

NATURE-BASED SOLUTIONS LEARNING SCENARIO

Title

THE AIR WE BREATHE. Air Scientist at school.

An Inquired-Based Learning lesson (IBL) to be aware of our impact on earth.

Author(s)

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Other teachers and students from different countries have taken part actively in eco-friendly activities (<https://live.etwinning.net/projects/project/224741>)

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Abstract

The main goal of this learning scenario is to help students realize that the place where we live in, the air we breathe and our way of living (where and what we buy to eat, how we illuminate or heat our houses, how we travel and our consumption habits) impact on our economy, our health and on earth. The aim is also to help students become more conscious about the climate change and our influence on it: humans are not only part of the problem but are also part of the solution to climate change.

We share some driving questions as the starting point of our Inquiry Based Learning (IBL) lesson. Students will gather air pollutants levels and display information in digital products to compare the air quality index (AQI), the dominant pollutants and their carbon footprint in students' four cities from three different countries that take part in an eTwinning project called: etwinninggreen4u (Ogulin, Croatia; Tafalla and Valencia, Spain and Aydin, Turkey). Students calculate their carbon footprint and will suggest eco-friendly activities to offset it. A virtual climate change summit will then take place at the end of the project when students. Share their research, results, conclusions, and suggestions to improve our earth's health.

Keywords

Climate change, air quality index (AQI), air pollutants, inquiry-based learning (IBL), carbon footprint, ecofriendly actions

Introduction (leave this section as it is)

“Nature-based solutions (NBS) are solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes, and seascapes, through locally adapted, resource-efficient and systemic interventions. Nature-based solutions must therefore benefit biodiversity and support the delivery of a range of ecosystem services.”

https://ec.europa.eu/info/research-and-innovation/research-area/environment/nature-based-solutions_en

Overview

Table of summary

<p>Subject</p>	<p>This learning scenario (LS) is meant to be used in English lessons with an emphasis on vocabulary about climate change and Inquiry Based Learning methods of teaching together with Science (Biostatistics), Economy and Mathematics as cross-curriculum approaches.</p> <p>This lesson will be approached within the eTwinning project and subjects are integrated and taught in different cities and countries that are eTwinning partners.</p> <p>This is a real learning scenario that belongs to a project named: eTwinningreen4u https://live.etwinning.net/projects/project/224741</p> <p>English is taught in a Secondary School in Aydin, Efeler, Turkey.</p> <p>Economy is taught in a Vocational School in Ogulin, Croatia.</p> <p>Science (Biostatistics) is taught in a Vocational School in Valencia, Spain.</p> <p>Math is taught in a Secondary School in Tafalla, Navarra, Spain.</p>
<p>NBS Topic</p>	<p>Public health, well-being, and air quality.</p>
<p>Age of students</p>	<p>15 – 20+ (primary, secondary, and vocational students)</p>
<p>Preparation time</p>	<p>5 hours. Teachers as project partners design the project draft before the school year starts.</p> <p>As soon as it begins, teachers explain to students the project: information, aims, work process and expected results, how the tasks will be graded and how they will be included in their grade.</p>
<p>Teaching time</p>	<p>5 sessions of 60 minutes. The last one will be a virtual summit about climate change that will take place online in a live event on Twinspace, the private virtual environment of an eTwinning project).</p>
<p>Online teaching material</p>	<p>https://www.google.es/intl/es/docs/about/ to share the project draft and process suggestions.</p> <p>https://www.google.es/intl/es/forms/about/ To create a form in which the questionnaire of the carbon footprint is saved in order to can be studied in detail, create, and display the information in graphs.</p> <p>https://www.google.es/intl/es/sheets/about/ Google spreadsheet to gather air pollutants</p> <p>https://www.euro.who.int/en/health-topics/environment-and-health/Climate-change Video related to climate change and health.</p> <p>https://www.pbs.org/wnet/peril-and-promise/2019/01/economics-climate-change/ Video Related to climate change and economy.</p> <p>https://toogoodtogo.org/en/movement/knowledge/the-carbon-footprintide Webpage with a video related to our carbon footprint.</p> <p>https://padlet.com/ Virtual dashboard as Padlet, to introduce themselves to the rest of the partners or to share research, results and posters related to Educational Environmental Day</p> <p>https://www.canva.com/en_gb/login/ Canva, to display information of the results and eco-friendly tips.</p> <p>Piktochart https://piktochart.com/ to display information of the results and eco-friendly tips</p> <p>https://breezometer.com/air-quality-map Breezometer to control the air quality.</p> <p>https://footprint.wwf.org.uk/#/ to calculate the carbon footprint (how big our environmental footprint is) in tones of CO₂.</p>

	<p>https://www.menti.com/ Mentimeter to choose some project products or gather thoughts related to climate change as a brainstorming activity</p> <p>https://en.calameo.com/ Calameo to convert the text file of the project summary into a digital e-book.</p> <p>https://www.genial.ly/en Genially to display the results</p> <p>https://ec.europa.eu/eurostat/data/database Data base to select graphs and more information about economy and climate change.</p> <p>https://www.cdc.gov/climateandhealth/effects/default.htm</p> <p>Answergarden https://answergarden.ch/ to share thoughts and reflections in different parts of the lesson (one Answergarden for each sharing activity)</p> <p>Powerpoint to disseminate students' research in a congress</p>
Offline teaching material	<p>DIN-A4, recycled materials to build air pollutants molecules (wooden sticks and paper and cotton balls).</p> <p>Several big sheets of paper and crayons for brainstorming activities and mind mapping the ideas</p> <p>Dictionaries (English, students' first foreign language_L2)</p> <p>Highlighters – to underline important and interesting facts in the texts of newspaper</p> <p>Red, yellow, green, blue, black, white hats or badges</p> <p>Printer, pins, Dashboard, mobile phone, camera and computer.</p> <p>Dashboard in the classrooms (wonder wall and ask for help with help-cards)</p>
NBS resources used	<p>https://naturvation.eu/nbs/stockholm/fresher-city-air-green-trees</p> <p>https://oppla.eu/case-study-finder?combine=air+quality</p> <p>https://naturvation.eu/nbs/bologna/green-area-inner-city-tree-planting-agreement</p> <p>https://helda.helsinki.fi/handle/10138/312390</p> <p>https://www.sciencedirect.com/science/article/pii/S146290118306671</p> <p>https://www.nature4cities.eu/</p> <p>https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Key%20facts,malaria%2C%20diarrhoea%20and%20heat%20stress.</p>

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Integration into the curriculum

This learning scenario (LS) will make use of Inquiry-Based Learning and CLIL methods as learning approaches where students learn a subject and a second language at the same time. Students work not only in technical subjects but also gain vocabulary in L2 and communication skills.

