Name: _____

Class: _____

Carbohydrates_worksheet

Warm-Up Questions:

Read the Khan Academy article on Carbohydrates and answer the following questions:

1) How does our body get energy from complex carbohydrates?

2) What are the two main functions of polysaccharides?

Computational Exercise #1: Molecular visualization of carbohydrates

Question #1: How many chiral carbons does a glucose molecule have? Identify the positions of each chiral carbon and list them below.

Question #2: Take a screenshot of your D-glucose structure in the 3D workspace and paste it below. What do you notice about the directions of each OH group?

Question #3: Based on your observation in Question 2, what conclusions can you draw about wedged and dashed bonds?

![Schrödinger | Education]

Question #4: Sketch your Fischer projection of D-glucose here.

Question #5: What is one advantage of Fischer projections over zigzag structures of organic molecules?
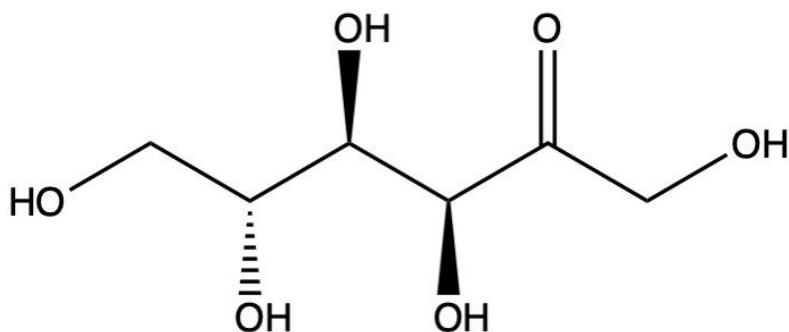
Question #6: Take a screenshot of your poly(alpha-D-Glucose) and poly(beta-D-Glucose) structures side-by-side in the tile view. Paste your screenshot in the table below. What similarities and differences do you observe between the two polymers? Note them down in the table below.

Amylose and cellulose side-by-side screenshot:	
Similarities	**Differences**

Individual Exercise:

Recall from Section 3.1 of this lesson that apart from glucose, **fructose** is also another well-known monosaccharide and is the natural sugar found in fruits. Fructose has the same chemical formula as glucose, but the way the atoms are arranged in each carbohydrate molecule differ.

1) Repeat **steps 1- 4** of Part 1 of the computational exercise for a **fructose** molecule instead. The zigzag structure of fructose is given below.

2) Take a screenshot of your fructose molecule in the 3D workspace and paste it below.

3) Take a screenshot of your fructose and D-glucose structures side-by-side in the tile view. Paste your screenshot in the table below. What similarities and differences do you observe between the two monomers?

Fructose and D-glucose side-by-side screenshot:	
Similarities	**Differences**

4) Draw a Fischer projection of a fructose molecule.