Globe Exchange Project: Crossing borders for a better future

Transnational research projects for highschool students using the Globe Program. Funded by EU Erasmus+ and supported by Globe Netherlands, Globe Poland and The Globe Program, a worldwide Science and Education Program.

Teacher handbook

Contents

Foreword

This *Handbook* is a result of cooperation of teachers from three European schools: Wolfert van Borselen in Rotterdam (the Netherlands), Zespół Szkół I Placówek Oświatowych in Nysa (Poland) and Srednja škola Buzet in Buzet (Croatia). We got in touch in spring 2018 thanks to our engagement in the GLOBE program. Its coordinators made an effort to put in touch representatives of schools with prior experience in scientific research this program supports. They wanted to inspire teachers to use their interest in GLOBE measurements and start an international Erasmus project together, and we accepted the challenge.

The GLOBE program our cooperation stemmed from (The Global Learning and Observations to Benefit the Environment Program) is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process, and contribute meaningfully to our understanding of the Earth system and global environment. Announced by the U.S. Government on Earth Day in 1994, the international GLOBE network has grown to include representatives from 122 participating countries and 131 U.S. Partners coordinating GLOBE activities that are integrated into their local and regional communities.

We address this Handbook to all the teachers of secondary school who already incorporated the GLOBE program into their work but would like to give their students opportunity to practice their social and academic skills cooperating with teenagers from other countries. It could be also used by those who have never heard of GLOBE community but would like to enrich their teaching job with some new, inspiring experience.

It's definitely worth the effort!

Introduction

Environmental problems have the tendency to cross borders, following airways, waterways, groundwater flows, animals migrating, but also human transport systems. And still, even in the European Union, every country has its own policy, speaks its own language, people live their separate lives. How are we going to be able to deal with environmental problems crossing borders if we keep the borders alive, if we are not used to working together if only on a very high abstract level of politics. To really solve environmental problems, or other problems that have the tendency to not keep itself to one country, we have to learn to work together. And concerning environmental (and other) worldwide problems, we also have to develop a natural and critical approach, so we are able to distinguish fake news from real problems and learn how to solve them using scientific ways. All of these skills and more are taught to students who are involved in the Globe Exchange Program: Crossing borders for a better future.

Other skills that are developed during the program are research skills, cooperative working and social skills, it-literacy, entrepreneurship, and the use of academic English. So the project is very complete looking at all the skills needed to build a better future. That also means this project is pretty complex and therefore it needs good planning and coordination, thinking the whole project through before you start. At the same time it is developed to enhance every time the project is done, by using the student exchanges to evaluate and develop the project, so the quality gets better and better and it is not a static project, it keeps up with time. Hopefully it will spread over the world its benefits and will help us as humanity to learn how to work together to build a better future!

Description of the program

Our partnership started with building up the idea of the project and writing the Application Form to get the Erasmus+ subsidy. It was accepted by our Erasmus National Agencies in summer 2018 and we were granted financial support for its implementation. The project lasted from 1 IX 2018 till 31 VIII 2020. Our project consisted of transnational teams of students doing environmental research and two exchanges per year of smaller groups of students who developed and evaluated the program. During two years, we finally only organised three mobilities: In Nysa, Rotterdam and Buzet. The final meeting in Poland had to be cancelled due to the epidemic (Covid 19) situation in Europe. The language of communication concerning the whole project was English.

During two years of our cooperation our students carried out two full cycles of research projects using GLOBE protocols to ensure a high standard of their work. They were grouped into international teams of six and used various means of communication. They also used digital tools to create final products, like the Multilingual Dictionary of Scientific Terms, videos, presentations and reports. As teachers we monitored their work constantly, helped where necessary and motivated to greater efforts. It was a splendid occasion for us to foster our teaching skills and competences. We learned a lot from each other and also from our students and despite some problems and complications we encountered, we found our partnership really satisfactory.

Aim of the project

The goals of this project is to give students the opportunity to develop professional and life skills that are only being learned through experience and cannot be taught by giving normal classroom lessons. This project makes it possible to actually develop transnational cultural and digital communication skills, experience in a real life collaborative environment, like so common in a lot of work environments nowadays where people work together across the world using Skype and joined documents. Students will do actual real life research in teams, developing their critical thinking on social and environmental issues and sustainability. And on top of that, students' language skills using English as a Lingua Franca will be trained in a real life situation. Introducing innovative practices in our schools will also lead to improving qualities of teaching-learning process. Teachers involved in the project will become better professionals, expert in time and group management, ready to integrate new practices and methods.

Logistics of the project

As the whole project consists of transnational research projects and two exchanges to develop and evaluate the program, the logistics are somewhat complicated. Underneath you'll find a roadmap to be able to get an overview and which makes it easier to organize a similar project for your school. It is very important to check the dates and holidays of the different schools, as it is our experience schools differ substantially on dates and lengths of Holidays, and consequently the moment students can work together on a transnational basis is limited.