English: Statements and tips to become ecofriendly students. Speaking about topics: climate change, air quality and their links to health and economy. Debate Club: arguments in favor or against ecofriendly actions.

Biostatistics and Math's: Statistics as Problem Solving, Data Organization and Representation. Frequency Tables. Frequency Bar Graph. Frequency Pie Chart. Box and whisker plots.

Biostatistics in Science: Disorders related to lower and moderate air quality in human beings. Respiratory diseases. Cardiovascular diseases.

Economy. Statistics and Graphs related to the influence of climate change on economy (gross domestic product, employment, agriculture, transportation, housing)

Aim of the lesson

To fortify the importance of critical thinking and enhance problem-solving, to foster curiosity, creativity, love for learning and scientific method applying, to motivate students to actively take part in environmentally friendly actions and see their positive impact on real life and to build social, emotional, scientific, and meaningful skills while improving their digital competence.

Outcome of the lesson

Spreadsheet with pollutants levels registered by students to better display information in graphs.

Digital presentations in which all the frequency tables and graphs will be displayed.

Digital posters with tips and information to foster students to become more ecofriendly.

These digital products will be shared in the virtual learning environment Twinspace and in the webpages of the schools or in educational virtual media.

Trends

Inquiry-Based Learning (IBL), Collaborative Learning: a strong focus on group work, Flipped Classroom: students master basic concepts of topic at home. Time spent in the classroom is used to reflect, discuss, and develop topics. Student Centered Learning: students and their needs are at the center of the learning process.

21st century skills

KEY SUBJECTS & 21ST CENTURY THEMES (Health Literacy, Environmental Literacy)





LEARNING & INNOVATION SKILLS (Creativity and Innovation, Critical Thinking and Problem Solving, Communication, Collaboration)

INFORMATION, MEDIA & TECHNOLOGY SKILLS-ICT-(Information, Communications, and Technology)

LIFE & CAREER SKILLS (Flexibility and Adaptability, Social and Cross-Cultural Skills)

Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your learning scenario needs to relate to nature-based solutions. If you are using any external documents, please scroll to the end of the document and add them to the Annex. Add more rows to the table if needed.

Name of activity	Procedure	Time
Session 0 (5 days before lesson)		
Wonder wall and driving questions.	<p>The week before this lesson starts, some images or news with information about climate change and its influence on economy and health will be shared not only in the classroom but also in a virtual dashboard in the Twinspace (virtual learning environment of the eTwinning project) to foster students' imagination and background knowledge and to motivate research causes and effects on health and economy.</p> <p>Some information images are shared on the dashboard in the classroom. See Annex_1</p> <p>Starting with a driving question, students will research about causes and consequences of climate change and how it impacts on health, economy, and any other field of education (from any subject is possible to address climate change at school). Driving questions are:</p> <ul style="list-style-type: none">  Do you know the air we breathe?  How much does our way of living impact on the earth?  Our attitude: a cause of and solution to climate change?  Part of the problem or the solution?we chose. 	1 week before the starting point of the lesson.
Session 1 (60 minutes)		
Introduction and starting point	<p>Students will watch some short videos with information about:</p> <p>https://www.euro.who.int/en/health-topics/environment-and-health/Climate-change Video related to climate change and health.</p> <p>https://www.pbs.org/wnet/peril-and-promise/2019/01/economics-climate-change/ Video Related to climate change and economy.</p> <p>https://toogoodtogo.org/en/movement/knowledge/the-carbon-footprint Webpage with a video related to our carbon footprint.</p> <p>https://www.cdc.gov/climateandhealth/effects/default.htm Webpage with effect of climate change on health.</p>	(20 min.)
Carbon footprint calculation	<p>Students will calculate their Carbon Footprint with https://footprint.wwf.org.uk/#/</p> <p>HOW BIG IS OUR ENVIRONMENTAL FOOTPRINT?</p> <p>The planet is in crisis, from climate change to the pollution in our oceans and devastation of our forests. It is up to all students to fix it. Students will take their first step with this environmental footprint calculator.</p> <p>Examples of these calculation are included in Annex_2a and Annex_2b</p> <p>Students will also fill Google Form with the questionnaire to save students' participation and have all data. https://forms.gle/S9nloboksTLoks2r6</p>	(30 min.)
Display	<p>All the digital products would be displayed in the classroom after printing. On the Twinspace will be also displayed.</p>	(10 min.)
Session 2 (60 minutes)		

