



Co-funded by the
European Union

Project: 101056066 — CLIMADEMY — ERASMUS-EDU-2021-PEX-TEACH-ACA

Deliverable D2.1 “List of available educational material and tools on climate change”

Document ID: CLIMADEMY -WP2-D2.1 – PU –v1.1

Due date of deliverable: 31/05/2023

Actual submission date: 31/05/2023

Task leader for this deliverable: University of Bremen

Dissemination level: PU

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Document status		
Revision	Date	Description
V0.1	17/05/2023	1 st draft – University of Bremen
V1.0	31/05/2023	Reviewed- University of Crete
V1.1	28/08/2023	EU logo and disclaimer added
Reviewed	YES	

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Executive Summary

The purpose of deliverable D2.1, “List of available educational material and tools on climate change,” was to explore, map and collect educational material suitable for teaching staff and students on three main categories: 1) drivers of climate change; 2) impacts on environmental, biological and social systems, and linkages to other SDGs; 3) mitigation and adaptation measures. The focus of the collected educational material is on the United Nations SDGs, and it follows the IPCC approach on the “Physical Science Basis of Climate Change” (WG I; based on the latest IPCC report).

In the [Introduction](#), we describe the process of exploring, mapping, and collecting educational material on climate change, the methodology applied in this context, how the material was categorized and tagged, and the structure of the information provided to the teachers.

The section [Project Description](#) presents the entire project. It summarizes each WP’s key ideas and the interrelationship between the different WPs.

In section 3, [List of available educational material and tools on climate change](#), we have listed all educational material. It is categorized and split into different sections according to the three categories from above and to the type of resource: articles, tools, games and videos. Each material entry displays the name of the material, a short description, available language(s), corresponding category or categories and the original and CLAUDI web links.

Abbreviations and acronyms

Abbreviation / Acronym	Description
SDG	Sustainable Development Goals
WP	Work Package
CLAUDI	Climate Auditorium
QEC	Quality Evaluation Committee
IPCC	Intergovernmental Panel on Climate Change

Partner short name used in this document	Full Partner Name
EA	Ellinogermaniki Agogi Scholi Pangea Savva A
FG	Fondazione Golinelli
RDPSEC	Regional Directorate of Primary and Secondary Education of Crete
UBREMEN	University of Bremen
UH	Helsingin Yliopisto (University of Helsinki)
UNIBO	University of Bologna
UOC	University of Crete

1 Introduction

The scope of this deliverable was to explore, map and collect educational material and tools on three main categories of climate change: drivers of climate change, impacts on environmental, biological and social systems, and linkages to other SDGs; mitigation and adaptation measures.

The process of exploring, mapping and collecting material from a variety of relevant Internet sources was done methodically and is described in the following. First, we have been assessing the material for relevancy, and it was deemed relevant if it pertains to global climate change and is available in at least one of the four CLIMADEMY hub's official languages. Then, we evaluated whether the material was to be used or adapted at the secondary school level. They were further categorized based on their purpose, if they were reliable, if scientific or non-scientific sources were cited and, on the belief, or denial that global climate change is occurring. The remaining criteria focused on the three main categories mentioned above.

The collected material is listed in [Section 3](#). It is divided into four different subsections corresponding to the type of resource:

- [Articles](#) for educational articles. Many articles can already be used in the classroom, as they have been developed as teaching resources and curricula and span across different education systems.
- [Tools](#) for interactive online teaching and learning. These include climate simulators, ecological and carbon footprint calculators, and greenhouse gas emission pathways explorers.
- [Games](#), both, board and online. The games are very effective tools for education and engagement. All games have a strong scientific background, but the complex issues were reduced so that they can be understood and analyzed in a simple way.
- [Videos](#) and documentaries available online, ready to help educators teach students about climate change and how it impacts their everyday lives.

The English material was made available online on CLAUDI at <https://claudi.chemistry.uoc.gr>, under "Courses", "Climate Auditorium", "Resources and material" and teachers across all hubs have access to this. If the material and resource is not in English, then it is available under the national CLIMADEMY hub of the corresponding language. For example, German-language resources are made available under "Courses", "German Hub", "Ressourcen und Material".

We provide extensive information on the CLAUDI platform about each resource so that the QEC and teachers can easily find the information they are looking for. For example, the information provided for the "Games" type of resource is structured in the following way: "Description" contains a brief overview; "About" includes the information about the contents of the game, the developer, languages available, web links to resource(s); "Purpose" describes the aim of the game; "Game description" describes what the player(s) have to do during the game. Each education material has been tagged with at least one of the three categories mentioned above and specific climate change keywords.

This deliverable lays the groundwork for deliverable D2.2 "Syllabus and content draft for the educational material". If gaps are identified in the collected material listed in Section 3, the QEC will develop in D2.2 new educational material to fill in the absence of information.

