“Engaging students in the learning process through innovation”

(ESTI)

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Students do observations in Poland

How do temperature and time of light intensity influence the life cycles of oak and bramble?

APPLICATION OF THE SCIENTIFIC METHOD TO A PRACTICAL CASE.

It is about following the stages of the scientific method, we will work in the same way that scientific researchers do.

Stages of the scientific method:

1. Observation and approach to a problem or question. (For this we use the phenoloGIT application and the map).

The trees are changing throughout the year. Flowers sprout, trees grow and fruits ripen.

Question: What causes the changes in the trees Why do some fall the leaves? Do they always fall on the same dates? Do they fall at the same time in all countries? do not? why will it be?

2 Development of the hypothesis (we are going to look for an answer to the question of this problem):
a) The different life cycle stages of trees are influenced by temperature.
b) The hours of light determines the appearance of the leaves, flowers and fruits.

We could work with a hypothesis, but we plan to work with two.

3. Experimentation (to check the validity of the hypotheses).
Compilation and analysis of the data during a period of time sufficient for the stages of the plant to be studied. (We will also use the data we extract from the application, map when comparing it with other countries)

4. Analysis of results.

Initially we planned to do the study with apple trees, chestnuts and we would compare the results not only with the map but also with the work carried out by the students of Naples, those of Chorzow in Poland, another school in Romania. Comparing the work of the schools we would arrive at a clear conclusion that we would analyze in March in the Italian school students from the 4 participant schools. When we started to work we realized that the App only has some species, but not those who had agreed, the same thing happens with the phnoloGIT map. So we have decided to do two studies, one with the agreed trees and another with the oak and the bramble to show partners to use the App since for these species we would have the APP and the map and we would make or scientific method with the following Trees: oak and bramble.
We started the exploration in December but the rexistros began in the second week of January,
The students started with the observations, they uploaded the photos to the App on Thursdays and they recorded the data and the observation of two

phenomena (one for the temperature and another for the duration of the days), and to analyze if a relationship is observed.

5. Conclusion and communication of results.

Once the validity of the hypotheses was determined, we prepared a report and published the results.

2. Objectives

1. Students become familiar with the scientific method.

2. Students are able to observe: the fall of the leaf, the period of vegetative rest, the appearance of buds ...

4. Improve deductive thinking

5. Learn to collect data.

6. Learn to formulate a hypothesis.

7. Develop a theory as a conclusion to the investigation.

APPLICATION OF THE SCIENTIFIC METHOD TO A PRACTICAL CASE.

We started with the work of observation and data recording from January 10 to March 21.
We try to follow all the stages of the scientific method as researchers do.

Stages of the scientific method:

1. Observation and registration of data also using the App that will help us to follow up.
2. Students take pictures every Thursday, upload them to the APP and record data
2. Development of the hypothesis (we will look for an answer to the question of this problem):

a) The different stages of the life cycle of the trees are influenced by temperature.
b) The hours of light determines the appearance of leaves, flowers and fruits.

We will consider the two hypotheses

3. Experimentation (to test the validity of the hypothesis).

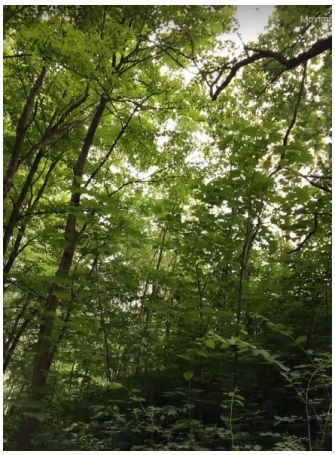
The collection and analysis of data for a period of time sufficient to explore the stages of the plant. (We will also use the data we extract from the application, map and big data)

We take a picture each week (Thursday) of the oak and the bramble to APPLICATION "phenoloGIT"

Each week students also record at temperature and daylight hours.

Compilation and analysis of the data during a period of time sufficient for the stages of the plant to be studied.

Construction of graphics with values two parameters to study two phenomena (one for temperature and another for two days), and to analyze a relationship is observed.

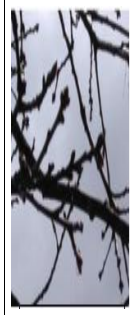




5. Conclusion and communication of results.

Once a hypothesis has been demostrated, students prepare a report and publish the results.

After register the data and observe what happens in other countries we can conclude Students got evidences that the light and temperature afects the lifecycle of the plants. The Bramble has leaves duting the whole year

Data Collection From January to March 2019

Day	10 January	17 January	24 January	31 January	7 February	14 February	21 February	28February	1 March	7 March	14 March	21 March
Temperature	12ºC	9ºC	15,6ºC	12ºC	11ºC	16ºC	17ºC	17ºC	12ºC	9ºC	7ºC	16ºC
Light	8.4 W	6.84 W	10.14 W	9 W	10.23 W	9.12 W	9.18 W	14.96 W	9.36 W	8.19 W	5.39 W	8.48 W
Humidity	70%	76%	65%	79%	93%	57%	54%	88%	78%	91%	77%	53%
Oak												
Bramble