Worksheet

Target group: second-grade primary school students, early-year grammar school students, and high school students

Group size: 5-30 students

Total time: 9 teaching hours (1st-2nd Block) + approx. 6 teaching hours (3rd-4th Block), + 8 teaching hours of optional activities (5th Block)

Material equipment for the implementation of the Programme:

1st Block

Activity Introduction

Space: a classroom with computer and a projector

Materials: printed articles (timeline variable for high schools), stationery, a table of adaptive measures, a table of environmental threats, a leaflet on measures of adaptation to climate change in residential districts, and the supporting PowerPoint presentation

Activity simulation game for implementing adaptations

Space: a classroom with a computer and a projector

Materials: a simulation game, a city chronicle for the groups, the supporting presentation file(s) for the teacher, and articles with information

Risks: the Programme is time-consuming, and there is a risk of poor cooperation among children and disagreements amongst groups during the simulation game; the trainer should assign students to the groups and designate a group leader.

Activity Fieldwork

Space: selected location(s), including those around the school

Tools:

- **Sociologists:** questionnaires, handouts, descriptive handouts on measures of adaptation to climate change undertaken by or proposed for residential districts (https://evp.adaptacepraha.cz/wp-content/uploads/2019/03/ADAPTACE_letak.pdf) and Adaptation of Prague to climate change (https://evp.adaptacepraha.cz/wp-content/uploads/2020/01/KLIMA_PRAHA_MAIL_CZ.pdf), and stationery
- **Researchers:** worksheets (two locations, temperature estimations, a picture of a drawn of a thermal image), papers for drawing a thermal image, crayons, a laminated

temperature and colour scale, a sample thermal image, a thermal camera, and three thermometers

- **Naturalists:** three two-litre water bottles, a worksheet, a mat or pad, and working materials
- **Urban planners:** a worksheet (map), stationery, a camera (a mobile phone), tips from abroad, articles with information, a leaflet, and examples of adaptation measures
- **Mathematicians:** a worksheet, a calculator, a camera, and a mobile phone

2nd Block

Space: a computer room with a projector

Materials: a minimum of 1 computer per group, a projector, and the completed worksheets and materials from the previous session

3rd Block

Space: a computer room with a projector, a room for presentations where the local adaptation forum can take place

Materials: a minimum of 1 computer, PowerPoint presentations from all groups (see Block 2), and a final PowerPoint presentation

4th Block

Space: a location where the adaptation measure(s) can or will be implemented

Materials: individual supplies (e.g., working tools, seedlings, clay, or work gloves)

5th Block

Sustainable transport

Space: a classroom with a computer and a projector

Materials: flipcharts, papers for the group game, worksheets for the groups, and the supporting presentation for the teacher

Rains, floods, drought

Space: a classroom with a computer connected to the Internet and a projector

Materials: two flexible plastic tubes, two glass balls, a sponge (dry), a measuring cylinder, worksheets for groups, and the supporting presentation for the teacher

Energy performance and adaptation of buildings

Space: a classroom with a computer and a projector

Materials: thermometers, plates, a simulation game, worksheets for groups, and the supporting presentation for the teacher

Programme annotation

The Project should begin with an introduction to the topic in which the students may become aware of their positions on climate change. This is followed by a simulation game, where students can test how the negative effects of climate change can affect the city and how the city can be protected (adapted) from climate threats. They will learn about the issue of climate change, its causes, its consequences, and the possible solutions. In individual research activities in the field, students will learn how their school environment is able to withstand negative climate phenomena. Students will work in specialist groups to thoroughly investigate one issue, e.g., public opinion research, torrential rains, heat islands, sustainable transport means, and water features. They will document their work and draw conclusions. Students will then discuss and propose appropriate adaptation measures to these phenomena, upon which they will elaborate and present the next day at school to their classmates; they will then present the same information to the public representatives at the local adaptation forum. The most suitable adaptation measures will receive funding as a reward, which students must then use towards the implementation of their proposed measures.

Programme structure and instructions

The class that participates in the Project will attend two Project Days (Block 1 and Block 2); this will then be followed by a participatory part of the Project: the presentation of their own proposals for adaptation measures at the local adaptation forum (Block 3). This can only be attended by a selected team of students. The implementation of the actual/individual measures will then take place in Block 4, and it is advisable that Block 4 is, again, completed by the whole student group. We also offer extra optional activities that centre around the topic of measures of adaptation to climate change for residential districts (linked to Block 1 and 2) for Block 5.

The Project starts with an introductory lesson in which the students may become aware of their attitudes towards the ongoing nature of climate change. From this introduction, the students may gather more information about possible climate threats to their environments, how to prepare for these threats, and how to behave in case of their manifestation. The Programme continues with a simulation game in which the students will experience the negative impacts that climate change can have on a city and how to protect (adapt) a city from climate threats. During the activity, students will gain a greater knowledge of climate change, its causes, its consequences, and possible solutions. They will learn that it is no longer possible to eliminate climate change, and that we must instead adapt to it. If a board game is not available (as a supplement), then an online learning application can be used

(http://evp.adaptacepraha.cz/stavitele-mesta-1-plna-verze/) that was developed for the Project.

