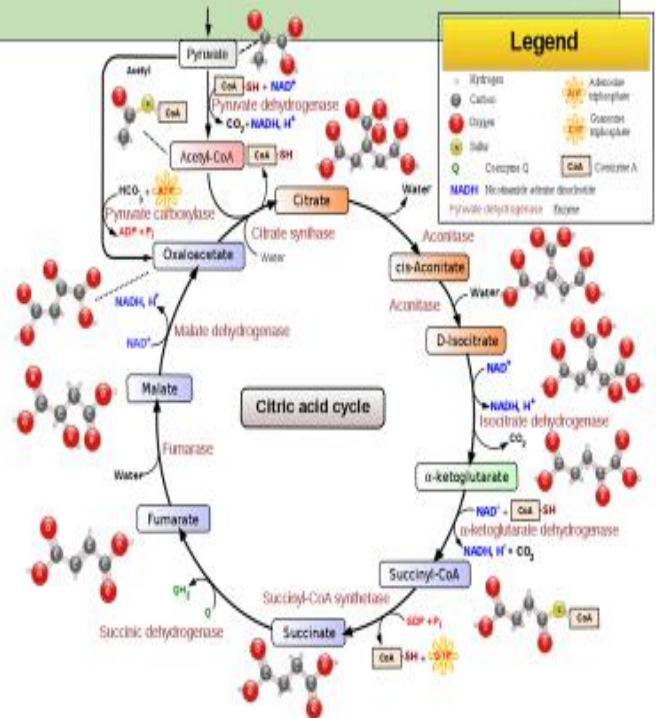


# A-Level Biology Taster session



Welcome back Y11!



Name: \_\_\_\_\_

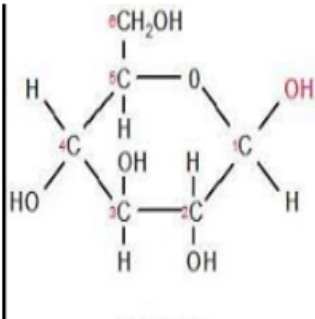
## Biological Molecules:

There are 4 main Biological molecules that we are interested in. You will learn these as soon as you start your A-Level Biology in September:

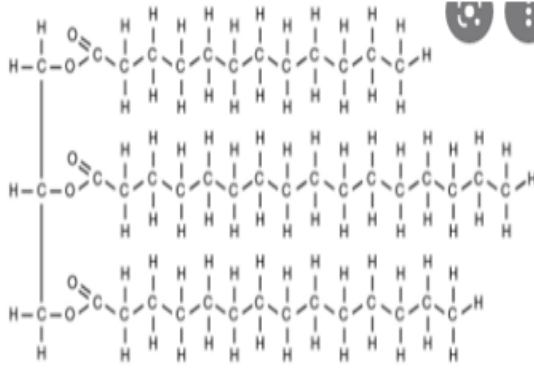
- Carbohydrates
- Proteins
- Lipids
- Nucleic acids

Which one is which?

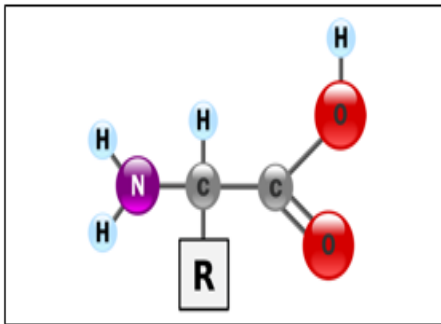
1.



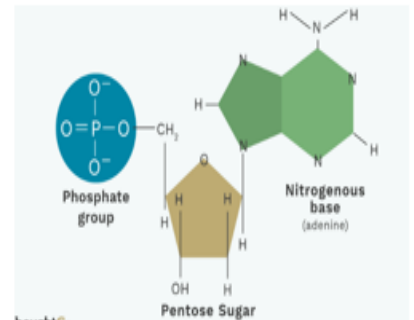
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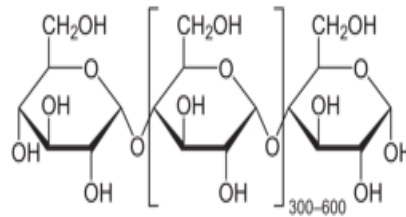
4.



3.



5.



Here are the tests for the different biological molecules. *Read through these carefully before starting any practical work.*

Molecule	Test	Result for positive test (and explanation)
starch	Using a pipette, place a drop of starch solution in a depression in a spotting tile. Add a drop of iodine solution.	<i>A blue-black colour is formed.</i> A coloured polyiodide complex is formed with starch.
reducing sugar (glucose)	Place about 10 cm <sup>3</sup> of glucose solution in a test tube. Add a few drops of Benedict's solution. Stand the tube in the water bath at 100 °C.	<i>A brick-red precipitate is formed.</i> The reducing sugar reduces the copper(ii) ions in the Benedict's to copper(i) oxide. <i>(If a lower concentration of reducing sugar is used, the colour may be green, yellow or orange.)</i>
non-reducing sugar (sucrose)	Place about 10 cm <sup>3</sup> of sucrose solution in a test tube. Add three drops of dilute hydrochloric acid. Shake the tube and place it in the water bath at 100 °C for 5 minutes. Remove the tube and allow it to cool. Add three drops of dilute sodium hydroxide solution and mix, to neutralise the acid.  Repeat the reducing sugar test as above.	<i>A brick-red precipitate is formed.</i> The acid hydrolyses the sucrose into glucose and fructose, which both give a positive Benedict's test.
protein	Place about 5 cm <sup>3</sup> of protein solution in a test tube. Add an equal volume of biuret reagent.	<i>A lilac (mauve) solution is formed.</i> Nitrogen atoms in the peptide bonds of the protein form a lilac complex with copper(ii) ions in the biuret reagent.
lipid	Place one drop of lipid in a clean, dry test tube. Add about 5 cm <sup>3</sup> of ethanol and shake thoroughly to dissolve the lipid. Pour the mixture into a test tube three-quarters filled with cold water.	<i>A white emulsion is formed on the surface of the water.</i> The alcohol mixes with the water, leaving the lipid to form an emulsion of microscopic droplets suspended at the surface.

### Investigation:

Use the methods shown on the information pages above to test each of the 4 substances for the food groups. Each of the substances is made up of one Biological molecule. You need to identify which biological molecule is in each one. One of the biological molecules is missing – which one is it?

<b>Substance</b>	<b>Protein</b>	<b>Lipid</b>	<b>Starch</b>	<b>Reducing sugar</b>	<b>Non-reducing sugar</b>
Substance B					
Substance I					
Substance O					
Substance L					

### Further questions to consider:

1. Which Biological molecule was missing?
2. What do we mean by a 'reducing sugar'? What is being reduced and what is the reducing agent?
3. What might a sugar be 'non-reducing'?
4. Why does the Benedict's solution form a precipitate?
5. What is the purpose of the acid being added to a non-reducing sugar?
6. Why do we then need to add an alkali following the acid?
7. What property of lipids allow them to form an emulsion with ethanol?

### Further reading/research:

- Biological molecules – crash course Biology:  
<https://www.youtube.com/watch?v=H8WJ2KENIK0>
- Biology revision guide - AQA
- Head start on Biology A-Level guide
- Transition material (due for Sept)
- TED talks – a huge amount of fantastic Biology talks to watch in preparation for September.

