



IT'S TIME TO CARE!

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ERASMUS+ 2018-2020

PROJECT DURATION: 1 SEPTEMBER 2018 - 31 AUGUST 2020



SUSTAINABLE CITIES

Methodology

Olaines 1.vidusskola

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Experiment carried by the team of Olaines 1.vidusskola on the topic Sustainable Cities. Air pollution.

Bio-indicators

Lichens are widely used as environmental indicators or bio-indicators. If air is very badly polluted with sulphur dioxide there may be no lichens present, just green algae may be found. If the air is clean, shrubby, hairy and leafy lichens become abundant. A few lichen species can tolerate quite high levels of pollution and are commonly found on pavements, walls and tree bark in urban areas. The most sensitive lichens are shrubby and leafy while the most tolerant lichens are all crusty in appearance. Since industrialisation many of the shrubby and leafy lichens such as Ramalina, Usnea and Lobaria species have very limited ranges.








Procedure:

1. Observations are made according to the description of the observation method. There are no other special requirements needed for observation.
2. Any inhabited place can be a place of observation.
3. It is not advisable to carry out observations in strong winds, as old branches can break and fall on people.

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First, we decided where to take Bio - indicators in our city and area. We decided to take them at Olaine Railway station, Center of the city, on the territory of our school, near a Highway and in Industrial area.

Then we studied what kind of lichens can we find if the air is clean and if the air is polluted. We did it at school with our Chemistry teacher.

Zona	Bioindikatori suga		SO ₂ mg/m ²
0	<i>Pleurococcus sp. (zaļāiģes)*</i> <i>Pleurococcus sp</i>		>170 high pollution
1	<i>Lecanora sp. (ķērpji)</i> <i>Lecanora sp</i>		150-160 high pollution
2	<i>Xanthoria sp. (ķērpji)</i> <i>Xanthoria sp</i>		125 medium pollution
3	<i>Parmelia sp. (ķērpji)</i> <i>Parmelia sp</i>		100 medium pollution
4	<i>Hypogymnia sp. (ķērpji)</i> <i>Hypogymnia sp</i>		70 low pollution
5	<i>Evernia sp. (ķērpji)</i> <i>Evernia sp</i>		40-60 low pollution
6	<i>Usnea sp. (ķērpji)</i> <i>Usnea sp</i>		<35 Clear air



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The next step - we went out to observe all these 5 places we decided to study. We collected the results walking around and studying lichens, took notes, then we came back to school and made a table of our results.

SampleN°	Objects	Lichen species	Pollution level
1	Station of Olaine	<i>Pieurococcus sp</i>	High
2	Center of Olaine	<i>Xanthoria sp</i> <i>Pieurococcus sp</i>	Medium till high
3	School territory	<i>Xanthoria sp</i> <i>Parmelia sp</i>	Medium
4	Highway	<i>Xanthoria sp</i> <i>Parmelia sp</i>	Medium
5	Industrial area	<i>Usnea sp</i> <i>Evernis sp</i>	Low till clear air



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We found out that according to lichens the most polluted area is at the Railway station because there are a lot of trains and also there are transport trains that carry coal, different chemicals, it causes air pollution.

The next polluted areas are City centre, Highway and the school territory. The exhaust fumes cause the air pollution.

To our surprise the cleanest area according to our Bio- indicators is in the Industrial area because there are filters in the factories and they take care of the air and air pollution.