



Start with yourself:

**environmental observation and
simple solutions for positive change**

For global teacher competition
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Climate Change Challenge to help to tackle the climate crisis ahead of
COP 29, the United Nations Climate Change Conference

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Primary source: My implementation program focuses on how I will implement the new learning scenario I have developed and how I will use it with my students in the new school year.

Keywords: climate challenge, microclimate, waste water, pollution, using air conditioner, environmental care, environmental observation, real problem, simple solutions

Grade of students: 9-10 (15-16 age)

Interdisciplinarity: biology, chemistry, physics, ecology, ICT, ethics, human rights

Teaching methods: PBL, 5E, observation, ideation and artifact

Learning results (21st century skills) :

- scientific literacy & thinking skills
- digital literacy & thinking skills
- design thinking skills
- research and critical thinking skills
- communication and collaboration skills

Teaching time: 6 weeks, 12 lesson hours & also home research

Assessment: diagnostic, peer assessment, self assessment, rubric, presentation

Aim of the learning process: students will understand that environmental problems must begin with their own observations and behaviors to prevent and resolve them. By finding simple solutions to issues of water loss in their residence or school area, they will be convinced by their activities that water can be reused and beneficially used, and that this has a positive effect on the microclimate.

Goals and Objectives:



1. **Measurable Goal:** Increase Engagement in Climate Change Discussions

Objective: students will actively participate in at least 80% of class discussions related to climate change by contributing at least one idea or question per lesson



2. **Measurable Goal:** Develop Creative Solutions for Environmental Issues

Objective: students will collaboratively create a project proposal addressing a specific climate change issue, demonstrating innovative thinking and practical solutions, by the end of the program (this new learning scenario)

3. **Measurable Goal:** Enhance Critical Thinking Skills

Objective: student will complete interactive activities designed to promote critical thinking about climate change, achieving a score of 75% or higher on associated assessments throughout the program (this new learning scenario).

Creating a supportive environment:

- ✓ Provide interactive lesson plans that incorporate hands-on activities related to climate change.
- ✓ Implement technology tools, such as online simulation programs, to enhance understanding of environmental concepts.
- ✓ Allow for flexible seating arrangements to minimize distractions and promote focus.
- ✓ Utilize graphic organizers to help students structure their thoughts during discussions and projects.
- ✓ Offer additional time for project completion, especially for collaborative work.
- ✓ Incorporate visual aids and multimedia, hands-on resources to support engagement and comprehension.
- ✓ Schedule regular check-ins with students to monitor progress and provide feedback.
- ✓ Foster a supportive classroom environment that encourages questions and creative thinking about climate solutions.



Program

Week	Lesson planing	Hours	Place
1	<ul style="list-style-type: none"> ▪ Waste of natural resources - what have we done? ▪ Threat of depletion of natural resources globally and locally ▪ Observation of water waste real situations, observation skills ▪ Monitoring process related to the condensation water of the air conditioner 	2	Area around school and home
2	<ul style="list-style-type: none"> ▪ Observation of water wastage, especially the monitoring process related to air conditioning condensation water - student research presentations ▪ Observation of water wastage, especially the monitoring process related to air conditioning condensation water - student research presentations ▪ Ideation for simple solutions for reuse of air conditioner condensation water - brainstorming, ideas. discussions 	2	Classroom And Home reasarch
3	<ul style="list-style-type: none"> • Gases emitted from transport • Researching plants that can absorb carbon dioxide gases • Mini garden models irrigated with condensation water from the air conditioner • Bus stop -mini garden models 	2	Classroom And Home reasarch
4	<ul style="list-style-type: none"> • Filling of condensation water of condensers, work on drip irrigation scheme • Work on a mini garden model in school and home area or nearby bus stop • 3D digital and hands-on design, basic procedures of real mini garden model • Calculation of costs, supplies • Conducting discussions with internal and external school partners • Preparation of proposals for local schools, institutions, municipalities 	2	Area around school and home
5	<ul style="list-style-type: none"> • Filling of condensation water of condensers, improvement of drip irrigation scheme • Maintenance of mini garden model in school and home area or nearby bus stop • 3D digital and practical design, real mini garden model improvement 	2	Area around school and home
6	<ul style="list-style-type: none"> • Presentation process for local community, school community, local municipality, (mini garden-bus stop model drip irrigation with air conditioner condensation water, for carbon dioxide absorption) 	2	Area around school and home



Program Overview



Driving Question or Challenge:

How can our individual actions and observations lead to innovative solutions for water conservation and positively impact our local microclimate?

