Bread Due: April 5th by 5:00 PM

Please submit your answers via the course website.

1. Leaveners:
    a. What is a leavener? Something that makes bread dough rise (produce CO_2)
    b. How do chemical leaveners work? Triggered by acid, sodium bicarbonate releases CO_2
    c. What is the difference between baking powder and baking soda? Baking powder contains an acid and sodium bicarbonate (the CO_2 source) – just add water and the reaction begins. Baking soda, on the other hand, needs an acid to be added to the mixture to be activated.

2. Why does the outside of bread turn brown during baking but not the inside? It reaches a temperature where the Mallard reaction can occur – this is a chemical reaction between proteins and sugars.

3. What are the two main categories if gluten protein in flour? Gliadins and glutens Describe the properties of each. Gliadin – small spherical shaped proteins that don't interact with many other things Gluten – long elastic protein that will readily interact with other gluten proteins. Interactions happen through sulfur bonds at the ends of the protein as well as through interactions in the body of the protein.

4. What happens when a baker lets dough "rest"? The gluten proteins are given enough time to interact – this will strengthen the gluten network.

5. Describe how the gluten network forms in bread flour. Make sure to discuss the role of sulfur, oxidizing agents, and water. Gluten proteins become lengthened by the sulfur atoms at the end of each chain reacting with oxygen to form S-S bonds. Water coats the proteins so that they are free to move around and interact with each other. When they interact, they stick together forming the network.

6. What is the main difference between batter and dough? The ratio of gluten to water. Batter has more water while dough has more gluten

7. Consider each of the following. State whether it will strengthen or weaken the gluten network.
    a. Salt strengthen
    b. High protein flour strengthen
    c. Oil weaken
    d. Shortening weaken
    e. Butter weaken
    f. Oxygen strengthen
    g. Milk (we didn't talk about this in class, but think about what you learned about milk and you'll be able to answer this) Primarily weaken - It will dilute the network (making it weaker) and add some fats (making it weaker)

8. Flour contains sugar. How is that sugar packaged? In starch granules.

9. During baking, the air pockets present in the dough expand.
    a. Why? As gases heat up, they naturally expand.
    b. As we discussed, gluten is elastic and plastic. Based on this, why doesn't the dough collapse back to its original size when it cools back to room temperature? At this point, the water has all evaporated from the gluten proteins – his makes it lose its plasticity, so it is locked into a shape and cannot recoil back to the original shape.

10. For each category (geography, culture, food, must see), list two things that you learned about Nice.