<p>Air Quality Index and Air pollutants registration</p>	<p>Students will use their mobile phones and download an app called Breezometer https://breezometer.com/air-quality-map See Annex_3a, Annex_3b, Annex_3c and Annex_3d. Students will gather on a shared spreadsheet in Google Sheets:</p> <ul style="list-style-type: none"> ○ Pollutants (name and levels) ○ Dominant pollutant (name) ○ Air Quality International Index (0- 100) ○ Air Quality Qualification: Poor-Low-Moderate-Good-Excellent. <p>Students work in groups or teams of 4 control and save data on a shared spreadsheet. Some pollutants and locations are assigned to each team to make possible the research. Students will register data during the lesson week to calculate statistics and display the information in graphs.</p>	<p>(40 min.)</p>
<p>Display</p>	<p>All the digital products would be displayed in a virtual dashboard like Padlet. On the Twinspace will be also displayed.</p>	<p>(20 min.)</p>
<p>Session 3 (60 min.)</p>		
<p>Offsetting our Carbon footprint with NBS</p>	<p>Students work in groups of 4 and will analyse some videos and webpages to find solutions that offset our carbon footprint. Team 1: https://naturvation.eu/nbs/stockholm/fresher-city-air-green-trees Team 2: https://oppla.eu/case-study-finder?combine=air+quality Team 3: https://naturvation.eu/nbs/bologna/green-area-inner-city-tree-planting-agreement Team 4: https://helda.helsinki.fi/handle/10138/312390 Team 5: https://www.sciencedirect.com/science/article/pii/S1462901118306671 https://www.nature4cities.eu/ team 6: https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Key%20facts,malaria%2C%20diarrhoea%20and%20heat%20stresses.</p>	<p>(25 min.)</p>
<p>Digital products Creation and display</p>	<p>Students create infographics with short and visual information about:</p> <ul style="list-style-type: none"> ○ How to offset our carbon footprint ○ Reduce Reuse Recycle ○ How to become more eco-friendly with R_R_R <p>See Annex_4a and Annex_4b.</p>	<p>(35 min.)</p>
<p>Session 4 (60 min.)</p>		
<p>Final products selection</p>	<p>Mentimeter. Students will vote for their favorite project product in the third phase of the IBL lesson. See Annex_5.</p> <ul style="list-style-type: none"> ○ Digital book ○ Posters to disseminate our project and help other students be aware of the air we breathe, our impact on earth and eco friendly actions to take care of our health and our planet's health. 	<p>(10 min.)</p>
<p>Eco-friendly actions in motion</p>	<p>Students after analyzing NBS resources and other scientific resources at home and at school, will suggest ecofriendly actions to become more environmentally friendly. Students will take pictures or suggest actions to take care about the planet Students will start with some eco actions in motion at school and out of school.</p>	<p>(25 min.)</p>

	See Annex_6	
Final products creation	Students will work in groups and will keep on creating materials, taking pictures of their eco actions and prepare the digital book in which all the project itinerary and its digital products will be included.	(25 min.)
Climate change summit	Virtual summit about climate change is decided to be organized at the end of the lesson. (online live event on the Twinspace of eTwinning.	(30 min.)
Session 5 (60 min.)		
Online event	Teachers will connect online and will present teams and topics	(05 min.)
Climate change virtual summit	Students will share their eco actions with short presentations in order to let as much students as possible to speak to their project mates. Students will share their screen while presenting their contribution and research to the eTwinning partners (eTwinners).	(40 min.)
Evaluation Reflection time	Students will evaluate their participation in the project in order to see what went well and what could be improved. Students will write their thought on papers and will pin them on the dashboard in the classroom.	(15 min.)
Reflection time for teachers	At the end of the project, teachers will reflect to improve future projects. This event will be online with Zoom or Twinspace virtual space.	60 min.

Assessment

Describe here the assessment method of the lesson, if any. For example, if you plan on assessing your students with a quiz, include here questions and answer options with color-coding the correct answers.

Point Value	Outstanding 80-100%	Good 60-79%	Beginning and Developing* 20-40%
Wonder wall	Share their thoughts about pictures and news (speak and write)	Share their thoughts about pictures and news (speak or write)	Look at the pictures and images and try to speak or write.
Watching videos	Watch videos, take notes, and ask some questions.	Watch videos, take notes, or ask some questions.	Watch videos and ask questions to their classmates or look at their classmates notes without taking part on the debate)
Carbon footprint calculation and display	Calculate the carbon footprint, write their results on the dashboard, and share it on Twinspace.	Calculate the carbon footprint, write their results on the dashboard, or share it on Twinspace.	Calculation in progress but do not write their results on the dashboard or hare it on Twinspace yet.
Air Quality Index (AQI) and Air pollutants (AP)	Calculate AQI and AP. Write their results on the dashboard and share them on Twinspace.	Calculate AQI or AP. Write their results on the dashboard or share them on Twinspace.	Calculation in progress and do not write on the dashboard or share them on Twinspace yet.
Offsetting our Carbon footprint with NBS	Suggest some activities.	Suggest one activity.	Still preparing the suggestion.
Final products selection and creation	Vote on the activity online Mentimeter	Have an opinion but still do not vote.	Is still thinking about their favorite products for the project.
Eco-friendly actions in motion	Take part in three eco actions or more.	Take part in two actions.	Take part in one action.
Online event: Climate change summit	Share one of their products and speak about their research.	Share one of their products or speak about their research.	Product prepared to be shared one of their products and do not speak about their research.
Collaboration and participation	Actively participates in helping the group work together better.	Demonstrates effort to help the group work together.	Sometimes participates in group.
Communication	Shares many ideas	Considers other people's feelings and ideas.	Listens to others.

Inspired by: Source: http://glory.gc.maricopa.edu/~mdesoto/webquest/webquest_evaluation.htm

*If some of the students achieve less than 20% in some activities, will be asked to share their thoughts, and will received help preferably from their project mates but also from the teacher.

Student feedback

Add here the method with which your students will be able to give you feedback and discuss the lesson.

The rubric is printed and exposed on the dashboard in the classroom.

There are three cards for each student. On these cards is written students' name. Students will pin their card to share with their classmates their need of help. If other students will help them, it will be considered positively by teachers.



