Macromolecules Case Studies: Rob and Lena

Rob is an athlete on the high school football team. He’s feeling quite a bit of pressure to perform well this season because it’s his junior year and the college scouts will be at many of the games looking for local talent. He’s sitting down at the lunch table with one of his good friends, Lena...

“Hey Rob, what the heck are you eating?” Lena’s nose scrunches up to show her disapproval of Rob’s meal.

“Give me a break. I’m trying to improve my game… something you wouldn’t know too much about.” Rob gives Lena a playful jab.

“Very funny, but really, what IS that?”

“Ok, ok, it’s a protein/carb shake that supposed to help me build muscle over time and give me energy to last me all the way through the rest of the school day and through practice this afternoon.”

“It’s look nasty. Can I see it? I want to look at the ingredients.”

Rob hands the shake over to Lena.

“Ok, let’s see... Ingredients... water, high fructose corn syrup, amino acid blend, yellow food dye #3... even the ingredients sound disgusting!”

“Yeah, maybe, but it’s worth it. I need to have a good season this year. The scouts have to notice me. So if it means I drink this yellow weird stuff, then that’s how it is.”

“Well, I can see how what you eat affects your energy, but I don’t understand how it affects building muscle. I mean, why don’t you just go to the gym and lift weights like a normal person?”

“I still have to go to the gym and lift weights, but this is supposed to help me build muscle faster. I don’t know how. Stop asking so many questions!”

Your Task: Answer each of the questions below (#1-3) on the back of this paper. Make it neat! You are turning this in!! Question # 4 should be answered on the BIG PIECE OF PAPER you are given.

1. What are the two claims of the protein/carb shake that Rob is trying? (i.e. what two things does he expect it to be able to do for him?)
2. Analyze the ingredients of the shake. Which of the ingredients are macromolecules/monomers? What kind of macromolecule(s)/monomer(s)?
3. Based on the ingredients and type of macromolecule they represent, evaluate whether or not the drink will actually help Rob accomplish the two goals mentioned in #1. This should be a TWO PART answer. There were TWO goals that Rob had in mind. Evaluate each one separately keeping in mind to explain in full detail how the macromolecules in the drink will/will not help with that goal.
4. Using your big piece of paper, your paper macromolecules, markers, crayons, glue, tape, and your creativity, create a detailed diagram showing the following...
   a. A depiction of the drink with the macromolecules it contains
   b. A depiction (maybe a flowchart) how the macromolecules in the drink do/do not help Rob with goal #1.
   c. A depiction (maybe a flowchart) how the macromolecules in the drink do/do not help Rob with goal #2.

Names of Group Members__________________________________________________________

Answer Questions #1-3 here...

1. Rob expects that the protein/carb shake will help him to build muscle and give him energy to last throughout the day.

2. High fructose corn syrup has fructose in it. Fructose is a monosaccharide, which is the building block for carbohydrates (a macromolecule). Amino acids are the building blocks for protein (a macromolecule).

3. Rob expects that the shake will help him build muscle. The shake contains amino acids. The amino acids will help him to build muscle because muscle is made out of protein. When you eat amino acids, your body can use those amino acids as building blocks to build up your own muscle. Rob also expects the shake to give him energy to last throughout the day. Unfortunately, the shake will not be able to live up to that expectation. It contains fructose, a monosaccharide, which is a simple carb. Simple carbs are digested very rapidly in the body which gives the person an initial burst of energy (making them hyper), but then the energy is used up so they become very tired (crash).