**Sourdough Starter Project**

**5.02 Understanding fermentation and its influence on food quality and food safety**

Over the course of the next week or two, you are going to be further exploring your sourdough starter. Before spring break, you and your team made sourdough starter and then you left it. I took the starter and refed it so that all of you would have some sourdough starter to spread the wealth.

Thursday, 03/27- Made Sourdough Starter.

Friday, 03/28- Made Sourdough and traditional pancakes.

Friday, 04/04- Refed two of the starter batches. There was 1 ½ cups of starter from each, making that 3 cups of starter. There was a weird liquid on top of the starter. You will explore what that was. I then added six cups of flour and six cups of water. I mixed it thoroughly and put it back in the fridge.

Monday, 04/07- Each of you will be given a ½ cup of starter to take home. Add 1 c of water and 1 c of flour today before you go to bed! Mix the batter thoroughly so that there are no chunks. Put it back in the fridge if you are not going to use until the weekend, if you plan to bake tomorrow or the next day leave it on the counter. *Foods II non-honors students: keep your starter out of the fridge!*

Tuesday, 04/08- Decision day… What are you going to make? Today, either do nothing to the batter and let it sit in the fridge and ferment or if it on the counter in a jar or bag you need to start taking a whiff and get ready to bake. If it is bubbly, has risen, and has a pleasant sour smell, it is ready to use. If the mixture is pink, orange, or any strange color throw it out. If it is ready to use, you will reserve a ½ c of the starter mix and use the remaining cup for your recipe.

**Foods II Honors:** Find a recipe that calls for a sourdough starter mix. This could be bread, pretzels, cakes, muffins, tortillas, or crackers. Sky is the limit. Use the starter mix when it is bubbly. If it has been in your fridge, put it on the warm counter to get it bubbly and smelling sweet again. Reserve a ½ cup of starter mix to keep your project going. Bring your sourdough dish to class for us to sample. If you are baking on the weekend, plan accordingly to bring in your dish to class on a school day.

With the remaining starter (your reserved ½ c), add 1 c of flour and 1c of water. Start the process over and bring to class ½ c of the starter to show that you did the project. Keep the rest and feed it to make an additional sourdough dish of your choice.

Tuesday, April 15th- all sourdough dishes must have been brought to school. In addition:

1. Fill out the questions provided.
2. Bring a copy of the recipe.
3. Bring back at least a ½ cup of starter.
4. Have your parent sign that you kept a starter at home and what you plan to bake in the future.

**Foods II non-honors:** You will be following the Amish Friendship Bread Recipe provided. Today is Day 4 of the recipe. On Day 11 you will bring in your Amish Friendship bread for everyone to try. You will also bring in at least one of your “Amish Friendship Bread” pass-alongs (the starter to give away). This means your project is due on Tuesday, April 15th.

You will need to have completed the questions and bring in a bag of starter and a loaf of your Amish Friendship Bread. You will also need to let us know if you made any additions or amendments to your Amish Friendship Bread Recipe (ie: nuts, pudding mix, fruit, etc).

**Amish Friendship Bread Recipe for Foods II Non Honors**

Day 1-5: Squeeze the bag.

Day 6: Add 1 cup of flour, 1 cup of sugar, and 1 cup of milk right into the bag. Be careful for any leaks or tears. Mix the contents by using a spatula or by squeezing the bag.

Day 7-9: Squeeze the bag.

Day 10: In a large plastic bowl, combine the batter, 1 ½ cup of flour, 1 ½ cup of sugar, and 1 1/3 cup of milk. With a wooden spoon, mix the ingredients together. Pour four, 1 cup starters into large ziplock bags like the bag you already have. Keep one of the starters for yourself, and give the other three starters to your friends along with a copy of these instructions.

To the remaining batter in the bowl, add 1 cup of oil (or ½ cup of oil and ½ cup of applesauce), 1 cup of sugar (or ½ cup of Splenda sugar baking mix), 1 t vanilla, 3 large eggs (or ¾ cup of egg beaters), 1 ½ t baking powder, 2 t cinnamon, 2 c of flour, ½ c milk, ½ t baking soda, and 2 small boxes of vanilla pudding (you can use sugar free fat free vanilla pudding, as well).

You can also add some nuts or put in some dried fruit, if you choose.

In a separate bowl, mix 1 cup of sugar (or Splenda sugar mix) and cinnamon to create a cinnamon sugar mix.

Grease two loaf pans. Sprinkle the cinnamon-sugar mix into the bottom and on sides. Pour the batter into the pans. Sprinkle with the remaining sugar and cinnamon mixture.

Bake at 325 degrees for about one hour, or until the toothpick comes clean.

**Fermentation Observations and Questions:** Use the reading, textbook, and your fermentation exploration to answer.

Type these answers on a separate document.

1. When were the first wines thought to have been made?
2. Describe the first time someone might have been drunk and their hangover.
3. Use this table to better understanding fermentation history.

|  |  |  |
| --- | --- | --- |
| Region/Country | Years | What were they fermenting? |
|  |  | Meade-honey wine |
|  |  | Chicha |
|  |  | Octli |
|  |  | Malted Barley |

1. Where does the word fermentation come from? How was this named derived- what observations were made?
2. How do traditional wine makers transfer microorganisms into the wine making process?
3. Define yeast.
4. Describe the contributions of each of these scientists.

|  |  |
| --- | --- |
| Scientists | Contributions to Common Understanding of Fermentation |
| Leeuwenhoek |  |
| Lavoisier |  |
| Gay-Lussac |  |
| Cagniard |  |
| Pasteur |  |
| Bigo |  |
| Buchner |  |
| Karl Lohmann, Yellapragada Subbarao, and Cirus Friske |  |
| Lipmann |  |

1. What are ALL of the products or components that go into the process of fermentation?
2. Fermentation is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of yeast multiplication. The yeast have to be \_\_\_\_\_\_\_\_\_\_\_\_ for alcohol to be produced.
3. What is the difference between alcoholic and lactic acid fermentation? Why did the beets used by Bigo not produce fine brew?
4. What is glycolysis?
5. When and why did glycolysis evolve?
6. What is glucose converted into during glycolysis?
7. What two routes can pyruvic acid take?
8. What are the two byproducts of fermentation?
9. Which byproduct are we most concerned with in our food science courses? Why?
10. What does the accumulation of alcohol do to the yeast cells?
11. How are wine and beer alcohols produced differently than liquors?
12. How is fermentation so essential for the agriculture and food science industries?
13. Rewrite the summary in your own words, in three sentences.

|  |  |
| --- | --- |
| Observations of Fermentation | What is happening? Use your scientific language and knowledge here. |
| Initial bubbling |  |
| After a few days, a layer of liquid floats on top of the sourdough |  |
| The starter is bubbling and rising up |  |

**Starter Sourdough Affadavit**

My son/daughter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ performed the fermentation process project and has kept ½ cup of sourdough starter at the house.

Within one week, he/she will use the sourdough starter to make our family \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_

*Sourdough Starter Care: Keep out until your starter is bubbly again and then put in the fridge for up to one week. After one week, use or “feed” it again with equal parts of water and flour (1 cup). Remove ½ c starter (discard) before feeding!*