PROFILES

Professional Reflection-Oriented Focus on Inquiry-based Learning and Education through Science

Biology ... What a Pizza!!!

Teacher Guide

The aim of the project is to guide students to a "scientific" approach in the study of chemical and physical phenomena of everyday life. The "chemistry" is often seen as a subject unconnected with reality, which is applied in specialized laboratories, where it is difficult to access. Generally students do not think that chemical transformations occur constantly in everyday life and that the kitchen can be considered a real laboratory. Therefore they should see through new eyes what happens to food during the preparation and cooking of pizza, they must present the **hypotheses** that explain the changes taking place and develop experimental activities. The **experimental activities** should be simple, reproducible and significant as well as able to **confirm** or invalidate the hypothesis.

In addition, by the study of the leavening, students are faced with the alcoholic fermentation which can provide the teacher numerous **suggestions for a debate**:

- What is the fermentation?
- There are other forms of fermentation in addition to the alcoholic fermentation?
- All organisms use this method to obtain energy?
- What is the difference between respiration and fermentation?
- Which mode is used by our cells?
- When the muscle fibro cells use lactic acid fermentation?

This module, thanks to the specific mode of approach to the study of the phenomenon, also allows you to:

- Encourage the motivation to learn through teamwork;
- Connect the academic world to the professional world of enogastronomic culture;
- "Learn to learn" for a meaningful learning;
- Combine an experimental activity to a series of mental processes that involve the knowledge of some basic concepts of biochemistry (structure and function of proteins, structure and function of starch).

With regard to the specific contents, at the end of this module students should be able to:

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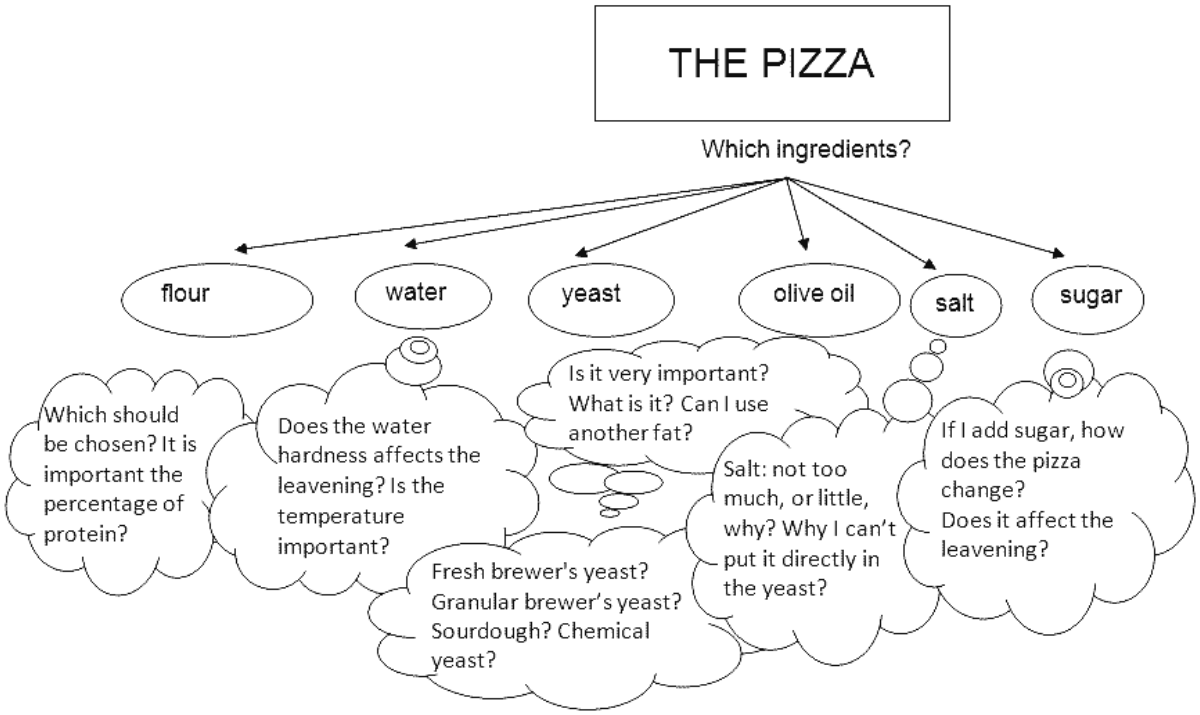
- Know the meaning of the "strength of a flour" and the role of proteins (gliadin and glutenin) in the leavening;
- Identify the physical factors limiting the leavening (temperature, time, humidity);
- Identify the chemical factors (salt, sugar, fat, water hardness) that are important in the leavening and their influence on the Saccharomyces activity (osmotic pressure, nutrient factors or inhibiting);
- Explain the physical changes that occur during the leavening (increase in volume, increase elasticity, development of large bubbles) and the cooking (increase in the volume of the bubbles for the thermal expansion of gases, caramelization of the sugars and the Maillard reaction for the color change and development of characteristic aromas);
- Describe, at the macroscopic and microscopic level, what happens during the leavening and cooking;
- Measure quantitatively the developed carbon dioxide.

The map of ideas ….



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