Need help



I have some doubts







I can help my classmates

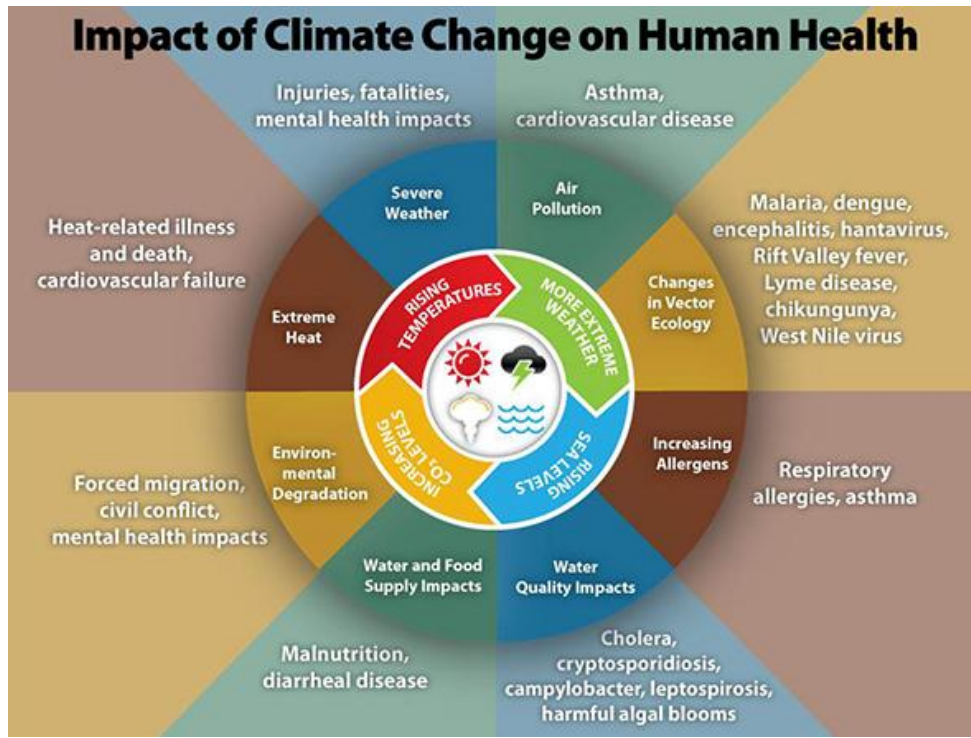
Students who need help or have questions related to any task will pin on the rubric square a "help card"

Teacher's remarks

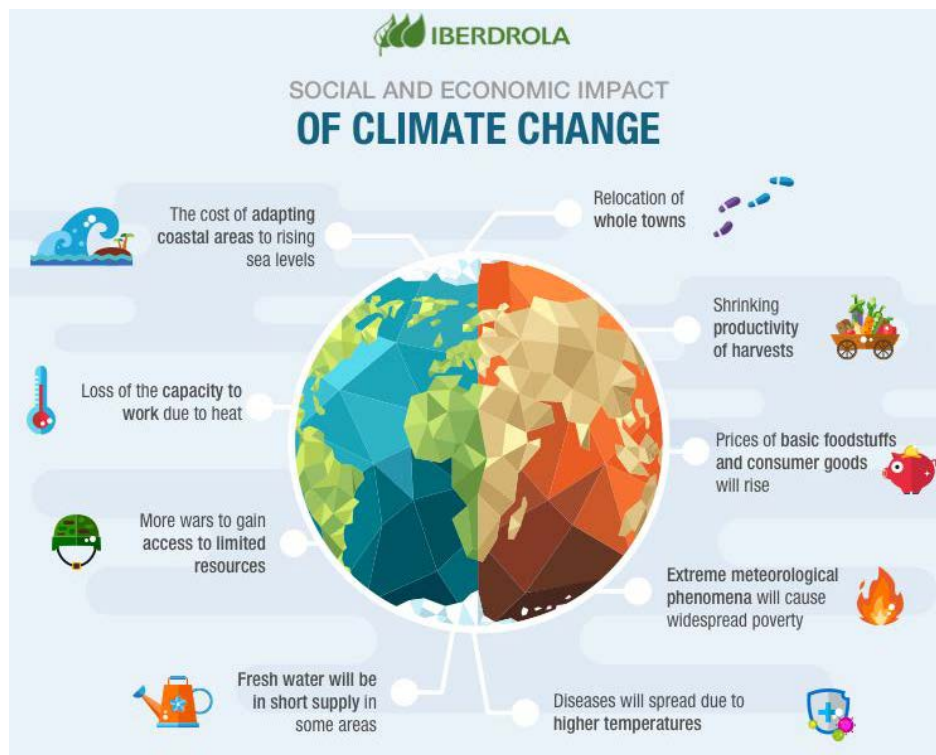
Add here your comments and evaluation AFTER the implementation of this lesson if you have time to test it, otherwise leave blank.

-  Online events motivate students a lot.
-  If it is impossible to create live online events because of the timetable of schools, it will be organized only with teachers and will share students' suggestions.
-  Highlighting positive point of the project is always positive to foster students research and participation.
-  Highlight competences that are improved with the project: communication, inquiry, English, personal, social, and technical competences.

Annexe_la



<https://www.cdc.gov/climateandhealth/effects/default.htm>



<https://www.iberdrola.com/environment/impacts-of-climate-change>

Annex Ib

Wonder wall

1 Inspiring Topics

- There is no Planet B
- Climate change and Economy
- Air pollution and health
- Climate change and health
- Carbon Footprint
- Eco friendship
- Strike School for Climate



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2 Driving Questions

- Do you know what climate change is?
- Do you know the effect on economy and health?
- Do you know the air we breathe?
- Our attitude: a cause of or a solution to climate change?



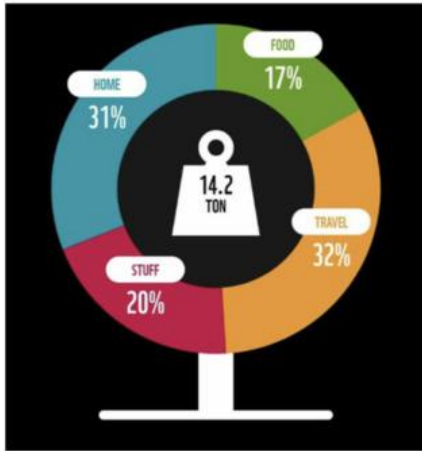
Erasmus+

CIPFP AUSIÀS MARCH
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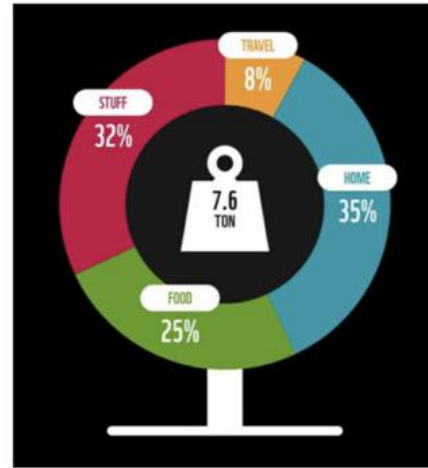
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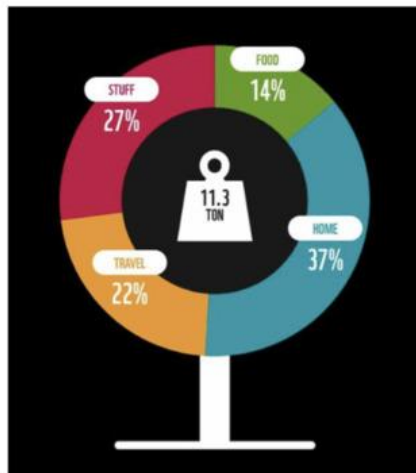
Our Carbon footprint



