Teacher Retraining Module

"Introduction to Climate Change Topics and Practical Application of the 'Climate Box' Educational Toolkit in Schools"

Content

Introduction

In the fast-evolving modern world, where the effects of climate change are becoming increasingly apparent and its impacts more severe, it is crucial to inform younger generation about this global issue. To mitigate the influence of human economic activity on the climate and to adapt to its negative effects, everyone must understand how can contribute to the fight against climate change. This requires knowledge, skills, and changes in attitudes and behaviors. Education plays an important role in this process.

Playing a key role in shaping the worldview of future generations, teachers can inspire students and develop a range of abilities and skills that will help them understand, assess, and address issues related to climate change. Climate change education helps young people understand the causes and consequences of climate change, promotes changes in their perspectives and behaviors, helps them adapt to climate-related trends, and facilitates the transition to a "low-carbon" economy by cultivating habits for a more sustainable lifestyle.

To achieve these goals, in 2014–2015, the United Nations Development Programme (UNDP) developed and piloted in Russia an innovative interactive climate change educational toolkit, the "Climate Box." This toolkit is designed to engage schoolchildren and introduce them to the scientific foundations of climate change, how it affects people and ecosystems, and how each person can contribute to global efforts to combat climate change. The "Climate Box" also provides teachers with guidance on how to integrate its materials into the school curriculum and extracurricular activities.

From 2016 to 2020, UNDP, with financial support from the Russian Federation, facilitated the distribution of the "Climate Box" in Eastern European and Central Asian countries – Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, and Uzbekistan. In 2020, Serbia also joined the program, becoming the first participating country outside the CIS region. In addition to creating national versions of the educational toolkit, the program included teacher training on how to use the toolkit, regional conferences for education representatives to share experiences in piloting the "Climate Box," and various events for schoolchildren.

In 2024, the authors updated and revised the "Climate Box," incorporating the latest climate change information from the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), as well as examples of mitigation and adaptation actions from around the world. The updated toolkit includes recommendations from teachers and experts based on their experience using the "Climate Box" in participating countries.

During the implementation of the "Climate Box" program, the need for a standardized module for teacher training in climate education became apparent. This module, integrated into the professional development system for educators, will enable a larger number of teachers to gain a comprehensive understanding of climate change issues and use the "Climate Box" materials in both formal and informal education.

The module includes examples of national approaches to addressing climate change, adaptation methods, and successful cases of reducing carbon footprints in the countries participating in the "Climate Box" program. It also provides recommendations for implementing the training module, considering the specific characteristics of national education systems.

The integration of this training module into teacher professional development will raise overall awareness of climate change issues, draw attention to the problem, and promote the use and dissemination of the "Climate Box" educational materials in schools and society.

The integration of the module within the education system will contribute to the achievement of Sustainable Development Goal (SDG) 13, "Climate Action," specifically target 13.3: "Improve education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning." The introduction of the module will also support the achievement of SDG 4 on quality education and target 4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development..." as well as target 4.c: "By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training".

About the module
Objectives of the training module

- Raising teachers' awareness for the effective implementation of climate education in primary, secondary and high schools.
- Providing methodological support to teachers for the practical application of the "Climate Box" toolkit to integrate the topic of climate change and its consequences into school curricula, extracurricular activities, and additional education.
- Supporting the development of innovative pedagogical approaches to integrating climate change issues into school education and raising awareness of the problem.

Scope of Application of the training module materials

- Training sessions within the existing professional development system for teachers of primary, secondary, and high schools.
- Training and seminars in education and awareness-raising on climate change and sustainable development.
- Preparing and delivering lessons, extracurricular activities, and additional education sessions on climate change using the "Climate Box" toolkit in educational institutions.
- Self-study on the topic of climate change.

Target audience

The primary target audience includes teachers, educators, methodologists, as well as school administrators who play a key role in integrating climate education into school curricula.

The module can also be useful for representatives of:

- Government bodies: Ministries of education and local educational authorities, which can implement new educational programs and regulate curriculum content.
- Organizations of additional education, which play a key role in extracurricular education.
- Youth organizations working on issues related to environmental protection, climate change, energy efficiency, renewable energy, sustainable development, and related topics. Such organizations typically possess technical expertise, experience, and readiness to raise public awareness and build capacity to address these challenges. They can also play an important role in mobilizing public participation and engaging youth in tackling climate change issues.
- A broad range of individuals interested in the topic of climate change, including parents, students, activists, environmentally conscious citizens, and anyone seeking to understand and address the problem of climate change.

