Macromolecules Concept Questions

1. Explain the relationship between monomers and polymers, using polysaccharides as an example.
2. a) Plants make a huge amount of cellulose each year which could be an excellent source of glucose as food for humans and other organisms. Why is it not?
   b) Although it can't be digested, why is fibre (*i.e.*, cellulose) considered to be an important part of a healthy diet?
   c) Wait a second, how can herbivores like cows eat grass as the largest part of their diet?
3. Lipids and carbohydrates can both be used as energy by cells. If you need quick energy, which might you choose to eat?
4. Which of these things is not like the others?
   a) fiber (b) sugar (c) starch (d) cellulose (e) fat
5. How does the structure of an unsaturated fatty acid differ from the structure of a saturated fatty acid? Give an example of a food that contains each.
6. Explain why some fatty acids are solid at room temperature while others are liquid. '
7. When you consume more food than you need for energy, the excess can be stored in the form of lipids. Why are lipids particularly useful for this purpose?
8. a) What property do all lipids share?
   b) How does this make them ideal for building cell membranes?
9. Suppose a membrane surrounded an oil droplet, as it does in the cells of plant seeds and in some animal cells. Describe and explain the form it might take.
10. What effect does hydrogenation have on fatty acids?
11. a) Cholesterol usually gets a bad rep in the media. What makes it a health risk?
    b) Should we try to eliminate it from our diet? c) Do we need cholesterol?
12. a) Why is a protein called a polypeptide?
    b) Why is a polypeptide not a protein?
13. Why are some amino acids soluble in water while others are not?
14. Although some people are vegetarians and therefore not eating meat, why do they need to make sure to include meat alternates in their diet?
15. Explain how the 3-dimensional shape of proteins is formed.
16. Discuss a couple of the interactions that can occur between the R groups of an amino acid sequence.
17. a) Some parts of amino acids are common to all amino acids while other parts are unique. Explain
    b) How does having different R groups make amino acids ideal building blocks for proteins?
18. a) Which elements are found in proteins but in neither carbohydrates nor lipids.
    b) Which element is found in nucleic acids but in neither carbohydrates nor proteins?
19. a) You connect a molecule of ribose, a phosphate, and a molecule of cytosine. What have you made?
    b) Why can you not say you've made a nucleic acid?