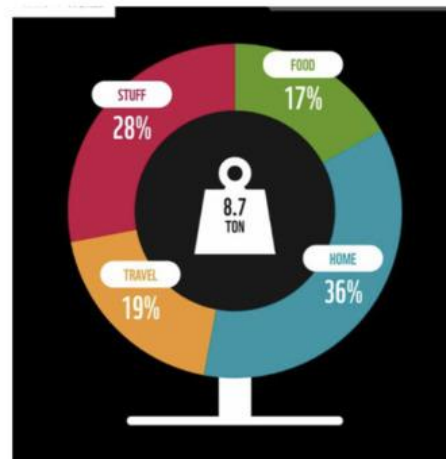
ECRIN'S CARBON FOOTPRINT



BERFIN'S CARBON FOOTPRINT



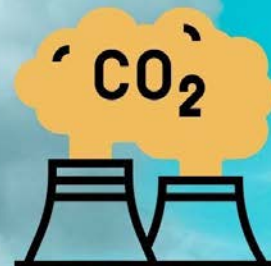
HUSEYIN'S CARBON FOOTPRINT



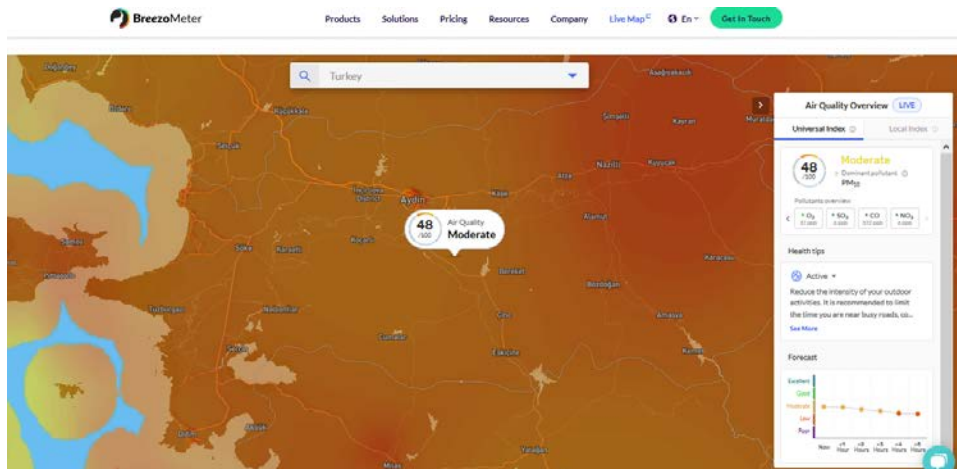
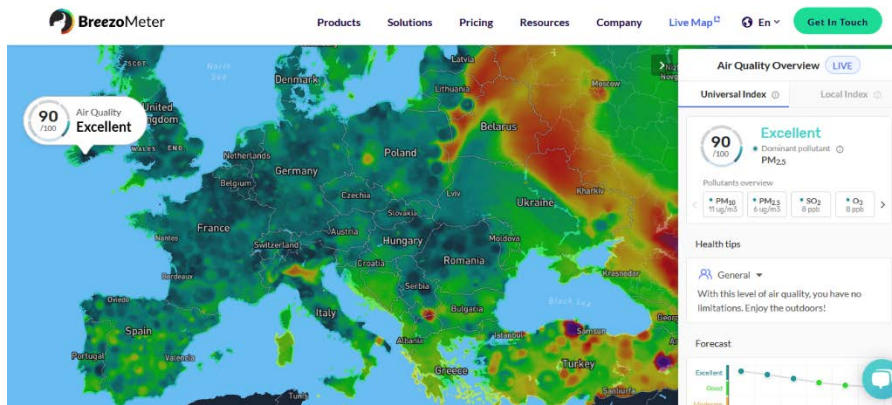
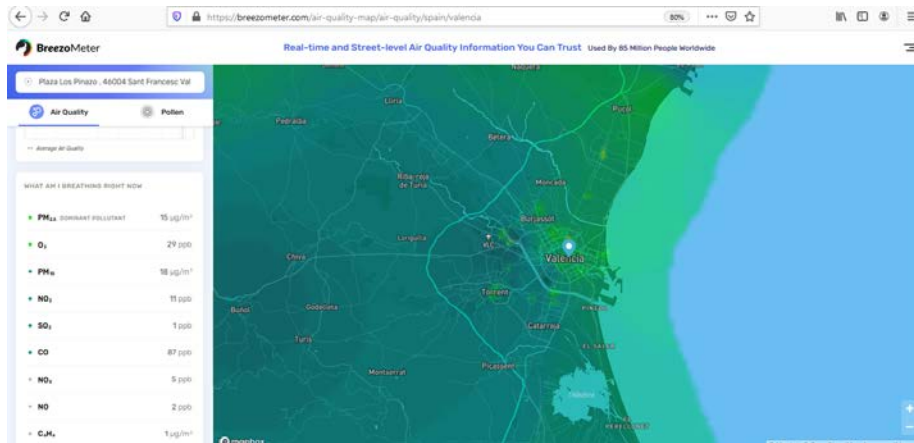
ARDA'S CARBON FOOTPRINT

