Standard 11 Food Science

FCS-FS-11. Students will discuss the principles of fermentation.

a. List the reasons that food is fermented and identify food products that result from fermentation.

b. Differentiate among yeast, bacterial, and mold fermentation.

c. List the factors that impact the growth of single celled organisms.

d. Describe the process of pickling, making vinegar, and making yeast breads.

Essential Questions:

- What is fermentation?
- What food products result from fermentation?
- What is the difference between yeast, bacterial, and mold fermentation?
- What factors impact the growth of single celled organisms?
- How is fermentation involved in the process of pickling, making vinegar and yeast breads?

Standard 11

Notebook Requirement	Possible Points
Fermentation Notes	20
Growth and Importance to the Food Industry Article	20
Standard 11 computer Lab assignment	20
Chapter 17 Crossword	20
Check Your Understanding page 399	20
Total	100

Standard 11
Fermentation

Fermentation
Has been a method of preserving food for centuries.
Mold and yeast are fungi.
Fermentation- Ingredients added to food mixtures along with carefully controlled conditions such as temperature and lack of oxygen promote fermentation

In fermentation
a.
b.
c.
d.
Lactic acid bacteria (lacto bacillus) convert lactose in milk to lactic acid which changes milk into curds and whey from which cottage cheese, yogurt and cheese are made.
Yeast and bacteria involved in fermentation survive in an anaerobic environment.
Yeast is crucial to the commercial industries involving beer and wine.

Pickling
Pickling", also known as "brining" or "corning",
_____
_____
_____

, or marinating and storing it in an acid solution, usually vinegar (acetic acid). The resulting food is called a **pickle**. This procedure gives the food a salty or sourtaste.

Yeast
One celled _____.
When added to grapes, the yeast eat the sugar and produce alcohol.
Alcoholic fermentation formula- $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + CO_2$.

In bread making, the yeast _____r and produces CO_2 (a gas) which causes bread to _____
During fermentation, carbon dioxide bubbles form: acidity increases which helps breakdown starch into sugar and suppresses the growth of bacteria.

Molds
Made up of more than _____
Vegetative mold cells take in food from the organism for energy and new cell material.
Molds reproduce through _____
Molds can survive in saltier, more acidic conditions; they cannot survive in anaerobic environments.

Molds produce stems which is called a _____. Fruiting bodies produce spores which settle on a substance and grow mold
_____.
Molds are detrimental and beneficial to the food industry
Molds produce toxins which can be poisonous and are linked to cancer.

Some molds are beneficial because they add flavor to cheeses such as Stilton, Gorgonzola, and Blue Cheese.
Molds contribute to the making _____.
Molds make ascetic and lactic acid which are important to the production of many enzymes.
Most important contribution of molds is in the production of penicillin.

In your notebook
Next Page: Use chapter 17
a. List the reasons that food is fermented and identify food products that result from fermentation.
b. Differentiate among yeast, bacterial, and mold fermentation.

Chapter 17 Define the following use the Food Science Book:

1. Microboiology
2. Microorganism
3. Microbe
4. Monera
5. Fungi
6. Bacteria
7. Micrometer
8. Cytoplasm
9. Bacilli
10. Cocci
11. Spirilla
12. Gram's stain
13. Aerobic
14. Anaerobic
15. Faculatative
16. Fungus
17. Hyphae
18. Mycelium
19. Spore
20. Mold
21. Yeast
22. Pure culture
23. Starter proteolytic

Create one of the following using 15 of the vocabulary words:

- Story
- 1 page summary
- Crossword with clues and a key
- Quizlet
- Kahoot

If you use all 30 you will get an extra 100

24. Lipolytic

25. Halophic

26. Genus

27. Species

28. Pasteurization

29. Fermentation

30. By-product

31. Brine

32. Curd

Complete Chapter 17 Check Your Understanding page 399

Growth and Importance to the Food Industry

1. If a yeast can grow at a low temperature it is said to be _____
2. At what temperature are wines and beer fermented?
3. How do bacteria multiply?
4. How does yeast reproduce?
5. What is another way yeast can multiply?
6. What conditions can yeast grow in?
7. What types of food can bacteria cause spoilage?
8. What are molds?
9. What family are molds apart of?
10. What is an example of mold that you can find in a shower?
11. Mold are made up of more than one _____
12. How can vegetable mold cells sustain the organism?
13. Molds can survive both _____ and _____ temperatures.
14. Molds can grow both on the _____ and _____ the surface of foods.
15. Molds produce a _____ consisting of several _____. Together these form a _____ body.
16. Mold spores are abundant in the _____
17. What happens if a food is allowed to stand in the open?
18. Why are molds important to the food industry?
19. What problems can molds cause?
20. What are the best known uses of molds?

Standard 11 Students will discuss the principles of fermentation.

Research using the internet:

Element A

1-List 3 reasons why food is fermented:

1-

2-

3-

2-Name 10 food products that are fermented:

1-

2-

3-

4-

5

6-

7-

8-

9-

10-

Element B

1-What is yeast fermentation?

2-What is the process of yeast fermentation?

3- What is bacterial fermentation?

4-What is the process of bacterial fermentation?

5- What is mold fermentation?

What is the process of mold fermentation?

