

ALPS4NATS PROJECT
ALPINE INITIATIVES FOR ALPINE NATIVES



01 – E-textbooks



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The Alps4Nats Learning / Teaching / Training material

The project Alps4Nats (Alpine Initiatives for Alpine Natives) brought together 3 secondary schools from Slovenia, Italy and France to test innovative pedagogical-didactic approach inquiry-based learning with a participative approach.

With the aim of solving sustainable development issues in the fields of tourism, agriculture, biodiversity and climate change, this document presents summaries of the learning material, produced by students in the learning phase of inquiry-based learning with the participative approach.

Students, either as a full class or in smaller groups first collected information about the SD issue they chose (they used various sources including documentary research, interviews with professionals, field trips...).

They then created and provided learning materials to enhance peer to peer learning. In most cases they chose to create interactive activities (available on shared space platforms such as Moodle, Google Drive) but each student group / class were able to define their learning materials adapted to their needs and interests. Students feed-back was that by creating means for peer-to-peer learning enabled them to deepen and consolidate their own learning. Although the time spent for the process was longer than a "normal" learning process, they felt that it was more efficient.

Students, when possible, then went on to develop, organize and carry out concrete projects with the objective of solving the chosen SD issue. This problem solving and participatory approach motivated students to take initiatives to try to solve local problems, thus making them truly aware about the challenges faced by their local environment. They thus became active citizens within their community.

They communicated on their projects locally and also shared them between partner countries (Slovenia, Italie, France) thus enabling them to assess and compare issues in the Alpine context and in doing so take steps towards strengthening their Alpine identity.

Project partners:



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PRESENTATION OF THE PARTNER SCHOOLS

Liceo scientifico statale “A.Calini” - Brescia - Italy

LICEO SCIENTIFICO STATALE “ANNIBALE CALINI” is a public high school in Brescia, historically known as one of the most prestigious, competitive and demanding public high schools in scientific studies in Northern Italy. It has distinguished itself by the competitiveness and rigor of the education provided to its students.

The Scientific High School (Scientific Lyceum) is one of the oldest secondary school types in Italy. The educational curriculum lasts five years, and students are generally 14 to 19 years of age. The Scientific High School offers a wide selection of studies. Central subjects are those related to Natural Sciences (Biology, Chemistry and Earth Science), Physics and Maths while classical disciplines are also very well represented (Italian, English, Latin, History and Philosophy). The strict and innovative preparation, characteristic of Calini High School, is complemented with countless extracurricular learning activities successfully promoted by the school.

The skills learned at school are experienced also in a work environment. Students attend on the job training in various companies and entities belonging to different economic-productive sectors comprising: bio-medical, economic law, technical-scientific-environmental, cultural and communications, sports, education, social, non-profit, services and linguistics.

At the same time, experiences in international projects, such as those financed by the European Community, are an opportunity for learning in situation. Liceo Calini has accepted and made its own the indications of the ministerial document GUIDELINES for the development of PATHS FOR TRANSVERSAL SKILLS AND ORIENTATION (pursuant to article 1, paragraph 785, law of 30 December 2018, n.145) which provide for the introduction in the curriculum of activities dedicated to them. In fact, the demand for new skills to meet individual needs, those of innovation and competitiveness of economic systems, as well as environmental challenges, places the education system in a position to adopt strategies aimed at improving practices and organizational interventions aimed at facilitating change.

Education and training are at the heart of active policies and action programs in the European area, so much so that in June 2016, with the communication of a New Skills Agenda for Europe, the Commission and the Council of Europe have proposed revising the previous recommendations. The Council Recommendation of 22 May 2018 (2018 / C189 / 01) updates, in fact, the 2006 version (2006/962 / EC) relating to "Key competences for lifelong learning" and, specifying the definition of key competences, frames it in a holistic and summary vision of elements of competence, in a dynamic combination of knowledge, skills and attitudes, in which the attitude is defined as "disposition / mentality", mind-set to act or react to ideas, people, situations.

From a European perspective, the eight skills for lifelong learning, for flexibility and adaptability in the face of digital and technological transformations underway, are interdependent and equally important. Therefore, making a competence-centered approach effective means improving basic skills,

but also investing in more complex skills whose characteristics have been reshaped to ensure resilience and adaptability.

Personal and social skills deserve a separate study, i.e. transversal and transferable skills through the operational dimension of doing: ability to interact and work with others, problem-solving skills, creativity, critical thinking, awareness, resilience and ability to identify the forms of guidance and support available to address the complexity and uncertainty of change, preparing for the changing nature of modern economies and complex societies.

From a European perspective, the objectives, or rather the learning outcomes, are therefore connected to the real world through action-oriented activities, by means of experiences gained during the course of studies, acquired through projects oriented to doing and reality tasks.

The European Council was able to summarize in a single document the vast literature produced in the field of "key competences for lifelong learning", designing a reference framework that outlines in particular 8 key competences, all of equal importance for development citizen's staff.

The approach to measurable learning outcomes in competences is also the basis of the European Qualifications Framework (EQF, Recommendation 2008 / C111 / 01 amended to C189 / 03 in May 2017), a basic tool for transparency and the comparison of qualifications study and qualifications between national systems.

The 2019 Budget Law of the Italian State has also ordered the new name of the alternation school-work courses referred to in the legislative decree of 15 April 2005, n. 77, in "courses for transversal skills and orientation" (hereinafter referred to as PCTO) and, starting from the 2018/2019 school year, they are implemented for a 2 total duration of 90 hours for high schools, in " arc of the final three-year course of study.

The orientation process, which is configured as a permanent right aimed at promoting active employment, economic growth and social inclusion, represents, in the Italian education and training landscape, an integral part of the educational path.

The PCTO, which the Liceo Calini promotes to develop transversal skills, helps to enhance the educational value of orientation in itinere, as they place students in the condition of maturing an attitude of gradual and increasing awareness of their vocations, according to of the reference context and the realization of one's personal and social project, in a logic centered on self-orientation. In fact, through the active protagonism of the subjects in learning, the ability to make conscious choices develops, an attitude, a "mental habit", a social and emotional mastery develops.

The acquisition of transversal skills allows students to enrich their personal assets with a series of knowledge, skills and attitudes that allow them to adopt appropriate behaviors with respect to the different situations in which they may find themselves, from the simplest to the most complex. These competences refer to the processes of thinking, cognition and behavior.

The ALPS4NATS project is a training opportunity that perfectly frames the objectives of the PCTO, as on the one hand it develops transversal skills, while at the same time it is an opportunity for orientation. The particular participatory approach and the choice of inquiry based learning as a working methodology qualify the project, which also focuses on the important European priority addressed to environmental issues and in particular to climate change in progress.

Webpage : [Liceo Scientifico di Stato "A. Calini" \(liceocalini.edu.it\)](http://liceocalini.edu.it)

Facebook page : [\(1\) Liceo Scientifico Annibale Calini | Facebook](#)

Links to the eBooks : [Alps4nats | Liceo Scientifico di Stato "A. Calini" \(liceocalini.edu.it\)](#)

Biotehniški Center – Naklo – Slovenia

BC Naklo is an ESD-oriented educational centre, where modern and innovative pedagogical approaches find their place to be implemented. From our viewpoint, mountain-oriented education and transformative learning receive a status »must have«, because 80% of our students come from subalpine and alpine areas.



So, it is one of the school priorities that our students get familiar with the natural and cultural heritage of the Alps. Even more, we strongly believe that they will find in their local area their life- and business opportunities. Thus, initiatives were encouraged to solve SD issues practically and upgrade their ideas within entrepreneurial mind-set.

At BC Naklo, we included in the Alps4nats project 107 students, who attend educational programs of nature preservation (EQF 4) and biotechnical gymnasium (EQF 5), and 4 teachers of VET and interdisciplinary modules as Ecological analysis and monitoring, Natural values and Agriculture. Some of them transform their Alps4nats learning into their project work at the end of their final year of schooling.



BC Naklo students transferred their knowledge about large carnivores to pupils from local primary school.

Webpage : <http://www.bc-naklo.si/>

Facebook page : [\(1\) BIOTEHNIŠKI CENTER NAKLO | Facebook](#)

Maison Familiale Rurale - La Tour d'Aigues -

France



The MFR of la Tour d'Aigues is a vocational school situated in the South of France that welcomes around 100 students from 15 years old to adults.

MFR - Maison Familiale Rurale – Rural and Familal Home is an associative movement created in the late 1930's.

The MFR have unique functional and educational characteristics within the French educational system:



- A modest size (150 students on average per establishment) ;
- A pedagogical approach centered on the personal project of each young person and on theoretical training linked to the realities of life thanks to a sandwich course system;
- Cooperation between teachers, families and companies hosting trainees for the implementation of the training;
- The emphasis placed on social and life skills training;
- Their associative functioning;
- Their location in rural areas where there are few training facilities;
- Their desire to have an ideal for society: that of ensuring that each person can build his or her life, with others, in his or her profession, family, neighborhood or village.

The slogan of the MFR, "Succeed differently", is based on a few guiding principles:

- Adults who are involved and responsible for the training of young people: educational responsibility of families, sharing of experiences between parents, involvement of training supervisors, professionals.
- Students who are not exclusively learners in the classroom but who are considered as people inserted in society, known and recognized, who have a social function, who are listened to, who gradually take on responsibilities...
- Teachers or trainers are not only professors but have a function of listening, of dialogue, of accompanying the training. The discipline (the subject taught) is not the center of the learning act. Teamwork is fundamental.
- Training is not only centered on book knowledge. The educational team also works on the professional and personal project and accompanies the reflection on orientation. The training is conceived in a global way and the parceling out of knowledge is avoided. The learning of interpersonal skills (politeness, respect for schedules, work well done...) and the valuing of practical know-how, internships and concrete cases are valued.
- The MFR is not just a school. It is an association anchored in the local dynamics to answer new needs. It has an ambition for the development of the territory and the people who live there.

All these characteristics justify the original name: MFR - "rural family home":

- It is a "house" because we live together, in a boarding school, we know each other, we participate in the maintenance of the premises;
- "family" because the parents are responsible for the functioning of the establishment;
- "rural" because the majority of these structures are located outside the cities.

Contrary to the classic school logic of learning to give back, the founders of the MFR experimented with a pedagogical method based on a two-step approach: in the field, the time of "doing and action" and at school, the time of "reflection and meaning". Over time curricula were tailored made to adapt to this system and the MFR movement has its own pedagogical research center.

There are currently MFR's in 40 countries worldwide, of which 495 are in France.

MFR's, although small structures, engage in Erasmus Projects at different levels with the conviction that developing European citizenship and openness is fundamental to the educational puzzle.

The MFR's actively teach and lead projects based on sustainable development issues and have as a result obtained the E3D sustainable development label.

Webpage : [La MFR Maison Familiale Rurale de la Tour d'Aigues \(mfr-latourdaigues.com\) / national webpage : Le site des formations par alternance des MFR](http://La MFR Maison Familiale Rurale de la Tour d'Aigues (mfr-latourdaigues.com) / national webpage : Le site des formations par alternance des MFR)

Facebook page : [\(1\) MFR La Tour-d'Aigues-Vaucluse | Facebook](#)

Sustainable Development Issue :

AGRICULTURE

OVERVIEW OF ACTIONS – Biotehniški Center Naklo

Summary

BC NAKLO CHOSEN SD ISSUES

AGRICULTURE

- Low milk price affects farmers
- Waste in the process of producing and processing milk
- Water quality in Lake Bled
- Fertilizers in intensive and organic farming
- A tradition of beekeeping in Slovenia
- Successful human-bear coexistence in the Alps



FOR MORE
INFORMATION:



Objectives

- Explore SD agricultural issues in the Slovenian Alps and their solutions (examples of good practices),
- Define the differences between intensive and organic farming and their effects on the quality of water, soil, air and biodiversity in the Alps,
- Become familiar with our traditional agricultural products and their production, make them or modify them in a way to be modern, innovative and sustainable.

Actions

Low milk price affects farmers - Solution: Producing Yogurt

We are Gaja, Lana, Zala, Sara, and Tjaž, 3rd-year students of Biotechnical gymnasium at BC Naklo.

The issue of low milk price in Slovenia was not improved by globalization

In our seminar paper, we tackled the challenge of low milk purchase prices, which causes the decline of small farms and enables the survival of only those who sacrifice quality for quantity.

Most small producers can no longer be competitive in milk purchase prices on the domestic market, for the prices are dictated by cooperatives, larger producers, and dairies. Thus a smaller producer who sells milk to a large dairy earns only about thirty-four cents per liter of milk.

Dairies usually impoverish the milk, use the seized substances for other products, and sell it at several times higher prices to large retail chains, which can further increase the price of liter milk due to contact with the mass of consumers.

With globalization and the opening of borders, Slovenian farmers began to deal with the import of milk. This milk usually comes from countries situated east of Slovenia. Production costs of imported milk usually cannot be compared to our country's, so foreign producers can further fill our market and lower already too low prices, making it difficult for small farms to survive.

A raising awareness campaign about changing our consumers' habits is necessary

Consumers are partly to blame for the situation. Namely, they agree to consume cheap, impoverished, foreign milk, just within their grasp and has nice packaging. Consumers should be aware that cheap advertised milk is not very good. We should buy milk straight from small farms, although it makes us step out of our comfort zone because homemade shops are not usually located in large shopping centers but in the countryside. This could also save consumers' money, as many farmers sell their milk lower than stores do. Farmers try to solve their financial problems in different ways.

How to add additional economic value to milk?

Solutions lie in organic milk production, hay milk production, and processing the milk into dairy products. In our research paper, we focused on making yogurt and the differences in production between large dairies - industrial process (Ljubljanske mlekarne) and small family dairies (eg Mlekarstvo Podjed in Olševke).

Learning is not just a direct straight line: Making ice cream and cheese from yogurt

Our research paper was continued next semester by Sabina, Klara, Klara, and Manca. The paper was part of our specialised VET module on agriculture. Since most of the group members come from farms, we are very interested in this topic.



First of all, we focused on ice cream, which is not a Slovenian traditional dairy product, but we all love to eat it. We researched raw materials, different types of ice cream, and differences in the technological process of industrially prepared and homemade ice cream.

Unfortunately, the ice cream machine broke down during our workshop, so we decided to make semi-hard cheese, mascarpone, and butter instead...

Semi-hard cheese recipe

Ingredients:

10l of milk, a cup of yogurt, rennet

Instructions

- First, we boiled 10 l of milk in a water bath at 66 ° C to eliminate unwanted microorganisms. When the milk reached the desired temperature, it was removed from the water bath and cooled to 40 ° C.
- We added a pot of plain yogurt to the milk, as the lactic acid bacteria in it causes fermentation coagulation. The mixture is set still for 10 to 15 minutes. Then we added the rennet required for enzymatic coagulation. The protein casein denatured and began to flake.
- The mixture was returned to the water bath. After a while (when we checked if the mixture was firm enough), we cut the mass into cubes with a knife. First horizontally, vertically, and then diagonally.



- We stirred the mixture with a wooden spoon for another 20 minutes to separate as much whey from the coagulum as possible.
- The whey was drained, the vinegar was transferred to moulds and weighed. After half an hour we turned it over for the first time and then we turned it again in 3 hours.



Waste in the process of producing and processing milk

ZERO WASTE concept in the Alpine world

We are Loti, Teja, Pija, and Rok and we support the ZERO WASTE concept both in the Alpine world and globally.

Many Slovenian farms have chosen biscuit baking as a complementary activity on the farm. We are interested in what kind of packaging they are using.

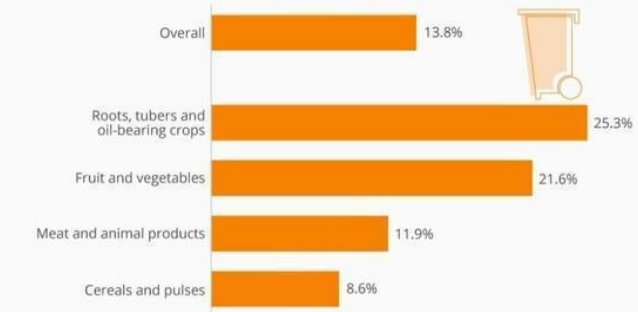
Zero waste is an ethical, economic, efficient, and visionary concept that leads society to change lifestyle and habits in the field of waste management, so that waste would not be generated at all. When we talk about the hierarchy of waste management, we want it not to be disposed or created at all or that it becomes a raw material for new products (circular economy).

Plastic packaging has some advantages: high flexibility for design, transparency, durability, relatively cheap. But on the other hand, its decomposition process is very long (sometimes even 100 years). Fossil fuels are the main raw material for the formation of plastic materials. The burning of fossil fuels contributes to the production of carbon dioxide, which is one of the main greenhouse gases, and thus makes a major contribution to climate change, which is going to hit the Alpine world hard.



14 Percent of Food Goes to Waste

Global share of different agricultural products that are thrown away (2016)



@StatistaCharts Source: FAO

statista

Plastic products also contribute to the emergence of microplastics in aquatic ecosystems, which have already been detected in both Lake Bohinj and Lake Bled. Microplastic particles are particles up to 2 mm in size that are formed during the decomposition of plastic products and travel through water waste into aquatic ecosystems and accumulate in seas and oceans. They affect organisms, which confuse them for food or inhale them.



Therefore, we started looking for cookie packaging with an as little negative impact on the environment as possible. We were thinking about paper or cardboard packaging, glass packaging... If our research had not been interrupted by the COVID-19, we would have made 'linške' biscuits and packed them in wooden boxes that we would have made ourselves.



Packaging waste from the 'cow' to the store

Our names are Kaja, Anteja, Maša, and Urška and we attend 3rd year of vocational high school. We continued researching this theme and tried to focus a little bit more on the waste that is made through the process of producing and processing milk.



Our attempt to find alternative packaging and reduce waste

We were thinking about how we could replace plastic packaging or at least reduce the amount of waste. We were interested in:

- *Determining the amount of waste generated in milk production – from the 'cow' to the store,*
- *Determining which waste is mostly generated during milk processing,*
- *Finding a way to reduce the amount of packaging in the production of dairy products,*
- *Finding the most environmentally friendly alternative packaging.*

In order to answer these questions, we visited the school dairy and barn.



Barn

The production of fodder generates quite a bit of waste. Every year the feed is covered with new foil. Bought fodder, if they cannot produce enough of their own (bales, hay...), is also covered in foil, which goes to waste. This waste also includes ropes used to tie bales. Sometimes waste is also spoiled feed or poor quality feed.

There is also a lot of manure and urine that accumulates in the manure pit, and they use it as a fertilizer.



The lights in the barn are on all day and at night they leave on safety light. One animal consumes about 100 liters of water a day.



Milking

This generates waste such as wastewater, paper towels, gloves, milk filters ...
These also include sanitary accessories such as injections (these are usually taken away by a veterinarian and disposed of appropriately).



