Lesson Plan

How to produce olive oil from olives

School: IC "Libero Andreotti"	**Teacher:** Stefania Porciani
Title : **Olive Oil Production - A Computational Journey**	**Time :** 2-3 class sessions
Subject : *Italian , ICT, Science, Art*	
Aim: ● To introduce students to the life cycle and characteristics of the olive tree. ● To develop curiosity, observation skills, and a scientific approach to exploring nature. ● To understand the natural cycles involved in olive oil production. ● To identify connections and relationships in the natural world.	
Key CS elements: decomposition, pattern recognition, abstraction, practicing algorithms	
Age group : Primary school 8 - 9 years old	
Learning situations: class, art room, computer lab, school garden and olive farm.	**Activity type :** individual work, group work; cooperative learning
Resources : ● Olives (real or plastic replicas) ● Pictures or diagrams of olive oil production steps ● Classroom materials (whiteboard, markers, paper)	

Learning development:

1. Decomposition

Activity 1: Understanding Olive Oil Production (30 minutes)

- Begin with a discussion about olives and their use in making olive oil.
- Decompose the olive oil production process into smaller, understandable steps.
- Create a simple list or diagram on the whiteboard showing the sequential steps in olive oil production

2. Pattern Recognition

Activity 2: Identifying Patterns in Production (45 minutes)

- Show pictures or diagrams of each step in the olive oil production process.
- Discuss patterns and commonalities among the steps, such as crushing, pressing, and extracting.
- Ask students to identify and label these patterns on the diagram.

3. Abstraction

Activity 3: Abstraction of Production Steps (45 minutes)

- Abstract the key principles of each production step, focusing on what happens to the olives.
- Discuss the concept of extraction, transformation, and the end product (olive oil).
- Encourage students to think abstractly about how each step contributes to the final product.

4. Algorithm Design

Activity 4: Designing an Olive Oil Process (60 minutes)

- Challenge students to think algorithmically and design a more efficient process for making olive oil.
- In small groups, have students sketch and describe their optimized olive oil production process.
- Encourage creativity and problem-solving as they modify the existing steps.

Algorithm: Olive Oil Production

Materials: Olives, olive press, crusher, separator, containers, and other equipment used in olive oil production.

Step 1: Harvesting (Timing varies based on olive maturity)

- Harvest ripe olives from the olive trees using manual or mechanical methods.

Step 2: Sorting Sort the harvested olives to remove leaves, twigs, and other debris.

Step 3: Washing

- Wash the olives thoroughly to remove dirt and dust.

Step 4: Crushing

- Crush the cleaned olives into a paste using a crusher or grinder. This process breaks the olives' cell walls and releases the oil.

Step 5: Malaxation

- Mix the olive paste to facilitate the coalescence of oil droplets into larger ones. This process improves oil extraction efficiency.

Step 6: Separation

- Separate the oil from the paste using a centrifuge or press. This step separates the oil from the solid components, such as pulp and pits.

Step 7: Filtration

- Filter the extracted oil to remove any remaining impurities or particles.

Step 8: Storage

- Store the freshly extracted olive oil in clean, dark containers to protect it from light and air.

Step 9: Quality Testing

- Conduct quality tests on the olive oil to ensure it meets specific standards and criteria.

Step 10: Packaging and Distribution

- Package the olive oil in bottles or containers for distribution and sale.

Step 11: Cleanup

- Clean and maintain the equipment used in the production process.

Assessment:

- Students will present their olive oil production processes to the class, explaining their design choices and the patterns they identified.

- Assessment will focus on students' understanding of the production process, their application of computational thinking principles, and the feasibility of their modified process.

Expected results:

- Students will gain a basic understanding of how olive oil is produced from olives.
- Enhanced computational thinking skills through the analysis and optimization of the production process.
- Increased awareness of the importance of efficient and sustainable food production practices.

Notes:

The project was born from having discovered in the immediate vicinity of the school, the farm "Giusti Nicola", specialized in the cultivation of olive trees. This plant, a beautiful and ancient tree, has become the main protagonist of the economy of our territory, both to produce new plants in the many nurseries, both for the production of excellent oil. The curiosity of children, the desire to explore and know, pushed me to make the territory a "great open book"