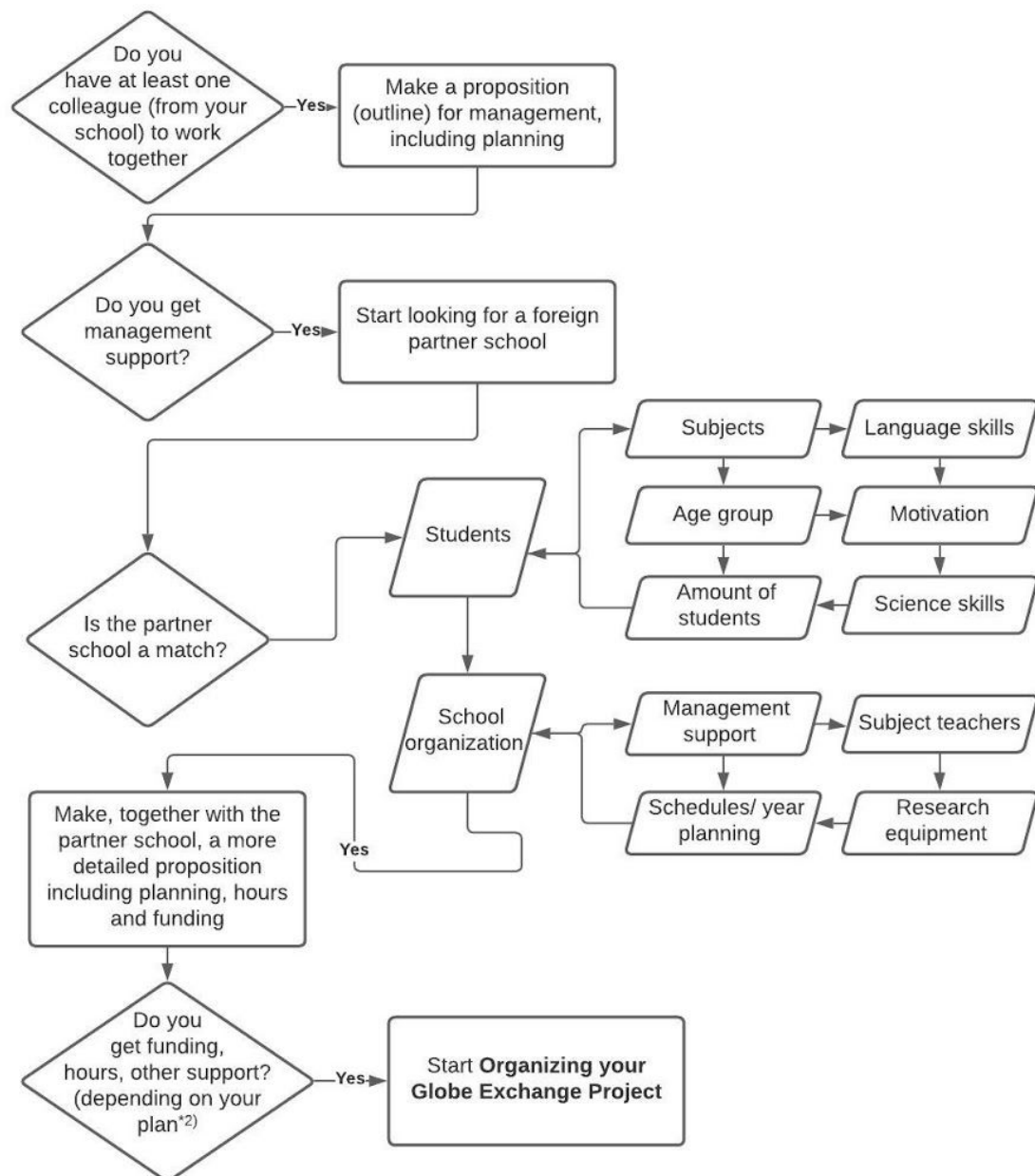| September	
Transnational Research projects	-Start instruction on research for students -Making pairs -Choosing subject/research question -Matching transnational teams
Exchange	-Information on first exchange for students -Choosing exchange students -Organizing Exchange
October	
Transnational Research projects	-Formulating hypothesis -Making research plan
Exchange	-Exchange 1: Kick off
November-December	
Transnational Research projects	-Doing measurements
Januari-Februari	
Transnational Research projects	-Uploading data to Globe database -Analyzing data -Writing reports
Exchange	-Information on second exchange for students -Choosing exchange students -Organizing Exchange
March	
Exchange	Exchange 2: Evaluation

Start up of the project

To be able to start up this project you need to answer the questions on the flowchart underneath to determine the scale of the project and to be certain the project is achievable. It is possible to do the project on a small or on a larger scale, but some requirements are necessary to make the project work. It is important to be certain that you have enough resources to complete the project, even on a small scale, to prevent disappointments for your students, teachers, school, but also other involved parties like parents. It's our experience that you better start small and achievable than reach for too ambitious goals that could turn out to be too difficult, causing the project to fail. Because restarting your project with unmotivated or disappointed people is almost impossible, so be sure to make a (small) success of your project!
If you have answered the questions, you can start writing the proposal for your staff and management. Be sure to talk it through and get the appropriate support!

The flowchart is written to set up a transnational research program using protocols of Globe, but if you want to leave the Globe concept out, that's also possible. Keep in mind that if you have to do research together with students from other countries at a distance, it is very important to have the same ideas about how to perform research. That is important for the way measurements are done, but also applies to the research cycle. Using the Globe research cycle and research protocols ensures you are working in the same way and it will be possible to combine and compare the data in a valid way. It will be hard enough to figure out a shared research question and hypothesis, using the Globe concept makes the whole project easier to organize. On top of that the data can be uploaded to the Globe Database, and be used for research purposes of other schools and institutes, like Nasa, to do research on climate.