As part of the Project, it is necessary to complete field research around the school. The rest of the activities will then take place in the classroom and the computer lab. The subsequent presentation of the selected adaptation measures will take place in the local adaptation forum (e.g., a hall of the municipal office, a theatre, a cinema, a community centre, etc.). The implementation of the adaptation measure takes place, again, in the selected location around the school or on the school grounds.

Block 1 – An introduction, a simulation game, and field research (5 lessons)

Activity	**Objectives**	**Teaching methods and forms**	**Time allotted**
Introduction	Students may become aware of their positions on climate change. Students will draw conclusions from the articles about the manifestations of climate change, what types of preventive adaptation measures exist, and how to behave in the event of such manifestations.	• the supporting PowerPoint presentation • movement activity - "Rock of opinions." • work with articles (timeline in case of high schools), • the creation of a spreadsheet	60 min.
Simulation game /+ online learning application	Based on a simulation game (online learning application), students will derive appropriate adaptation measures for their cities.	• the simulation game/online learning application	75 min.
Field research around the school	Students will test their skills in working with thermal imaging cameras and	• Research activities	90 min.

	thermometers, mapping water and green features in the city, and other experiments in the field according to selected activities. They will then collect data from a selected site for subsequent research and activities.		

Block 2 – **Processing outcomes (three teaching hours)**

In the individual research activities, students will learn how vulnerable their school environments are to climate change as well as how resilient it is to negative climate phenomena; they will also propose appropriate adaptation measures to these phenomena. During a discussion, they will decide on which adaptation measures to propose for funding for implementation. A selected team of students will then prepare a final presentation.

- processing results of field activities
- a presentation of the group's measurable outcomes – the current and future status
- conclusions on and selection of measures
- preparation of a presentation for competition (only a selected team of students may prepare it)

Block 3 – **Student presentations and competition (four lessons).**

The selected students present their proposal(s) utilising their pre-prepared PowerPoint presentation for representatives from public administration offices and the public at a local adaptation forum (it is advisable to have the whole group of students in the audience). The selected team of students will present their final proposal(s) to the committee independently; they must justify how their proposed measures will be beneficial for the community. The expert panel will select the best proposal according to the criteria below on a scale of 1 to 10 (with 10 as the best measurement):

1. benefits of the proposals for the community
2. the feasibility of the proposed measures
3. the commitment levels of the student groups and their presentation skills
4. the design proposal

A committee of experts (e.g., from CzechGlobe, the Institute of the Academy of Sciences for Global Change Research, or local councillors and professional officials, or the staff of the Koniklec Eco-centre) will determine the order of the winning proposals on the basis of the public debate. The best proposals will receive financial support for their implementation; these should be initiatives for adaptation measures on the school grounds or around the school, such as a type of barrel, trees, bushes, watering cans, composters, flower pots, raised soil beds, or solar panels for charging mobile phones. We prefer green and blue adaptation measures; however, if necessary, grey measures are also possible. Classes that do not receive funding to implement "hard" adaptation measures may try to implement some of the accompanying soft measures, like organising an information campaign for their parents, councillors, and community; or lobbying other sources for funding for their hard adaptation measures.

Block 4 – The implementation of adaptations and adaptive measures (approximately four teaching hours)

The students will use any funds awarded to implement their proposed measures. In cases where the proposed measures are to be implemented in public spaces, then the owner of the land, which is usually a municipality or a private entity, must be contacted. This can be done by the teacher and the children (they can write a letter to the municipality or private entity, call them, or arrange a personal meeting that the teacher and the class representatives can attend). Alternatively, a staff member from the eco-centre or environmental education centre that is running the Project with a school can assist.

Block 5 – Optional activities for Block 1 and Block 2 (time 60 to 330 min.)

The individual activities allow students to gain knowledge from the individual chapters of the Adaptation Strategy of the Capital City of Prague, which is Prague's plan for adaptation to climate change phenomena.

The "Feelings Map" activity precedes the Project and can only be completed if the district has it online for public completion. The other three activities may be completed in conjunction with the "Exploring the School Neighbourhood" activity or as a follow-up to the Project itself.

Activity	**Objectives**	**Methods and forms**	**Time allotted**

Feelings Map	Students mark places vulnerable to climate change on a map of their municipalities.	• working with an online application • a discussion	60 min.
Rains, floods, drought	Students reflect on the results of their field work and propose measures to increase the proportion of vegetation and water areas in their cities. Students will test the retention capacities of different areas in their cities. Students will design adaptation measures to prevent flooding.	• an experiment • research • a group discussion • group work • field work	90 min.
Sustainable mobility	Students will experimentally test the effect of green spaces on air pollution. Students will propose measures to improve accessibility within and movement around their cities as well as encourage the use of urban public transportation instead of cars.	• research • a group discussion • group work • field work • an experiment	90 min.
City energy performance and adaptation of buildings	Students will examine the insulating properties of four different building materials. Students will explore the principles of passive houses and test energy improvements to their family home in a simulation game.	• an experiment • a simulation game	90 min.