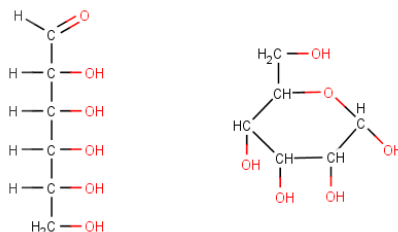
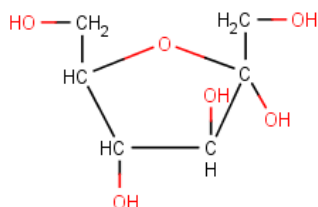


Bring your work with you to class to submit.

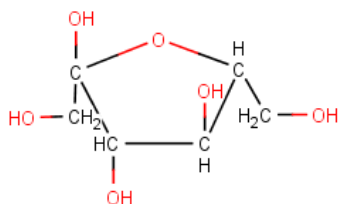
1. Gulose is the C3 epimer of glucose. Draw the linear and cyclical form of gulose.



2. Fructose is the ketose equivalent of glucose. Draw this molecule in the cyclical form with:
a. the anomeric carbon in the α -conformation.

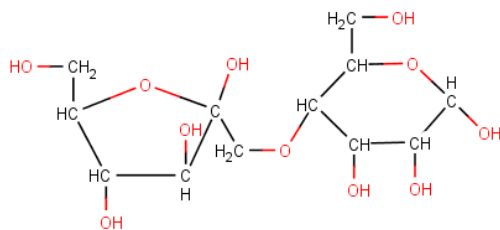


- b. the anomeric carbon in the α -conformation but pointed to the left.

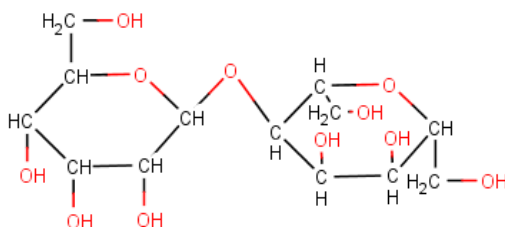


3. Draw the structure of each disaccharide:

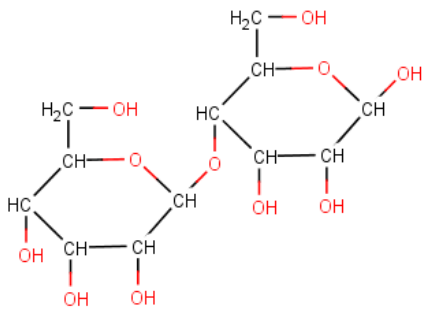
- a. β -fructose (1 \rightarrow 6) α -gulose.



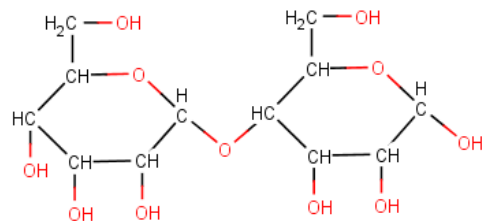
- b. β -gulose (1 \rightarrow 1) α -glucose.



4. Starch and cellulose are both made out of glucose. Humans cannot metabolize cellulose but they are able to metabolize starch.
- What is the difference in these molecules at the disaccharide level? **The orientation of the anomeric carbon.** Draw each disaccharide and clearly label what is different about the two.

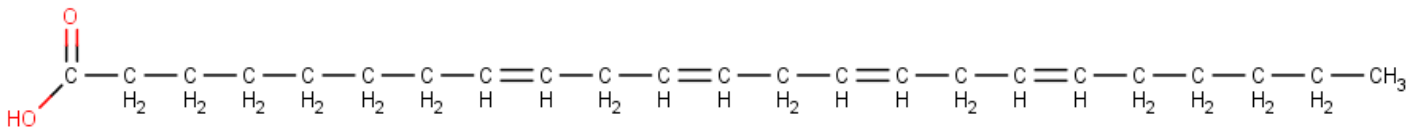


Cellulose

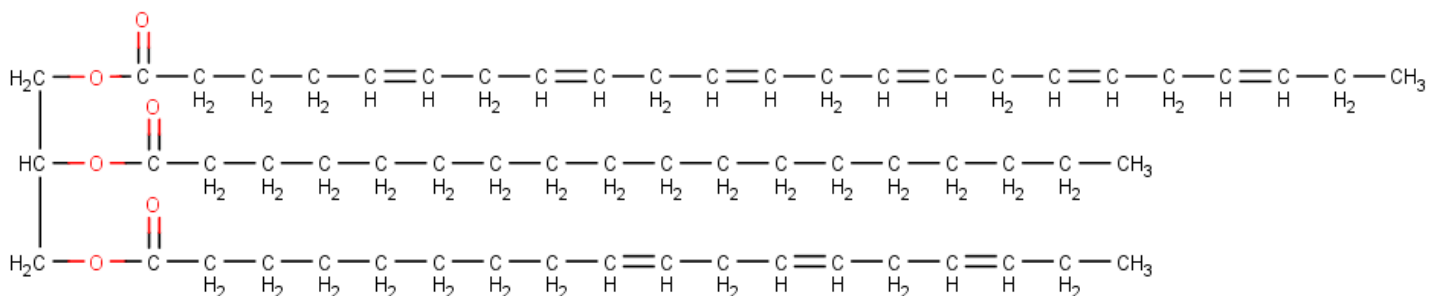


Starch

- How does this small difference in the structure of the disaccharide influence the 3d structure of these polymers. **Starch is a coil with weak interactions. Cellulose forms sheets with really strong interactions.**
 - Humans regularly eat cellulose. How is this molecule processed by our bodies if we cannot metabolize it? **Bacteria in our gut (our microbiome) can digest it and use it for energy.**
5. Draw a fatty acid that is 22:4:n-6



6. Structurally, what is the difference between an omega 3 and omega 6 fatty acid? **The position of the first double bond. Omega-3 has a double bond on the 3rd carbon from the end. Omega-6 is on the 6th carbon from the end.**
7. Draw a triglyceride made of the following fatty acids:
- DHA
 - Stearic Acid
 - α -linolenic acid



8. What is the primary structural difference between a phosphoglyceride and a triglyceride? Phosphoglycerides have a polar group on one of the carbons of glycerol. How does this structural difference influence the role of each of these molecules in your body? The polar group makes phosphoglycerides pack together in bilayers. This is important for biological compartmentalization. The absence of the polar group makes triglycerides very hydrophobic. They pack together in adipose tissue as a very efficient way to store energy.