Dairy

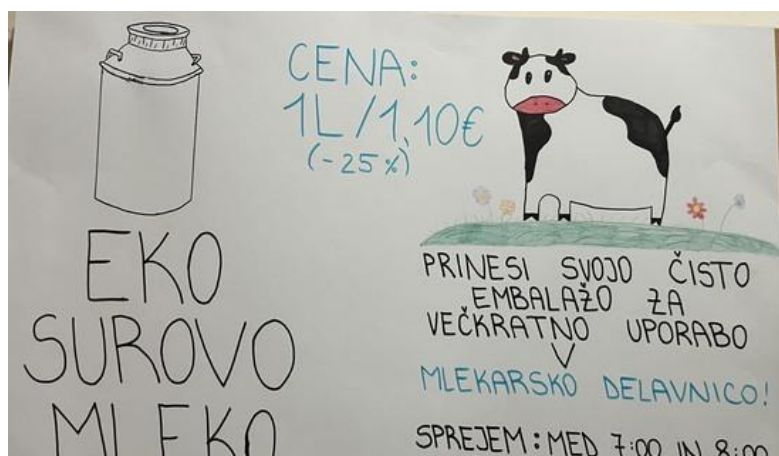
The waste generated by cheese- and cream-making is whey.
A lot of waste is generated due to packaging and washing equipment. There are approximately 2 bags of bio-waste filled per week. 2-3 rubbish bags a week are filled with label papers, empty boxes, and empty fruit bags. Samples, surplus, and sludge, on the other hand, go into barrels and are classified as biological waste. Wastewater is generated about five cubic meters per day.



Findings

We found that a lot of waste is generated in the process **from the "cow" to the store**, with the most waste being water and plastic packaging. In this process we see many more opportunities for sustainable improvements, we could start with glass packaging of dairy products.

Much has changed since our workshop... We now offer first dairy products in glass packaging and employees can buy milk in their reusable can... (see the poster inviting employees to make sustainable purchases).



The tradition of beekeeping in Slovenia

We are Jerneja, Špela, and Karmen and we attend vocational high school in Naklo Biotechnical Center. As a part of our project, we researched beekeeping and honey products in Slovenia. Plant pollinators are going to be endangered in the future, as bee population is declining due to the use of harmful plant protection products or their improper use. On the other hand, Slovenia (and the Alpine world) is known for honey/bee products.

Slovenian indigenous bee species - Carniolan lavender/*Apis mellifera carnica* is described as a modest, calm, and hardworking bee, much like Slovenes. It also has a great orientation ability, developed by living in smaller hives in stacks.

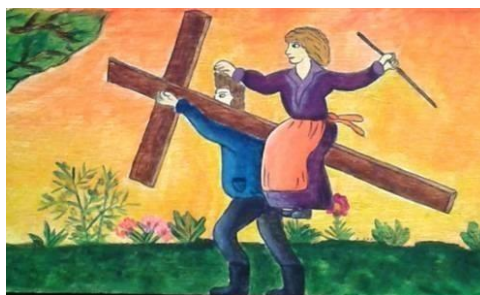
Beekeeping is a frequent traditional complementary activity on Slovenian farms. The knowledge acquired by farmers about beekeeping was presented more than 230 years ago by Anton Janša, the first teacher of beekeeping in Imperial Vienna.

Honey is formed when worker bees bring nectar into the hive and hand it over to young bees. Young bees process the nectar, add secretions of their glands to it, then thicken it and store it in covered honeycomb cells. The honeycomb is then removed, transferred to a bar where its cells open. This is followed by pouring, filtering, removing surface impurities and packaging.



There are different types of honey in Slovenia, depending on the grazing of bees: flower, forest, chestnut, spruce, fir... They differ in flavor, color, and health benefits.

In Slovenia, we have a traditional hive - AŽ hive or kranjič. Because the honeycomb is folded in stacks, the bees began to rob or crash into foreign hives. The problem was solved by marking the entrance to the hive with a painting - beehive paintings. Beehive paintings showed images from The Bible, our cultural heritage customs etc...



Honey was used:

- to sweeten dishes before the appearance of crystallized sugar. So we knew different types of gingerbread, which were also decorated by hand in the 19th century,
- for the preparation of alcoholic beverages - mead.

Bee products were also used as a medicine:

- Royal jelly, as food for queen and bee brood. It is produced by suckling bees. It strengthens the immune system and inhibits skin aging.
- Propolis, which consists of resin, essential oils, organic acids, and various vitamins and minerals. It has an anti-inflammatory and antibiotic effect.
- Pollen, which is a dietary supplement that raises energy and strengthens the immune system
- Beeswax was used as a raw material for making candles and wax images. It used to be 5x more expensive than honey.

Honey bread

We are Neža, Nika, Eva, and Rebeka, and we were strongly attracted to the traditional honey bread production in the pre-Alpine and Alpine valleys in Slovenia. Honey bread was used as a candy or a birthday gift, sometimes it was used as a tool for drawing attention. Today, it is a traditional souvenir offered in souvenir shops, as it is a part of our cultural heritage.

'Loški/Dražgoški kruhki' are typical honey breads made in Škofja Loka, Poljanska and Selška valley. They were initially made by nuns from Škofja Loka. The honey dough of 'Loški/Dražgoški kruhki' was formed with special wooden models that had carved patterns. In the vicinity of Škofja Loka, on the farms, housewives hand-shaped and decorated the honey dough, and 'Loški/Dražgoški kruhki' were made.



The ingredients needed are water, rye and wheat flour, honey, and cinnamon. They used to add deer salt (a substitute for baking powder for rising). The quantities and manufacturing process varied from family to family and each housewife entrusted it only to her daughters.

Traditional shapes are hearts, maiolica, pipe, flowers... On the feast of the Holy Three Kings (6th of January), the girls gave the boys presents - decorated honey breads in the shape of a crescent. The traditional motifs were plantain, carnation, wheat, grapes, leaves, vine tendrils, and various meadow flowers. After baking, 'Loški/Dražgoški kruhki' were coated with honey, which was diluted with water, for an extra shiny look. At the workshop, our group made simple 'Loški/Dražgoški kruhki' and decorated them with plantains.



BEE4ME

We are David, Žan, Timon, and Andraž - a team of dedicated high school students who have faced the challenge of sustainable beekeeping and entrepreneurship. We intended to develop an innovative entrepreneurial idea in the field of beekeeping, as David is a dedicated beekeeper.



We want to develop a cosmetic cream from bee venom and so we established the company Bee4mee. The cream would be called Bee Beautiful.

Bee venom (apitoxin) accelerates the formation of collagen and increases blood circulation in our skin. Collagen represents 30% of the protein in our body, it gives our skin elasticity and resilience. After the age of 20, our body produces less and less collagen, which makes our skin dry and withered, and eventually less and less radiant. That is why wrinkles appear. In addition, our cosmetic cream would contain honey and propolis, which would help prevent the formation of pimples and acne.

The cream would be made of natural ingredients only: olive oil, shea butter, milk, beeswax...

As part of the Alps4nats and YES Slovenia (promotes entrepreneurship among young people) projects, we made a business and marketing plan. The product will bear the I feel Slovenia brand - pleasant, useful, and natural. The cream is going to be user-friendly, it is going to disinfect, cleanse and care for our user's skin. The main ingredients would be of local origin.



We would use glass packaging because it has the least negative impact on the environment.



The product would increase the number of bees in Slovenia (and thus also hives and beekeepers). The product is technologically highly innovative, but at the same time, we remain deeply connected to nature. What are we going to feel: the smell of honey.

Although it is currently just an idea, we deeply believe that the product will see the light of day in the future.

Fertilizers in intensive and organic farming and their effects on the quality of soil and biodiversity

The differences between intensive and organic farming or why is organic farming desirable/necessary in the alpine world?

We are Ažbe, Nina, Nastja and Hana. In this research paper, we explored the differences between intensive and organic farming or why is organic farming desirable/necessary in the alpine world?

The Alpine world is going to be heavily affected by climate change in the future. Intensive agriculture makes a strong contribution to greenhouse gas emissions and thus contributes to the greenhouse effect. In the fight against climate change in agriculture, we need to pay attention to sustainable soil management, fertilization, the use of PPPs, and the amount of carbon in the soil. The common strategy is organic farming.

- The Alps can not compete with flat areas in terms of production intensity, so they focus on the quality of the products, which has an immense impact on sustainable tourism
- Organic farming helps maintain species diversity and protects the soil from erosion.
- Climate change will affect water availability.

Agriculture will thus need to be adjusted to the drinking water needs and the quantity of water that water bodies (lakes, rivers) need in different seasons. Alternative solutions are going to be the construction of water reservoirs, the use of drip irrigation, the increase of organic matter in the soil, and the use of drought-resistant plants.

- Plants should be grown for human- and not for animal consumption (so we should also eat less meat). This would also reduce emissions of methane, one of the greenhouse gases. We could switch to extensive livestock farming, which could be based on local fodder production without additional feed and synthetic mineral fertilizers.

The benefits of organically grown food:

- quality food with high nutritional value, high content of minerals (micronutrients - Mg, K, Na, Fe, Mn, Cu), vitamins (B1, C), and secondary metabolites (polyphenols - antioxidants). It also contains lower content of additives, which increases the duration, increases the attractiveness, or intensifies the taste of the product and pesticide residues,
- the products grow slowly without excessive concentration of nitrogen and therefore contain fewer nitrates and nitrites,
- better taste because the crops have more time to develop and ripen.

Fertilizers used in intensive and organic farming

We are Meta and Laura, students of vocational high school. This school year, we researched the difference between fertilizers used in intensive and organic farming. We are interested in this topic as one of us lives on a farm.

The fertilizer provides nutrients for the growth and development of the plant. The nutrients that a plant needs are divided into macronutrients and micronutrients. Plants need macronutrients in larger quantities - N, P and K, and micronutrients in smaller quantities (μg) - Fe, Zn, Cu, Co, Mn ... Growth, and development of the plant are limited if there is not enough nutrient in the soil (Liebig's law of minimum).

Fertilizers can be mineral (natural and synthetic origin) or organic (solid manure, slurry, liquid manure, compost). Organic fertilizers also include green manuring, meaning that remains of plants growing in the field are buried and in this way, part of the soil's nutrients are restored - legumes, cereal straw, potato cumin...

Our experiment

In our research, we tried to find differences in lettuce growth - the development of the root system (weight and density), the amount of crop, as well as its color and potential disadvantages. We grew lettuce on both conventional (Profi Humko ZEOHUM) and organic substrate (Humko Premium).

We used 4 different fertilizers in our experiment:

- Plantella VITA - a multivitamin fertilizer that creates ideal conditions for root growth and is made from algae
- Plantella Calcium - prevents and cures physiological diseases caused by lack of nutrients
- Protifert LMW - biostimulant, made from natural, organic ingredients, used to regulate and improve plant nutrition, works as stress protector when it comes to too high or too low temperatures or when there is excess or lack of water.
- Protifert Calcium - a special foliar fertilizer with calcium and amino acids.

Planting :

First we planted lettuce - on an organic and conventional substrate. We planted 15 lettuce heads on each side. On the organic substrate, we fertilized the plants with Plantella VITA and Plantella Calcium, and on a conventional substrate with Protifert LMV and Protifert Calcium. We had a control group on both sides.



We watered and fertilized the plants twice a week.

Growing

Lettuce heads grown on conventional substrate turned out to be mostly heavier than the ones on an organic substrate. Organic samples were too small to sell. Lettuce heads also differed in color - the organic pattern was light green and the conventional one was dark green.



Results

The quality of lettuce heads differed from one to another. Organic samples had a larger and more branched root system, which would probably be an advantage in dry (stressful) conditions.



The experiment was designed in too small a sample to be considered credible. But it does strike up a conversation on:

- More lettuce was produced on a conventional substrate
- Stronger roots would provide an advantage in stressful conditions in the future (climate change).

OVERVIEW OF ACTIONS – Liceo Scientifico Statale Annibale Calini

Summary :

Liceo Calini chosen SD issues:

- Local products in the Alpine Area
- Bees and their extinction risks

Objectives :

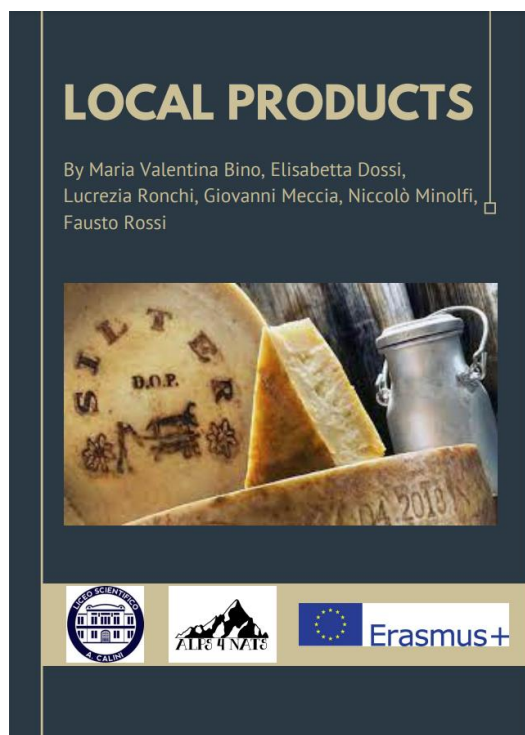
- Explore SD agricultural issues in the Italian Alps and their solutions (examples of good practices),
- Become familiar with our traditional agricultural products and find a way to make their commerce more sustainable.
- Discover the importance of bees in agriculture and the problems that affect them.

Actions :

Local products in the Alpine Area

We're six students : Giovanni Meccia, Elisabetta Dossi, Maria Valentina Bino, Lucrezia Ronchi, Niccolò Minolfi, Fausto Rossi. Below you can find a link to our eBook.

<https://cspace.spaggiari.eu/pub/BLS0001/Alps4nats/Local%20Products.pdf>



We investigated typical local products. The problem is that they aren't known in everyday life.

We decided to create a consortium to preserve the quality and all important characteristics of the product. In particular, we focused ourselves on cheese, that's the most known product and which represents the best alpine environment.

Talking about local products in such a highly globalized economic reality is surely not easy.

In fact it could seem almost an utopia to bring together those two different kinds of trading, that are apparently so out of proportion with one another. Actually, as time passed, traceability and certainty of a product, known for his traditional and typical processing, won over the business. A goal accomplished abandoning the trading logic that for years focused more on the quantity than on the quality. This was in fact a very detrimental system, especially for those little businesses, so important for every territory's economic framework. We can think about the example of "grana padano", a well-known product all over the world thanks to its protected designation of origin.

Surely this change is because of the different economic situation that improved over the past years, and that made the customer not only interested in food in order to survive. Today, as he has more economical and choice possibilities, the customer is also, if not mainly, looking for quality and certainty.

As we saw, we made a lot of improvements in this direction, especially talking about certifications: the creation of trademarks that could grant controls over goods and their production. Despite this, we found out that there was a very strange lack between those countless trademarks: it's not present a mark for the Alpine area.

We believe that a trademark for such a wide, and productive, region is fundamental, to guarantee the authenticity of the various Alpine products.

Bees and their extinction risks

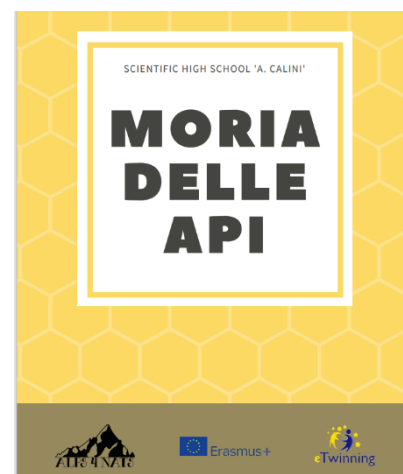
We are Andrea, Carlo, Daniele, Filippo, Giovanni and Stefano. Below you can find a link to our eBook.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/eBook%20Moria%20delle%20api.pdf>

Bees are hymenopterous insects of the super-family Apoidea and play a very important role in society by providing important ecological benefits and services. They are pollinating insects and this function enables the conservation of flora and the maintenance and improvement of biodiversity.

Without the contribution of bees, many plant species would cease to reproduce, as they would not be able to pollinate themselves, causing a chain reaction of serious consequences for food and the ecosystem.

Suffice it to say that, according to the I.N.R.A (National Institute of Agricultural Research-France), about 84% of plant species and 80% of food production in Europe depend to a large extent on pollination by bees and are at least partly responsible for about 75% of the agricultural production needed for food.



Since 2000, a drastic decrease in bees and hives has been noticed, and this phenomenon has become even worse since 2007, when the situation began to be perceived as alarming due to massive losses in a short period of time.

The causes of this phenomenon are varied.

The most prominent is the use of neonicotinoids. These are pesticides that enter the plant vascular system, nectar and pollen, and are used extensively in agriculture for seed treatment. These chemicals are among the main culprits in the increased mortality of bees: they reduce their sense of smell, memory and sense of direction, act on the nervous system and cause death.

Another factor is varroa destructor. This is a parasite from Asia that has affected the whole world, except Australia, and has become the main pathological problem for bees. The mite feeds by sucking haemolymph (the bee's blood), reproducing inside the cells of the honeycombs and severely affecting the bee's immune system, thus exposing it to other pathogens, especially viruses. To date, no adequate system has been found to control this parasite.

Another important cause is malnutrition, especially in areas of the world like the United States where there are large expanses of monocultures. This means that bees only ever feed on the same plant, taking only one type of pollen and nectar.

Finally, climate change, rising temperatures, changing rainfall patterns and more erratic or extreme weather events are likely to cause increasingly noticeable impacts on pollinator populations.

OVERVIEW OF ACTIONS – MFR la Tour d'Aigues

Summary :

The class started out by learning about the theme using different pedagogical approaches: photo language, debates, inspiring people, personal reflexion, cooperation games and brainstorming about the questions that they have regarding each issue that was co-chosen with the Italian and Slovenian partners (water, pollution, recycling, bees).

They made a questionnaire on each issue to find out what they families and internship tutors knew or questioned about each issue.

When they came back to the MFR they were surprised by some of the answers and felt that there was a real need to educate people on these subjects!

They planned the visits that they felt would help them get a better understanding of the problems so as to be able to define what project they could set up to help people act in a positive way.

Unfortunately, because of the arrival of COVID the country went into lockdown and all the visits and activities cancelled.

Students kept working on the project online, doing research and by having online discussion groups.

Students said that online learning wasn't easy – especially with their sisters and brothers around so they proposed to make something to link learning and good moments with each other.

Students developed capacities in inquiry based learning, they had to research and exchange online without having the benefit of field visits. They had to be creative to use their social environment during COVID to develop concrete solutions that met both their social situation and project targets.