Real-world Context:

This learning process connects to real-world issues of water scarcity and climate change, as students will explore the critical role of water conservation in their communities. Students will investigate how excessive water loss affects their school and home environments and understand the broader implications of these issues on local and global scales. By designing a mini garden and drip irrigation model, they will see firsthand the importance of reusing water and its benefits to the microclimate, fostering a sense of responsibility towards environmental stewardship.

In-depth Inquiry:

Students will engage in a comprehensive inquiry process by asking questions about water usage, researching local water conservation practices, and exploring the science behind microclimates and drip irrigation systems. They will delve into the effects of air conditioning condensation on water waste and how it can be repurposed. By examining various sources, including scientific articles and case studies, students will evaluate different perspectives on climate change and water management, encouraging critical thinking and informed decision-making.

Student Voice and Choice:

Students will have the opportunity to make decisions about their projects, including selecting specific water issues to address within their community, choosing the design of their mini garden and irrigation system, and determining how they will present their findings. This autonomy will empower them to take ownership of their learning and engage more deeply with the content.



Collaboration:

The project will encourage collaboration among students as they work in small groups to design their models and presentations. They will pool their diverse skills and perspectives, fostering teamwork and enhancing their collective problem-solving abilities. Collaboration will also extend to engaging with local environmental organizations for insights and support.

Interdisciplinary Connection:

This project bridges subjects such as biology (ecosystems and water cycles), chemistry (water properties and conservation), physics (drip irrigation mechanics), ecology (microclimates), ICT (digital presentations, 3D CAD), ethics (environmental responsibility), and human rights (access to clean water and environment). This integrated approach reflects the interconnected nature of real-world issues.




Critique and Revision:

Students will participate in peer review sessions where they will present their project proposals and receive constructive feedback from their classmates. This collaborative critique process will encourage them to refine their ideas and designs based on the input received, fostering a culture of continuous improvement and learning.

evolved.

Public Product:

Students will create a tangible public product, which will include a detailed model of their open-air bus stop mini garden model (or mini garden model) with a drip irrigation system that utilizes air conditioner condensation water. They will also prepare a presentation to share their findings with the school community, demonstrating their understanding of water reuse and its impact on the microclimate.



Reflection:

Throughout the project, students will keep a learning journal to regularly reflect on their experiences, insights, and challenges. They will assess their understanding of water conservation concepts and their progress in developing solutions. Reflection sessions will be scheduled after major milestones, allowing students to articulate what they've learned and how their perspectives have

Teacher Facilitation:

The teacher will act as a facilitator by guiding students through the inquiry process, providing resources, and helping them navigate challenges. Instead of delivering direct instruction, the teacher will mentor students, encouraging them to explore concepts independently and develop their solutions while providing scaffolding as needed.

Assessment:

Assessment will include both formative and summative methods. Formatively, students will participate in self-assessments and peer assessments throughout the project. Summatively, the final product will be evaluated using a rubric that encompasses creativity, practicality, understanding of concepts, and presentation skills. This diverse assessment strategy will ensure a comprehensive evaluation of student learning and skills development.

Aligned Standards:

NSS-ESS3-4: Evaluate design solutions for maintaining biodiversity and ecosystem services.

NSS-ETS1-2: Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.



1ST

WEEK



- ✓ Waste of natural resources - what have we done?
- ✓ Threat of depletion of natural resources globally and locally
- ✓ Observation of water waste real situations, observation skills
- ✓ Monitoring process related to the condensation water of the air conditioner



Lesson 1 & 2 :

Waste of Natural Resources - What Have We Done? (2 couple hours)

Objectives:

- Understand the global and local threats of natural resource depletion.
- Develop observation skills related to water waste.
- Learn to monitor condensation water from air conditioning units.