Structure of the training module

The training module "Introduction to the Climate Change Issues and the Practical Application of the "Climate Box" Interactive Learning Toolkit in Educational Organizations" consists of two modules.

The recommended number of learning hours for the full course is 16.

Table 1. *Structure of the Training Module*

№	Sections	Topics
Module 1: Basic Course on Climate Change		
1.1	The importance of climate education of the youth and presentation of the UNDP Climate Box climate education and awareness program for schools.	
1.2	**Climate change:** causes, impacts, adaptation, and mitigation	**1.2.1.** The problem of climate change **1.2.2.** How climate change affects the natural world and human beings. Can we adapt to the inevitable consequences of climate change? **1.2.3.** How to prevent dangerous climate change
1.3	**National content of the "Climate Box."** Examples of approaches to addressing climate change, adaptation methods, and successful cases of reducing the carbon footprint from the national version of the "Climate Box."	

№	Sections	Topics
Module 2. Resources and Approaches to Climate Education		
2.1	**Practical use of the "Climate Box" toolkit** for raising students' awareness of climate change issues, shaping behavioral attitudes, and fostering responsible attitudes toward a safe future influenced by climate change factors.	**2.1.1**. Incorporating climate change topics into subject-specific educational programs. **2.1.2.** Integrating climate change topics into extracurricular activities. **2.1.3.** Development and implementation of climate change projects.
2.2	**Best practices** for organizing student education on climate change using the "Climate Box" educational toolkit.	**2.2.1.** Examples of thematic and interdisciplinary lessons on studying climate change using the «Climate Box» toolkit. **2.2.2.** Examples of extracurricular activities on the topic of climate change.
2.3	**Monitoring and evaluation** of the effectiveness of climate education, raising awareness, and developing competencies on climate change issues	**2.3.1.** Monitoring and evaluation system for the effectiveness of climate education and the use of the "Climate Box" toolkit. **2.3.2.** Evaluation and assessment materials for assessing students' knowledge on climate change issues.
2.4	**Organizing network and collaboration** to create an effective climate education system.	

When developing a teacher training program, it is recommended to integrate topics from both the first and second parts. This approach ensures a comprehensive understanding of the material and promotes the practical application of knowledge in school settings. For example, after studying section 1.2.1. 'The problem of climate change', it is recommended to organize a discussion on how these topics can be incorporated into the educational programs of various school subjects, such as natural sciences, geography, and social studies.

During the training, it is important to hold discussions that will help teachers develop creative and effective methods for integrating climate change topics into their teaching practice. It is recommended to use group exercises, brainstorming sessions, and collaborative lesson plan development to connect theoretical knowledge with its practical application. This not only strengthens teachers' knowledge but also fosters the development of critical thinking, problem-solving skills, and action-oriented approaches, making the learning process more dynamic and meaningful.

Recommendations for integration of the module into training programs

To ensure broader teacher engagement and a deeper understanding of the topic of “climate change” for its integration into formal and informal education, it is proposed to integrate this module into the existing professional development courses (PDC) for primary and secondary school teachers. PDCs are mandatory for all educational professionals in Eastern European and Central Asian countries and are conducted by both state and private organizations licensed to provide additional professional education.

Teacher retraining programs are regularly adjusted to reflect new developments in the educational system and can be supplemented with the materials from this module. To support the use of the module’s materials and their inclusion in PDC programs, recommendation letters can be sent from local educational authorities. Recently, distance learning programs for professional development have become increasingly popular, offered on organizational websites for self-study or conducted in online and offline modes. The training module allows for this option: the main presentation materials are accompanied by text descriptions, which makes it possible to record video lectures, and the tests included in the module can be conducted remotely to assess the learning outcomes.

Youth organizations involved in environmental protection, climate change, and sustainable development can also provide assistance and support in promoting the module’s materials and organizing awareness-raising activities within teaching communities. By using the module’s materials, they can give lectures in educational institutions, organize thematic meetings with teachers, and hold competitions and contests.

PART 1.
Basic Course on Climate Change

The first part of the module focuses on raising the awareness of teachers and methodologists on climate change issues, its consequences, and possible measures for mitigating climate impacts and adaptation.