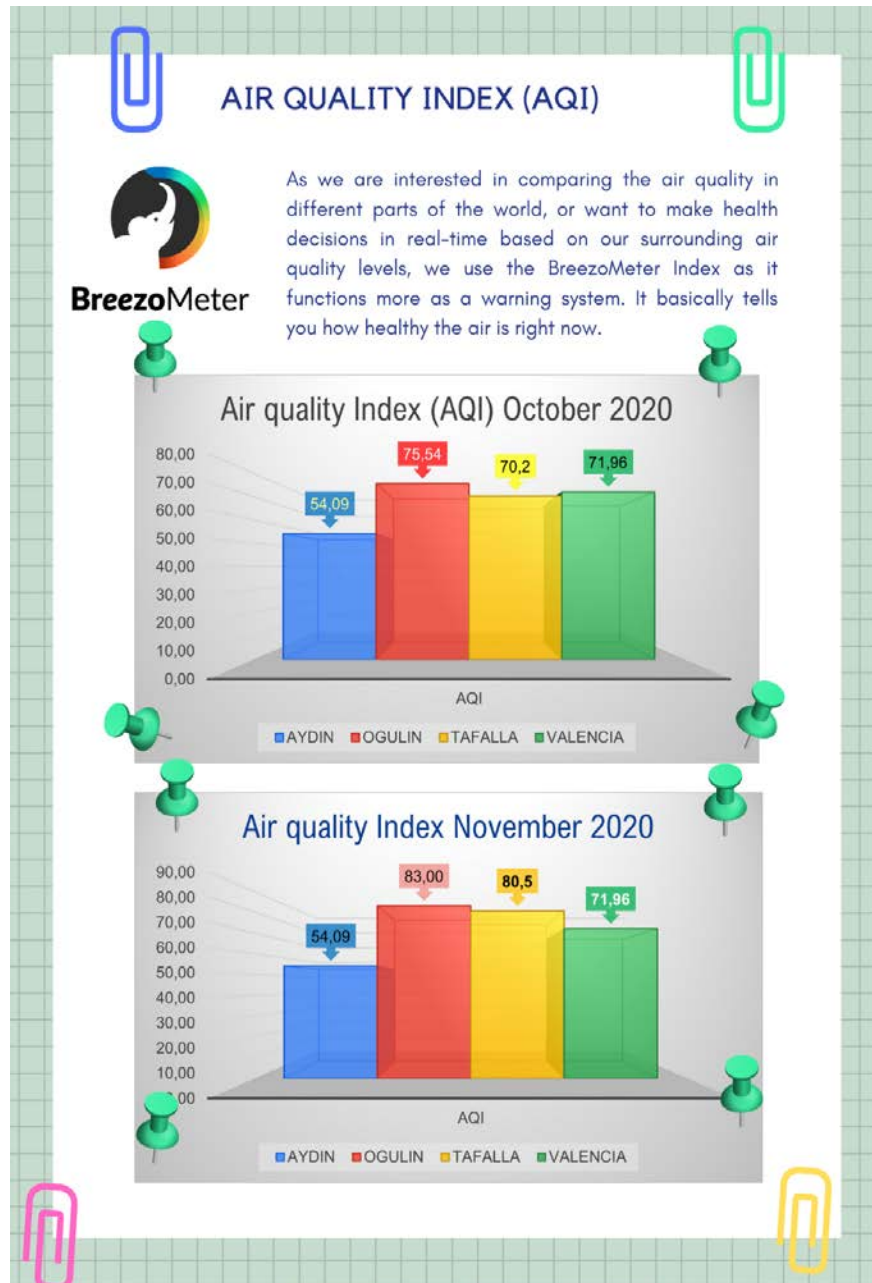
Resource: eTwinningreen4u project

WE CALCULATED OUR ECOLOGICAL FOOTPRINT