It is not necessary though to make it an Erasmus+ Program. The exchanges can be held at pretty low cost if you use host families for the students to stay during their visit. The ongoing research in the meantime is done by transnational teams working online together, for that purpose you would only need the proper equipment at the different schools and of course you'll need teaching hours, preferably embedded as part of the curriculum. The core of this project consists of these transnationale teams working together on a shared research question, where they use their different surroundings and climate to compare measurement data to test their hypothesis, overall that's free. More about the actual organization of the project you can read in the next chapter, this part is about finding the right partner school and starting up the transnational collaboration process.

How to start up a Globe Exchange Project*1

Do you have at least one colleague (from your school) to work together —Yes▶ **Make a proposition (outline) for management, including planning**

Do you get management support? —Yes▶ **Start looking for a foreign partner school**

Is the partner school a match? ▶ **Students**

Subjects → Language skills

Age group → Motivation

Amount of students ← Science skills

School organization ← Management support → Subject teachers

Schedules/ year planning ← Research equipment

Yes

Make, together with the partner school, a more detailed proposition including planning, hours and funding

Do you get funding, hours, other support? (depending on your plan*2) —Yes▶ **Start Organizing your Globe Exchange Project**

*1 As far as Globe is concerned, it is assumed you are familiar with Globe research and research protocols. If not, start getting familiar with Globe first.

*2 If you want to apply for a Erasmus+ K2 scholarship, your plan has to to be designed according to the requirements of Erasmus+. Make sure you inform yourself properly.

Organizing exchange 1: Kick Off

Organizing the exchange

In our case in each transnational meeting six students and two teachers from each visiting school took part. Students were chosen on voluntary basis. They were asked to write a letter of motivation or take part in an interview in which they were to explain why they would like to take part in the mobility. The criteria we took into consideration were the ability to communicate in English, good grades for science subjects and English, students' behavior at school. We also looked at student's engagement in project activities carried out prior to international meetings.

At the beginning of the project each school must specify the requirements they will follow while selecting students for these short-term exchanges, and make them publicly known by uploading it on their websites. It should be a clear information on who will select students, when and on what basis. Before each exchange teachers should organize a meeting for selected students and their parents to explain details concerning the journey and accommodation. They will familiarize students and parents with location of organizing institutions, program of the exchange and what is expected from them. They will also set the rules concerning safety and avoiding danger and risky behavior during the trip and while staying with host families, make it clear what kind of behavior is unaccepted and explain how teachers, students and parents will communicate during the exchange. Parents can be asked to fill in a form on any special needs of their children, concerning diet, health or any other things teachers should be aware of. All participants of the exchanges should be insured (sending schools responsibility). Best if students could stay with host families. During all the activities prepared by the organizing institution, students and teachers work together, afterwards exchange students can spend time with host families.

We recommend that schools organizing each exchange should have a meeting with parents who agreed to invite visiting students to stay with them. They will discuss matters concerning safety and well-being of invited guests, matters concerning transport to and from school, program of the exchange and communication between teachers, students and parents. They will be also informed about any special needs of the exchange students. If all the students of participant schools learn English, they will not require any special linguistic support. From the start of the project it would be advisable anyway to pay attention to teaching English vocabulary students might find useful to talk about science. Short-term exchanges should be integrated with the project activities and result from the objectives specified earlier. That's why students who are to take part in transnational activities should be informed and prepared in advance for the activities in which they will participate while staying in a partner school. Teachers / coordinators of the project are responsible for it.

Aim of the exchange

The aim of the first transnational meeting is to prepare students for the implementation of research projects they will carry out during the first year of cooperation. Most of all, we want them to learn how to notice problems in their local environment and formulate research questions, which will be the starting point of analysis, measurement, defying the cause of the problem and finally the attempt to explain the situation.

We suggest organising a set of workshops in which students of all schools will first characterise places where their schools are located, especially the impact of human activity visible there. Considering the similarities in geomorphology, hydrology, biosphere and climate they will work later in international teams to prepare a list of research questions all students involved in the project might later use in their research work. They will be also allowed to ask different questions, but the ones prepared during the meeting may serve them as an example. Another goal we suggest could be creating a multilingual dictionary of scientific vocabulary in languages used by participating students. This multimedia dictionary can be later expanded when students learn new words in the course of the project. The first meeting should also be the opportunity to work together on the rules participants should follow while working in international teams, as well as the methods of monitoring the progress and evaluation of the results of our collaborative work. The results could be prepared in the form of multimedia presentations.

To help students with formulating research questions we can organise field trips where they will practice observation of the landscape, its features, both natural and man-made, defining the consequences of human activity and finding elements their research questions could refer to. It could be a chance to show the students how the ecological issues can be addressed by the people who professionally deal with environmental protection. Some workshops can be held at school, integrated with the lessons. The guests can attend lessons with the host students they will be staying with, so that they get a chance to see teaching methods used in a foreign school. Some other workshops can be organised in small international groups, parallel to normal school activities. The results we want to produce is first of all the list of project questions we can later use to start up students research programs, rules of cooperation and forms of project monitoring and evaluation.

Goals of the exchange

Involved students will gain knowledge and expertise to start their own research projects - they will have research questions prepared or at least have a list of questions that can serve as an example for their own ones. They will learn or revise English vocabulary necessary to describe their work - not only while preparing the multilingual dictionary but also participating in workshops given in this language. They will learn basic things about the environment of the participant schools and it will be easier for them to cooperate trans-nationally on environmental issues present in the areas where the schools are located. They will learn how to use digital platforms as a tool for implementing the project. They will also get to know at least some of the teachers and students they will cooperate later with. Teachers will gain confidence that the students are equipped with sufficient knowledge and skills to carry out their research on an international level. They will also get to know personally other participants of the project, which will definitely make communication easier. They will have prepared a detailed set of monitoring procedures and ways to evaluate the effectiveness of students' work. Common activities will benefit all participants with its ice-breaking effect, facilitating mutual understanding but also comprehension of the overall goals of the Erasmus projects.