1.1. On the importance of climate education for youth and an overview of the UNDP educational program on climate change for schoolchildren, “Climate Box”

The materials include an overview of the UNDP educational program for schools on climate change, known as the “Climate Box.” The structure and content of the “Climate Box” educational toolkit are presented, along with key recommendations for its use, as well as the principles of a comprehensive approach to developing climate education.

1.2. Climate change: causes, impacts, adaptation, and mitigation

This section clearly presents the scientific basics of the climate change problem, provides examples of the impact of climate change on nature and humans, and showcases approaches and successful examples of combating climate change from different countries. The material will help deepen the understanding of this issue, its causes and consequences, as well as what can be done at the country, city, school, family, and individual levels to reduce climate impact and adapt to the inevitable consequences. The section consists of three topics corresponding to the parts of the “Climate Box” toolkit.

Topic 1.2.1. The problem of climate change

The content of the first part of the “Climate Box“, dedicated to the scientific basics of the climate change problem, is presented. It covers the differences between climate and weather, provides descriptions of climate types and climate zones, explains the causes of past climate changes and modern trends, and discusses the concepts of the ‘greenhouse effect’ and ‘greenhouse gases,’ as well as their leading role in current climate changes.

Topic 1.2.2. How climate change affects the natural world and human beings. Can we adapt to the inevitable consequences of climate change?

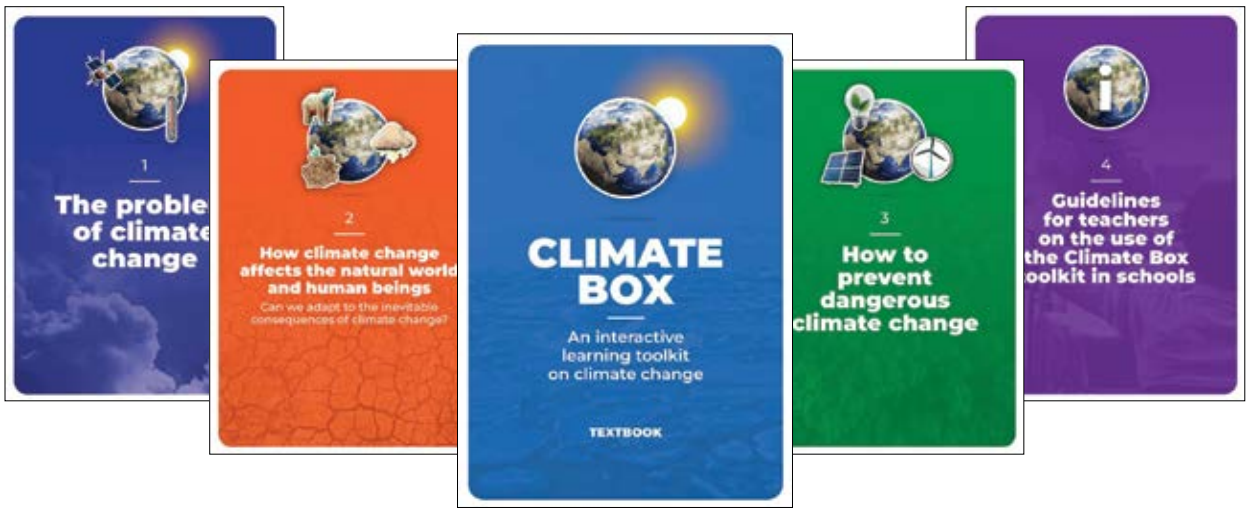
The topic presents the content and in-depth explanation of the second part of the “Climate Box.” It examines the impact of climate change on nature, humans, and economic activities, with examples from various regions of the world, and suggests possible ways to adapt to the inevitable consequences of climate change. The topic includes various aspects of the effects of climate change on weather, plants and animals, forests, water resources, agriculture, coastal regions, mountainous regions, Arctic regions, cities, and social issues.

Topic 1.2.3. How to prevent dangerous climate change

This topic, in accordance with the third part of the “Climate Box” textbook, offers solutions aimed at mitigating climate change, reducing global greenhouse gas emissions, and lowering the carbon footprint. The module materials thoroughly explore the impact of using fossil fuel energy sources on climate change and the possibilities of mitigating it through transitioning to low-carbon ‘green’ energy sources and types of transport, improving energy efficiency and conservation, green construction, as well as projects focused on forest restoration and protection. The topic also explains what a ‘carbon footprint’ is, which human activities and production processes affect its size, and suggests ways to reduce the ‘carbon footprint’ at household, regional, and global levels.