Element C

1-What is the difference between the 3 types of fermentation? Yeast, bacterial, and mold

Element D

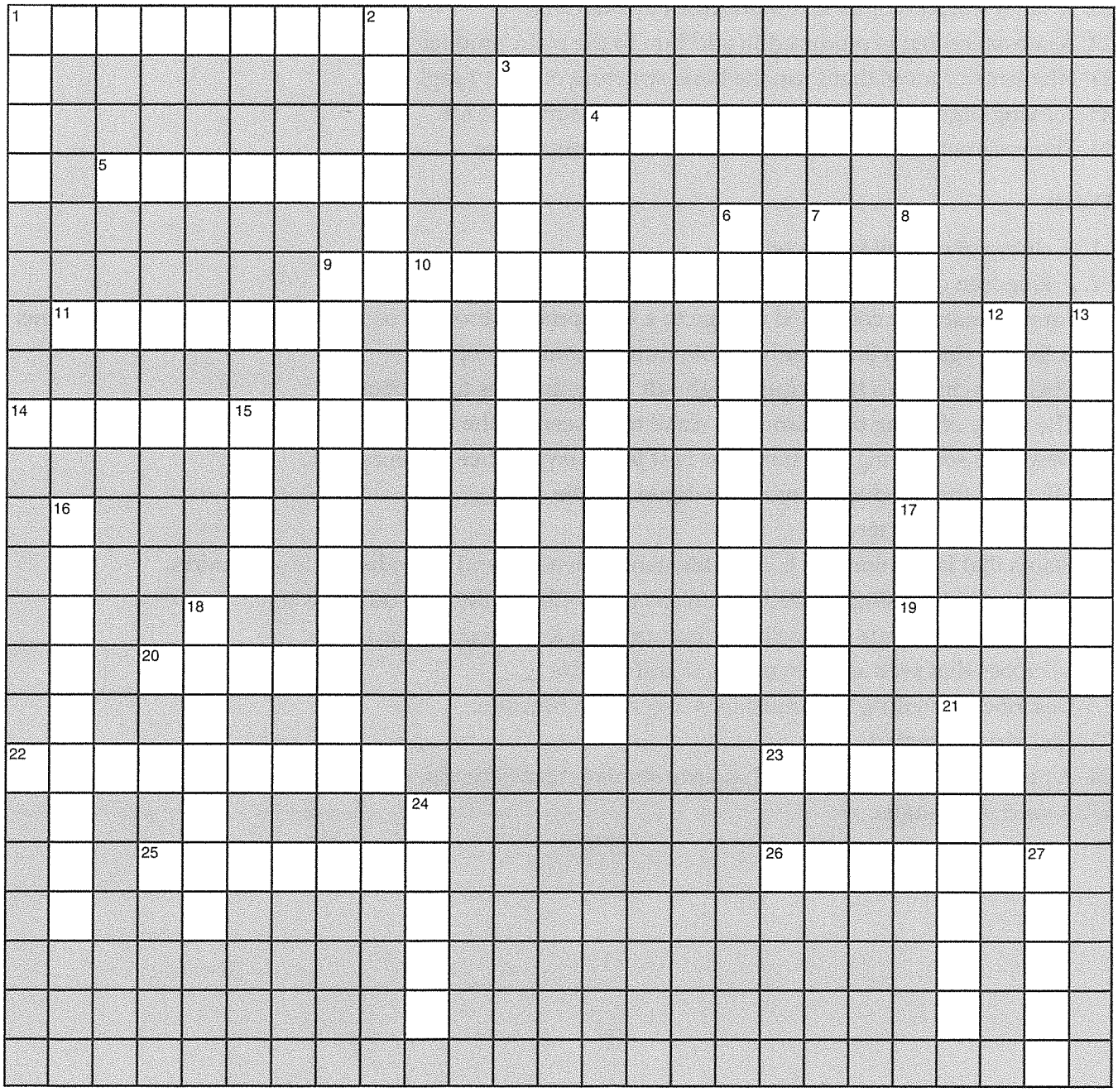
1-Describe the step-by-step way of processing pickles, then draw the steps of making pickles or paste pictures:

2-Describe the step-by-step process of making yeast bread (not a quick bread), then draw the steps of making yeast bread or paste pictures:

Chapter 17
Fermentation: Desirable Effects of Microbes
Microbes

Name _____ Date _____ Period _____

Read the definitions on the next page and write the appropriate terms in the crossword puzzle.



(continued)

Across

1. A gelatinous liquid that fills the rigid cell walls of bacteria.
4. A branched network of hyphae.
5. A pure _____ is a large volume of one type of microbe purposely grown in a nutrient media.
9. A process in which a liquid is heated until spoilage bacteria have been destroyed.
11. A substance containing microorganisms that is added to food to bring about desired flavor, texture, and/or color changes.
14. One-thousandth of a millimeter.
17. A mixture of salt and water.
19. Spherical bacteria.
20. A single-celled fungus that reproduces by budding.
22. A substance that is produced in addition to the main product of a reaction.
23. Filaments or tubes that form the basic structure of most fungi.
25. A living organism that is only visible through a microscope.
26. The basic category of a classification of living organisms.

Down

1. A clump of coagulated protein.
2. A kingdom of organisms in which most biologists classify bacteria.
3. An enzymatically controlled change in a food product brought on by the action of microorganisms
4. A living organism that is only visible through a microscope.
6. Describes microbes that require high salt concentrations to function.
7. The study of living organisms too small to be seen by the unaided human eye.
8. Describes something that functions best in an oxygen-free environment.
9. Microbes that produce enzymes to digest protein are _____.
10. Spiral-shaped bacteria.
12. Plants that lack chlorophyll, have filament structures, and reproduce through spores.
13. Extremely small single-celled organisms that multiply through cell division.
15. A fungus that forms a mycelium structure with a fuzzy appearance.
16. Microbes that produce enzymes to digest fats are _____.
18. Describes something that must have oxygen to function.
21. Rod-shaped bacteria.
24. A group of living organisms that have similar characteristics.
27. A seed of a fungus.