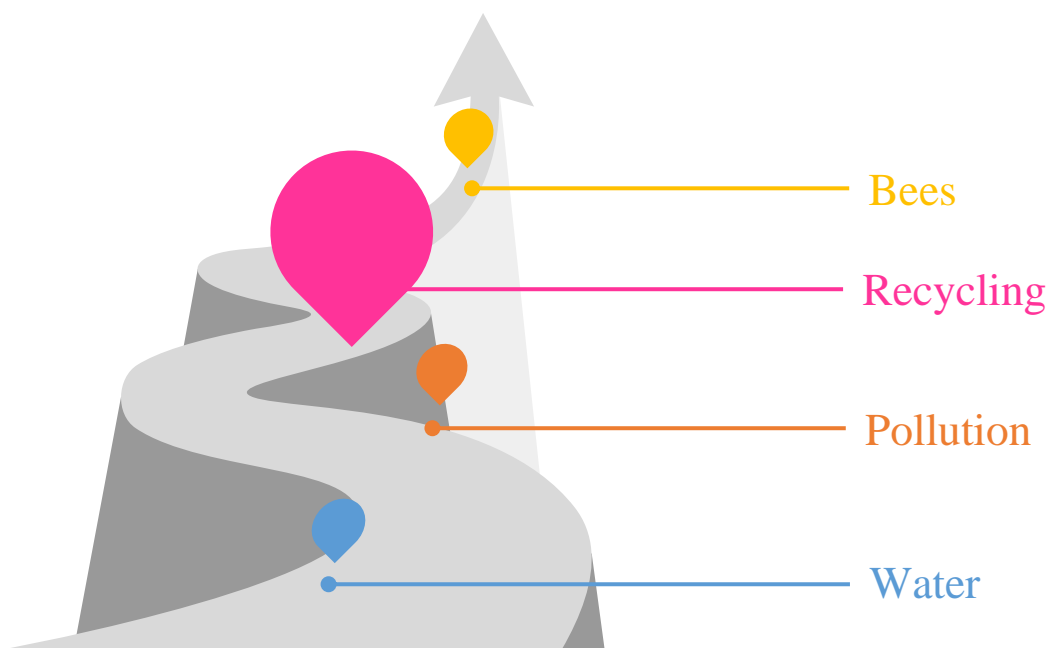
Key sustainable development issues:

How to raise awareness about these issues to be able to change the way we act at a local level:

how to decrease pollution, encourage recycling and water conservation and protect the bees that often suffer from the agricultural practices linked to the vineyards.

Objectives:

- ✓ Understand how agriculture affects our local environment.
- ✓ Define and gain knowledge about :





Funded by the
Erasmus+ Programme
of the European Union



Actions

Photos to express ideas

The project started by learning and debating about sustainable development.

First the students had a discussion about what sustainable development means for us : each student chose a photo to express what sustainable development means and a hot debate ensued !



The students then made posters with their personal thoughts on the subject :

Personal thoughts



Cooperation game as a base to problem solving

The students then had some fun playing a cooperation game to understand the importance of cooperating together to be able to solve SD (and any!) issue :



And after watching some inspiring videos of people who have been able to raise awareness on SD issues (like Greta Thunberg) each person calculated their carbon footprint.

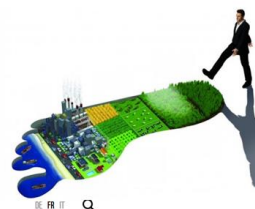
Inspiring to change : young people have a role to play

As a class the students calculated that they consume 2.5 planets!!



And thus deduced that it is definitely time to act !!

Calculating my carbon footprint : How many planets do I use ?



Inquiry based learning

The students brainstormed each chosen SD issue (water, pollution, recycling, bees) to define together the questions that they had on each issue.

They then created a questionnaire on each issue to question their social-professional environment. The objective was to be able to determine, more widely than just the classroom, what the key issues were for people in our area.

They asked their questions to their tutors of internships, families and friends.

When they came back to the MFR they were surprised by some of the answers and felt that there was a real need to educate people on these subjects !

The students determined their research and subsequent projects based on the results of the questionnaire. They had to deal with varying perspectives and thus adapt SD actions to the needs of the local community.

The key issues they wanted to explore were :

Water : In Provence access to water is always a problem in the summer months and water restrictions are often imposed.

Wine production represents 50% of the agriculture production in our region. But the heat and lack of water can lead to a loss of production. In 2017 the wine producers lost 40% of their production.

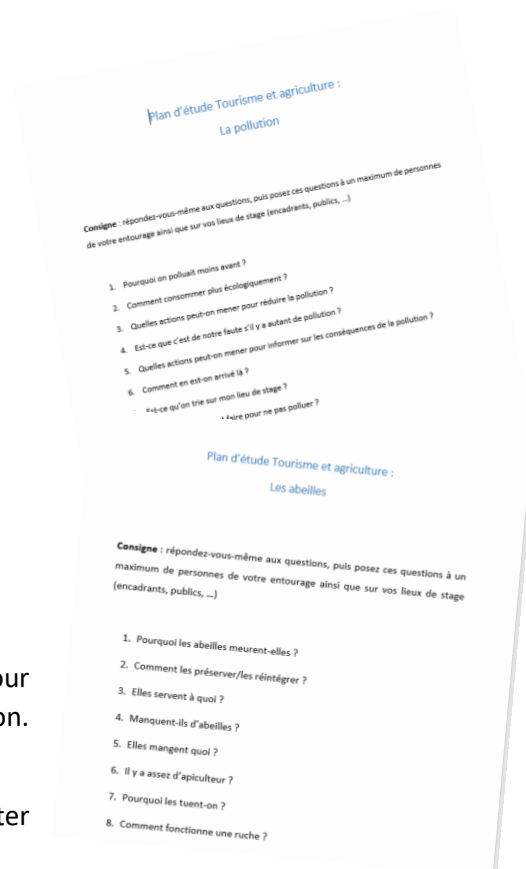
Also, our Durance-Verdon territory is responsible for 56% of the water resources used in the region.

In the future, it is expected that the demand for water will increase and the volume of water available will decrease. It could impact our production of hydraulic electricity and also it could impact agriculture and biodiversity.

So water is a key issue that the local population needs to take into account.

Recycling : The questionnaires results showed a lack of education on what products could be recycled and how. With an average of 33.4 kg of waste per inhabitant (2016), the Provence region is under national averages (47.6 kg/inhabitant). Research showed that the performances per inhabitant is as follows:

- 22.3 kg / inhabitant for glass
- 11 kg / inhabitant for light packaging
- 7.5 kg / inhabitant for card board packaging



- 2.7 kg / inhabitant for plastic
- 0.8 kg / inhabitant for aluminum

Even though public authorities have developed a more active recycling policy, the local population often lacks knowledge about the important of recycling and how to recycle.

Pollution : Our area is an agricultural and touristic region (3rd touristic region in France). Both activities have effects on the pollution levels, which then have effects on the local population.

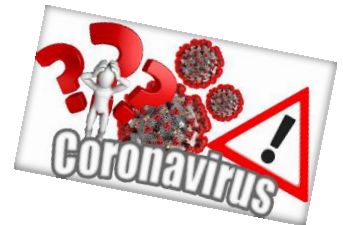
Bees : Our agricultural environment too often disregards the key role of bees in the global environmental picture. The use of many pesticides have affected the bee population. A study in 2017/2018 showed that our region had a higher rate of bee mortality than the national level.

Also, the student's questionnaires showed that many people didn't have any knowledge about bees and see them as being a nuisance rather than having an active role in our lives.

Field trip – online learning

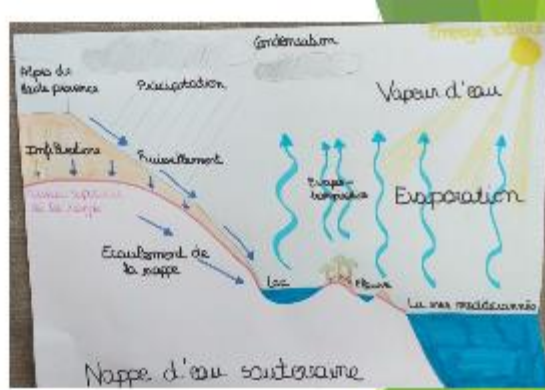
Unfortunately, due to the arrival of COVID the planned field trips were cancelled.

Nevertheless, the students kept working on the project. Students, in on-line working groups, researched each chosen issue and wrote a report on the problem, the consequences and solutions that could be envisaged at a global and local level. They also made short overviews of each problem in a poster to facilitate the understanding of their colleagues. A shared space on Google Drive was used to be able to share knowledge and students work.



Games made on water and pollution

<https://learningapps.org/view7061955>



COMMENT L'EAU VIENT DANS MON ROBINET



<https://learningapps.org/view6987242>

<https://learningapps.org/view6987242>



LA POLLUTION DE L'EAU

Vocabulaire :

<https://learningapps.org/watch?v=p6w7lhdsc20>



EAU : BON OU MAUVAIS COMPORTEMENT ?

<https://learningapps.org/view4244449>



PRESERVATION DE L'EAU

<https://learningapps.org/view12467179>



Games to learn about bees

► Game : <https://learningapps.org/watch?v=p36z0u1na20>

► Quiz : <https://learningapps.org/display?v=u91espuw120>



Concrete solutions

The confinement being long, and many students having to juggle between their work for their school and helping their brothers and sisters, they decided to make games based on the subject that they researched.

Some games were mind games; some were board or card games. Other games were more physical (using targets or the twister concept).

The games were posted on Google drive so that all the families could choose and download the games they wanted to play and learn.

Some examples :



Making games for our family during confinement

A word game where you have to guess the object using the sounds of the pictures (ex: 2. Gel Douche = shower gel)



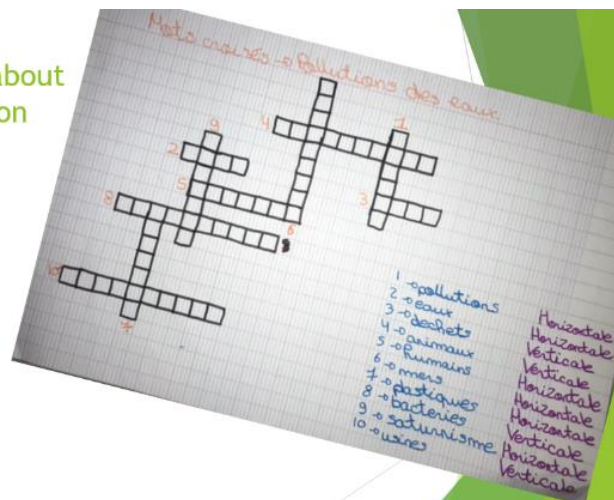
A target game where you win or lose points depending on where you throw the sticky balls

Emma Capron
Les balles aux cibles
Pour jouer aux balles aux cibles il faut :
- Il faut être au minimum 7 personnes.
- Être âgé(e) de moins de 6 ans.
Règle du jeu :
Le but du jeu comme vous pouvez le voir sur la photo c'est de ne pas toucher les cibles adhésives, car si vous les touchez, vous devez des points. En revanche si vous touchez les cibles non adhésives, vous gagnez des points.
Gagner le jeu en 3 parties, le premier qui a le plus de points a gagné!
BONNE CHANCE !!!



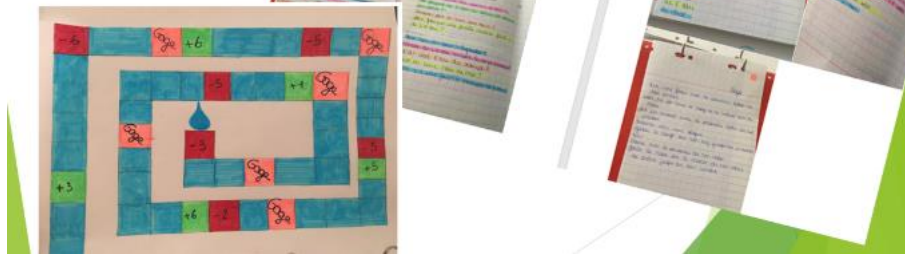
Cross words about water pollution

Cross words about water pollution



Water preservation game

Board game on water preservation



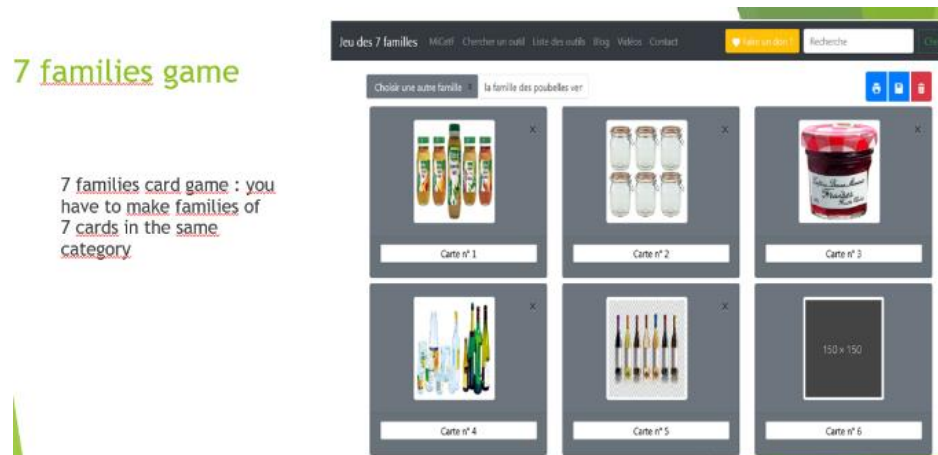
Memory card game

Memory game about things that pollute/not pollute



7 families game

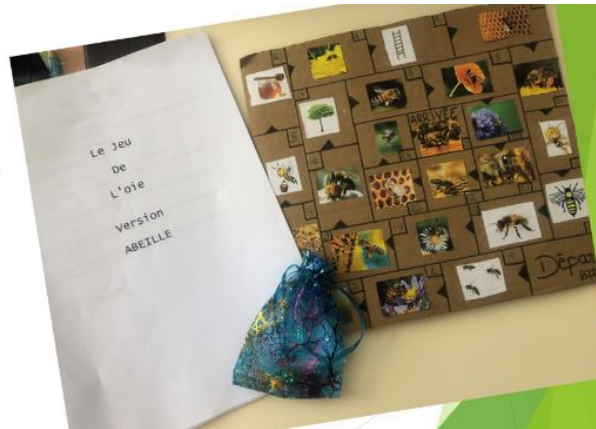
7 families card game : you have to make families of 7 cards in the same category





Bee's game

A board game to learn about bees and the role they play in our environment



Which bin game

A game with pictures of trash and you have to put them in the right bin (red or yellow) when it is your turn



RESULTS

This theme enabled students to use different learning techniques to be able to define their projects:

- ▶ **Brainstorming** : promoted creativity and spontaneity that was stimulating and encouraging for students. It allowed students to think out-of-the-box as they bounced their ideas off one another. It piqued their curiosity that even in the first session it enabled some concrete project ideas to emerge.
- ▶ **Inquiry based learning**: Enabled students build their comprehension, critical thinking and communication skills. It helped students focus on open questions to use evidence-based reasoning to be able to develop creative thinking in the projects they proposed. It enabled students to take ownership of the process and promoted engagement.
- ▶ **Online learning** : For students that don't like school this was very challenging. They enjoyed the comfort of being at home and being able to learn / do at their own rhythm. A self-paced system enabled them to make progress with a rhythm that suited them. Live sessions enabled socially engaging contact and access to the materials online was available at any time that worked for them.
- ▶ **Learning by doing** : Based on what they had learnt through online learning and the inquiry based learning students were better armed to adapt their games to the needs of the people around them. It also enhanced their communication skills when they tested their games on the members of their family. Games making provide a fun, interactive and engaging way for students to learn and explore. They can also help teachers assess the students' progress and thus provide targeted support.
- ▶ **Interaction, not isolation** : Taking the concept further that we did, the interactivity and immersion of games helped students explore how various approaches to new concepts, such as SD issues, can lead to different outcomes. Thus moving from abstract learning to practical, real-world understanding. Learning was done by interacting together, not in an isolated theoretical learning process – and this was even more important in a confinement situation.
- ▶ **Multi-skill approach to learning** : In order to make their games the students had to use a wider range of skills and not just apply the knowledge of their research. This enabled some students to show other skills they had that wouldn't have been apparent in a traditional learning approach.

GLOSSARY

The key words that the students researched were :

- ▶ **Environment** : the air, water, and land in or on which people, animals, and plants live.
- ▶ **Agricultural practices** : all activities conducted by a farmer on a farm to produce agricultural products



- ▶ **Water conservation** : refers to the preservation, control and development of water resources, both surface and groundwater, and prevention of pollution.
- ▶ **Recycling** : to collect and treat used objects and materials that are ready to be thrown out in order to produce materials that can be used again.
- ▶ **Pollution** : is when harmful substances are added to the environment and then change it in a bad way. There are five kinds of pollution of the environment: water pollution, air pollution, noise pollution, soil pollution and thermal pollution.
- ▶ **Depollute** : to remove the pollution.
- ▶ **Protection** : the act of protecting or state of being protected.
- ▶ **Ecosystem** : All the living things in an area and the way they affect each other and the environment.
- ▶ **Raise awareness** : If you are aware of something, you know about it.
- ▶ **Eco-friendly** : not harmful to the environment : not having a bad effect on the natural world.

Sustainable Development Issue :

TOURISM

OVERVIEW OF ACTIONS – Biotehniški Center Naklo

Summary

BC NAKLO CHOSEN SD ISSUES

TOURISM

- Effects of the mass tourism on animals in the Alps
- How to reduce the impacts of mass tourism in the Vintgar Gorge
- Water quality in Lake Bled
- Waste issues in the mountain huts
- Sustainable souvenirs



FOR MORE
INFORMATION:



Objectives

- Define negative impacts of mass tourism on the local community and environment,
- Become get familiar with the transition process from mass to sustainable tourism,
- Explore examples of sustainable tourism in the Slovenian Alps,
- Design new sustainable tourist products,
- Explore traditional souvenirs, which are locally produced and sustainable, and produce them

Actions

Sustainable souvenirs - The symphony of chamomile

We are Manca, Eva, Katja, Iza, Tina and Klementina. We have noticed that some souvenirs, offered in Alpine touristic centers, are not very sustainable and could harm the environment, especially when made out of synthetic textiles, plastics. Our main goal was to design a useful souvenir, (so it doesn't collect dust) that has a minimal or no negative footprint on the environment.

We planned to produce salve from alpine plant extracts and pack it in environmentally friendly packaging, but COVID-19 has slightly changed our plans. Consequently, we used just ordinary chamomile plant (*Chamomilla Matricaria*), which is not typical for the Alpine area but was easily accessible in lowlands in times of quarantine.



At first, we explored terms and conditions for selling homemade products, produced from natural ingredients. We were interested in:

- natural ingredients of salve, their max. quantity in % and function (plant drugs affects our skin – healing, hydration, nutrition, solidity, and aromaticity of products),
- production process,
- labeling requirements for cosmetics products,
- quality certificates.