Practical summary

The project is started and ended with an exchange activity every year. The goal of the first exchange is to kick-off the project and create a start involving students from the beginning into the development of the whole project, the goal of the last exchange is to evaluate the project.

First of all, the whole project needs an introduction, at your school and for the students. During the introduction both the exchanges and the transnational research activities have to be mentioned, so you give an overview of the program and then more information on the exchange. Students have to know what the criteria are to be able to apply for the exchange. But at the same time you also have to start up the research projects, by building teams. We treat both separately, but be aware the planning is simultaneous.

Steps to set up the first exchange

1. Planning the exchange with the partner school
    a. setting a date
    b. developing the program
    c. organizing hosting families
2. Introduction of the whole Globe Exchange Project to the students

a. extra information on the first exchange
3. Inviting students to apply for the exchange
4. Choosing a representative group of students
   a. for example 2 per class
5. Setting up a parent meeting
6. Doing all the paperwork, parent permissions, e.g.
   a. booking transfers

Exchange week 1: Kick off

The program of the first exchange is meant to kick off the project. Getting to know the other school, the different surroundings and other students, are important subjects. But to add something to the whole program it is necessary students work on a high abstraction level. The purpose of this first week is first and for all to introduce the whole Globe Exchange Program, so students can take this knowledge home, to be able to peer teach about the program. A big part of the introduction has to consist of teaching students how to perform research using the Globe research cycle and the Globe protocols. Other subjects will be the collaboration process of the online transnational research teams and how they would communicate and organize their cooperation. The students could come up with a communication protocol and a dictionary of special terms. Next to these subjects there should also be a place to get to know the different countries and the cultures, as that's also a part of the collaboration process.

A program for exchange week 1 would have the following items:
1. Teaching each other about the different countries
   a. nature
   b. climate
   c. culture
2. How to cooperate online?
   a. do we need protocols
   b. what media will we use
   c. how are the groups organized
3. Research skills
   a. what is the level in the groups
   b. are the students on the same level
4. How to think of a good research question and hypothesis
   a. think of examples
   b. give teachers more insight in the problems that arise when thinking of a hypothesis
5. Working with the assignment
   a. is the assignment clear

       b. is the rubric clear
6. Research and language
       a. develop a multilingual research dictionary

Organizing Transnational Research projects

Description of the research projects

The goals of the whole program is for students to work in transnational teams on environmental research, the exchange weeks are meant to organize everything and they only involve a few students (and teachers). In between the two exchange weeks the real work is actually done by all of the involved students. Typically these research projects are done by all of the students from on class or study year. Matching is done based on the interest of the students and the subject of research is integrated in the curriculum of the subject or subjects that are involved, like science, geography, chemistry, physics, or biology. And for most of the schools English language could also be involved, as it is used as a lingua franca to work together on the research projects. By the start of the year students will receive lessons on research methodology, Globe protocols and the use of research terms in English. According to the different spheres used in Globe the students choose a subject or research question and they will be matched with one or more teams abroad to work together on their research. In our example teams of six were formed, with pairs from three countries. The research consists of a complete research project according to the research cycle of Globe, see underneath.
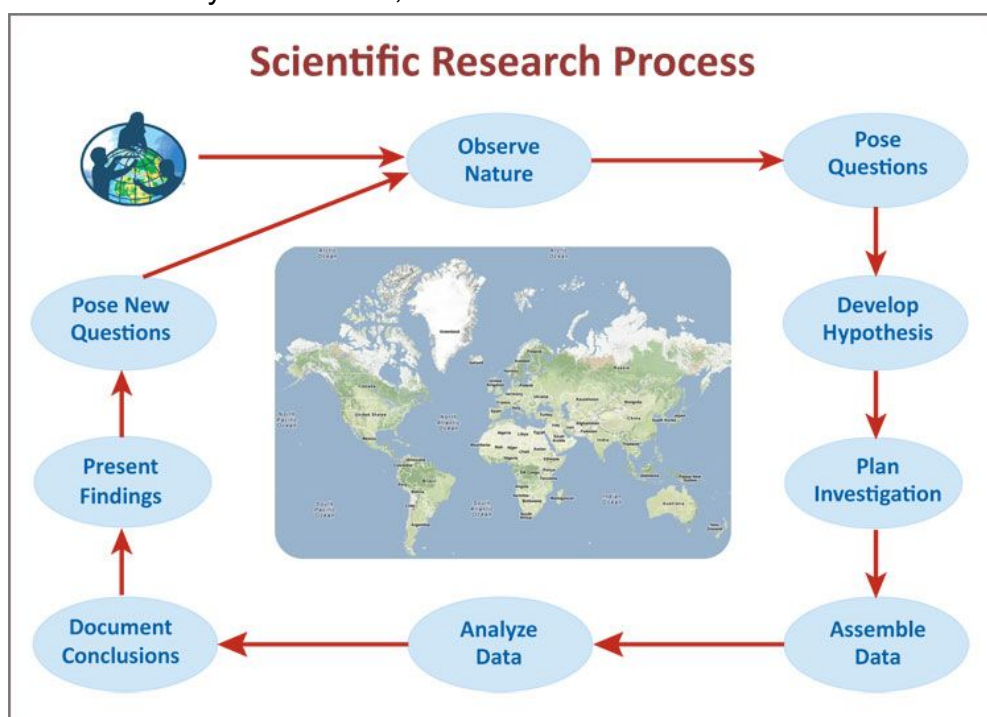
An example of an assignment you can find as an attachment to this Teacher Handbook and an example of a roadmap you can find at the end of this chapter.