1.3. National content of the “Climate Box”

The national content is presented, highlighting the manifestations of climate change in the country and approaches to addressing the climate change problem at the national level, including adaptation measures and effective solutions for reducing the carbon footprint, relevant to local conditions and included in the national version of the “Climate Box.”



PART 2.
Resources and Approaches to Climate Education

The second part of the module provides recommendations for the practical use of the "Climate Box" toolkit to raise students' awareness of climate change issues, shape behavioral attitudes, and foster responsible actions related to climate change factors. It aims to help teachers understand how to use the "Climate Box" educational toolkit and integrate climate change topics into school curricula. The section offers advice on incorporating climate change topics into **subject lessons**, as well as in **extracurricular** and **out-of-school activities**. The appendices to the guide include examples of lesson plans for various subjects, event scenarios, and project work samples that will help organize climate change education and integrate this important topic into school programs.

2.1. Practical Use of the "Climate Box" Toolkit

Topic 2.1.1 Incorporating Climate Change Topics into Subject-Specific Educational Programs

This topic presents recommendations for organizing climate education in schools using the "Climate Box" toolkit, with a particular focus on incorporating climate change topics into subject-specific lessons. The fourth section of the "Climate Box" guide adapts the topics from the first three parts to the educational programs of primary and secondary schools. This approach allows teachers to plan the inclusion of the guide's materials into the curricula of various school subjects.

After presenting the general approaches, it is recommended to divide participants into small groups and assign them the task of developing ways to integrate the proposed topics into their teaching practice, as well as creating detailed lesson plans.

The integration of climate change topics into natural sciences and social studies curricula is of critical importance for raising awareness, fostering a holistic understanding of the issue, and inspiring young people to take action toward building a more sustainable future.

This approach enables students not only to acquire knowledge about the impact of climate change on natural ecosystems but also to see how scientific principles studied across various subjects can be applied to analyze and solve climate-related problems. It promotes the development of a comprehensive perspective on the issue and enhances critical thinking skills essential for identifying solutions at both global and local levels.

Here are just a few examples of how to integrate climate change into various subjects:

Physics: Students can study the basic principles of heat exchange and heat transfer, which are directly related to climate change. They can explore how changes in greenhouse gas concentrations affect the Earth's thermal balance and lead to global warming. Additionally, they can investigate possible technologies and innovations that could help reduce greenhouse gas emissions and mitigate climate change.

Biology: Students can research the impact of climate change on biodiversity and ecosystems. They can study how changes in temperature and weather conditions affect species distribution, which may lead to the extinction of certain species or alter their migration patterns. They can also explore the concept of an ecosystem-based approach to adaptation, examining how the conservation and restoration of natural ecosystems, such as forests, wetlands, and coral reefs, can help mitigate the effects of climate change and enhance the resilience of both natural and human systems.

Chemistry: Students can study the role of chemical processes in climate change, such as the formation of greenhouse gases. They can investigate various methods of analyzing and monitoring greenhouse gas emissions, as well as ways to reduce these emissions through the development of new materials or technologies.

Geography: Students can explore various aspects of climate change, including the geographical distribution of climate zones, changes in glacier geography, and global sea-level rise. They can also study the impact of climate change on regional ecosystems and human activities, such as agriculture, urban planning, and population migration.

Social Studies: Students can examine the impact of climate change on societal processes and social inequalities. They can explore how climate change affects the economy, healthcare, education, and security, especially in vulnerable regions of the world. They can also investigate the effects of climate change on migration, studying how extreme weather events, droughts, and rising sea levels force people to relocate. Additionally, they can consider the social and political aspects of international cooperation on climate change issues, as well

as the role of government and non-governmental actors in taking action to mitigate the effects of climate change.

Integrating the issue of climate change into the curricula of these subjects helps students develop an interdisciplinary understanding of the problem, form a comprehensive view of its solutions, and foster critical thinking and innovation in addressing climate change challenges.