Linking theory to practice

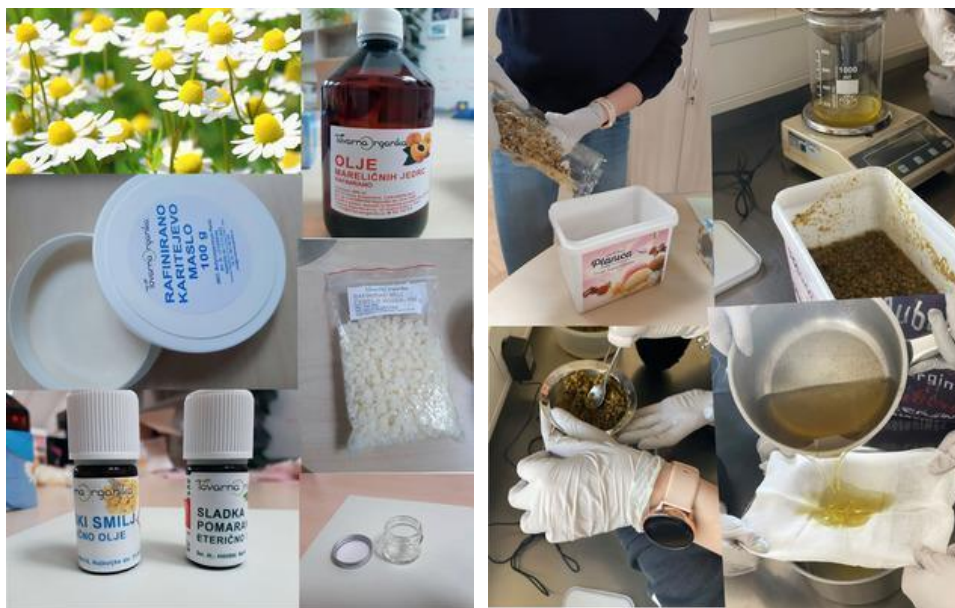
We created a recipe for chamomile salve with the help of the DIY cosmetic experts (company BeeBeauty), compared the prices of ingredients on the market, and calculated their needed quantity.

Ingredients:

Ingredients for chamomile salve are apricot kernel oil, dried chamomile flowers, shea butter, bee-wax pellets, essential oils – Immortelle (*Helichyrsicum italicum*), sweet orange, and vitamin E oil.

Recipe:

- We have prepared an oily extract out of apricot kernel oil and dried chamomile flowers. The mix was put in a warm place with indirect sunlight for 14 days. In the end, it was strained through a sponge gauze pad.



- Before the working process, we had to disinfect the working surface, our hands, all bowls and pots, and all cosmetic jars, where we packaged our salve. For disinfection purposes, we used 70% alcohol.
- We put oily extract, shea butter, and beeswax pellets in a double boiler and gently warmed the mixture on low heat until butter and wax were melted.
- Once melted, we removed the mixture from heat and added essential oils and vitamin E oil. The chamomile salve was ready.



- We quickly poured the warm salve into prepared jars (15 ml) and allowed them to cool completely.
- In the end, we chose glass packaging, which has a lower environmental footprint than plastic and is validated by EU cosmetic legislation.
- After that, we prepared labels with the logo of our company, titled The Alpine Symphony of silk. We named the salve "The symphony of chamomile". We put all the required information on the label: ingredients and their possible allergens, date of production and expiring date, volume ...



Herbal salves could be an entrepreneurial idea

We presented our products at the final conference of the Erasmus+ project, where they emphasized the role of women in urban areas. Herbal saves could be one of the entrepreneurial opportunities for those women. Our product was sent as a promotional gift to all participants of the conference.



How to reduce the impact of mass tourism in the Vintgar Gorge

We are a group of three, Sara, Ivana and Val. All members are closely related to the Vintgar gorge. We live or work nearby, so we have decided to investigate the effects of mass tourism in the Vintgar Gorge.

The Vintgar Gorge

The Vintgar Gorge is a natural value located in Triglav national park. The Radovna River cuts the Vintgar Gorge deep between the hills of Hom and Boršt. Steep slopes overgrown with beech forests. It is famous for its beauty and waterfalls. How could walking along a wooden planked boardwalk through a naturally carved gorge filled with rushing translucent water not be peaceful?



SD issue of mass tourism

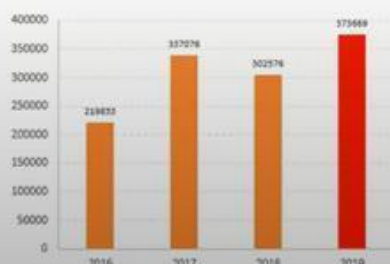
In recent years, the Vintgar Gorge is exposed to massive crowds.

In 2015, Vintgar Gorge was visited by 121.000 tourists. The price per person was 5 EUR. 4 years later, the ticket's cost was doubled, and the number of visitors increased by at least 2,5-times.

kupno število obiskovalcev – po mesecih (2019)



Primerjava obiska v letih 2016, 2017, 2018 in 2019



Parking lots were full. The ticket line was nearly stretched into the parking lot. Instead, you were going to walk the mile-long Gorge with 200 of our new best friends. Most of them were incognizant of personal space and completely oblivious to anyone trying to snap photos.



Triglav national park, Tourist Association in Gorje, an area manager, and locals try to solve the situation. The proposed solutions are:

- limited number of visitors per day
- the even higher price of tickets
- establishment of new parking lots, which enable more environmentally friendly and cheaper options for parking and the use of public transport – shuttle for transport directly to Vintgar
- establishment of the one-way alternative route through the Gorge (St. Catherine, Zasip).



We have cooperated with the Tourist Association in Gorje, and its director Tomaž is helping us with the project.

Solution: Design of learning path, which will reduce the effect of mass tourism

We made a survey, where we asked visitors of Vintgar Gorge questions related to natural value, mass tourism, quality of their visit. Answers confirmed that the alternative path through Vintgar Gorge is suitable for a learning path. A learning path could be devoted to plants and trees. In Vintgar Gorge, you can find 540 taxa of moss, ferns, and flowering plants adapted to the alpine forest, river, and mountain ecosystems. Among them is 23 protected species. Frequent species of trees are beech, small-leaved linden, spruce, large-leaved willow, the sycamore maple, the European hop-hornbeam, and alpine laburnum.



We also found 13 invasive plants, for example, tree of heaven (*Ailanthus altissima*), Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*).

Due to our survey, tourists are willing to spend 2 – 3 hours and learn about the natural heritage of Vintgar Gorge.

In the end, we can conclude that the learning path established at the one-way alternative route through the Gorge could be an additional tourist attraction. It will help decrease the pressure of mass tourism on endangered ecosystems in the Gorge. We helped prepare the promotional video and leaflet, presenting an alternative one-way path through the Gorge and its flora and fauna.

OVERVIEW OF ACTIONS – Liceo Scientifico Statale Annibale Calini

Summary

Liceo Calini chosen SD issues

- Light pollution
- Organic pollution

Objectives

- Explore the effect of light pollution on the environment and find way to minimize it
- Explore the causes and the effects of organic pollution on the environment and find ways to minimize it
- Increase people awareness about effects of mass tourism on the environment

Actions

Light pollution

We are Anna Mettifogo, Fatima Mabrouk, Sandro Ye, Federico Barbieri, Francesco Odolini; Federico Bassi. We are all students of Scientific High School 'A. Calini'. We live in Brescia and we love Pizza.

We investigated light pollution in the alpine area. We chose this topic because we thought that it was a very important and underrated topic, that many people don't consider.

Light pollution is the direct or indirect introduction of artificial light into the environment and is one of the most common forms of environmental alteration. Light can propagate for hundreds of km and can even block the view of the stars: in Italy 8 out of 10 Italians cannot see the pristine starry sky. We have tried to think of feasible solutions that allow both to reduce the rate of light pollution and to save economically. Our idea focuses on the creation or greater diffusion of sensors that control the light of street lamps. In this way, when a vehicle approaches a lamppost, the light will be switched on for a certain period, to decrease the numerous underused illuminations. If, for example, on mountain roads, this sensor was activated at every street lamp, it would be possible to drastically reduce the light pollution of that area. Which would benefit not only us humans, but also all animal species. Environmental damage linked to light pollution affects both animals and the environment and the balance of the earth. Migratory birds, sea turtles, night moths can lose their orientation while some plants undergo an alteration of the photoperiod (the duration of



the daily lighting period). All living things certainly experience an abnormal, unexpected and unhealthy rhythm change. First of all, we have a biological clock that certainly does not remain indifferent to excessive light.

We thought that limiting the beam of light produced by the thousands of street lamps would be the first significant step in reducing light pollution.

The best solution for us was the creation or greater diffusion of the sensor that control the light of the street lamps, in this way, when a vehicle approaches a lamppost, the light will be turned on for a certain period. This would help to decrease the many underused illuminations. We found that you can measure the light pollution in your area by building a little star counter.

Below you can find a link to our eBook about Light Pollution.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/Light%20pollution.%20How%20this%20problem%20affectys%20he%20alpine%20area.pdf>

Organic pollution

Our group is composed by Giulia, Lucia, Samantha, Margherita, Anna and Alessandro.

We got information about organic pollution studying, interviewing experts and visiting mountains and observing.



How beautiful it is to go to the mountains: breathe fresh air, go hiking, admire enchanting landscapes and observe some alpine animals. Unfortunately, due to man, it could one day disappear. In recent years there has been more and more talk of environmental and atmospheric pollution and how to find a solution to this problem. We have focused on organic pollution in the Alpine ecosystem by analyzing the main pollution factors, such as the manure and the various gases it produces. Organic pollution is a type of chemical pollution caused by carbon pollutants, such as organic matter like liquid manure, sewage treatment sludge, etc., organochlorides (DDT), like pesticides, or polychlorinated biphenyls (PCB), like chemical and industrial products, that are toxic for humans and the environment. Some of these are highly biodegradable, others are persistent and are called POPs. Organic pollutants can come from domestic sewage, urban sewage, industrial effluents or agricultural waste for exemple, but also from animals, like manure.

Below you can find a link to our eBook about Organic Pollution :

[https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/Ebook%20Inquinamento%20Organico%20\(Alps4Nats\).pdf](https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/Ebook%20Inquinamento%20Organico%20(Alps4Nats).pdf)





Biogas is a concrete response to climate change

The farming activity in the Alpine area occupies large spaces, precisely for this reason we should arrive at an idea of plant centralization. It would be important to devise a treatment system that can be exploited from multiple areas. We should try to give it sustainability also from a logistical point of view, because any anthropogenic activity unbalances the ecosystem. The impact of the impoverishment of matter by a farm can be mitigated, reinstated and canceled by the same production of waste and manure by cattle.

The state encouraged the production of electricity from renewable sources. There have been incentives for a year on biomethane, like the incentive for the anaerobic treatment plant that produces biogas, because this system costs a lot.

The environmental, social and health effects of climate change are already evident and very serious: to prevent the situation from precipitating it is necessary to act immediately to halve CO2 emissions as soon as possible. Installing a biogas plant means making a concrete contribution to this urgent and no longer postponable process.

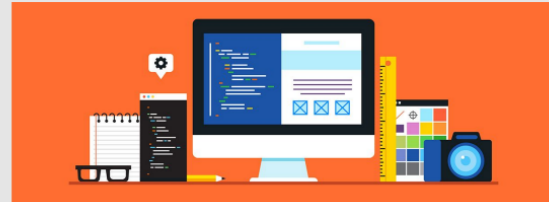
Incentives of this type are very important, because they help to increase the reuse of matter, as it is or through treatments. This reuse of matter is called circular economy: "WHAT IS A WASTE FOR SOMEONE CAN BECOME ONE RAW MATERIAL FOR SOMEONE ELSE".

Our concrete solution

Idea

We were asked to find a practical solution to solve the problem of pollution caused by the incorrect disposal of manure.

Our idea is to design a website, in which to collect the data and information obtained from our research, to make them available to anyone who needs it.



How it will be developed

Our project will be divided into several web pages, each containing a different topic.

The first page will be intended for the introduction of the topic, where the problem of the incorrect disposal of manure and the damage it can cause will be explained and analyzed.

The second page, on the other hand, will contain a guide that will explain the correct behaviors that farmers and large companies should maintain to minimize the amount of pollution, but not only that, it will also contain small precautions, useful for protecting the environment, which each of us will be able to implement on a daily basis. All this enriched with photos and explanatory videos.

Recreational games will also be included, intended for fun and learning.

OVERVIEW OF ACTIONS – MFR la Tour d'Aigues

Summary

This first theme led the students of the MFR la Tour d'Aigues to become aware of the nature that surrounds them. The sensory approach adopted enabled to first let them « feel » nature and express it in temporary « nature mood boards » art work.

A trip to Cezanne's art studio allowed the students to discover an artist that was passionate about our local nature (he painted the St Victoire mountain over 60 times!).

Students then learned to observe and draw the nature around the school and came to the conclusion that feeling and understanding nature is necessary to be able to capture it in an art work.

They then observed paintings of Cezanne and the reality today and expressed their feelings on their observations.

They also observed how art is part of our common local identity – and how local culture is an important factor of why so many tourists visit our region.

They then listed all the cultural aspects around their own houses and then thought of ways to ensure that people preserve the nature around us.

The solution they explored was to make games so that people around them could learn about the cultural aspects that were important to them.

To be active in the preservation of our cultural heritage the students defined that it was necessary to first be aware of it. So to help others learn about the wonders of our natural countryside and cultural heritage each student made a game. Each game was intended to highlight natural and cultural aspects of their region (art, food, local language, monuments, places, natural areas...).

Their hope is that by spreading knowledge you also spread the desire to protect local culture.

Key sustainable development issue

The protection of nature is essential towards protecting our cultural heritage which is important especially as we live in a very touristic region (Luberon – southern France).

How can Art help us protect nature and the value of our territory ?

Objectives

Our objectives were to:

- Observe nature and how it makes us feel
- Appreciate the connection between nature and art.
- Understand how culture and art is a part of our identity
- Understand the attractiveness of the region we live in.
- Create innovative ways of engaging other people in the preservation of our natural and cultural heritage.

The issue we wanted to address was the protection of nature as it is essential towards protecting our cultural patrimony which is important especially as we live in a very touristic region.

Our solution was to create games to raise awareness about the different cultural aspects of where we live.

Actions

Field trips

The field trip started with a quote of a local artist :

« Le peintre concrète au moyen du dessin et de la couleur ses sensations, ses perceptions ». (The artist concretizes, through drawing and color, his sensations, his perceptions.) - Paul Cézanne

We started by walking around the school to observe nature and how it makes us feel. Students took notes based on an observation questionnaire.

Then the students made nature mood boards using elements of nature that they had picked up to create temporary art work.



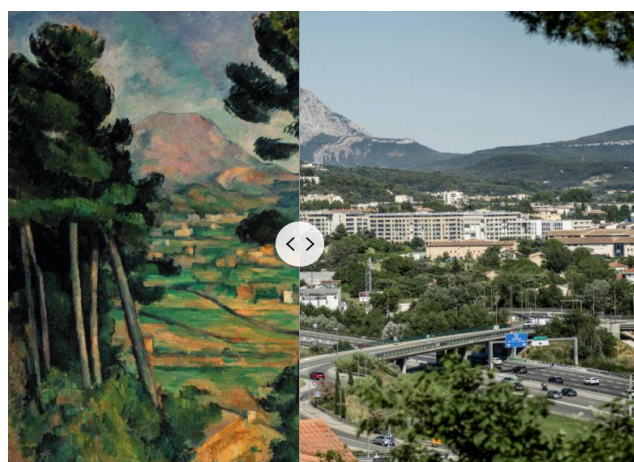
A field trip to visit Cézanne's workshop in Aix en Provence allowed the students to see the environment he worked in and the nature he preserved for us in his paintings.

Painters inform us about the countryside around us. They inform us about their evolutions. But above all they show us the beauty of the countryside, they show us how to observe nature, how to admire it... and how to preserve it.



L'atelier de Paul Cézanne-Atelier des Lauves

Students observed the differences in landscapes that Cézanne had painted and the existing landscapes today :



This led them to gain an understanding of the importance of art in the quest to preserve nature. But also the risk of losing nature to human development.

Interactive activities

The students played with existing online activities such as proposed by the museum Le Grand Palais (Paris) : [Joue avec Paul Cézanne | RMN - Grand Palais jeune public, découvre des œuvres de Paul Cézanne en jouant : des quiz de tous les genres](#)

https://www.jeunepublic.grandpalais.fr/IEUX-CEZANNE/jeu_cezanne2.html?_ga=2.5458035.1567297058.1606686269-1382601...

Les paysages de Cézanne

Cézanne compose ses peintures avec les couleurs ; il crée ainsi différents plans et donne l'espace et la profondeur à ses œuvres. Voici trois de ses œuvres, amuse-toi à recomposer chacune d'elle.

BONNE(S)
RÉPONSE(S) 0 / 3

Œuvre n°1



Paul Cézanne (1839-1906) : Le Quartier du Four, Auvers-sur-Oise
Année 1912, huile sur toile, 68,3 x 52,2 cm
Philadelphia Museum of Art - The Samuel S. White 3rd and Van Winkle Collection, 1967

Observe bien cette toile et clique pour commencer.

[Retour au site RMN-GP Jeune Public](#)

And they also made some of their own :

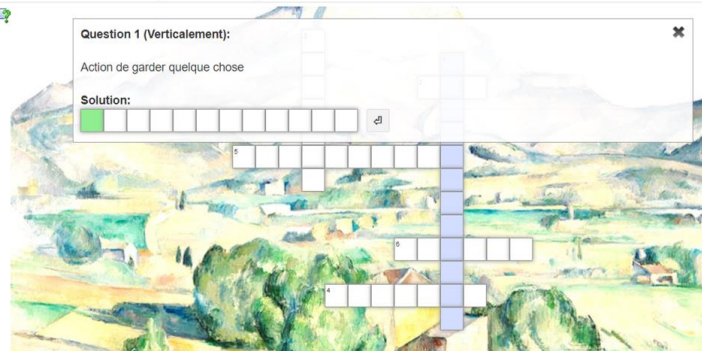
Trouve les bons mots à partir de leur définition.

En même temps réfléchi au sens des mots... penses-tu qu'il faut préserver la nature et l'art ?

A toi de jouer : <https://learningapps.org/display?v=pqrkifemf20>



L'art a-t-elle un rôle à jouer dans la préservation de la nature ?



Trouve les 5 différences dans l'œuvre de Paul Cézanne



Si tu veux jouer en ligne, clique sur :

[Jouer à Paul Cézanne différences - Jeuxclik.com](https://jeuxclik.com/jouer-a-paul-cezanne-differences)

Concrete solutions

To help others learn about the wonders of our natural countryside and cultural heritage the students chose to make games – their idea was to make learning fun.

The plan was to go to the primary school in our village and play the games with the children in the school - but then COVID came and we had to cancel the partnership with the primary school.

Nevertheless, students actively engaged online and managed to create games using recycled materials they have at home.