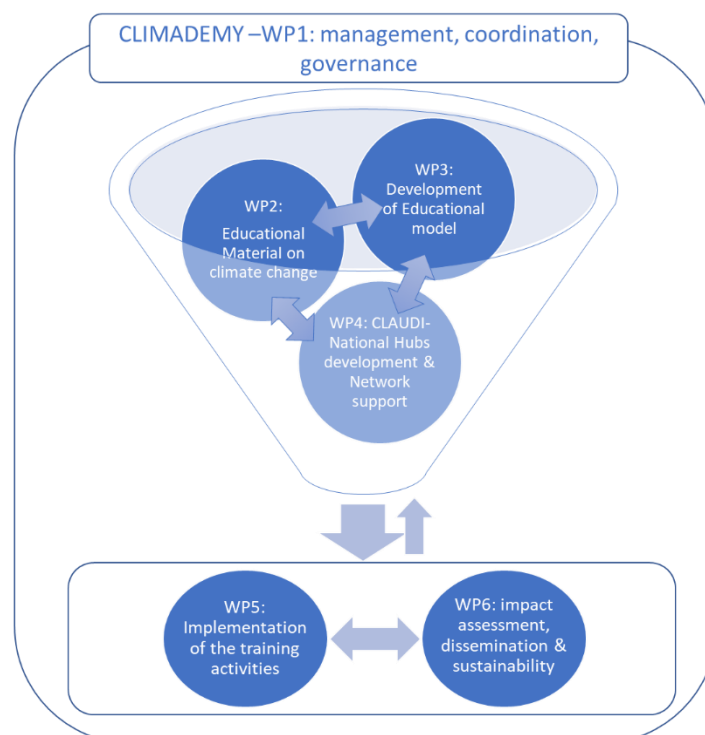
2 Project Description

This deliverable on the “List of available educational material and tools on climate change” reports on part of the work done in WP2 of CLIMADEMY project.

The Climademy project is divided into 6 work packages, listed below.

- WP1: Project management, coordination and governance
- WP2: Educational materials on climate change
- WP3: Development of educational model for teacher training
- WP4: Establishment of a common virtual CLAUDI and National Hubs
- WP5: Implementation of the Training Activities
- WP6: Impact assessment, dissemination and sustainability

In WP1 the project coordination and management bodies will be established, in order to ensure the general project coordination and monitoring of progress. In WP2 educational material will be collected and further developed to understand the main drivers of climate change. WP3 will focus on the development of an educational model suitable for teacher training. WP4 is concerned with the establishment of the four national hubs and the development of the virtual CLAUDI platform. The aim of WP5 is to organize the large-scale implementation of the Training Activities leading to an enhanced notion on Climate Change Education of participating teachers and eventually to their professional development. Finally, WP6 is concerned with the dissemination and sustainability of the project deliverables.



3 List of available educational material and tools on climate change

The list of educational material and tools is divided in three categories:

Category 1. Drivers of climate change

Category 2. Impact on environmental, biological and social systems and linkages to other Sustainable Development Goals

Category 3. Mitigation/Adaptation measures

They are further organized in

1. [Articles](#)
2. [Tools](#)
3. [Games](#)
4. [Videos](#)

1. Articles (A)

A1. Deutschlands Verantwortung für klimabedingte Schäden und Verluste

Info on global historical greenhouse gas emissions and an overview of the global effects of the climate crisis on Central America. Available only in German language. Category **2** and **3**. Original and CLAUDI link <https://www.ci-romero.de/produkt/factsheet-klimaverantwortung> and <https://claudi.chemistry.uoc.gr/course/view.php?id=19>, respectively.

A2. Born into the climate crisis

Quantifies the extent to which children will experience extreme weather events as a manifestation of climate change and the widening inequality between high-income and low- and middle-income countries. Available in English, French, Spanish and Arabic languages. Category **2** and **3**. Original and CLAUDI link <https://resourcecentre.savethechildren.net/pdf/born-into-the-climate-crisis.pdf> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=26>, respectively.

A3. Unsere Schule für das Klima: Klimaschutzmaßnahmen für Schüler:innen

A climate check tour, supported by questionnaires, in search of the climate hotspots in students' own school. Available only in German language. Category **1**, **2** and **3**. Original and CLAUDI link https://www.greenpeace.de/publikationen/sfe_handreichung_klimaschutzmassnahmen_210416.pdf and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=29>, respectively.

A4. Iss gut jetzt! Bildungsmaterial zu (umwelt-) bewusstem Essen

It draws the attention to the background and connections of food production. It shows the students what other ways are available and what actions they should take. Available only in German language. Category **1, 2** and **3**. <https://www.greenpeace.de/bildungsmaterial/Iss-gut-jetzt.pdf> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=28>, respectively.

A5. Climate for schools: A passage opens

The students discover the important role Arctic sea ice plays in the Earth's climate system. Available in English, French, Spanish, German and Dutch languages. Category **1**. Original and CLAUDI link
https://climate.esa.int/media/documents/ESA_CCI_Education_Resources_A_Passage_Open_s.Jul22.pdf and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=42>, respectively.

A6. Climate for schools: The carbon cycle

A set of activities to help the students learn about natural and human sources of CO₂ and seasonal changes in the carbon cycle. Available in English, French, Spanish, German and Dutch languages. Category **1** and **3**. Original and CLAUDI link
https://climate.esa.int/media/documents/ESA_CCI_Education_Resources_Carbon_Cycle_Jul_22.pdf and
<https://claudi.chemistry.uoc.gr/mod/page/view.php?id=50>, respectively.

A7. Climate for schools: Taking the pulse of the planet

Students learn about various types of electromagnetic radiation, how they are used in Earth observation and to show that our planet is changing. Available in English, French, Spanish, German and Dutch languages. Category **1** and **2**. This version is addressed to the lower secondary education. The article from below with the same title is addressed to upper secondary education. Original and CLAUDI link
https://climate.esa.int/documents/632/ESA_CCI_Education_Resources_Taking_The_Pulse_Of_The_Planet_LS_Jul22.pdf and <https://claudi.chemistry.uoc.gr/course/view.php?id=39>, respectively.

A8. Climate for schools: Taking the pulse of the planet

Students learn how data from Earth observation satellites is collected and used to monitor both natural cycles and abnormal trends linked to climate change. Available in English, French, Spanish, German and Dutch languages. Category **1** and **2**. This version is addressed to the upper secondary education. The article from above with the same title is addressed to lower secondary education. Original and CLAUDI link
https://climate.esa.int/documents/1287/D3.3_KE_cci_ERM_ERP-US04-EarthPulse_v2.1.pdf and <https://claudi.chemistry.uoc.gr/course/view.php?id=44>, respectively.