Regulating the research process

Implementing students research projects requires constant monitoring and regular evaluation. Since students take on the responsibility for the complete process, teachers must be there for them to offer advice, support and encouragement if necessary. Working in transnational teams will not bring success unless you show great discipline concerning time management and following the schedule as closely as possible. Each country has a different calendar of the school year and preparing a project timetable you must take into consideration different dates of winter break, holidays, etc., which limits to certain extent the time when students can work together.

Monitoring students work and involvement in the assignment can have various forms:

- discussions during the lessons with complete class
- observing students work in the classroom if project implementation is integrated with subject curriculum
- extra consulting hours while teacher is available for students
- starting a shared document (Google) in which students are expected to describe progress they make with their work (checklist)
- sharing with students email address which they can write to in case of problems
- short questionnaires / surveys with which teachers can find out how well students are handling the task

Evaluation should start prior to project implementation, to define students needs and competences. It will help to decide on the level of difficulty of the project assignment. Then we should evaluate students' work on each stage of the project cycle: formulating research questions and hypothesis / measurements / writing reports. There are numerous questions such evaluation should help us answer:

-are the research questions feasible (can students answer them using resources available at school and their expertise in the subject)?
-will the measurements they've planned allow them to address the research question they formulated?
-were their measurements comparable? / valid? /
-have they used proper GLOBE protocols to write their final report?

Students research project - roadmap

STEP 1

Form transnational teams

You can do it matching students at random or (recommended) according to their interest / age / gender

Exchange their email addresses to let them get in touch and establish means of communication

It is advisable to encourage them to have a video chat first to get to know each other better

STEP 2

Formulating research question and hypothesis

Let students decide in groups what they would want to focus their research on: biosphere/ hydrosphere / pedosphere or atmosphere (this could be also the criteria for arranging them in groups)

After checking with the teacher which tools and reagents are available at school, students work on their research questions and later formulate the hypothesis

STEP 3

Measurements and field work

Discuss with students safety measures concerning using chemical reagents and places where they could collect their samples

Ask groups to define where and when they are going to do the measurements and how to use GLOBE protocols to write down the results

Define time span they need to collect data

STEP 4

Writing a final report

Discuss with the students components of a scientific report
Use GLOBE requirements to ensure quality of their work

If necessary instruct on how to use shared documents to collaborate on writing the report

Set the deadline for handing it in.

STEP 5

Evaluation

Once the project is complete collect feedback from students / parents/ other people involved to check if the assignment met their expectation, how they benefited from it.

Organizing Exchange 2: Evaluation

Organizing the exchange

Last project meeting will serve the purpose of summing up both students research projects and the complete project we will collaborate on. First, we can organise workshops during which students of all schools will share with others the results of research work they and their schoolmates have done while working together. They can be asked to present the conclusions drawn on the basis of questionnaires all participants will fill in at the end of their research work. This may refer to for example difficulties they faced, how they managed to solve them, who and what helped them, what they found surprising, how they benefited from collaborating on an international level. During other workshops students may be asked to specify the most vital environmental problems in their regions. Have they asked themselves the right project question which led them to better understanding of the impact human actions have on our environment? Would they formulate the project question in a different way if they were to start their work again? Why? During these workshops students could present their ideas on posters which would later be displayed to the public.

The main point of the meeting could be a conference summing up the project. During the conference we could introduce to the audience participant schools, students would talk about their research, together with teachers they would share their experiences of participating in GLOBE program. Teachers might report on the results of evaluation of the project. We could invite representatives of local authorities and institutions dealing with environmental protection, coordinators of the GLOBE program, methodological advisors for science subjects, members of school Parents Council, local media and students and teachers of other schools.
Expected results will be overall evaluation of the project, methodology of successful research project, display of students' works or report on the conference.

Aim of the exchange

All participants will gain experience in communicating in English, improve their knowledge of scientific vocabulary, get experience in expressing views in public, planning one's work, preparing and holding conferences. These entrepreneurial competences might benefit them when they enter the job market in the future, together with such key competences as team work, creative and critical thinking, evaluating one's work. Using digital tools will help them foster their media and ICT literacy. Students will also improve their ability to use in practice knowledge they acquired in science lessons but also during the project. Attractive form of planned activities will lead to better integration of all participants, which might result in continuing the cooperation, even though the project comes to an end. Teachers will

get equipped with the tools and methods of implementing research projects and incorporating them into their subject lessons. Organising institution, but also other participating schools, will have a chance to promote themselves not only in the local community, but also to wider public.

Practical summary

The second exchange is all about evaluating the project, this is about the results of the research, the research process as well as the collaboration process inside the transnational teams, but also between the teachers and the schools. Students again have to know what the criteria are to be able to apply for the exchange, unless the same group of students participates in the exchange again.