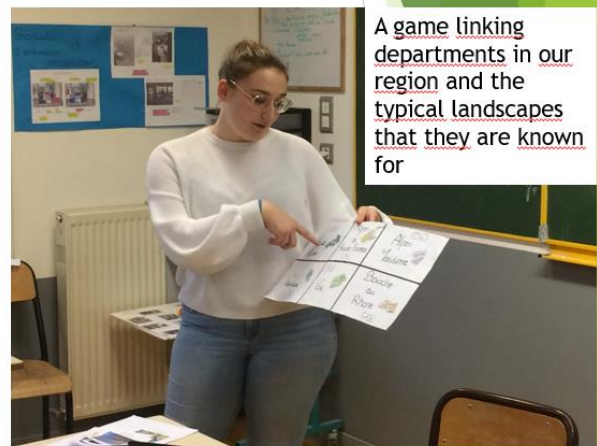
The games were tested on their close family members and when possible were posted and shared online so that they could be enjoyed by other families of the class.

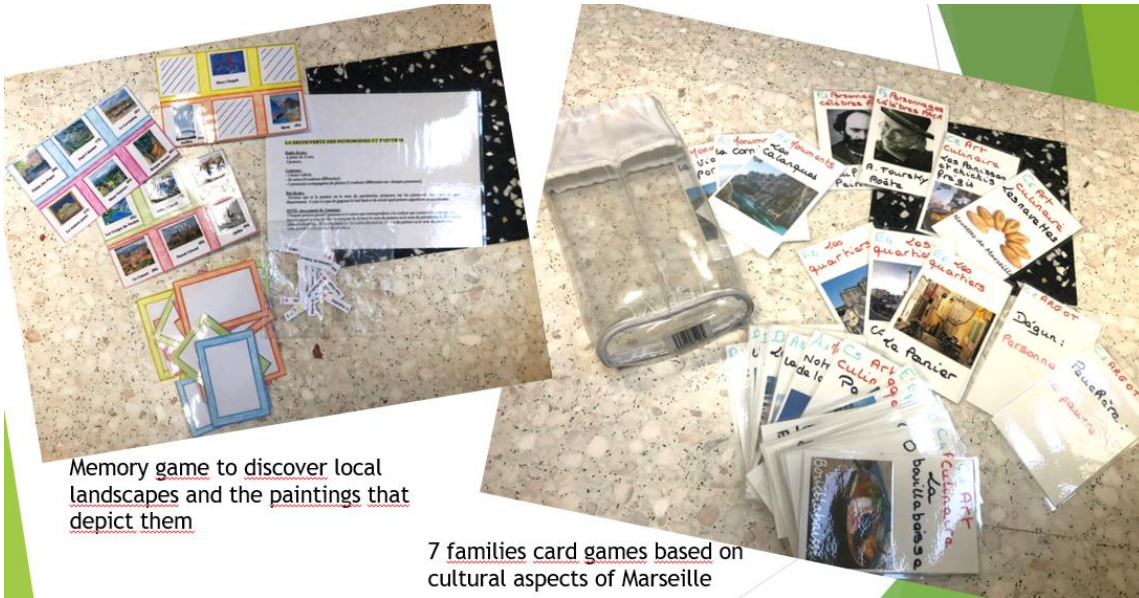
When back at school, after lockdown, students brought in the games they had made and presented them to the class.

A game linking the map of the region and places that have been painted



A game linking departments in our region and the typical landscapes that they are known for

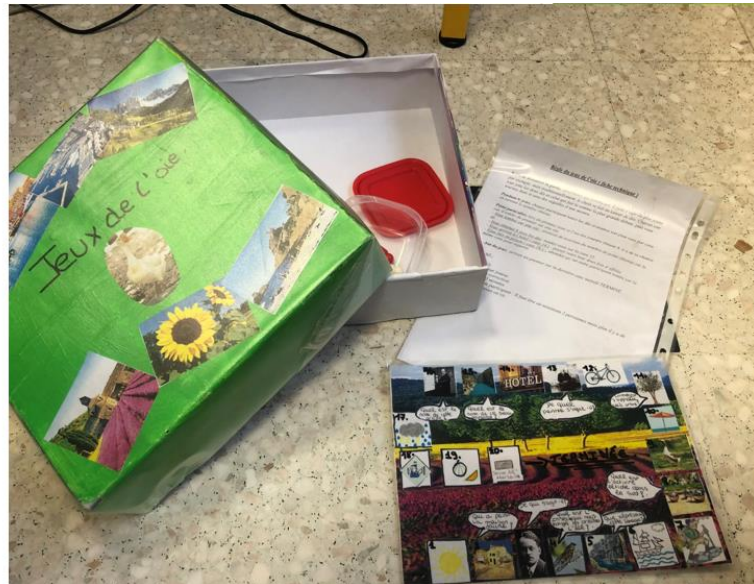




Memory game to discover local landscapes and the paintings that depict them

7 families card games based on cultural aspects of Marseille

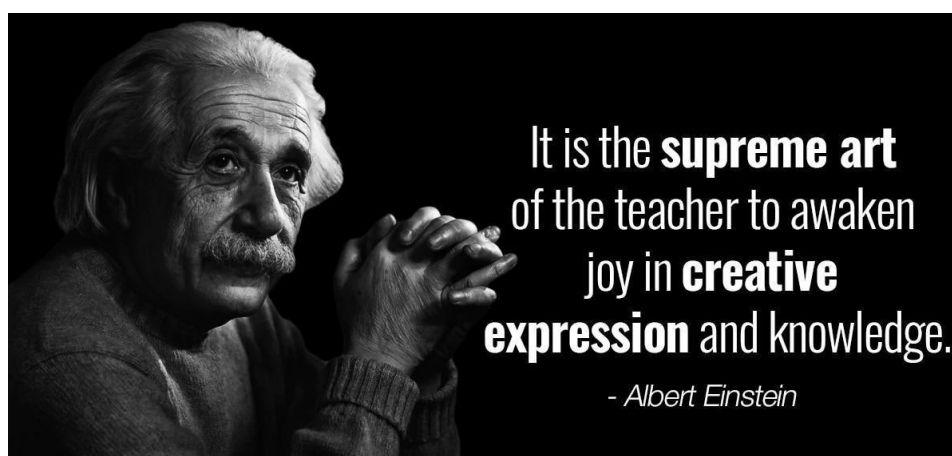
Board game to discover local landscapes, monuments, artists...



RESULTS

This theme enabled students to use different learning techniques to be able to define their projects :

- ▶ **Multi-sensory approach** : by engaging more than one sense at a time both surprised and delighted the students as they were more used to in-class teacher to student learning. They felt more at peace with the learning process and found it more fun. They concluded that the concepts and learning were easier to remember.
- ▶ **Increased knowledge about local culture** : The students had a lot of good ideas for their games that touched upon a wide range of cultural aspects : art, language (local dialect), places, monuments, food. By using their local culture, something close to home, the students felt it was more engaging and less conceptual.
- ▶ **Learning by doing** : Students found that although a lot more fun, learning by doing obliged them to rethink quite a lot. Instead of just learning about art and nature they found that when they were making their games a lot of trial and error was necessary to make them easy to understand and fun.
- ▶ **Value of being creative, of making/doing by yourself** : Students were proud of their work. They wanted to test the games in the local primary school but unfortunately this wasn't possible due to COVID.



GLOSSARY

The key words that the students researched were :

- ▶ **Art**: a diverse range of human activities involving the creation of visual, auditory or performing artifacts (artworks), which express the creator's imagination, conceptual ideas, or technical skill, intended to be appreciated primarily for their beauty or emotional power.
- ▶ **Culture** : Culture is considered a central concept in anthropology, encompassing the range of phenomena that are transmitted through social learning in human societies. Cultural universals are found in all human societies. These include expressive forms



like art, music, dance, ritual, religion, and technologies like tool usage, cooking, shelter, and clothing.

- ▶ **Emotion**: a conscious mental reaction subjectively experienced as strong feeling usually directed toward a specific object and typically accompanied by physiological and behavioral changes in the body.
- ▶ **Heritage** : something transmitted by or acquired from a predecessor
- ▶ **Identity** : the distinguishing character of somebody or something.
- ▶ **Nature** : derived from the Latin word *natura*, or "essential qualities, innate disposition", often refers to geology and wildlife.
- ▶ **Senses** : the faculty of perceiving by means of sense organs.
- ▶ **Preservation** : the activity or process of keeping something valued alive, intact, or free from damage or decay.

Sustainable Development Issue :

BIODIVERSITY

OVERVIEW OF ACTIONS – Biotehniški Center Naklo

Summary

BC NAKLO CHOSEN SD ISSUES

B I O D I V E R S I T Y

- Effects of mass tourism on animals in the Alps
- A golden jackal in the Alps and Slovenia
- Mountain pastoralism in Slovenia
- Japanese knotweed - if you can't beat it, eat it :)
- Monitoring of rock ptarmigan population in TNP
- Slovenian lynx population thriving



FOR MORE
INFORMATION:



Objectives

- Become get familiar with endangered animal and plant species and ecosystems in the Slovenian Alps and their conservation strategies,
- Know various invasive species and their effects on environment, business and human health,
- Know indigenous domestic species in Slovenia, their areas and breeding programs, pros- and cons of their breeding,
- Address biodiversity issues in the Slovenian Alps and find creative solutions for raising awareness campaign

Actions

Effects of mass tourism on animals in the Alps

We are Julia Tomec, Lara Prusnik, Marcel Nemeč and Nuša Zvržina. We are students of Biotechnical Centre Naklo and we study environmental science. We all love taking care of nature.

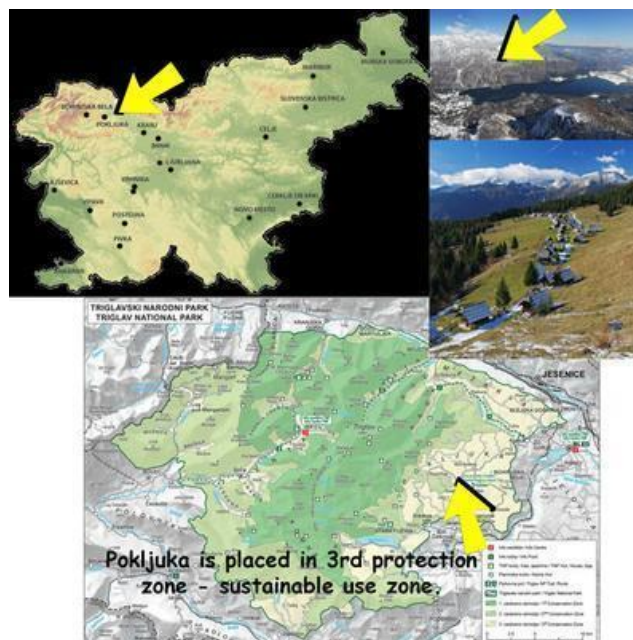
Our topic is the effects of tourism on nature in the Alps. We chose this topic because it's popular right now. We focused on the large carnivores populations in Pokljuka.

Triglav National Park and Pokljuka plateau

Triglav National Park is a protected area, that also connects with other protected areas in the Alps, in the Network of Protected Areas – ALPARC.

The national park is divided into three protection zones: the first, second, and third protection zone:

- 1st zone: Strict protection (“wilderness”) – no hunting/wildlife regulation
- 2nd zone: Protection zone, where traditional uses (agriculture, forestry, hunting) are allowed
- 3rd zone: Sustainable use zone, including permanent settlements and villages



Pokljuka is the karst plateau on the eastern side of the Julian Alps. It is 20 km long and almost as wide. Its altitude is between 1,200 and 1,500m. It is covered in spruce forests.

Pokljuka belongs to the Triglav National Park. It is mostly situated in the 3rd protection zone, where sustainable use of landscape is promoted.

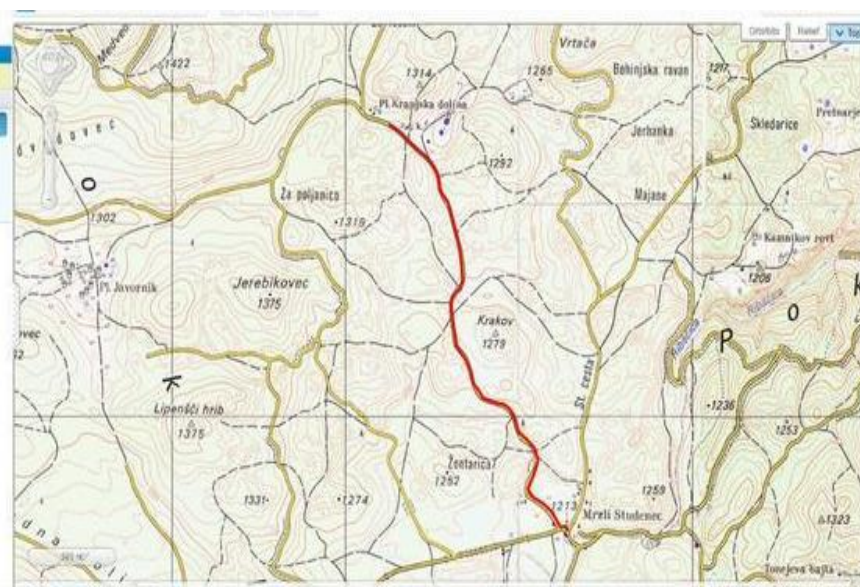
The effect of mass tourism on Pokljuka

Tourism is a massive environmental threat to Pokljuka. In most cases, the sources of pollution are connected to the construction and renovation of tourism infrastructure, organization of mass events and sports competitions (it holds world-famous biathlon competitions), implementation of sports activities (cycling, biking, hiking, cross-country skiing) out of designated trails. It results in disturbed wildlife, endangered habitats and ecosystems, demolition of alpine meadows, soil erosion, contamination of soil, fresh- and groundwater, exhaust emissions, noise and light pollution, trash dumping...



Fieldtrip to Pokljuka

Our practical work included taking a field trip to Pokljuka.



We went there to take some genetic samples of animals - urine, feces, hair, saliva and identified footprints in snow with identifying key.

Our guides showed us a camera that captured footage of a fox walking around the woods. They also taught us how to make a cast of a footprint. They explained how to monitor wolves in our forests using howling. Due to their territorial characteristics, they will howl back when they hear us.



Pokljuka is an Alpine area, where tourists, locals, and large carnivores should coexist.

Experts have confirmed a long-term presence of 6-7 bears and 2 - 3 packs of wolves at Pokljuka. Reestablished presence of large carnivores in the Pokljuka region brings a potential for conflicts to various stakeholders (locals, hunters, farmers, authorities, and nature-lovers).

A way to build and maintain a positive image of large carnivores among the general public is to raise awareness of their lifestyle and present their charismatic characteristics. For this purpose, we have built plastic models for plaster castings of animals tracks...

But if you find them in nature – in snow or in mud, that's even better.

We went to a primary school in Bohinjska Bistrica (A school in Julian Alps Biosphere Reserve) where we presented large carnivores to 30 pupils. Our workshop included a game “Who do I belong to?”, where pupils connected photos of animals to their footprints and feces. In the end, we howled together.





[Let's click on the link to see how did we perform howling :\).](#)



A Golden Jackal in the Alps and Slovenia

We are Matic, Lan, Nace, and Nejc, four students of Biotechnical Centre Naklo who love nature. We chose the topic of Golden Jackals (*Canis aureus*) because the jackals aren't that well researched in Slovenia and not many people have had the opportunity to take a photo of them. Truly fascinating beings.

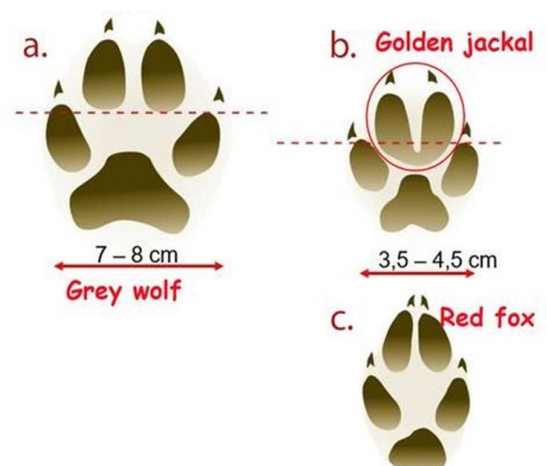


Some of our group members are passionate wildlife photographers. Our group has chosen to capture a rather rare animal in our environment, the Golden Jackal. At first, we decided to capture the animal on camera, but due to COVID-19, our assignment has slightly changed.

What is a golden jackal?

A golden jackal (*Canis aureus*) is a member of the Canid family, an animal smaller than a wolf, but larger than a fox.

It possesses shorter legs, a shorter tail, a more elongated torso, a less-prominent forehead, and a narrower and more pointed muzzle. The golden jackal's coat can vary in color from a pale creamy yellow in summer to a dark tawny beige in winter. It has joined pads of medieval toes.





It has a very diverse diet – from small rodents, fish, birds, frogs, eggs, and also carrion. It is not only a generalist but also an opportunist – it chooses foods, which are easy to find and catch. If the slaughterhouse waste management is poorly regulated in the area, landfill sites are very attractive habitats for jackals. A great amount of easily accessible food is one of the reasons for their increased population. Even though, regularly their packs are smaller, more family-sized - a male and a female and their children.

They spread rapidly and over long distances, even across human-dominated landscapes. They prefer lowlands, but they can also be seen in mountains. In the last decades, they have spread from the Balkans to Western and North Europe. Their quick expansion is limited by wolves; the range of wolves and jackals is mutually exclusive.



Looking for golden jackals at Ljubljana moors

In the process of creating our seminar paper, we contacted experts on golden jackals. They invited us to join them in the field of Ljubljana Moors. We were looking for tracks in the mud, taking part of their feces for genetic sampling. They demonstrated to us an acoustic method of monitoring – sampling. Golden jackals are territorial animals, they mark their territory with howling. For the time of our field trip, they didn't howl back due to floods in the monitored area a couple of days back.



Mountain pastoralism in Slovenia

Our names are Tajda, Nina, Ina, Maša, and Hana, we are 2nd-year students of Nature Conservation at BC Naklo. We have chosen the topic of high mountain pastoralism, which is slowly disappearing around the Alpine arch.



The tradition of Mountain Pastoralism

Alpine pastoralism refers to the grazing of livestock and the production of milk and dairy products on high mountain pastures. In the past, this activity was very important.

One of the most famous pastoralist areas in Slovenia is Bohinj and the surrounding plateaux. Pastures were mostly built on terraces in forested areas, especially if there was a water source. This was due to the long winters and short summers and the little arable land.



Because of the heavy dependence of the peasant economy on pastoral livestock farming, the oldest form of pastoralism, called *individual shepherding*, survived in Bohinj until the second half of the 20th century. This is a form of pastoral organisation in which each mountain landlord has his own stable and a shepherd.

Who is a SHEPHERD (MAJER/PLANŠAR)?

Shepherds lived a very simple lifestyle in the mountains. We call them *Majer* and *Planšar*. It refers to a person who takes care of animals on a mountain. Majer/planšar on the lower mountains had to make their cheese, cottage cheese and butter. Majer/planšar was usually a younger family member (14, 15 years old) or older unmarried family member. They were capable and reliable people, who were closely connected to the mountains. It was a demanding profession, but it gave a sense of freedom. After the Second World War, shepherding and the associated cheese-making began to decline.