Topic 2.1.2. Integrating climate change topics into extracurricular activities

Extracurricular activities in school provide an important opportunity for additional learning, and integrating the topic of climate change into these activities helps to expand students' awareness.

There are several approaches to incorporating climate topics into extracurricular activities, which allow for diversifying the educational process and making it more engaging and informative for students. Various approaches and examples of activities are presented in the **"Guide to Using the Climate Box in Extracurricular Activities."**

One way to integrate the topic of climate change into extracurricular activities is through organizing environmental initiatives. Students can participate in cleanup events to improve the school grounds, plant trees, or create eco-friendly gardens.

School clubs and eco-clubs can play a key role in this process, providing platforms for the practical study and discussion of climate issues. For example, an ecology club could organize discussions and presentations on the impact of human activity on the climate, while a science club could analyze data on climate change.

Organizing thematic competitions and events, such as photo exhibitions on environmental topics or video contests about nature conservation, draws students' attention to climate change issues and motivates them to actively participate in finding solutions.

Inviting scientists and climate change experts to conduct lectures, workshops, or discussions is also an effective way to engage students with the topic. The involvement of specialists helps students understand the scientific aspects of the problem and inspires them to seek innovative solutions.

Extracurricular activities are an effective tool for the practical application of the knowledge and skills that students acquire during the educational process. Integrating the topic of climate change into such activities fosters a sense of responsibility toward the environment and helps develop students into active participants in the process of preserving nature for future generations.

Topic 2.1.3. Development and implementation of climate change projects

The development and implementation of climate change projects are an effective way to engage schoolchildren and youth in practical activities, fostering their creative thinking potential, planning skills, and ability to take social actions aimed at addressing climate change. Proper planning of such projects is a key prerequisite for successful collaboration between teachers and students.

The methodological guidelines highlight and describe in detail the stages of project planning:

- Fostering clear motivation among participants to address climate change issues;
- Identifying the focus of project efforts: how each student's proposed solutions for reducing the impact on the planet's climate and adapting to climate change can be applied in practice, either individually or within the family, class, school, neighborhood, or any other community unit;
- Defining the 'product' of the project;
- Understanding the differences between a climate change project and research work;
- Choosing the project format (network-based or individual).

A sample list of relevant and accessible topics for schoolchildren is provided, along with the selection of methodology, requirements for project execution, formatting, and presentation at competitions.

Additionally, detailed recommendations are provided for organizing, preparing, and conducting project competitions on climate change for schoolchildren and youth at various levels (school, city, regional, national). These include the structure, competition documentation, the work of the organizing committee, criteria for evaluating projects, methods of project defense, and examples of expert evaluation sheets.

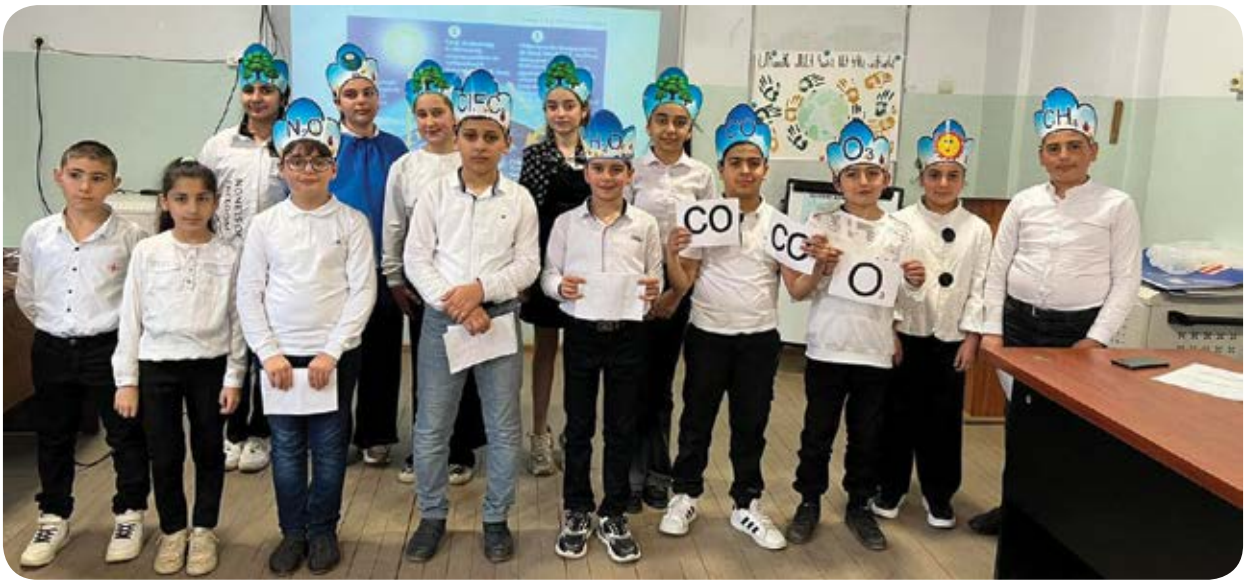
2.2. Best practices for organizing student education on climate change using the “Climate Box” educational toolkit