A9. Climate for schools: Urban hotspots

Students learn about the "urban heat island" effect: how this effect is monitored and the attempts to reduce it. Available in English, French, Spanish, German and Dutch languages. Category **1**. Original and CLAUDI link
https://climate.esa.int/media/documents/ESA_CCI_Education_Resources_Urban_Hotspots.pdf and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=84>, respectively.

A10. Climate for schools (upper secondary education): Biodiversity and habitat loss

Students learn about the relationships between climate change and ecosystems. Available in English, French, Spanish, German and Dutch languages. Category **2** and **3**. Original and CLAUDI link

https://climate.esa.int/media/documents/ESA_CCI_Education_Resources_Biodiversity_And_Habitat_Loss.pdf and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=92>, respectively.

A11. Climate for schools: Planetary heat pumps

Students learn how the oceans influence climate through their role in planetary heat regulation. Available in English, French, Spanish, German and Dutch languages. Category **2** and **3**. Original and CLAUDI link

https://climate.esa.int/documents/1289/ESA_CCI_Education_Resources_Planetary_Heat_Pumps.pdf and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=32>, respectively.

A12. Wodurch wird das Klima beeinflusst? (Grundlagen Klimawandel)

Focuses on the fundamental effects of the additional greenhouse effect caused by humans on the climate system and its subsystems such as the atmosphere, oceans and biosphere.

Available only in German language. Category **1**. Original and CLAUDI link

<https://www.umwelt-im-unterricht.de/wochenthemen/wodurch-wird-das-klima-beeinflusst-grundlagen-klimawandel> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=91>, respectively.

A13. Projektideen: Klimawandel und Maßnahmen zum Klimaschutz

Four different project ideas address the differences between weather and climate, the consequences of extreme weather events, the effects of climate change on the oceans, but also the possibilities of individual climate protection. Available only in German language.

Category **2**. Original and CLAUDI link <https://www.umwelt-im-unterricht.de/unterrichtsvorschlaege/projektideen-klimawandel-und-massnahmen-zum-klimaschutz> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=91>, respectively.

A14. Klimaveränderungen und extreme Wetterereignisse

Focuses on the risks of ongoing climate change and what can be done to adapt to the extreme weather events such as storms, extreme heat or heavy rainfall. Available only in German language. Category **2** and **3**. Original and CLAUDI link

<https://www.umwelt-im-unterricht.de/hintergrund/klimaveraenderungen-und-extreme-wetterereignisse> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=91>, respectively.

A15. Umwelteinflüsse auf die Gesundheit

How the environmental pollution is influencing the health and life expectancy of people in Germany. Available only in German language. Category **2** and **3**. Original and CLAUDI link

<https://www.umwelt-im-unterricht.de/hintergrund/umwelteinfluesse-auf-die-gesundheit> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=91>, respectively.

A16. Climate Change and Physics

Part of the Teacher's Climate Guide series of articles available at teachers-climate-guide.fi explaining the climate change in the context of each school subject. Available in English, Swedish and Finnish languages. This article is focused on the **physics** subject. Category **1**.

Original and CLAUDI link <https://teachers-climate-guide.fi/physics/> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=90>, respectively.

A17. Next Generation Climate for Grades 6-8

It is a six lesson lower secondary school climate change curriculum which teaches the students about the cause of the global temperature change, the major repercussions of climate change and helps them understand how to monitor and minimize those repercussions. Available only in English language. Category **2** and **3**. Original link is available at <https://climategen.org/resources/36169/next-generation-climate-for-grades-6-8>.

A18. Toivoa ja toimintaa

Toivoa ja toimintaa -materials address sustainable development, the emotions associated with it and how schools can act and contribute to sustainable development. The materials are aimed at teachers of different subjects in secondary schools and secondary education, but will also be useful for other educators. Category **1,2** and **3**. Available in Finnish. <https://toivoajatoimintaa.fi/>

A19. Ilmastonmuutos minussa - Climate Change in Me

The Climate Change in Me teaching material offers creative writing exercises for addressing environmental emotions, sustainable future, and environmental activism with young people. The teaching material is suitable for teachers of various subjects working in lower and upper secondary education, teachers of literary art and creative writing, as well as environmental educators, and it also provides tools for the work of other educators. The use of the teaching material is free for educational purposes. Category **2** and **3**. Available in Finnish and English. <https://www.climatechangeinme.fi/>

A20. Ilmasto-opas.fi

A website maintained by several authorities, including the Finnish Meteorological Institute, the Finnish Environment Institute and the Ministry of the Environment, on the mechanisms, causes and consequences of climate change in Finland and elsewhere in the world. Category **1,2** and **3**. Available in Finnish, English and Swedish. <https://www.ilmasto-opas.fi/etusivu>

A21. Koulun korjausopas

A website to build a carbon neutral school through activities (badges), tools (simulators) and a handbook. Themes include food, infrastructure, transport and attitude. Suitable for students, teachers and the whole school community. Category **1,2** and **3**. Available in Finnish and English. <https://koulunkorjausopas.fi/>

A22. Stories about climate impact and local solutions

Here you can find some stories, mainly local Italian stories, concerning impacts of climate change on human activities and biodiversity. You can also find some stories of human adaptation to environmental change. Category **2** and **3**. https://www.radarmagazine.net/page/4/?s=clima&el_dbe_page

A23. Climate scenarios and impacts and risks.