Where do they live? In shepherds' huts, called STANOVI

Huts on the lower mountains were half brick half wood. The stable was separated from the house. In the higher mountains, huts were made out of wood, logs and covered with shingles, which stood on stilts called 'mares'. They had an open fireplace, a storeroom (the dairy), and a modest bed (the bear cot). The barn consisted of two stories, the first to shelter animals and the second to store hay.

Indigenous breeds of grazing animals

- cows: Cika and spotted cattle
- goats: Drežnica goat
- sheep: Jezersko-Solčava sheep, Bovec sheep,

The animals are kept in stables in winter and grazed in pastures in other seasons. Grazing rights in the uplands were precisely defined, and the old rule was that each farmer could graze as many animals as he could feed over the winter, so there was a link with the amount of fodder.



PROBLEMS OF AGRICULTURAL ABANDONMENT IN THE MOUNTAINS – overgrowth, landscape change, invasive species

Mountain pastures need to have a constant pH. Fertilising would upset the balance, cause the disappearance of plant species, change the composition of the grass sward and affect the yield and quality of forage. Frequent mowing also leads to the disappearance of species and the emergence of invasive species.

Plants that are already on the Red List of threatened species: yellow mallow, cranesbill, arnica, lemon lily, dogtooth violet, etc.

Invasive species: annual fleabane, large-leaved lupine, Alpine dock, etc.

Mountain revival due to tourism

As the mountain industry began to decline, owners started renting out their homes to tourists. Each year, the land is cleared by logging and burning the vegetation, by doing so we are preserving biodiversity and revitalising mountain management. In Slovenia, mountain pastures are less frequently used for seasonal grazing, and where they are, they are used for grazing animals that are more economically viable but less useful for the preservation of the cultural landscape. The result is the overgrowth of grazing pastures.

Visitors to the pastures enjoy the natural and cultural landscape while learning about traditional farming and developing respect for nature and the people who work on the pastures. Visitors bring additional income to farmers, resulting in mutual satisfaction and the possibility of further development of the area. Typical dairy products, which are offered on mountain pastures: cheese, cottage cheese, butter and sour milk.

Visit to the Gartner farm "Pr Odolnek"



As part of Suitable's E+ mobility in Slovenia, we visited the Gartner farm in Bohinj, where they breed 'cika', an indigenous type of cattle. We learned about the traditional grazing, and the equipment shepherds used in the mountains.

We learned about how local farms worked together - the Stara fužina grazing community. We also visited a cheese ripening plant. They make the traditional "Bohinj" cheese, which we were able to taste.



OVERVIEW OF ACTIONS – Liceo Scientifico Statale Annibale Calini

Summary

- Excursion to a natural reserve: Torbiere del lago d'iseo. - Observing local biodiversity and effect on the biodiversity of the presence of non-native and invasive species
- Excursion to CRAS (wildlife rescue centre) in Paspardo – Observing local biodiversity
- The alpine wolf and related problems
- Biodiversità alimentare - Food biodiversity

Objectives

- Become familiar with endangered animal and plant species and ecosystems in the Italian Alps and their conservation strategies,
- Address biodiversity issues in the Italian Alps and find creative solutions for raising awareness campaign
- Discover how food production can affect biodiversity and increase awareness about food good practices.

Actions

Excursion to a natural reserve: Torbiere del lago d'iseo. - Observing local biodiversity and effect on the biodiversity of the presence of non-native and invasive species





With the help of an expert we visited a natural area close to Lake Iseo in Valcamonica Valley, to discover local biodiversity and how the introduction of alien species such as the big catfish “*Silurus glanis*” has had a big negative impact on bird populations breeding in the reserve. We also observed a rabbit (*Sylvilagus*) that today is widespread. The guide also showed us many non-native plants which compete with the local ones.



We took samples of the water to test them back to the school in our laboratory.

Excursion to Paspardo – Observing local biodiversity :

The outing to Paspardo, a village in Valcamonica, on Thursday 20 May, allowed us to come into contact with a different ecosystem from the one we are usually used to.

We were accompanied along the way by two experts who explained to us which species live in the area and allowed us, through some listening points, to identify some animals.

Among the birds, we saw the honey buzzard, the great tit, blackcap, robin, chaffinch and we listened to the cry of the extremely rare dwarf owl.

In addition, we were also able to observe an Eagle Owl specimen that had been rescued in the earlier years by the local rescue centre, and the researchers told us that in the wild this bird of prey is very

difficult to see in nature, as it hunts at night. However, a sign of their presence in the area are the various hedgehog shells that some hikers find on the ground.

At this centre we also saw two elk and looked at antlers and analyzed their composition, seeing how diet has an impact on their development.

The animals we saw are only a small fraction of those that usually inhabit these territories. Due to climate change, some birds have brought forward their migration periods. The birds that live in this area, because of the warmer spring, migrate to territories such as Germany, Austria and Scandinavian countries a few months earlier than they did years ago.



Another problem that has been pointed out to us by experts is that animals that hibernate tend to wake up earlier than they did years ago.



So climate change has affected the territory a lot: we have noticed how it has affected the territory and the behavior of certain species. Experts have pointed out to us how the shape of forests is also changing: there is a trend towards a reduction in green meadows, which are essential habitats for certain species such as the black grouse. Paradoxically, the deforestation that took place in Valcamonica during the time of Napoleon had benefited these species, which now find themselves in difficulty also because of the increase in habitat, due to the fact that the temperature has risen over the years as a result of the greenhouse effect (animals move up higher to find a favorable climate).

Rising temperatures have also had an effect on precipitation and weather events. As the air temperature is higher, more water evaporates and therefore the number of precipitations has increased during the last few years. precipitation has increased in recent years.

The alpine wolf and related problems

The importance of the wolf on our mountains is out of doubt, and has clear results. This predator controls the number of elements of various species that, if let free to reproduce, will end up damaging, with their diet, plants and trees of the area.

Some studies, carried out in North America, proved that the presence of the wolf influences also the stability of river banks and reduces hydrogeological instability.

We have therefore worked to identify some of the innumerable problems that afflict the alpine wolf. The most important: poaching, the excessive confidence that the animal has acquired with man, the risk of hybridization, the conflict with breeding and the impossibility of bringing these two realities together.

Poaching and hunting were the main culprits of the risk of extinction in the 1970s, therefore, although the number of wolves has stabilized, it's essential to limit these practices. In fact, every year about 300 wolves die at the hands of man. Of these, one in two dies at the hands of poachers from snares, traps, poisoned baits and gunshots.

Another problem about wolves is about his bond with humans and the territories they occupied. Wolves are animals that naturally won't attack people, but because of a growth in the wolves' population and the consequential expanse in the territories they occupy, some problems emerged in the relationship between wolves and humans.

The risk of hybridization is a very frequent phenomenon, due to the fact that wolves mate with feral dogs, thus losing most of their genetic characteristics and nature. In some areas, the hybridization rate reaches 30%.

It is therefore clear that in order to preserve such an important species, steps must be taken to prevent its genome from being lost and the remaining specimens from further diminishing.



Below you can find the link to our eBook.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/eBook%20The%20Alpine%20Wolf%20.pdf>

Biodiversità alimentare - Food biodiversity

We are Federico, Daniele, Niccolò, Anna, Giulia and Valentina.

Our group wants to discover what is the link between nature and food and how diversification can be good for the alpine ecosystem with the animals and human beings who live there. We chose to focus on this topic, because we want to discover how the rising of the temperature is linked to biodiversity change and how diversification can be good for the alpine ecosystem with the animals and human beings who live there. In particular we want to analyse the relationship between global warming and the introduction in the alpine ecosystem of new vegetal species that replace the autochthonous ones. At first we want to study the causes and the reasons about the appearance of new species and the disappearance of endemic ones. Climate change is the most important of these causes because the rising in temperature is causing the movement in altitude of a lot of vegetal species that start fighting with the others which have always inhabited this ecosystem. In the end we wish we would find a way to preserve these plants at risk of extinction because of climate change in order not to lose some important foods which allow humans to have a diversification in nutrition. A varied diet that mainly exploits the resources that we can find in the surrounding area can guarantee benefits to the environment, our health and that of the animals that live there. Our goal is to find a way to struggle against monoculture in the alpine environment in order to preserve the species at risk of extinction and let us have a

more varied diet. Why did we choose his topic? Because we think that only by educating society we can truly combine our lifestyle and make the difference

Below you can find the link to our eBook.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/eBook%20Biodiversit%C3%A0%20aumentare.pdf>

OVERVIEW OF ACTIONS – MFR la Tour d’Aigues

Summary

This theme led the students of the MFR la Tour d’Aigues to discover what biodiversity means and how it is essential to our everyday life : to eat, to be healthy, to have clothes.

Field trips enabled the students to discover the uniqueness of the Luberon (a UNESCO biosphere) and discussions with partners from the LPO (League of Protection of Birds) and the PNRL (Natural Regional Park of the Luberon) helped them understand the aspects that need to be preserved.

Students then brainstormed to see what actions they could concretely carry out to not only enable the preservation of biodiversity but also encourage it and raise awareness to help others understand and act.

The key aspect they focused on were :

- Preservation of plants.
- Protection of birds
- Protection of insects
- Raising awareness

Key sustainable development issue

Preserving and encouraging biodiversity because :

“Biodiversity is the key so we can all live in glee!”

Objectives

- Understand biodiversity and its impact on us and our impact on it
- Identify how we can act at a personal and local level
- Encourage others to act and enjoy acting !

Actions

Learning and reasearch

The theme started out by a discussion around the uniqueness of the Luberon area. The Luberon is a UNESCO biosphere – so it has lot of unique aspects that must be preserved.

Based on their findings in the previous themes, the students noted that around them there are : unique plants that survive thanks to the work of insects – both of which are necessary to the preservation of birds.

Students also benefited from the exposition that was lent to the MFR by the Parc Naturel Regional du Luberon (our regional park) : The theme of course was biodiversity ! :



The students recapitulated their findings in a presentation :

In the Luberon we have some unique plants

1 800 different plants grow in the Luberon that is 30% of the French flora !

31 plants exist only here!

Many plantes are also used for medecins or cosmetics

The plants survive thanks to the work of 17 000 different insects

Half of France's butterflies live in the Luberon.
And you couldn't come to the Luberon without hearing the unique sound of the cicada.



We harbor many wonderful birds who need the insects and the plants to survive

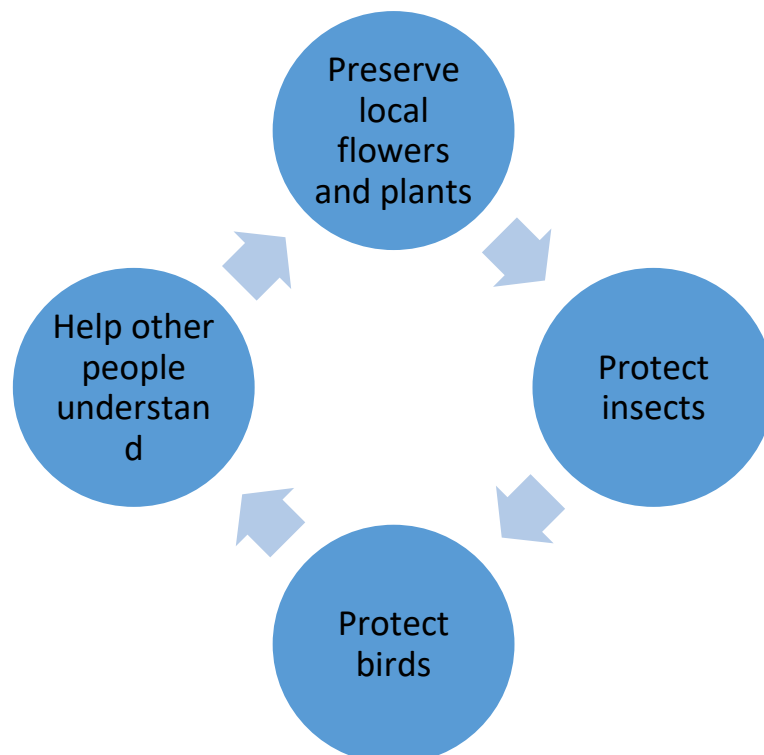
More than 140 birds have been counted in the Luberon. It is a mix of mountain and mediteranean birds. There are also some unique species such as : the Bonelli eagle and the Grand-Duc owl. And we must mention the Vautour percnoptère (who lives half his year in the Sahara) that risks extinction.



A discussion during a field trip with a specialist of the National Regional Park informed the students that human activity has put pressure on these riches :

- 15 butterflies are now considered to have disappeared from our region
- 16% of dragon flies are at risk
- 82 % birds may disappear
- 11% of the flora is threatened

They defined that there was a link between each issue and the need to raise awareness about the importance of biodiversity :



Field trips

A field trip to the Domaine de la Thomassine, where they conserve and protect lots of old varieties of plants (the domain is part of the National Regional Natural Park of the Luberon), enabled the students to learn about biodiversity through seeing, feeling and tasting.

They were lucky to be able to pick as many different varieties of apples as they could carry and take them home to share with their families.

A work shop on making apple juice facilitated discussions about the link between nature and humans. It also sparked debates on how an international regulatory and economical system leads to having only 4 varieties of apples on sale in shops.



A second field trip with a specialist from the LPO (Ligue de la Protection des Oiseaux – League for the Protection of Birds) enabled the students to go insect catching and learn about insect classification and the importance of insects in the wildlife. Non formal educational methods were used to encourage students to make choices and debate about the contradictions between what we “need” and what we could do differently to preserve biodiversity for ourselves and future generations. Using photos as a

base material, students were given 2 different points of view to defend – they often had to defend a position that they personally disagree with. They then had a debate defending their position and where they had to negotiate sustainable actions and goals with the opposing party. (ex: debate on clothes : buying clothes cheap to be able to change often and be in fashion / or buying eco-friendly clothing that cost more and thus not being able to change style so often. Ex: eating/not eating exotic fruit).



The specialist of the LPO then took the students to another area to do some bird watching and learn about their habitat and needs.



Students also spontaneously carried out some clean up and recycling actions :



And the eco-delegates managed at last to convince local authorities that our school deserved our own recycling bin :



[LA TOUR D'AIGUES : La Maison familiale au cœur du Développement Durable - Infos Sud Lub \(over-blog.com\)](#)

Concrete solutions

The students started by brainstorming for ideas and then classified them based on what they deemed important:

- Creating opportunities for wildlife by creating different ways of planting seeds and plants depending on your way of life: seed bombs to be thrown when walking, seed paper to be planted in the garden, and replanting the whole school to enable all the students to be able to appreciate the beauty and usefulness of plants.
- Making insects welcome (making insect hotels) and helping birds find shelter locally (creating bird houses)



Actions to nurture flowers and plants :

Seed bombs : The students collected seeds and mixed them with earth and clay and made them into balls that can be thrown when you go for a walk.



Seed paper : They recycled egg holders (from the school canteen) and made them into paper. They put seeds into the paper and left them to dry. They then cut the paper into smaller pieces to give to people at Christmas.

The idea is that you plant your seed paper in the earth to promote plants.



Planting the school :

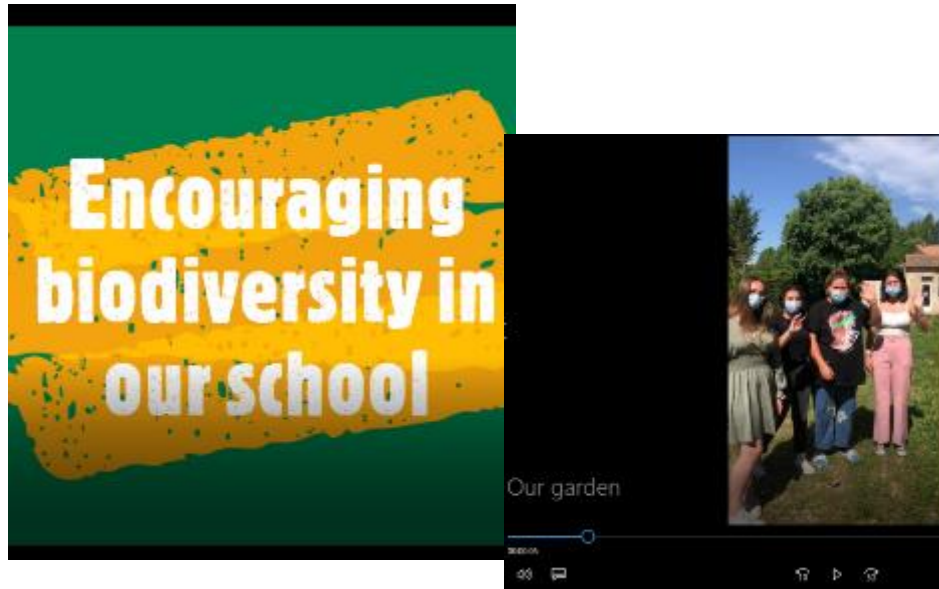
They then made a plan to replant the school to make it more biodiversity friendly. They presented the project to the school “residential life” commission and to the director.

They contacted local plant growers to find out what indigenous plants would be the best to plant to encourage local wildlife and also be drought resistant. They also worked with the “residential life” commission to create a kitchen garden full of plants that can be used by the cooks and also by the students to make their evening drinks (verbena, thyme, mint...).



A film to share :

The students made a short film about their garden to share with the partners of the project online :



Actions towards preserving insects :

The students wanted to create insect hotels to be able to put them around the school. They had to research how to make them, then plan the necessary material and tools and set to work !



Bird protection :

The students collected pine-cones and then mixed grease and seeds and put the mixture on the pine-cones to make sustainable bird feeders. The bird feeders were used in the school over the winter time and also as a present to raise awareness.



The students used the wood that they had bought to make the insect hotel to make some bird houses that were then put around the school. The students have also applied to become an LPO protection site:



Raising awareness :

Christmas goody bags :

Christmas was approaching and the students wanted to share all that they learnt and made with the other students, teachers and of course their families and friends. So they made Christmas goody bags

(with the seed bombs, seed paper, pine-cone bird feeders) that they wrapped in paper bags and decorated with a Christmas message.

The biodiversity goody bags were also given to old people in the village in another solidarity project we had. The students dressed up as father Christmases in order to distribute their presents to everyone.

These “positive call to actions” were distributed to over 80 people as presents for Christmas. This was to make everybody aware that it is easy to act in favor of biodiversity. They thus found motivating ways for the local community to act.



Film making :

The students then wanted to make a film to explain the link between nature conservation and the preservation of our local culture.

They wrote 4 short scenarios and defined the key messages they wanted to transmit. They made the costumes and found the locations that they would like to be shown in the film. They contacted a local film maker to come and add a professional touch to their work.

The film was made in French but then English subtitles have been added to enable a wider audience to understand their work.

The film was first projected during the ‘Colloque’ of MFR – a conference that brings together all the students of the different MFR’s of the Vaucluse department. In total 100 people saw the film and a debate ensued between the students of the different schools about their local culture and nature preservation.