Steps to set up the second exchange

1. Planning the exchange with the partner school
    a. setting a date
    b. developing the program
    c. organizing hosting families
2. Inviting students to apply for the exchange
3. Choosing a representative group of students
    a. for example 2 per class
4. Setting up a parent meeting
5. Doing all the paperwork, parent permissions, e.g.
    a. booking transfers

Exchange week 2: Evaluation

The goal of this exchange is to improve the project and give some publicity to it so it will continue in the future, in the same or in other schools. Students are actively involved in the evaluation, they choose the best research reports, they evaluate themselves and the teachers and make a product to gain publicity like writing an article or making a movie. To prepare for this week it is also possible to make a questionnaire and send this to all of the participants, the results could be used to discuss during this last exchange week as part of the evaluation.

A program for exchange week 2 should have the following items:

1. Choosing the best research report using
    a. the globe research rubric
    b. a rubric on the collaboration process

2. Evaluating and writing a report about what to keep and what to improve concerning the whole project on a few topics
    a. collaboration between students
    b. collaboration between schools
    c. transnational research process and writing the report
    d. role of the teachers
3. Creating a product to gain publicity by transnational teams, for example
    a. an article
    b. a presentation
    c. a movie
    d. a website
4. Organizing an event for the students, teachers, management, parents and local community to share the results of the collaboration
    a. presentation
    b. press conference
5. Ending the project with a special goodbye party

Sources

GLOBE official website
https://www.globe.gov/

GLOBE find a collaborator site
https://www.globe.gov/globe-community/find-a-collaboration-partner

GLOBE Poland
http://globe.gridw.pl/

Erasmus plus
https://ec.europa.eu/programmes/erasmus-plus/node_en

EU partner search
http://www.eupartnersearch.com/AboutUs.aspx

Erasmus Result Platform (for inspiration)
https://ec.europa.eu/programmes/erasmus-plus/projects_en

eTwinning platform
https://www.etwinning.net/en/pub/index.htm

our project site on eTwinning platform
https://twinspace.etwinning.net/72637

our project Facebook site:
https://www.facebook.com/fromglobetoerasmus

Program Globe to Erasmus Exchange week Rotterdam March 2019: Evaluation

	Day 0 (24-3-2019)	Day 1 (25-3-2019)	Day 2 (26-3-209)	Day 3 (27-3-2019)	Day 4 (28-3-2019)	Day 5 (29-3-2019)	Day 6 (30-3-2019)	Day 7 (31-3-2019)
9.00		106 Getting to know the school	Vroesenpark 9.00 Start with Chi Kung outside 9.30	Carroussel: Choose the best presentations based on the rubric of Globe	Starting a bit later (sleeping in)	107 Multicultural dictionary	Departure Coatian students	Departure Polish students
10.00		107 Geo lesson on Rotterdam	Lecture/wandeling door Li An Phoa (Drinkable Rivers) / Self reflection: What was your role in the groupwork?		107 Preparing presentations and classroom	107/outside Globe Fieldwork	Optional: Polish students visit Amsterdam	
10.45-11.15		Break	Break	Start CS	Break			
11.15		107 Geo lesson on Dutch landscape	107 Carroussel / Choose the top 3 of the best research projects	Citywalk Rotterdam Naturally via app	107 Preparing presentations and classroom			
12.30		Lunch served at school	Lunch served at school	Lunch in town	Lunch served at school	Lunch served at school		
13.00-15.30	Arrivel -Polen: 13.00 Eindhoven -Croatia: arrival Amsterdam around 12.30, they take the bus 45min.	Cycle excursion to De Rotte, a small river. We will have a look at the landscape and it's environmental issues and students get the opportunity to socialize, so they get to know each other better	107 Students fill in rubrics/evaluation forms on the research and teamwork	13.30 107 Preparing the presentations of tomorrow for students, teachers, parents and press.Writing press release. We go on untill it's finished :-)	14.00 Presentation for students, teachers, staff, parents and press	Visiting a few highlights of the area and diner		
		Diner at host families	Diner at host families	Diner at Wok restaurant	Diner at host families	Diner by the sea		

From GLOBE to Erasmus: First Project Meeting in Nysa, Poland (26 – 30 November 2018)

MONDAY, 26 November	TUESDAY, 27 November	WEDNESDAY, 28 November	THURSDAY, 29 November	FRIDAY, 30 November
8:00 – meeting at school • meeting school principals and project coordinators • visiting school • coffee break (10:50 – 11:35) • geography lesson • meeting town authorities 14:00 – 16:00 lunch break (at students' homes) 16:00 – workshops at school • multilingual dictionary • how to use eTwinning site	8:00 meeting at school (students attend 2 lessons with their hosts – different classes) 10:00 - workshops: • presentations on the school regions • looking for similarities and differences which might help us form research questions • coffee break (11:35 – 12:30) • workshops part 2 (first attempt to formulate research questions) 14:15 – 16:00 lunch break (at students' homes) 16:00 – sightseeing Nysa (cathedral/old town/ treasury/museum/...) 18:00 - bowling	8:00 – leaving for Wrocław 11:30 visiting Hydropolis + workshops on acid rain 14:00 visiting Wrocław University (Faculty of Geography) +sightseeing tour of the city 17:00 – dinner break returning to Nysa at around 20:00	8:00 coming to school (students attend 2 lessons with their hosts – different classes) 10:00 – field trip to Nysa Lake and Bioagra plant (round noon coffee break in Rybak Hotel by the lake) 14.00-16.00 workshop • evaluation first exchange week • 16:00 – 18:00 lunch break (at students' homes) in the evening – sport activities in the gym: • table tennis tournament (international doubles – Polish Ss + their visitors) • badminton • basketball • football	8:00 - workshops: • sharpening research questions • adding hypothesis and research method • preparing the final list of examples of research plans • presentations summing up the first project meeting • information for the media 10:50 – goodbye meeting with school principals 12:00:17:00 – a trip to nearby town Głuchołazy (a bit of hiking in the mountains / graduation tower / a bit of sightseeing) on the way back – dinner at a restaurant