AND CARBON FOOTPRINT

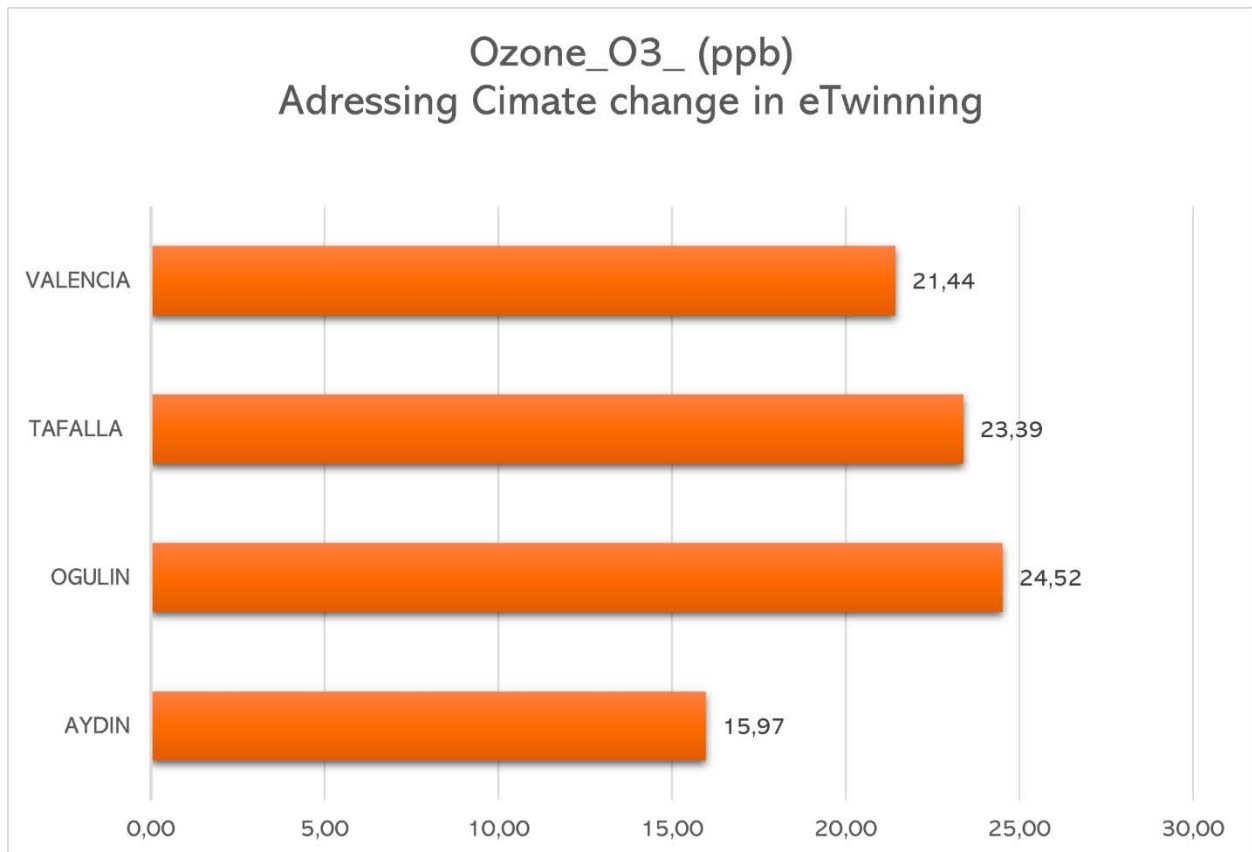
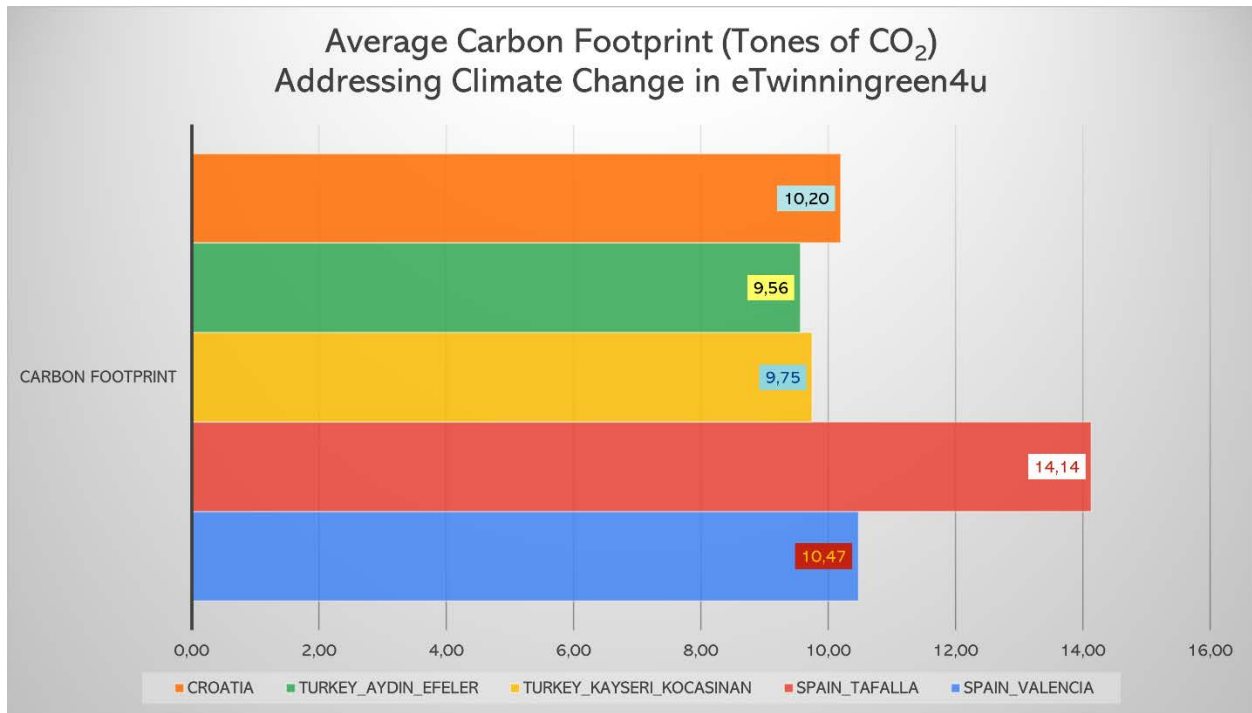