Here you can find a detailed report by CMCC about climate scenarios in Italy and potential risks for human society. Category **2** and **3**. <https://www.cmcc.it/it/analisi-del-rischio-i-cambiamenti-climatici-in-italia>

2. Tools (T)

T1. Das Treibhausgas CO₂ im Laufe der Zeit

The tool shows how the atmospheric CO₂ concentration changed in the last 450 million years and provides an insight into carbon cycle processes. Available only in German language. Category 1. Original and CLAUDI link at https://www.iup.uni-bremen.de/carbon_ghg/Clim4Edu/interaktiv/CO2_im_Laufe_der_Zeit.html and <https://claudi.chemistry.uoc.gr/course/view.php?id=43>, respectively.

T2. Wie messen Satelliten CO₂?

An interactive browser-based graphic allows the students to intuitively figure out how to determine the atmospheric CO₂ concentration from the satellite observations. Available only in German language. Category 1. Original article available at https://www.iup.uni-bremen.de/carbon_ghg/Clim4Edu/interaktiv/Wie_messen_Satelliten_CO2.html.

T3. My climate future: how will I experience climate change?

The students will find out how many more climate extremes will face across his/her lifetime relative to a world without climate change. Available only in English language. Category 2. Original and CLAUDI link at <https://myclimatefuture.info> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=59>, respectively.

T4. C-ROADS

Online policy simulator to test and visualize the long-term impacts of climate strategies across distinct regional groups. Available in English, German, Norwegian, French, Spanish, Japanese, Korean, and Turkish languages. Category 2 and 3. Original and CLAUDI link at <https://c-roads.climateinteractive.org> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=93>, respectively.

T5. CAT (Climate Action Tracker)

The tool tracks government climate actions and measures them against the Paris Agreement aim of holding warming below 2°C and pursuing efforts to limit warming to 1.5°C. Available only in English language. Category 2 and 3. Original and CLAUDI link at <https://climateactiontracker.org/countries/eu/> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=38>, respectively.

T6. Climate Impact Explorer

The Climate Impact Explorer tool shows how the climate change impacts will increase over time for a selected country or province at different warming levels. Available only in English language. Category 2 and 3. Original and CLAUDI link at <https://climate-impact-explorer.climateanalytics.org/> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=101>, respectively.

T7. 1.5°C national pathway explorer

With the help of the "1.5°C national pathway explorer", the students can explore the 1.5°C national pathways for countries and sector-specific decarbonization benchmarks derived from global IPCC pathways compatible with the Paris Agreement. Available only in English language. Category 2. Original and CLAUDI link at <http://1p5ndc->

pathways.climateanalytics.org/#all-countries and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=103>, respectively.

T8. Transport Emissions Disaggregation

Shows the impact of different factors on total greenhouse gas emissions from passenger transport and mobility levels. Available only in English language. Category 1. Original link at <https://tools.climateanalytics.org/teedit>.

T9. Adaptation map

The map provides an overview of adaptation actions (i.e., policies, strategies, programs and projects) in 11 countries in West Africa and the Member States of the Caribbean Community since 2010. Available only in English language. Category 3. Original link at <https://adaptationmap.climateanalytics.org/index.html>.

T10. Local Sea-Level Projections

The tool allows to browse via tables and figures the local sea-level projections relative to year 2000 for three warming scenarios leading to different increases in global mean temperature above pre-industrial levels. Available only in English language. Category 2. Original and CLAUDI link at <https://localslr.climateanalytics.org> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=58>, respectively.

T11. Temperature trend calculator

The tool calculates temperature trends with uncertainties, following the method in the methods section of Foster and Rahmstorf (2011). Available only in English language. Category 2. Original and CLAUDI link at

https://skepticalscience.com/temperature_trend_calculator.html and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=99>, respectively.

T12. „Schools for Earth“ CO2-Schulrechner

A climate footprint calculator for schools. The students can use it to create a climate balance sheet for their school. Available only in German language. Category 1. Original and CLAUDI link at <https://co2-schulrechner.greenpeace.de> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=100>, respectively.

T13. My Footprint: Climate & Nature

The student has to answer four different set of questions on “food”, “travel”, “stuff” and “home”. Based on the answers the tool calculated the student’s size of the carbon footprint. Available in English and German languages. Category 2. Original and CLAUDI link at <https://footprint.wwf.org.uk> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=104>, respectively.

T14. Climate Bathtub Simulation

An interactive simulation tool that teaches several principles regarding the dynamics of the global carbon cycle and climate change. Available only in English language. Category 1 and 2. Original link at <https://www.climateinteractive.org/ourwork/climate-bathtub-simulation>.

T15. Our planet, our future

This is an interactive web tool to learn about the science of climate change, what is happening across the EU and how we can all do our bit to fight climate change. Available in all European Union languages. Category **1, 2** and **3**. Original and CLAUDI link at <https://ec.europa.eu/clima/sites/youth> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=98>, respectively.

T16. IPCC Interactive Atlas

A tool that enables spatial and temporal climate analyses. Based on the IPCC's Sixth Assessment Report. Available in English. Category **1** and **2**. <https://interactive-atlas.ipcc.ch/>

T17. En-ROADS simulator

A systemic tool to simulate the impact of different climate actions on the future development of the planet. Intended for use by policy makers and educational institutions, for example. The simulator is particularly suitable for use in a workshop or role-playing game. Available in several languages including English, German and Italian. Category **1, 2** and **3**. <https://www.climateinteractive.org/en-roads/>