The film was then projected to the school Board and parents and then used on the website and social media : [Actualités de la MFR, les évènements, les news \(mfr-latourdaigues.com\)](https://www.mfr-latourdaigues.com)



Plant sharing :

At the end of the school year, each student of the school was able to choose a plant to take home so as to continue their engagement about biodiversity during the summer break.

19 June at 10:51 · 🌍

Hi! Yesterday was our last day of school at the MFR La Tour-d'Aigues ! The students received their Europass and Alps4Nats certificates! They also received plants (flowers, tomatoes, eggplants...) The message they want to share is "if you want to act against global warming, you can plant your own vegetables and flowers". Thanks to Bioflore Provence who gave us more than 50 plants for the students of our school! So the fight for biodiversity goes on!! Have a nice summer and we hope to see you in September in Brescia! 🍷🍷🍷🍷



RESULTS

This theme enabled students to use different learning techniques to be able to define their projects :

- **Researching** : Discovering the names of the species of fauna and flora that lives in their area. Also the uniqueness of some species and their use.
- **Collaborating** : Working on the theme brought the students closer to the notion of collaborating not only among themselves but also with experts in the field and thus creating a more collaborative relationship between students-teachers-schools-experts in the field.
- **Planning and designing**: The creation of a more biodiversity friendly school encouraged the students to think ahead and plan things concretely while taking into account a wide range of factors. For example: natural factors such as sunlight and water but also human factors (maintenance, communication with other students...).
- **Engaging actively** : Students enjoyed doing concrete actions that could have an immediate effect.
- **Nature education** : Being outdoors and active enhanced understanding and implication. This made thinking about concrete projects a lot easier and also had the effect of **fostering a sense of responsibility** and the **birth of sustainability values** thus changing the students into ambassadors for biodiversity in their families.
- **Interdisciplinary approach** : Students realized that to carry out their multiple projects they used a wide range of skills and knowledge : communication, biology-ecology, maths, English, rural territory,

GLOSSARY

The key words that the students researched were :

- **Biodiversity** : short for biological diversity—means the diversity of life in all its forms—the diversity of species, of genetic variations within one species, and of ecosystems.
- **Conservation of Biodiversity** : The management of human interactions with genes, species, and ecosystems so as to provide the maximum benefit to the present generation while maintaining their potential to meet the needs and aspirations of future generations; encompasses elements of saving, studying, and using biodiversity
- **Ecosystem** : Describes all living organisms existing in a particular area as well as physical elements such as water, air, soil and sunlight, and the interactions between them.
- **Ecosystem service** : Term for the benefits humans receive from natural processes occurring in ecosystems, such as providing clean drinking water and decomposition of waste. In 2004 the UN grouped services into four categories: provisioning - eg water supply regulating - eg influence on climate supporting - eg crop pollination and cultural eg outdoor activities.
- **Ecology** : A branch of science concerned with the interrelationship of organisms and their environment; the study of ecosystems



- **Extinction** : The evolutionary termination of a species caused by the failure to reproduce and the death of all remaining members of the species; the natural failure to adapt to environmental change.
- **Fauna** : All of the animals found in a given area.
- **Flora** : All of the plants found in a given area
- **Habitat** : A place or type of site where an organism or population naturally occurs.
- **Habitat degradation** : The diminishment of habitat quality, which results in a reduced ability to support flora and fauna species. Human activities leading to habitat degradation include polluting activities and the introduction of invasive species. Adverse effects can become immediately noticeable, but can also have a cumulative nature. Biodiversity will eventually be lost if habitats become degraded to an extent that species can no longer survive.
- **Inventory**: On-site collection of data on natural resources and their properties.
- **Native species** : Flora and fauna species that occur naturally in a given area or region. Also referred to as indigenous species.
- **Rehabilitation** : The recovery of specific ecosystem services in a degraded ecosystem or habitat.
- **Sustainable development** : Development that meets the needs and aspirations of the current generation without compromising the ability to meet those of future generations.

Sustainable Development Issue :

CLIMATE CHANGE

OVERVIEW OF ACTIONS – Biotehniški Center Naklo

Summary

**BC NAKLO
CHOSEN SD ISSUES**

CLIMATE CHANGE

- Global warming: Alpine glaciers melting faster than ever
- Rock ptarmigan - A victim of climate change
- Sustainable mobility in Jezersko

OUR FUTURE IS
IN YOUR HANDS

FOR MORE INFORMATION:

Objectives

- knows the causes and consequences of climate change, especially in the Alpine region,
- understands that he/she is also contributing to climate change with his/her actions and choices,
- is familiar with the concept of sustainable mobility, understands the ways in which sustainable mobility contributes to the prevention of climate change and examples of good practice in the implementation of sustainable mobility in tourist destinations,
- understands that the fight against climate change requires everyone - locals, tourists, etc.
- understands how principles that contribute to preventing climate change (Think global, Act local...) work.

Actions

Sustainable mobility in Jezersko

Our names are Ana, Dora, Tia, Zoja, and Danaja, we are 2nd-year students of nature conservation at BC Naklo and we researched the issue of sustainable mobility in Jezersko.

Tourism in Jezersko

The municipality of Jezersko is located in northern Slovenia, near the border with Austria and has 625 inhabitants. Jezersko is a mountain village that involves the local population in tourism.



People used to visit Jezersko for the beauty of the lake valley and the mountains above it. It is also known for its medical tourism, as there is an eye hospital since 1982. In winter, cross-country skiing trails are set up along the thematic trail, and it is also possible to go sledding and ice-skating. You can spend summer there hiking in the valley and on the surrounding peaks, mountaineering on the protected routes of the high mountains, or climbing.



Tourist attractions: Lake Planšar (heart-shaped), the Shepherd's Ball (ethnographic event), Čedca waterfall and mineral water spring (healing characteristics).

The number of tourists is increasing. In recent years, the TIC has seen a rise in the target group of excursionists and estimates that Jezersko receives around 80,000 visitors per year and 27,000 overnight stays. However, the increased number of visitors has created a traffic problem - full car parks, off-street parking, heavy traffic on a single road.



Tourism activity in Jezersko is spread throughout the year, but summer and winter months are the most crowded with visitors. It would make sense to introduce sustainable mobility activities there. We will therefore look at sustainable mobility options that have been introduced in some tourist centres around Slovenia and could be applied in Jezersko.

Impacts of transport on climate change

Exhaust gases are a source of greenhouse gases and cause climate change. Almost half of the greenhouse gases are carbon dioxide and a good third are methane. Almost half of the greenhouse gases come from agriculture, a quarter from energy generation, and a fifth from transport. The problem arises when the greenhouse effect is too strong, which causes the earth to overheat. The overheating will be especially visible in the Alps, where temperatures have risen by almost 2 Celsius degrees over the past 120 years - almost twice the global average. Researchers predict that temperatures will rise by another two Celsius degrees over the next 40 years.



Sustainable mobility

Sustainable mobility can reduce the impact of greenhouse gases. Public transport, exercise, and active leisure should be encouraged in touristic centers for both residents and visitors, and energy consumption should be reduced.

BOHINJ:

The municipality of Bohinj is one of the leading Alpine municipalities in Slovenia in the field of sustainable mobility.

Goals:



- To reduce the negative impact of traffic on the environment and space.
- To improve accessibility for visitors and the local population during the summer season.
- To improve the offer of sustainable forms of mobility for visitors.
- To adapt public transport to the needs of local people and visitors.
- To build on opportunities for intermodality between different forms of mobility.
- To increase visitor information on sustainable mobility options in the municipality.



Measures in the field of public transport and motorised transport:

- revitalisation of the railway station for sustainable mobility (P+R).
- cheaper bus services for residents,
- free summer Hop-on Hop-off bus to main tourist attractions,
- improvement of bus stops,
- continuation of controlled parking
- reinforcement of the traffic policing service ...

BLED:

Many projects encourage locals and visitors to leave their cars at home or in the car park and explore Bled and its surroundings on foot or by bike. The promotion of sustainable transport in Bled is also reflected in a large number of charging points for electric cars. For a completely green break, the Julian Alps Card, which promotes sustainable mobility, is available in summer and winter. The card is available free of charge to guests staying at least 3 nights in Bled with one of Tourism Bled's partners.



KRANJSKA GORA:

They want to reduce the negative effects of traffic on nature and the frustration of locals due to rush hour.

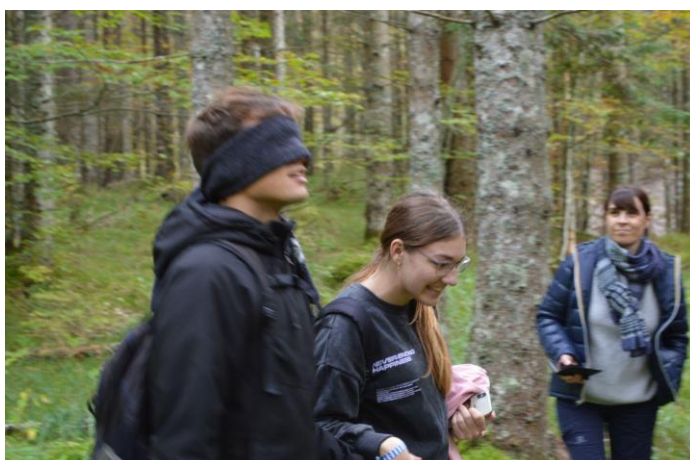
Sustainable mobility measures that could be implemented in Jezersko

- encouraging the purchase of electric vehicles and setting up free charging stations for users,
- setting up a public transport service from surrounding areas to Jezersko,

- creating a micro-network of public transport, walking and cycling routes to the main tourist and sports areas,
- setting up more paid parking places, which are not in the immediate vicinity of tourist attractions such as Lake Planšark and linking them to the public transport network.

Promoting the walking train in Jezersko

As part of the E+ Suitable project, we invited German and French students to visit the Ravenske Kočna nature trail with us. We introduced them to mobility issues in the Lake District, the disappearing glacier below Skuta, the characteristic flora and fauna and the life in Lake District in the past.



Sustainable development in Jezersko - Think global, act local

As a mountain village, Jezersko is committed to sustainable development. In addition to sustainable tourism and mobility, they also strive to develop micro-economic activities.

We met an "herbalist" who collects and cultivates plants for tea mixtures, syrups ... He also grows raspberries for syrups, jams, chutneys...



OVERVIEW OF ACTIONS – Liceo Scientifico Statale Annibale Calini

Summary

Effects of climate change on high-altitude flora

Birds and climate change

A sustainable school trip on Mount Maddalena

Objectives

- discover the causes and consequences of climate change, on plants and animals in the Alpine area
- understands how sustainable mobility contributes to the prevention of climate change and examples of good practice in the implementation of sustainable mobility in tourist destinations.
- organize a sustainable school trip

Actions

Birds and climate change

It is not news that climate change is causing massive disasters and forcing many animals to change their habits, if they can.

Birds are only one of the many endangered species. With the rise in temperature they are finding themselves forced to move to more northerly territories or to higher altitudes.

Studies have been done on the specific changes of each species. An increase in the amount of heat is not an unprecedented fact: the temperature has always been constantly changing, sometimes it rises and



sometimes it lowers. There was a period, for example, when there were ibexes on the coasts.

The real problem is that everything is happening too fast and animal species have to change their habits quickly; and in recent years, the BBC has no longer doubts: things are changing, not because it is nature that changes normally, but because of human intervention. The emissions of pollutants into the atmosphere are extremely high and this causes the ice at the North and South Poles to melt. The ice at the poles never melted and over the years has trapped a huge amount of methane gas; melting would release all this methane into the atmosphere causing a monstrous increase in the greenhouse effect.

Birds accustomed to the cold react fairly quickly to these climate changes: they move in search of colder territories. In the Alps, most species climb higher and higher, where unfortunately they often find themselves forced to change their diet, because the plants cannot move quickly, or they meet new species. Moreover, the higher you go, the more surface where you can live becomes less and less.

The reduction of the territory is a serious problem because it increases the natural selection phenomenon that reduces the number of elements of a species and can also bring to complete extinction in the area. In the Italian Alps, the majority of forest or shrub bird species are predicted to remain stable or increase as a result of elevation shifts in suitable habitats .

However, open habitat species may face a severe decrease in distribution as grasslands are colonized by forest and shrubs, because much of the area is not at a sufficient altitude to accommodate further elevation shifts. The rising treeline is reducing the size of alpine habitats and increasing their isolation.

A recent study of potential climate-change impacts on vegetation types indicates that we might experience a 60% reduction in the area of alpine habitat over the next 20 years through colonization by trees and shrubs, and a near total loss (97%) in about 80 years.

In the article we especially want to focus on the alpine birds that are experiencing this situation, such as the golden eagle, the ptarmigan, the shag, the little bustard, the alpine finch, the alpine chough, the blackbird, the woodpecker, the deaf croak, the owl, the little egret, the raven, the reedbug, the crow, the bearded vulture or the capogrosso owl and describe their lifestyle in order to find a possible solution to the problem of elevation shift.



Below you can find the link to our eBook.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/eBook%20Let%E2%80%99s%20not%20fly%20oo%20high.pdf>

Effects of climate change on high-altitude flora

The Alpine environment is almost synonymous with the natural environment. The second half of the century, anthropogenic forces have contributed substantially to its shaping.

Our scientific article deals with the consequences of climate change on vegetation and focuses on three main topics:

Changes in temperature and precipitation

The climate trend, in a scenario of doubling CO₂ concentration, indicates a general warming trend in the general warming of the Alps in winter and, more markedly in summer, especially at high altitudes.

Precipitation intensity and frequency are expected to increase in winter, but decrease significantly in summer.

The high sensitivity of the snowpack to temperature variations is expected to result in a generalized general reduction in the snowpack characterized by early snowmelt in spring. Although these climatic variations have often resulted in spring frosts, which have damaged, and sometimes destroyed, entire blooms.

The altitude at which snowfall tends to occur is also increasing. There, the so-called "snow reliability line" tends to rise by 125 m for every °C increase (we are currently 4 °C above the acceptable level).

The temperature increase in 2050 is expected to be about 15 °C in summer and about 13 °C in winter. Precipitation, on the other hand, is expected to increase by 5-25% in winter and to be increasingly characterized by rainfall events. Precipitation, on the other hand, is expected to increase by 5-25% in winter and be increasingly rainy rather than snowy, and to decrease by around 5-40% in summer.

Instead, the equilibrium line of glaciers is expected to rise from 60-70 to 140 m per °C with associated increased glacier ablation and retreat.

Increasing the forest line

As a response to climate change, both animal and plant species are changing their distribution on the Alpine territory.

Over the course of the century, climate change has already resulted in a progressive of plant species to higher altitudes.

For example, it is predicted that the forest line could shift upwards by several hundred metres in the next century. In fact, the so-called "tree-line", which is situated in most cases between 1500 and 2000 metres above sea level will reach 2500/2750 metres by 2100, encroaching on pasture areas.

This phenomenon is called thermophilisation, in other words, plant species living at high altitudes are giving way to plant species living at low altitudes. This phenomenon is called thermophilisation, in other words, plant species that live at high altitudes are giving way to species that typically live at lower altitudes, and according to researchers GLORIA (the Global Observation Research Initiative in Alpine Environments) is occurring much faster than expected.

These are mainly dwarf shrubs, such as the blueberry (*Vaccinium myrtillus*) or plants such as the stone pine (*Pinus cembra*), the red rhododendron (*Rhododendron ferrugineum*) or the Alpine tussel (*Homogyne alpina*) which are gradually migrating to higher altitudes, thus increasing the competitive pressure on rarer species living at lower temperatures.

Although today's mountain peaks are richer in species than they were a hundred years ago, this is testament to the ability of natural systems to adapt to the light. systems to adapt in light of the physical limitations inherent in this upward movement, there is also evidence of the risk of extinction to which many mountain species are exposed if climate change continues over time. if climate change continues.

However, there is already a real risk of biodiversity loss at high altitudes as summit species compete with other species. summit species are in competition with more adaptable species from lower altitudes.

Loss of snow biodiversity

During the last century, a high reduction in biodiversity has been observed in an increasing number of cases, reaching the highest rate ever recorded. During the last century, a high level of biodiversity reduction has been observed in an increasing number of cases, reaching the highest rate ever recorded.

The main factors threatening Alpine biodiversity are not only the increase in temperature and the resulting change of seasons, but also the increase of CO₂ in the atmosphere and in biogeochemical cycles. and biogeochemical cycles.

All these factors cause the migration of many species, which in turn leads to the presence of new pests and infected plants. of new pests and weeds with important consequences not only for the biodiversity of natural environment species in the natural environment, but also on agriculture and human health.

One example is the spread of the pine processionary moth, a pest that has shown a tendency to move up and down the mountain. tendency to shift altitudinally, particularly on the southern slopes of the Italian mountains. Italian mountains.

Weather and climate conditions are a determining factor in the structure of ecosystems and the geographical distribution of plant and animal species. distribution of plant and animal species. When meteorological parameters exceed the limits of physiological tolerance limits of individual species, they can be forced to respond in various ways, changing the timing of their life cycles, moving to more suitable territories, changing morphology, behavior or physiological functions. morphology, behavior or physiological functions that affect the productivity of ecosystems. Underlying

of this great variety of living organisms is the variety of habitats and natural processes that regulate their dynamics, including the climatic processes found in the dynamics, including the climatic processes found in high mountains, where even slight variations in altitude, slope and exposure can amplify the slope and exposure can amplify the range of microclimates. Habitat loss and fragmentation, climate change, over-exploitation of resources, introduction of alien and invasive species, and pollution are the main enemies of biodiversity. irreversibly alter the balance of that system, but can also amplify the effects of this process.

Below you can find the link to our eBook.

<https://cspace.spaggiari.eu/pub/BSLS0001/Alps4nats/Ebook%20Flora%20Alpina.pdf>

A sustainable school trip on Mount Maddalena

During the Covid time it was difficult to meet and to spend time together but we could spend a day in the open on Mount Maddalena that is quite close to our school. The trip was an opportunity to implement a sustainable school trip. We moved only by public transport and by foot and we spent most of the time in the woods not only wandering but also collecting data to inquire about plant biodiversity in this area.



Funded by the
Erasmus+ Programme
of the European Union





Funded by the Erasmus+ Programme of the European Union





We specifically took measurement of the biomass amount and of the dimension of the tree to compare it in different environments. We collected leaves from different plants of the same species to measure them and to evidence genetic biodiversity.