Engage:

- Using different question types for effective critical thinking and problem solving

https://docs.google.com/document/d/19E8XDnesBZMN8_0jt4HBAaU7PUVHxw6P1VfM0695M5Q/edit?usp=sharing

- Begin with a class discussion on resource depletion. Ask students to share examples of water waste they have observed in their daily lives.

- Creating word art by students about climate change challenge

<https://wordart.com/ovmi32x7dfz4/students-climate%20%20change%20minde>

- Presentation by teacher

https://drive.google.com/file/d/14PXQ9DNreG0e1XDR0cm1RR49_N8uaZj5/view?usp=sharing

Explore:

- Introduce students to the concept of natural resource depletion and its implications through videos/articles.

- Students will visit the school and local community to observe and document instances of water waste, focusing on air conditioning units.

Explain:

- Discuss the findings from their observations. Introduce the science behind air conditioning condensation and its potential for reuse.

<https://photos.app.goo.gl/CWRUGk5rxruQqZR5A>

Elaborate:

- In small groups, students will brainstorm ways to reduce water waste in their homes and schools.

Group task worksheets:

https://drive.google.com/file/d/1rLJpUTL7rtZ4UKu9r66K6GvPXpd4EA_G/view?usp=sharing

- Each group will present their findings and ideas to the class.

Evaluate:


- Students will complete a reflection **3D virtual exhibition** entry on what they learned, observed about water waste and how it impacts their community (with using <https://www.artsteps.com>)

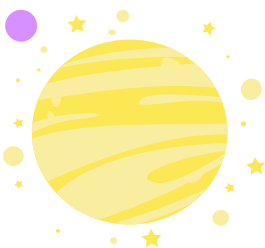


2ND


WEEK



- ✓ Observation of water wastage, especially the monitoring process related to air conditioning condensation water - student research presentations
 - ✓ Observation of water wastage, especially the monitoring process related to air conditioning condensation water - student research presentations
 - ✓ Ideation for simple solutions for reuse of air conditioner condensation water - brainstorming, ideas. discussions
- 



Lesson 3 & 4 :
Monitoring Water Wastage - Research Presentations
(2 couple hours)



Objectives:

- Present findings from research on air conditioning condensation water.
- Engage in brainstorming solutions for water reuse.

Engage:

- Drag and Drop essential climate change terms and concepts
<https://learningapps.org/watch?v=p2uciugpt24>
- Review last lesson's observations. Pose the question: "What can we do about air conditioning condensation?"

Explore:

- Students will present their research on water wastage, focusing on air conditioning condensation, to the class.

Explain:

- Discuss the importance of reusing water and the potential solutions that can be implemented.
- Answering video-based questions <https://learningapps.org/watch?v=pfu3vdxpj24>

Elaborate:

- Conduct a brainstorming session where students ideate simple solutions for reusing air conditioning condensation water.
- Can be use mind map creation, such as: <https://mymap.ai/share/reuse-of-air-conditioning-condensation-water-v95Y9zCMs1RDc>

Evaluate:


- Students will write a proposal outlining their chosen solution for reusing condensation water.



3_{RD}

WEEK



- ✓ Gases emitted from transport
 - ✓ Researching plants that can absorb carbon dioxide gases
 - ✓ Mini garden models irrigated with condensation water from the air conditioner
 - ✓ Bus stop -mini garden models
- 



Lesson 5 & 6:

Gases Emitted from Transport and Mini Garden Models

(2 couple hours)



Objectives:

- Research plants that absorb carbon dioxide.
- Design mini garden 3D models that utilize air conditioning condensation water.

Engage:

- Introduce the concept of greenhouse gases and their impact on climate change.

Explore:

- Students will research various plants that can absorb carbon dioxide and are suitable for their mini garden.