T18. Guide and Educational Materials on Climate Change Adaptation

Educational material from the LIFE-IP adaptivegreece project on various aspects of climate change. It provides activities for the understanding of the fundamental terms of climate change and an overview of its consequences. Available in Greek. Category **3**. <https://www.adaptivegreece.gr/el-gr/%CE%B2%CE%B9%CE%B2%CE%BB%CE%B9%CE%BF%CE%B8%CE%B7%CE%BA%CE%B7/%CE%B5%CE%BA%CF%80%CE%B1%CE%B9%CE%B4%CE%B5%CF%85%CF%84%CE%B9%CE%BA%CE%BF-%CF%85%CE%BB%CE%B9%CE%BA%CE%BF/%CE%BB%CE%B5%CF%80%CF%84%CE%BF%CE%BC%CE%B5%CF%81%CE%B5%CE%B9%CE%B5%CF%82/artmid/807/articleid/28>

T19. Walk the global walk

This is a two-part module that thoroughly explores social and economic impacts of climate through a variety of activities and integrated teaching modules. The first part concerns the creation of sustainable states and societies, while the second part addresses the problems posed by climate change. Available in many different languages, including English, Greek and Italian. Category **3**. <https://walktheglobalwalk.eu/el/teacher-space/resources-training-material/category/4-exploring-the-17-sdg-s-and-the-sdg-11>

T20. The power of the sun

A single experiment on solar energy production by Click for Schools project. In this experiment, students build a circuit in which a light bulb is switched on by a solar panel. Students observe not only the light bulb lighting up but also the voltage of the current produced by the circuit. Available in Greek. Category **3**. https://www.clickforschools.eu/wp-content/uploads/2020/04/Experiment_about_creation_of_electricity_with_a_solar_panel_gr.pdf

T21. My ecological house

From Click for Schools, it constitutes individual activity on the characteristics of an ecological house and the construction of a model of a house with these characteristics. It is a group

activity in which each group works on a different feature of the ecological house. Available in Greek. Category 3. https://www.clickforschools.eu/wp-content/uploads/2020/04/Design_of_an_ecological_house_model_adapted_to_regional_constraints_and_available_local_resources_gr.pdf

T22. Colourless, odourless but present... I am CO₂

From Click for Schools, a combination of two experiments on the creation of CO₂ and its effects on global temperature. The first experiment involves the production of CO₂ through a chemical reaction and its subsequent detection through a calcium hydroxide trap. The second experiment combines the previous CO₂ synthesis with an experimental setup designed to link increasing concentrations of CO₂ to rising temperatures. Available in Greek. Category 1. https://www.clickforschools.eu/wp-content/uploads/2020/04/Experiment_about_CO2_impact_on_earth_temperature_gr.pdf

T23. Depicting climate reality

From Click for Schools, an individual brainstorming activity on the impacts of climate change on the students' living area. In this activity the brainstorming acts as a basis for debates between students and school presentations at the end of the activity. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Drawing-your-climate-reality-The-impact-of-climate-change-on-your-specific-area_gr.pdf

T24. In case that...

From Click for Schools, a one-off activity to create a mobile phone application to communicate a natural disaster. In this activity, students create an application that informs the general public about the necessary actions to take in case of a natural disaster in their area. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Create_a_smartphone_application_to_adapt_to_a_natural_major_risk_gr.pdf

T25. Eco-green Mediterranean house

From Click for Schools, an individual activity to create a model of an ecological house. In this activity, students are asked to consider and/or familiarize themselves with the effects of climate change and the adaptation measures to be taken into account when building an ecological house. The application is not necessarily limited to the creation of a model; students are encouraged to use their imagination in other ways such as collage or sketches. Available in Greek. Category 2,3. https://www.clickforschools.eu/wp-content/uploads/2020/04/GR_Adaptation_to_global.pdf

T26. Imagine if all ice on Earth melted

From Click for Schools, a single experiment to study the influence of ice melting on sea level. In this experiment, students explore not only the melting of ice in general but also the different influence on sea level of land ice melting compared to sea icebergs. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Experiment_about_ice_melting_impact_on_the_sea_level_gr.pdf

T27. Electricity: How could our needs meet with responsible uses

From Click for Schools, a unit in which students discuss the climate impact of burning fossil fuels. The module is based on the use of videos and class discussion on the link between the

use of fossil fuels and the overproduction of CO₂ in the atmosphere. A link is made between CO₂ and the greenhouse effect and the module concludes with the implementation of a collective action by students for the general public to raise awareness of the latter on the issue of climate change. Available in Greek. Category 1. https://www.clickforschools.eu/wp-content/uploads/2020/04/GR_Electrical_energy_and_climate_change.pdf

T28. The ocean swells...

From Click for Schools, an experiment on sea level rise due to ocean warming. In this experiment, students explore the relationship between temperature and water levels and how rising water levels due to climate change can lead to rising water levels. The experiment is performed by groups of students so that the groups can compare their results with each other. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Experiment_about_temperature_impact_on_sea_level_gr.pdf

T29. Forest & Climate Change: a burning issue!

From Click for Schools, is a module aimed at exploring how climate change affects the incidence of fires. The module is based on the use of brainstorming, construction of concept maps, watching videos and interactive play. The module familiarizes students with the ways in which climate change affects the rate of fire occurrence and motivates them to take an active role in informing the general public about this issue. The module concludes with students organizing a collective action on the issues discussed in class that is relevant to the general public in their community. Available in Greek. Category 2. <https://www.clickforschools.eu/wp-content/uploads/2020/05/GR-Forest-fires-Climate-Change-a-burning-issue-Project.pdf>

T30. Illustrating climate reality-The impact of climate change on your region

From Click for Schools, an individual activity in which students will attempt to identify the impacts of climate change in their area. The activity is based on a brainstorming by the students followed by a debate. Students work in groups to brainstorm and then each group discusses their results with the other groups. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Drawing-your-climate-reality-The-impact-of-climate-change-on-your-specific-area_gr.pdf