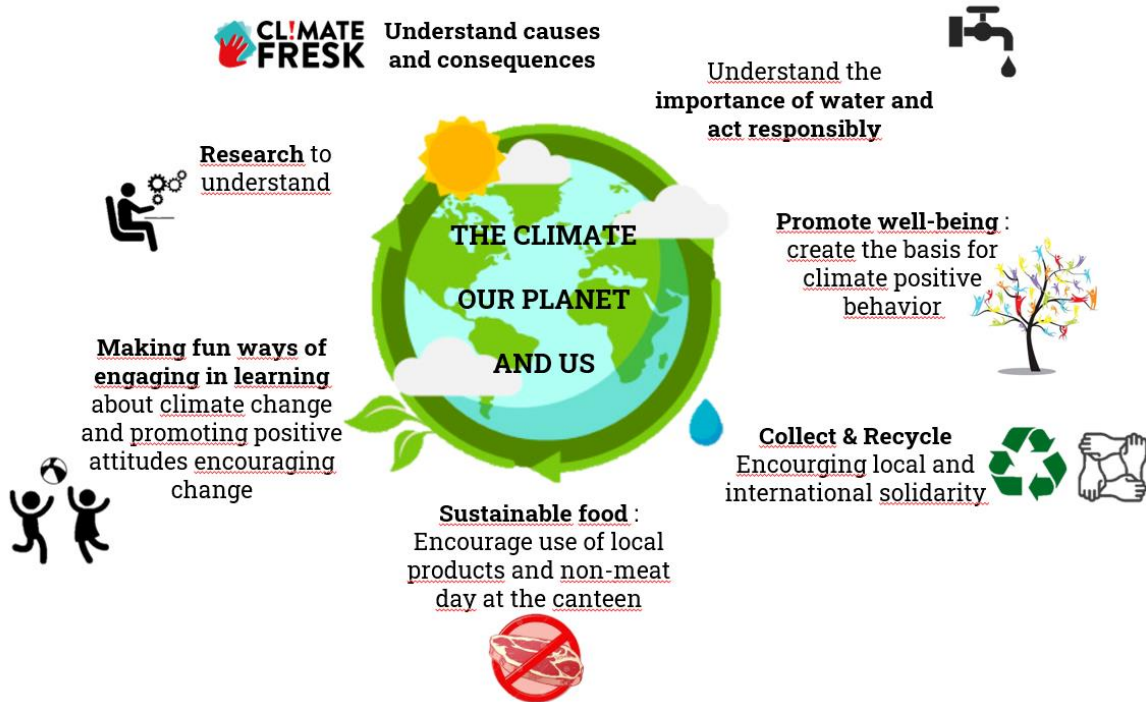


We also paid attention not to leave any garbage and to collect our waste properly.

OVERVIEW OF ACTIONS – MFR la Tour d'Aigues

Summary

CLIMATE CHANGE & SOCIAL ECOLOGY made in MFR



Key sustainable development issue

How to develop a culture of caring for the environment and enhance climate positive behavior and willingness to act ?

Objectives



Actions

Researching the theme :

The students admitted to have heard a lot about climate change and the catastrophic predictions, but didn't feel that they really knew what it was about.

The first step was for them to group up two by two and choose an aspect to research. Some groups chose a more scientific approach while others chose historical, political, personal, economic, and psychological questions to explore.

They learned to identify information coming from appropriate sources and those that had less foundation. Thus exploring the world of 'fake news' and the impact it can have on our beliefs.

They presented the results of their research in an exam that counts towards their final baccalaureate.

Elaborating and understanding causes and consequences: the Climate Collage :

Website : <https://climatefresk.org/association/> // Presentation of the Climate Collage - YouTube

The Climate Fresque is a French nonprofit organization funded in December 2018 whose aim is to raise public awareness about climate change. It proposes a collaborative serious game based on 42 cards where the participants draw a fresque which summarizes the work of the Intergovernmental Panel on Climate Change

The workshop lasted three hours and was animated by an animator of the PNRL (Parc Naturel Régional du Luberon). It consisted of 3 distinct phases:

- The first phase consists in discovering and linking the cards by cause-consequence relationships to build the fresk as explained in the IPCC reports.
- The second phase is creative: the participants decorate the fresk and choose a title.
- The last phase is a debrief enabling a discussion about players' feelings, positions, questions and both individual and collective solutions.

As one student remarked : “It’s when we see all that is happening that we understand – it makes us think”.

It enabled students to explore the different issues affecting our world and also understand the effects of climate change on a global and local level.



Field trips

The students visited the local water plant to understand the process of cleaning the water that we use and drink everyday. The visit was conducted by a specialist from Durance Luberon.

They saw how difficult it is to have a good quality of water and how it is important to preserve it against pollution and pesticides.

In class a debate enabled them to discuss different ways that they could act in favor of water preservation – both in the school and at home.



PERTUIS

Partenariat : les jeunes à la découverte du petit cycle de l'eau

Dans le cadre d'une convention partenariale avec la Maison Familiale Rurale (MFR) de la Tour d'Aigues, le Syndicat Durance Luberon a organisé une visite de ses ouvrages d'eau potable et d'assainissement.

Ce sont 11 élèves de premières Bac pro, accompagnés de leur enseignante, qui ont, ainsi, pu découvrir sur une journée, les principes et le fonctionnement général d'une station de traitement d'eau potable ainsi que celui de deux stations d'épuration des eaux usées situées sur les communes de Pertuis et de la Bastide des Jourdans. Grâce à ces visites au cœur des installations, les élèves de la MFR, engagés et sensibles aux enjeux environnementaux, ont pu renforcer leur connaissance sur les étapes du petit cycle de l'eau ainsi que des techniques de traitement

voys, responsable exploitation assainissement) pour ce qui concerne l'assainissement. Cette journée a permis de sensibiliser les élèves sur les dégâts causés par les lingettes même celles dites biodégradables et les bons gestes à adopter.

"Depuis la pandémie, nous avons constaté une augmentation des lingettes retrouvées dans les systèmes d'assainissement. Ces produits nuisent au bon fonctionnement des stations d'épuration et des fosses septiques. Il est important d'adopter les bons gestes en les jetant à la poubelle d'ordures ménagères" indique Nicolas Escande. Cette rencontre a, également, été l'occasion pour les équipes du Syndicat Durance Luberon de faire découvrir la diversité des métiers de l'eau et de l'assainissement au sein d'un service public de qualité.

Jocelyne THOMAS

Plus de lingettes dans les systèmes d'assainissement
En présence de Karine Moutret, vice-présidente du Syndicat Durance Luberon, ces visites, qui se sont déroulées dans le strict respect des règles sanitaires, ont respectivement été menées par Wilfried Galizzi, responsable eau potable et Michael Derrives, technicien eau potable, pour la partie eau potable ainsi que par Nicolas Escande responsable service assainissement et Philippe Sa-

11 élèves ont visité les stations d'épuration des eaux usées à lits plantés de roseaux située sur la commune de la Bastide des Jourdans ainsi que celle de Pertuis. / PHOTO D.L.R.

Concrete solutions

The wave of school strikers across the planet fighting for climate action has underlined the need for educational institutions at all levels to do their bit to avoid climate breakdown. But knowing where to start can felt like a challenge for the students.

They recognized that changing the ways people think and act isn't easy. Humans are creatures of habit. This is why making change is often hard. The students chose to focus on some key areas that they felt they had difficulty dealing with but that were in the scope of what they could do at their level. The idea being that over time, changes that felt impossible will become second nature until eventually, we find ourselves transformed.

So the concrete solutions that the students set up were as follows :

Creating a 'Serenity and well-being week' at the MFR so that all students feel more connected and open to change :

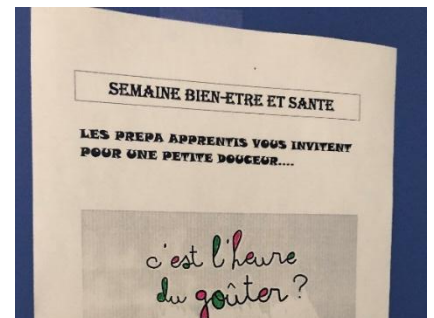
Students often hear about climate change but admit that it's causing them to feel fear and anxiety, which defeats the object of climate change education.

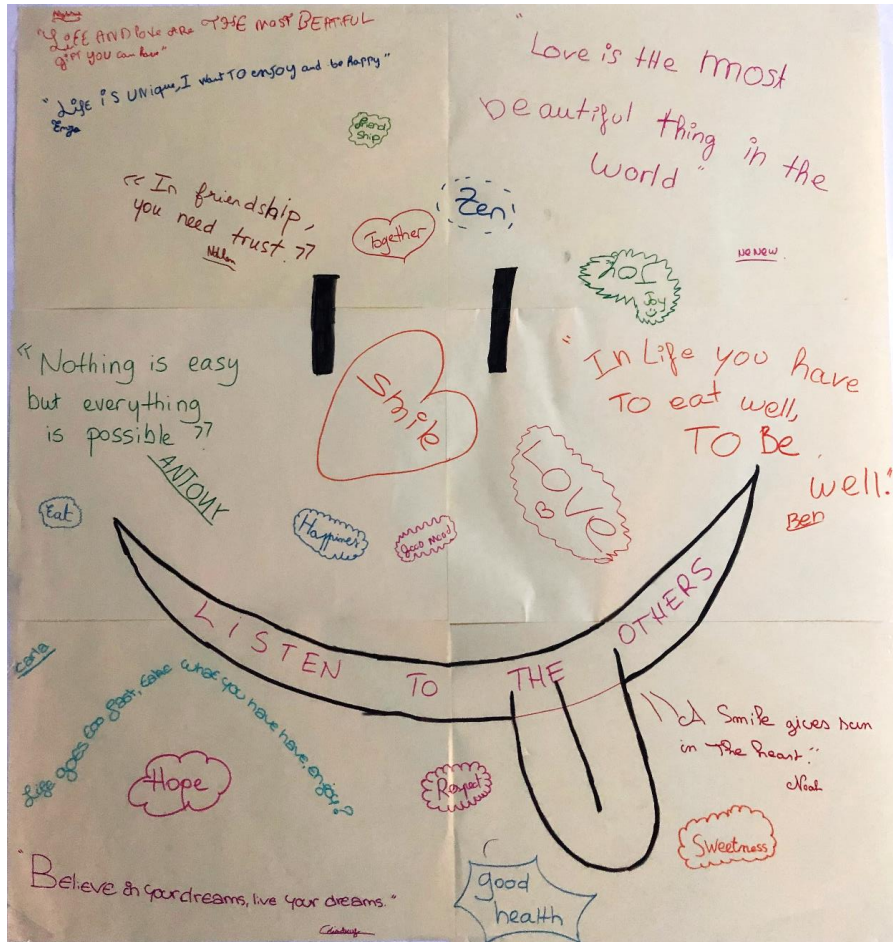
In most western cultures, we are taught to value reason over emotion, and to dismiss, judge and manage our feelings. But unacknowledged, our feelings are more likely managing us. They are the unconscious drivers of our thoughts, beliefs, behaviors and actions. Chief amongst them: fear. Fear turns our heads the other way, buries them in the sand, fills them with despair. Fear motivates self-concern and prevents us from feeling compassion or care about the impact of our choices on our fellow humans, other species and the planet itself. Fear can inhibit the desire to learn more and take action – particularly in young people.

So the students suggested to make a themed week at the school where feelings and well-being would matter :

- The school was redecorated with a zen approach,
- Each student made and wore a smiley badge
- Menus at the canteen were adapted and a workshop around organic products animated by the director of the local organic shop,
- Cooking workshops enabled students to express their culinary skills using local products to make delicious snacks for break times
- Manual activities and gardening enabled students to connect with each other and the environment.
- Massage and reflexology workshops were organized to enable those who wished to feel better in their bodies and also create a space where feelings could be expressed.
- People working in close contact with others (fireman, care-givers, social centers...) came to have open workshops with the students to exchange on their jobs and the way they care for people.
- A sound workshop was organized at the end of the day outside enabling all students to benefit from the relaxing sounds of gongs.
- A tree of emotions and free speech was set up for all students to write their feelings on.

Students said that the week enabled them to feel more connected with themselves, with others and also more connected to nature and the environment, thus more willing to change their ways.





Free-meat day :

Some students, in their research, had worked on the impacts of industrialised agriculture and found that it creates the same amount of greenhouse emissions as all the world's cars, trucks and aeroplanes combined. Also its appropriation of natural areas engenders the reduction in natural habitats thus leading to extinctions of species.

Its relentless appropriation of wilderness areas makes it the chief contributor to mass extinctions, too. They determined that a concrete action would be to reduce their meat consumption. A big challenge for students who love hamburgers. The discussion in the class was very heated !

So 2 student representatives presented a proposal to the cook and director of the MFR to have a "meat free" day in the canteen.

Convincing the students isn't easy, and the cook has to keep trying new recipes to try and make it tasty – but small steps are being taken.

Recycling and local and international solidarity :

In their research students were shocked to discover that only 9% of plastic has ever been recycled in the world.

So they used the incentive of the international recycling day to finalize the collection of batteries in the project “Piles Solidaires”. They made posters explaining the use of recycling and the benefits of their collection going to help a school in the village of Alamarina in Madagascar. They collected 334 kg of batteries and obtained an eco-citizen certificate from the association Piles Solidaires/Batribox.

The climate crisis disproportionately affects poorer communities in the Global South. It’s therefore important that our actions show solidarity with their struggles and endeavor to make a difference.



Another event was organized in the new school year: students made leaflets that they distributed in the neighborhood and to the town council to encourage all the inhabitants to team together with them to clean-up the village. Not many came, but they still had a great time and collected loads of rubbish.



Gaining recognition for actions :

Actions of students and school staff led to the school obtaining the level 3 of the E3D sustainable development label. The certificate was given by the Academy of Aix-Marseille.

Using all the knowledge to make fun ways of learning :

The students used all the knowledge acquired during the 4 themes to make interactive games for the Italian and Slovenian partners during their mobility to France :

To enable the Slovenian and Italian students discover the village of La Tour d'Aigues, the French students had prepared an orientation game in the village with games based on each of the themes of the project.

The first game was a cooperative challenge where students had to work together to find solutions to cross the imaginary rising water linked to climate change. The teams were full of imaginative solutions!



Then they were challenged to find recycling solutions by hands on sorting into the right bins. The extra challenge was being attached two by two.





A climate change quiz required the students to “catch” the world in their hands and have to answer correctly to keep it from exploding.



A sensory game followed where the students had to guess what the local biodiversity is by smelling herbs hidden in bags and filling out an information document with their answers.



The ‘tourism’ theme took place in the local castle (thanks to the kind permission of the village) : the French students told the story of the castle and challenged their partners to use fancy dress to re-create a scene from the story. A blind fold product tasting then enabled the partners to discover different tastes for which our region is renowned.



Every time a challenge was completed correctly the Slovenian and Italian students won a code number that led to a hidden treasure filled with goodies that enabled the Slovenian and Italian students to 'taste' the treasures of the Luberon. A great way for all to learn by doing !



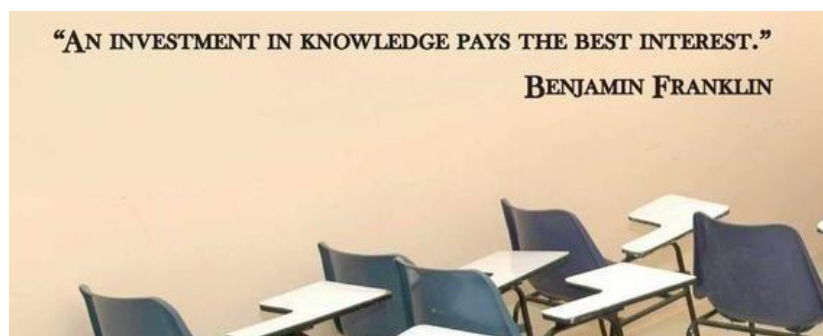
RESULTS

- **Defining causes and consequences of climate change** made the students active players in understanding and grasping both concepts and actions – and also the role that they can play.
- **Feeling connected helps shape climate-positive behavior.** Teaching students about climate change is not solely to spur them on to take action and do their part for their environment, although that is, of course, one aspect of it. It's also to prepare them for the future as they will be growing up in an era where they will likely be responsible for developing climate change solutions. In this sense, promoting climate positive behavior is essential to lay the foundations for change.
- **Multi-subject approach** : climate change is often taught in schools through a scientific point of view. We tested a multi-subject approach because we believe that there needs to be a greater engagement across disciplines, particularly looking at the social dimensions. We need to create the opportunities for students to make connexions in a wider scope that reflects the different realities of the world around us. Students need to know the basic scientific facts of what causes climate change, but should also be able to have a reasoned discussion of the global implications and why society is finding them so difficult to deal with. If the solutions

were easy, we would have them already, but school can provide a powerful catalyst towards the answers that we need. Education is an essential factor in the ever more urgent global fight against climate change. Knowledge regarding this phenomenon helps young people to understand and tackle the consequences of global warming, encourages them to change their behavior and helps them to adapt to what is already a global emergency.

Furthermore, education helps people to adapt to climate change, because it improves their ability to assimilate information, calculate risks, prepare for climate crises and recover from their effects.

- **Getting students to suggest and make changes is more convincing for other students.** Letting students lead the way and create their own approach to taking climate action is more efficient than a teacher-down approach.
- **Leading by example :** In the era of hands-on learning, it seems more likely that students will learn about climate change if they see it first-hand. If we want to impart climate change education on the youths we must also be sure that they we are leading by example in terms of sustainability and being environmentally-friendly. Thus climate change education is about a school team effort to change the way we operate at different levels.



GLOSSARY

Adapt : to change your behavior so that it is easier to live in a particular place or situation.

Behavior : an action, activity, or process which can be observed and measured. Often, these actions, activities, and processes are initiated in response to stimuli which are either internal or external.

Change : to make different in some particular / to give a different position, course, or direction to.

Habit : a usual way of behaving : something that a person does often in a regular and repeated way.

Impact : a powerful or major influence or effect.

Social ecology : studies relationships between people and their environment, takes a "broad, interdisciplinary perspective that gives greater attention to the social, psychological, institutional, and cultural contexts of people-environment relations

Sustainable food : We are what we eat and maintaining a sustainable diet reinforces our commitment to the environment. This type of healthy diet is rich in vegetables, encourages the consumption of local products, generates less waste and limits the consumption of meat and fish to protect biodiversity.

Well-being : the state of being happy, healthy, or prosperous.

OUTCOME

Students developed many different competences both on a professional and transversal level.

Students developed knowledge and skills in the fields of tourism, agriculture, biodiversity and climate change, alpine natural and cultural heritage.

Throughout the duration of the project students communicated in their mother tongue developing professional and technical terminology. They created documents and developed interactive activities (which also combined with learning how to learn) and shared their findings with their peers in a foreign language, thus enlarging the scope of their understanding of the SD issues in an Alpine context. They became aware of differences and similarities within other countries and discussed the possible transfer of some solutions they had explored.

They developed their sense of initiative and entrepreneurship by imagining and creating concrete solutions in their local environment and thus took steps towards defining their vision for the future.

They collaborated with their peers, with students from other countries and also with professionals in the field. They learnt from others, developed empathy for perspectives and actions of others and became aware of their own role in the local community.

The student's feedback that their implication in this project had influenced their personal and professional perspectives. They discovered new opportunities offered by their Alpine natural and cultural heritage. They said that they felt better equipped with knowledge and skills (and a stronger Alpine identity) for the challenges that lay ahead. They felt closer to nature and the issues at hand and also safer in the knowledge that they have the power and the possibility to act locally to change things globally.



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