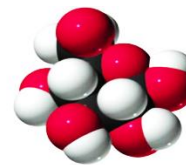


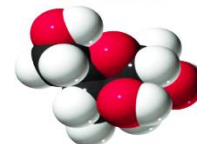
Sweet Science of Candymaking
Laboratory Worksheet for Article by Tom Husband

1. Nearly all candies start from dissolving sugar (sucrose) in water and setting over heat. What accounts for the vast differences between candies such as caramels, fudge, rock candy, and peanut brittle?



D-glucose

2. Sucrose is a dimer, made up of two smaller monosaccharides, named _____ and _____.



D-fructose

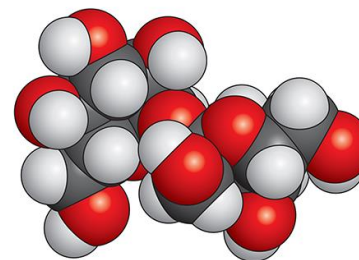
3. Draw an image of the structure of sucrose below from Figure 1. Understand that at each point on the cyclic structures there is a carbon atom. You don't need to indicate this, however, just draw the structure as you see it. Pay attention as to whether the hydroxyl (-OH) groups are indicated above the cyclic rings or below them.

4. Describe what happens to sugar crystals when they are dissolved in water.

5. Describe mechanistically how *dissolving* is different from *crystallization*.

6. When a solution is said to be *saturated*, what is happening?

7. Define *dynamic equilibrium*.



8. How does heat affect the ability of water to hold solute particles (sucrose)? Does hot water accept a higher concentration of solutes or lower?

9. Briefly describe LeChatelier's Principle.

10. Considering LeChatelier's Principle, when heat is added to a sugar/ water candy system, how does the system respond in order to bring the temperature down?

11. As the bonds between fructose and glucose break apart in a sucrose molecule, is this an exothermic or endothermic reaction? Explain.

12. Still considering LeChatelier's Principle, when heat is removed from the candy system, how does the system respond in order to bring the temperature up?

13. As bonds form between sucrose molecules as they rejoin the crystal, is this an exothermic or endothermic reaction? Explain.

14. Why is there such a risk of crystal formation when the temperature of the candy system is decreased?

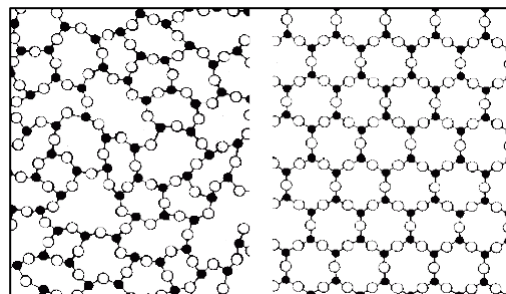
15. When making fudge, we want millions and millions of tiny crystals, so small they cannot be perceived on the tongue as feeling “grainy.” What can we do to the candy system to ensure the formation of millions of these crystals?

16. When making fudge, why do we want the candy system to cool very quickly and not slowly?

17. Name some candies that do not form crystals at all.

18. Where does *glass candy* get its name from?

19. What is meant by the term, *amorphous structure*, when discussing glass?



20. How is the binding of sucrose molecules in glass candy different from that in crystalline candy?

21. What is added to gummy candies to make them more rubbery and pliable?

22. What is done to marshmallows to create more volume?
23. Cakes and marshmallow candies are culinary foams. What is a foam?
24. Describe the process by which cotton candy is made.
25. Two factors play a key role in the way texture is developed in candies. What are those two factors?
- a.
 - b.
26. Describe the way the syrup is handled to prepare the below candies:
- a. rock candy
 - b. fudge
 - c. gummies, marshmallows, cotton candy