T31. Looking for the effects of climate change in our immediate environment

From Click for Schools, an individual activity in which students explore the possible impacts of climate change on their place of residence. The activity uses short interviews that students can take from adults in their family circle and questionnaires that students fill in themselves. The activity also includes the provision for analyzing the results of the questionnaires with simple statistical tools. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/Exploring-the-consequences-of-climate-change-in-our-environment_gr.pdf

T32. Biodiversity at risk! When Mediterranean species are threatened by climate change

From Click for Schools, an activity on the effects of climate change on biodiversity in the Mediterranean. In this activity, students participate in a game about the interactions of the natural elements of the Mediterranean and how these interactions are affected by climate change. Available in Greek. Category 2. https://www.clickforschools.eu/wp-content/uploads/2020/04/When-Mediterranean-species-are-threatened-by-climate-change_gr.pdf

T33. Sustainable mobility

From Click for Schools, an activity to raise students' awareness of the environmental impact of their modes of transport. In the activity, students map the route they take to get to school and the means of transport they use. Available in Greek. Category **3**.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Towards-a-sustainable-transport_Mobility_gr.pdf

T34. Let's listen to the trees. The skills of adaptation to climate change

From Click for Schools, an individual debate activity on climate change adaptation processes. The debate is based on the main ideas of a text provided by the teacher. Available in Greek. Category **3**.

https://www.clickforschools.eu/wp-content/uploads/2020/04/The-skills-of-adaptation-to-climate-change_gr.pdf

T35. Eco-book: Interview with an author of a book on ecology

From Click for Schools, an activity in which students prepare and conduct an interview with an ecology writer. Students read different parts of an ecology book and prepare questions based on what they have read. The results of the interview are presented to the rest of the students in the school or to the general public. Available in Greek. Category **1, 2, 3**.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Interview-with-the-author-of-an-ecological-book_gr.pdf

T36. Testing a new way of sharing an electric bike in the city

From Click for Schools, a section on sustainable means of transport and more specifically, on the use of bicycles. This module combines the use of video and the use of mobile phone applications. Students combine the app with the use of sustainable transport, such as cycling for one week and discuss their results. Available in Greek. Category **3**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Trial-of-new-city-electric-sharing.pdf>

T37. Change gear, get your head in the game-Activity to promote sustainable development

From Click for Schools, a collection of activities on the relationship between transport and climate change. These activities discuss issues such as the use of fossil fuels for transport and how this can affect the environment and society. Available in Greek. Category **3**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Promote-sustainable-Mobility.pdf>

T38. Project to change our habits in relation to littering

From Click for Schools, a module in which students are made aware of the problem of waste management and how it affects an ecosystem. The module is based on an initial brainstorming by the students on the issue and continues with a litter collection activity, followed by sorting the litter into categories. Students work in groups, so that they can compare their results. The module concludes with a public awareness campaign. Available in Greek. Category **3**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GRProject-to-change-our-habits-concerning-Littering.pdf>

T39. Eat wisely! Organizing a sustainable dinner to contemplate on the relationship between food, agriculture and climate change.

From Click for Schools, an activity in which students plan a dinner for the general public with dishes prepared with sustainable ingredients. Each dish, designed by the students, is accompanied by a presentation highlighting its sustainable characteristics/ingredients. The event concludes with an evaluation by the public through a google form, the results of which are analyzed by the students. Available in Greek. Category **3**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Organising-a-sustainable-dinner-.pdf>

T40. SPECT'ACTOR- A collection of short theatrical sketches that will modify our ecologic behavior.

From Click for Schools, an activity to discuss and communicate the consequences of climate change. In this activity, students engage in discussions about the consequences of climate change through interactive drama games. The activity concludes with a presentation of the interactive play to the general public. Available in Greek. Category **2**.

https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Interactive_theater_skeches.pdf

T41. The bee school - Helping bees survive climate change

From Click for Schools, a module on the impacts of climate change on biodiversity. More specifically, through visits to an apiary, students are made aware of the effects of climate change on the bee population. The module concludes with students organizing a public awareness campaign on the effects of climate change on bees. Available in Greek. Category **2**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Helping-the-bees-to-survive-climate-changes.pdf>

T42. Organizing an information campaign by students for students and for the general public.

From Click for Schools, a module in which students organize and participate in communication and awareness-raising activities on climate change. In this module, students organize themselves into groups and undertake activities such as writing articles, creating blogs and creating slogans. These actions also make use of various social media. Available in Greek. Category **2**.

<https://www.clickforschools.eu/wp-content/uploads/2020/04/GR-Creating-a-communication-students.pdf>

T43. Waterrap- writing lyrics for a rap song for problems concerning water

From Click for Schools, a module on the protection of freshwater as a vulnerable resource. The activity involves the construction of "knowledge folders" in which students deposit all the knowledge they gather about water. Also, before writing and presenting the rap song, students (using video) do a historical review of rap music in general. The final song is presented to the rest of the school. Available in Greek. Category **2, 3**.

https://www.clickforschools.eu/wp-content/uploads/2020/04/GR_Writing_lyrics_for_a_rap_song_about_water_problems.pdf

T44. Marine life at risk-Experiment on the impact of ocean acidification on marine life.