Research assignment Globe to Erasmus
(2018-2019, Abjini Blom)
Subject: Natural environment compared, Croatia, Netherlands and Poland
Grade: Netherlands: pta, Croatia: test, Poland: project
Evaluation: 150911GLOBE-ISF_rubric_HS Deadlines: Fase 1+2 20th December 2018, Fase 3+4 21th februari 2019

Introduction

The goal of this assignment is to do your own geographical or environmental research. The research is done by groups of pairs of either country, so the team will consist of 6 students. The subject of the research you can think of yourselves, as long it fits the Globe protocols and thus one of the spheres: atmosphere, hydrosphere, biosphere or pedosphere (soil). You will also have to do at least one series of measurements according to Globe protocals and upload them to the database of Globe.

Concerning subjects you can think of problems concerning water like flooding, pollution of air and water or problems concerning the underground and soil related to plants or trees.
If we look at Rotterdam, we can go to parks, look at the river or go to the country or the sea to do research.

Research

Geographic research is about looking for relations between certain features or fenomenon of a region, you look for a relationship or an explanation. Or you could even think of a prediction or a solution to a certain problem. Your research question should be a challenge and not easily answered by looking for it on Google. Your research is, next to theoretical knowledge, based on observations or measurements done by your group. To analyze your observations you use certain statistical techniques like comparing graphs or correlations. As it is about certain regions, and belangs to geographical research, we also want you to contruct a map of your results.

Research proces

We use the steps of the Globe research cycle. During the research you will have to keep a logbook to account for the work you did. Next to that there are phases built into the research that you have to hand in before you continue. There are some specific things that have to be handed in, like the record of your observations or measurements. Exact requirements you find in the rubric of Globe.

Globe research cycle

0   Observe nature / orientations (choose subject of interest)
1   Pose question (specific research question and sub questions)
2   Hypothesis (what do you expect the outcome will be)
3   Plan investigation (methods used, theory)
4   Assemble data at least one aspect according to a Globe protocol
      (do observations/measurements, look for relevant theory)
5   Analyze data (upload at least one series of measurements to the Globe database)
      and use statistics/cartography to analyze
6   Document conclusions and check hypothesis

7   Present findings (write paper according to the Globe rubric)
8   (Pose new questions)

Contents of your paper

You follow the steps of the Globe research cycle.

-Frontpage
-Foreword
-Contents
-Summary
-Preface
-Research question and hypthesis
-Research plan
-Results and analysis
-Conclusion
-Evaluation and reflection
-Resources
-Appendix

To update data to the Globe database use the following link:
https://www.globe.gov/globe-data
account is: blom_student1@globe.gov
inlogcode: WolfertGlobe2018

Information sheet Globe protocols and fieldwork

Underneath you'll find information on how and what to observe and measure based on the Globe protocols.

Measurements and observation protocols Globe
-Hydrosfeer: water quality, oxygen, temperature, Ph-value, e.g.
-Pedosfeer: features of the underground and soil, moist, type, e.g.
-Atmosfeer: climate, air pressure, temperature, humidity, clouds, aerosols, e.g.
-Biosfeer: measuring m2, gradients, type of landscape, e.g.

Research questions (to match teams):

<u>Atmosphere</u>

1. How do climatic factors determine the climate of Nysa, Rotterdam and Buzet?
2. How do climatic factors determine the rural or urban climate of Nysa, Rotterdam and Buzet?
3. How do people influence the quality of air in Nysa, Rotterdam and Buzet?
4. How will climate changes influence the environment (economy and society) of Nysa, Rotterdam and Buzet?
5. What is the relationship between atmospheric circumstances and clouds?

<u>Hydrosphere</u>

1. How do the rivers of Nysa, Rotterdam and Buzet differ and why?
2. How do the lakes of Nysa, Rotterdam and Buzet differ and why?
3. How to reduce water pollution of the rivers in Nysa, Rotterdam and Buzet?
4. How will climate changes influence the environment (economy and society) of Nysa, Rotterdam and Buzet?
5. In what way are we threatened by the water crisis?

<u>Pedosphere</u>

1. How do climatic factors determine the climate of Nysa, Rotterdam and Buzet, looking at the landscape?
2. How do the soils of Nysa, Rotterdam and Buzet differ and why?
3. How is soil pollution related to the environment if you look at the location of agriculture?
4. How is soil pollution related to the environment if you look at the location of industry?
5. How is soil pollution related to the environment if you look at the location of infrastructure?

<u>Biosphere</u>

1. Is our town / city a balanced / sustainable place concerning nature?
2. How does climate influence the different biospheres of Nysa, Rotterdam and Buzet?
3. How do climatic factors determine the landscape of the climate of Nysa, Rotterdam and Buzet?
4. How is the division of types of plants according to the humidity of the soil in the parks of Nysa, Rotterdam and Buzet.
5. How are the biospheres affected by the location of buildings or infrastructure?