Annex_3a

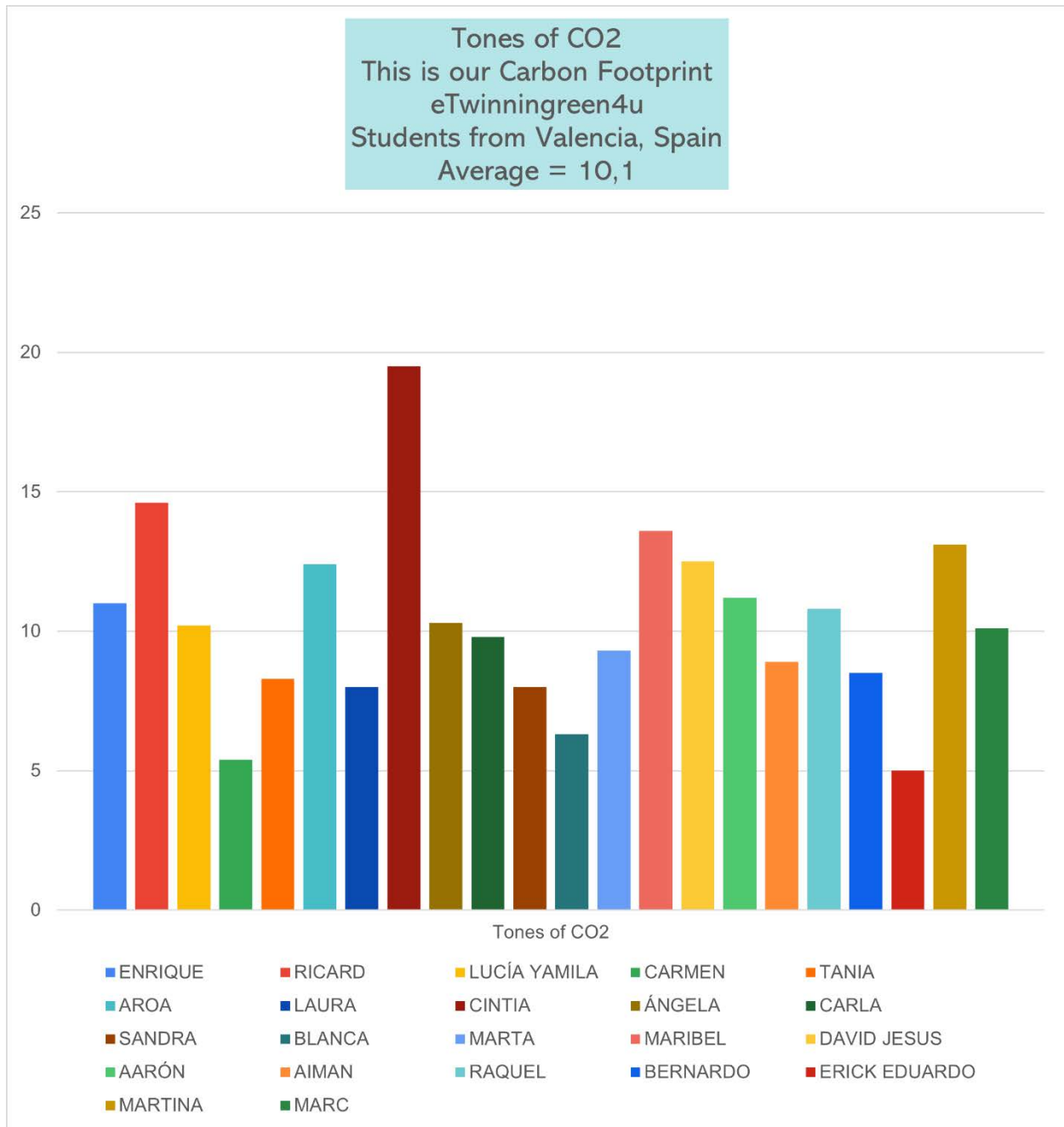




Annex_3c



Annex_3d



WORLD ENVIRONMENT DAY TIPS

REDUCE REUSE RECYCLE

World Environmental Education Day 2021

**Every positive action
makes a huge difference!**

SUSTAINABLE DEVELOPMENT GOALS NO POVERTY	ZERO HUNGER	GOOD HEALTH AND WELL-BEING	QUALITY EDUCATION	GENDER EQUALITY	
CLEAN WATER AND SANITATION	AFFORDABLE AND CLEAN ENERGY	DECENT WORK AND ECONOMIC GROWTH	INDUSTRY, INNOVATION AND INFRASTRUCTURE	REDUCED INEQUALITIES	SUSTAINABLE CITIES AND COMMUNITIES
RESPONSIBLE CONSUMPTION AND PRODUCTION	CLIMATE ACTION	LIFE BELOW WATER	LIFE ON LAND	PEACE, JUSTICE AND STRONG INSTITUTIONS	PARTNERSHIPS FOR THE GOALS

OUR IDEAL

13

CHALLENGES

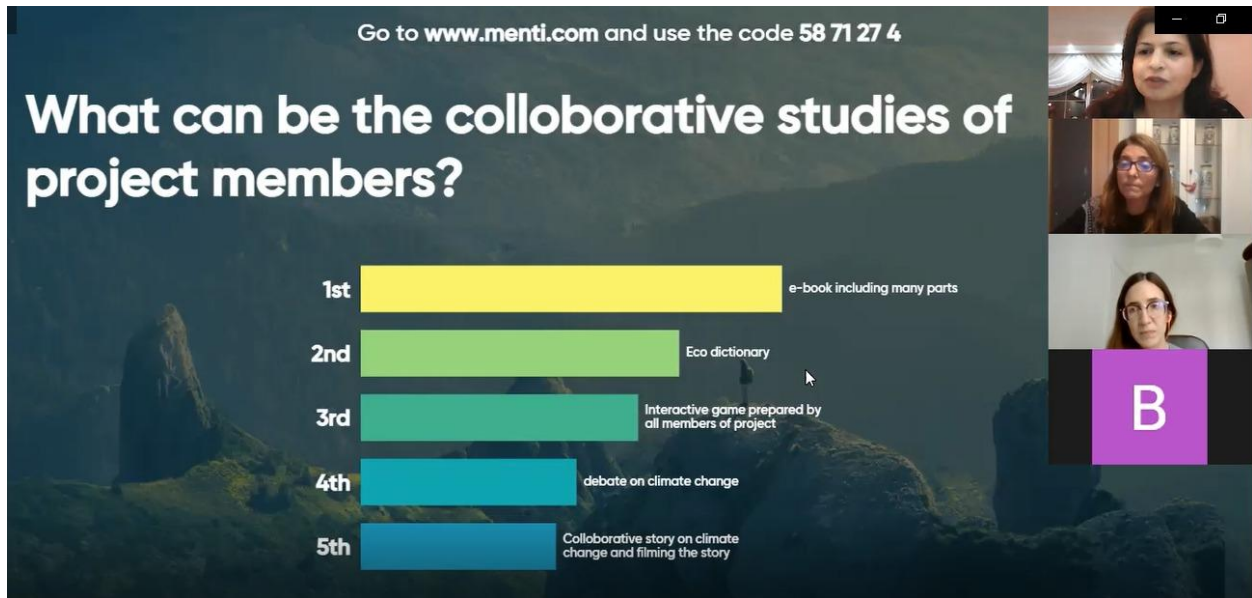
- Bike race to the border Deve Bair every morning.
- 14 days no junk food.
- Run at least 5 times a week .
- Exercise at home and eat healthy food.
- No sweets for one month.
- Purge negativity from yourself.
- Jumping rope 50 times at least 5 days per week.
- Exercise 4 times a week and avoid fast food.
- Run 2 kilometers every Monday and Friday.
- Ride a bike at least 40 min, four times a week.
- Do 100 push ups per day.
- Take a walk in the nature everyday.
- No sweets and fizzy drinks for 3 months.




Annex_5

Go to www.menti.com and use the code 58 71 27 4

What can be the collaborative studies of project members?



Rank	Collaborative Study Idea
1st	e-book including many parts
2nd	Eco dictionary
3rd	Interactive game prepared by all members of project
4th	debate on climate change
5th	Collaborative story on climate change and filming the story



Annex_6a



Annex_6b



Annex_6c