From Click for Schools, an experiment on the influence of low marine pH on shellfish shells. The experiment is divided into two parts, in the first the students observe how the

dissolution of CO₂ causes a decrease in the pH of the water and in the second they observe the effect of an acidic solution (vinegar) on a shell. Available in Greek. Category 2.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Experiment_about_the_sea_acidification_impact_on_the_marine_life_gr.pdf

T45. Let's change our habits-Activity to introduce the concept of Climate Change

From Click for Schools, an activity on the effects of climate change and the possible actions students can take to address them. The activity is based on brainstorming, use of videos and expression of ideas on padlet platforms. The activity concludes with students working collectively on writing articles, blog creation, etc. Available in Greek. Category 2.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Activity-to-introduce-Climate-Change-to-students_gr.pdf

T46. Don't play with rivers-Climate change and flash floods

From Click for Schools, an activity on the link between climate change and extreme weather events such as floods. The activity is based on the use of videos and the construction of concept maps by the students. Students work in groups to enable them to compare and discuss their findings. Available in Greek. Category 2.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Climate-change-and-flash-floods_gr-1.pdf

T47. Climate change reporter-Observing and informing about the possibility of reducing CO₂

From Click for Schools, an activity in which students take on the role of reporters, investigating aspects of local lifestyles that may have a negative impact on the climate. Students are divided into groups, so that they can compare their findings. Also, along with the local lifestyle, students will also study the functioning of their school to observe similar issues but on a smaller scale. Available in Greek. Category 3.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Climate-change-reporter-Observing-and-reporting-on-possible-CO2-emissions-reduction_gr.pdf

T48. Wake up! Acting as eco-citizens in the community

From Click for Schools, an activity to mobilize students to act as eco-citizens to inform the general public about climate change. The activity is based on brainstorming slogans which will be put on posters created by the students themselves and aimed at raising awareness of the general public about the consequences of climate change. Available in Greek. Category 2.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Acting-as-an-eco-citizen-in-local-community_gr.pdf

T49. When water becomes threatening

From Click for Schools, an activity on how climate change affects extreme weather events, such as floods. The activity is based on students collecting information from students about past floods. Information is collected by asking relatives and people in their family's social circle. Available in Greek. Category 2.

https://www.clickforschools.eu/wp-content/uploads/2020/04/Activity-on-flood-risks-in-your-area_gr.pdf

T50. Ecological footprint of food

A simple tool to calculate the ecological footprint of the food products you buy in the supermarket, in terms of CO₂ emitted and water consumed. Available in Italian. Category 1.

<http://www.improntawwf.it/carrello/>

T51. Find maps and georeferenced data about climate (and more)

Worldmapper is a useful tool to search for georeferenced information on a global scale about a wide range of data, including data related more or less directly to climate.

<https://worldmapper.org/maps/emissions-co2-relative-2016/>

3. Games (G)

G1. Climate Adaptation Game

The **online** game provides a common ground for discussions between the students about climate change adaptation. Available in English and Swedish languages. Category **3**. Original and CLAUDI link at <https://www.smhi.se/en/climate/education/climate-adaptation-game> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=37>, respectively.

G2. The Climate Game

Purpose of the **online** game is to reach net zero greenhouse gas emissions by 2050 to keep the planet from further global warming. Available only in English language. Category **3**. Original and CLAUDI link at <https://ig.ft.com/climate-game> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=60>, respectively.

G3. Keep Cool

The **board** game promotes the understanding of connections between human behavior, political and economic strategies and the development of the climate. Available in English and German languages. Category **2 and 3**. Original and CLAUDI link at <https://www.spiele-entwickler-spieltrieb.de/spiele/neustart/keep-cool> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=61>, respectively.

G4. Keep Cool

Similar to the above, but **online**. Available in English, German, Romanian, Ukrainian and Russian languages. Category **2 and 3**. Original and CLAUDI link at <http://www.keepcoolmobile.org> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=61>, respectively.

G5. Climate Poker

The **board** game helps the students learn about the factors that influence climate change and who is suffering from it. Available in German and English languages. Category **2**. Original and CLAUDI link at www.bowosho.de and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=65>, respectively.

G6. The Great Climate Poker

The students learn from the **online** game about the factors that influence the climate:

volcanoes, Sun, El Niño-Southern Oscillation, North Atlantic Oscillation, Greenhouse gases. Available in German, English, Spanish and French languages. Category **1**. Original and CLAUDI link at <http://climatepoker.unibe.ch> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=66>, respectively.

G7. Climania: The Climate Action Game

The **board** game aims to educate people about the impact of homes and the built environment on climate change. Available only in English language. Category **3**. Original and CLAUDI link at <https://climaniathegame.com/play-climania> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=102>, respectively.

G8. Mission 1.5°

In this **online** game, the players take on the role of climate policymakers and they are educated about climate solutions. Available in all six of the United Nations official languages: Arabic, Chinese, English, French, Russian and Spanish. Category **3**. Original and CLAUDI link at <https://www.mission1point5.org> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=107>, respectively.

G9. Change Game

The **online** game deals with the complexities of climate change. With the help of the game, the students will understand better the consequences certain decisions have on the environment and society. Available in Italian and English languages. Category **2 and 3**. Original and CLAUDI link at

<https://www.changegame.org/education> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=105>, respectively.

G10. Kyoto

Players are delegates from different countries and they face rounds of negotiation at a climate conference. They have to try to hit reduction targets and provide the needed funding. Available in German and English languages. Category **2 and 3**. Original in English <https://www.amazon.de/Pegasus-Spiele-57801E-englische-Ausgabe/dp/B08HLV85JX> and in German <https://www.amazon.de/Pegasus-Spiele-57801G-deutsche-Ausgabe/dp/B08HLV8HNL>. The CLAUDI link at <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=106>.

G11. Maaailmanpelastuspeli

World Rescue is a card game that teaches resource wisdom as players consider how to ensure the planet has enough resources. The aim of the World Saver game is to inspire people to learn about maths and science and to take an interest in sustainability issues. Category **2 and 3**. Available in Finnish.

<https://www.kemianteollisuus.fi/fi/tyoelama/tulevaisuuden-osaamistarpeet/maailmanpelastuspeli/>

G12. Poikkiteollinen oppimistarina: Tulevaisuuden tutkijat - Mitä ilmastolle tapahtui

Future Scientists is a virtual learning story where students reflect on the factors that influence climate change and learn about ways to mitigate climate change. The learning story runs on both computer and phone. Category **2 and 3**. Available in Finnish.