Example page from the Multilingual Dictionary of Scientific Terms

english	croatian	dutch	polish
a			
amount	količina	hoeveelheid	zawartość
altitude	visina	hoogte	wysokość
acidic	kiselo	zuur	kwaśny
air	zrak	lucht	powietrze
airplane	zrakoplov	vliegtuig	samolot
alkaline	lužnato	alkalisch	alkaliczny
atmosphere	atmosfera	atmosfeer	atmosfera
aerosols	aerosol	aerosolen	areozole
abrasion	abrazija	slijtage	abrazja
alternative	alternativa	alternatief	alternatywa
accumulation	akumulacija, nakupljanje	samenstelling	akumulacja
b			
biology	biologija	biologie	biologia
book	knjiga	boek	książka
biosphere	biosfera	biosfeer	biosfera
biodiversity	bioraznolikost	biodiversiteit	bioróżnorodność
branch	grana	tak	oddział
biome	biom	ecosysteem	biom
border	granica	grens	granica
barometer	barometar	barometer	barometr
breeze	povjetarac	bries	bryza
bay	zaljev	baai	zatoka

Example of end-of- project evaluation form:

From GLOBE to Erasmus - project evaluation

Please take a moment to fill in this questionnaire, which will help us evaluate to what extent our collaboration met the objectives we had described in the application form while building up the project. Thank you very much for your help,
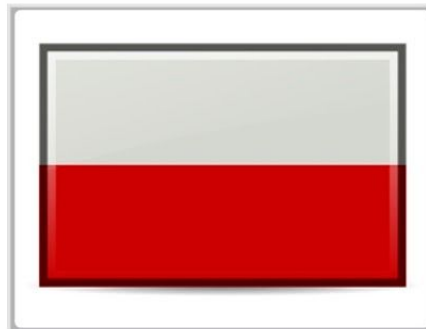
project coordinators
*Required

1. Where are you from? *

    Tick all that apply.

☐ Croatia   ☐ the Netherlands

☐ Poland

2. When did you take part in project activities? *

Mark only one oval.

◯ in the first year of project implementation (2018-2019)

◯ in the second year of project implementation (2019-2020)

◯ both

3. Your role in the project *

Mark only one oval.

◯ a student

◯ a teacher

Skills and competences

4. How has participation in our project influenced your ability to do a research / to carry out a research project in its full cycle? *

Mark only one oval.

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	considerably

5. Which of your scientific skills and competences have changed for better? *

Tick all that apply.

☐ ability to ask a research question

☐ ability to do the measurements / field work

☐ ability to write a report

☐ ability to analyse the situation and draw conclusion using collected data

☐ ability to think critically about the world around us

Other: ☐ _____

6. How has participation in our project influenced your language competences (English)?

Mark only one oval.

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	considerably

7. Which aspects of your language competences have changed for better? *

Tick all that apply.

☐ speaking skills
☐ using English for day to day communication
☐ vocabulary
☐ understanding spoken / written language
☐ describing scientific problems in English
Other: ☐ _____

8. How has participating in the project influenced your IT / digital skills and competences? *

Mark only one oval.

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	considerably

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9. Which IT tools / apps / computer programmes did you use while working on the project? *

Tick all that apply.

- [ ] Google shared documents
- [ ] padlet
- [ ] Excel
- [ ] GLOBE database
- [ ] eTwinning site

Other: [ ] _____

Communication / social skills

10. Which tools did you use to communicate with your partners from other countries? *

Tick all that apply.

- [ ] e-mail
- [ ] Skype
- [ ] WhatsApp
- [ ] Messanger
- [ ] Instagram
- [ ] eTwinning site

Other: [ ] _____

11. How would you evaluate communication in your group? *

Mark only one oval.

	1	2	3	4	5	6	
there was hardly any communication	◯	◯	◯	◯	◯	◯	very successful

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15. Has participation in the project activities increased your awareness concerning global environmental issues? *

Mark only one oval.

	1	2	3	4	
not at all	○	○	○	○	considerable

16. Has participation in the project inspired you to broaden your knowledge concerning environmental issues of our planet? *

Mark only one oval.

	1	2	3	4	
not at all	○	○	○	○	considerable

Recommendations

17. How much did you enjoy taking part in our project? *

Mark only one oval.

	1	2	3	4	5	6	
not at all	○	○	○	○	○	○	greatly

18. Would you like to take part in such undertaking once more? *

Mark only one oval.

○ definitely yes

○ hard to say

○ definitely no

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15. Has participation in the project activities increased your awareness concerning global environmental issues? *

Mark only one oval.

	1	2	3	4	
not at all	◯	◯	◯	◯	considerable

16. Has participation in the project inspired you to broaden your knowledge concerning environmental issues of our planet? *

Mark only one oval.

	1	2	3	4	
not at all	◯	◯	◯	◯	considerable

Recommendations

17. How much did you enjoy taking part in our project? *

Mark only one oval.

	1	2	3	4	5	6	
not at all	◯	◯	◯	◯	◯	◯	greatly

18. Would you like to take part in such undertaking once more? *

Mark only one oval.

◯ definitely yes

◯ hard to say

◯ definitely no

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19. Do you think participating in the project increased your employability? Has it improved those of your skills and competences which are decisive on a job market? *

Mark only one oval.

◯ Yes

◯ Hard to say

◯ No

20. Which skills do you think these would be? Tick 3 which are most important. *

Tick all that apply.

☐ language skills
☐ self-management skills
☐ digital / media competences
☐ critical / analytical thinking
☐ social skills / ability to cooperate with others
☐ readiness to deal with challenges
Other: ☐ _____

21. Do you think your school should implement more projects like this? *

Mark only one oval.

◯ Yes

◯ Hard to say

◯ No

22. Feel free to make comments on how you feel about participating in our project - we will appreciate any feedback you can give us.

_____

_____

_____

_____

_____

Thank you very much!

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