Topic 2.2.1. Examples of thematic and interdisciplinary lessons on studying climate change using the “Climate Box” toolkit

This topic offers examples of thematic and interdisciplinary lessons aimed at integrating climate change topics into various school subjects. These examples will help teachers include this topic in the curricula of natural sciences, social studies, and other disciplines.

Topic 2.2.2. Examples of extracurricular activities on the topic of climate change

This topic presents examples of game-based learning and extracurricular activities focused on climate change topics. These examples will help teachers incorporate climate change topics into additional education programs to enhance students’ knowledge and develop their competencies.



2.3. Monitoring and evaluation of the effectiveness of climate education, raising awareness, and developing competencies on climate change issues

Topic 2.3.1 Monitoring and evaluation system for the effectiveness of climate education and the use of the “Climate Box” toolkit

This topic provides a description and the main approaches to organizing a monitoring and evaluation system for climate education.

The monitoring and evaluation system has two main objectives:

- Regular assessment of the effectiveness of the climate education program’s implementation and the results achieved in relation to the set goals, objectives, and expected outcomes;

- Evaluation of the positive impact of students’ acquired knowledge and their projects on the climate, in terms of reducing their carbon footprint or vulnerability to climate change at the household, school, or local community level.

Topic 2.3.2. Evaluation and assessment materials for assessing students’ knowledge on climate change issues

This topic provides a toolkit for teachers (tests, questionnaires, survey sheets, and sample reporting forms for submission to a central data collection center at the national or local level).

The developed materials can be used to monitor the assimilation of the material covered, assess the formation of competencies and behavioral attitudes aimed at mitigating human impact on climate change, increasing resilience to its negative effects, and tracking the effectiveness of climate education and the use of the “Climate Box” toolkit.

The test materials are grouped according to the sections of the “Climate Box” textbook and can be used either after completing a specific section or upon completion of the entire course. Several options for test tasks are provided, including a description of the methodology for their implementation, answer keys, a scoring method, and an assessment scale corresponding to the points scored.

Energy efficiency tasks involve performing calculations, completing homework assignments with parent participation, and other forms of engagement.

When developing assessment materials at the regional level, it is recommended to include locally relevant questions alongside general climate change topics, as seen in the assignments from Armenia, Belarus, and Kazakhstan.

2.4. Organizing network and collaboration to create an effective climate education system

Education is a key element in the global response to climate change. Network and interagency collaboration helps consolidate all available resources – from ministries, government and private companies, to individuals such as experts, volunteers, and eco-leaders – to promote public awareness, especially among youth, on climate change issues.

Examples and pathways are provided for utilizing such collaboration as an effective tool for expanding climate education and awareness at all levels. Additionally, examples of activities aimed at engaging society in implementing and promoting creative and social initiatives are presented, with a focus on enhancing the capacity to reduce climate impact and adopt adaptation measures to climate change.

Training Module for Teacher Retraining “Introduction to Climate Change Issues and Practical Application of the “Climate Box” Educational Toolkit in Educational Institutions“

/ E. Malts, Y. Dobrolyubova, A. Poghosyan, D. Sorokin.
United Nations Development Programme, 2024

This training module complements the Climate Box educational toolkit on climate change, developed by the United Nations Development Programme (UNDP). The module aims to raise awareness and build the capacity of educators in climate education and awareness. It is intended for teachers, educators, methodologists, staff of supplementary education organizations, non-governmental and youth organizations, educational specialists, and other stakeholders from various countries. The module provides a comprehensive understanding of climate change, equipping educators to teach this topic effectively using the Climate Box materials in educational institutions.

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