<https://www.helsinki.fi/fi/tiedekasvatus/opettajille-ja-opetuksen-tueksi/materiaalipankki>

G13. STOP!-ilmastopeli

Plan Finland's STOP! climate **board** game is an educational game for secondary school and university student groups, where young people get involved in climate solutions. The climate game illustrates not only climate change but also the unequal distribution of wealth and empowerment in the world. Category **2** and **3**. Available in Finnish.

<https://www.gloaalikoulu.net/materiaalit/ilmastopeli/>

G14. Hyvät kortit -peli

Sitra's Hyvät kortit **board** game is for anyone who is interested in developing their ability to imagine different futures and thereby practice thinking about the future. Category **3**.

Available in Finnish. <https://www.sitra.fi/julkaisut/hyvat-kortit-peli/>

G15. Let's play!

From Click for Schools, an individual activity in which students are asked to design and play a **board** game on climate change. The game that students are asked to create is a question/answer game about various climate change issues. In addition to the rules and questions, students will design and draw the board game itself. Available in Greek. Category **1, 2, 3**. https://www.clickforschools.eu/wp-content/uploads/2020/04/Activity-to-review-Science-lessons-by-creating-a-board-game_gr.pdf

4. Videos (V)

V1. Climate change – living on the water

The movie discusses the sea level rising which threatens 700 million people who live on the world's coasts. Available only in English language. Category **3**. Original and CLAUDI link at

<https://www.youtube.com/watch?v=vy3gMVGwjuc> and
<https://claudi.chemistry.uoc.gr/mod/page/view.php?id=89>, respectively.

V2. Der Klima-Check

The film explains what climate means - how it is connected worldwide and why we have to protect it . Available only in German language. Category **1** and **2**. Original and CLAUDI link at

<https://youtu.be/4i7-h-ySBNl> and
<https://claudi.chemistry.uoc.gr/mod/page/view.php?id=88>, respectively.

V3. Klimawandel - Was wir tatsächlich tun können

The movie answers the following questions. What does the climate migration problem mean for us? How quickly and radically do we need to tackle this problem? How can each of us contribute? Available only in German language. Category **3**. Original and CLAUDI link at

<https://youtu.be/bCvUwnldqBI> and
<https://claudi.chemistry.uoc.gr/mod/page/view.php?id=86>, respectively.

V4. What NASA knows from decades of Earth system observations

The movie discusses NASA's Earth-observing satellite fleet and the record of observed evidence of climate change. Available only in English language. Category **1** and **2**. Original and CLAUDI link at https://youtu.be/Q-Zsu1_tPU and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=83>, respectively.

V5. Der Klimawandel nur ein Mythos? Die Klimawandelskeptiker der USA

The film focuses on the coal mining industry in the town of Gillette, USA and residents' views on climate change. Available only in German language. Category **1**. Original and CLAUDI link at <https://youtu.be/Bm-b0hcQQWE> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=82>, respectively.

V6. WissensWerte: Klimawandel

The video answers the following questions: what actually is climate change? How is it created? What can be done about it? Available only in German language. Category **1**, **2** and **3**. Original and CLAUDI link at <https://youtu.be/dMDQzXvEBTE> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=81>, respectively.

V7. Friendly Guide to climate change and what you can do to help

The drawing movie is a pragmatic overview of climate change - what the problem is, where it's coming from and what we can do about it. Available only in English language. Category **2** and **3**. Original and CLAUDI link at https://youtu.be/3CM_KkDuzGQ and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=80>, respectively.

V8. What is Climate Change? Explore the Causes of Climate Change

The movie explains the greenhouse effect and the role of greenhouse gases in the atmosphere. It explores the consequences of climate change on the environment and the changes that we can make to protect the Earth. Available only in English language. Category **1**, **2** and **3**. Original and CLAUDI link at <https://youtu.be/EuwMB1Dal-4> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=79>, respectively.

V9. Causes and Effects of Climate Change

Movie on what causes climate change and what are its effects. It discusses the human impact and consequences of climate change for the environment and our lives. Available only in English language. Category **1** and **2**. Original and CLAUDI link at https://youtu.be/G4H1N_yXBiA and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=78>, respectively.

V10. Good Food Bad Food - Anleitung für eine bessere Landwirtschaft

The documentary film shows people fighting against soil being poisoned by chemical fertilizers and pesticides. Available in German and French languages. Category **1**. Original and CLAUDI link at <https://www.amazon.de/Good-Food-Bad-Anleitung-Landwirtschaft/dp/B004KB4RU4> and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=77>, respectively.

V11. European Union Energy Policy

Five short videos answering the following questions: “What are the EU's energy sources?”, “What could be the energy of the future?”, “What is energy efficiency?”, “What is energy?” and “What is renewable energy?”. Available in all European Union languages. Category 1 and 3. Original and CLAUDI link at https://learning-corner.learning.europa.eu/learning-materials/eu-energy-policy_en and <https://claudi.chemistry.uoc.gr/mod/page/view.php?id=39>, respectively.

Conclusion

The deliverable D2.1 reflects the work conducted in the frame of WP2, task 2.1. The scope was to explore, map and collect educational material and tools on three key categories of climate change, namely drivers of climate change, impacts, and mitigation and adaptation measures. The collected material was filtered in terms of relevance and then divided into four categories: a) Articles, b) Tools, c) Games and d) Videos. The content that feeds WP2 (T2.1) will continue to be updated throughout CLIMADEMY. New filtered material from all four Hubs (in English, Greek, German, Italian and Finnish languages) will be added in a dynamic process.