Explain:

- Discussing and exploring how a mini garden can help improve local microclimates and contribute to carbon dioxide absorption.
- This part can be organized by inviting people who are specialists in this field to the class («professionals back to school»), or this discussion and research can be conducted in relevant areas near the school.
- Wall for questions

<http://linoit.com/users/ahmadovaaliya/canvases/%20%C2%ABprofesionals%20back%20to%20school%C2%BB>

Elaborate:

- In groups, students will begin designing mini garden models that will be irrigated using condensation water.
- Students will make practical models for a mini garden using recycled materials and also various 3D CAD programs (such as <https://www.tinkercad.com>)
- Students will post their researched the various plants that can absorb carbon dioxide and are suitable for a mini garden, on Padlet wall.

https://padlet.com/ahmadovaaliya/Minigarden_seeds_plants

Evaluate:


- Students also will create a AI images or rough sketch of their future mini garden model, outlining the plants they will use.
- After researching the various plants that can absorb carbon dioxide and are suitable for a mini garden, the collection of their seeds and seedlings will begin.
- Short videos and pictures of selected seeds and plant seedlings growing after planting will always be added to the Padlet wall and student groups will provide feedback



4TH

WEEK



- ✓ Filling of condensation water of condensers, work on drip irrigation scheme
 - ✓ Work on a mini garden model in school and home area or nearby bus stop
 - ✓ 3D digital and hands-on design, basic procedures of real mini garden model
 - ✓ Calculation of costs, supplies
 - ✓ Conducting discussions with internal and external school partners
 - ✓ Preparation of proposals for local schools, institutions, municipalities
- 



Lesson 7 & 8 :
Drip Irrigation Scheme and Mini Garden Model Design
(2 couple hours)



Objectives:

- Develop a drip irrigation scheme for their mini garden.
- Continuing design and hands-on work on their mini garden model.

Engage:

- Discuss the importance of efficient irrigation methods in water conservation.
- Watch the video questioner and summarize the content.

<https://learningapps.org/watch?v=pxtwh5gnv24>

Explore:

- Introduce students to drip irrigation systems and how they can be designed.
- Then discuss how to develop this drip irrigation system for your mini garden by using “drip irrigation planning app” <https://www.growveg.com.au/garden-planner-intro.aspx>

Explain:

- Guiding, mentoring students in creating a drip irrigation plan using air conditioning condensation water by the creative and unique way.
- Use before created Padlet wall for guiding, mentoring and constructive feedbacks.
- https://padlet.com/ahmadovaaliya/Minigarden_seeds_plants

Elaborate:

- Students will carry on working on their mini garden models, applying their drip irrigation designs.
- Students will contact “Life Terra Mission” for mini garden planting support and adding the land location to the “Life Terra Mission” monitoring online map system.

<https://www.lifeterra.eu/en/do-you-have-land>

Evaluate:

- Each group will conduct a cost analysis and supply list for their mini garden project.
- For cost analysis students will use estimator tool


<https://fastercapital.com/content/Gardening-Cost-Estimator-Tool--How-to-Grow-and-Harvest-Your-Own-Food.html>



5TH

WEEK



- ✓ Filling of condensation water of condensers, improvement of drip irrigation scheme
 - ✓ Maintenance of mini garden model in school and home area or nearby bus stop
 - ✓ 3D digital and practical design, real mini garden model improvement
- 



Lesson 9 & 10 :
Improving the Mini Garden Model and Maintenance
(2 couple hours)

Objectives:

- Refine the drip irrigation scheme and maintain their mini garden model.
- Continue real hands-on improvement of their garden model.

Engage:

- Reflect on the initial designs and discuss what worked and what didn't.
- Use design based teaching environment, prototype \longleftrightarrow testing \longleftrightarrow planning

Explore:

- Students will share their experiences and findings from maintaining their mini garden by video and photos, VR exhibition apps, Padlet wall and etc.

Explain:

- Discuss improvements that can be made to their irrigation systems and garden designs.
- At the same time, as the number of such mini-gardens increases, how it can affect the microclimate and the climate change challenge should be discussed and action strategies should be determined.

Elaborate:

- Students will implement different changes to enhance their mini garden. models.
- Distribution of brochures and videos will begin to introduce the mini-garden model, which is irrigated with specially selected plants and seeds, with condensation water from the air conditioner.

Evaluate:

- Each group will present their modified designs and discuss the expected outcomes.
- Carbon footprint calculations will be carried out for the feasibility of integrating the proposed mini-garden models with bus stops or school yards.


<https://www.carbonfootprint.com/calculator.aspx>

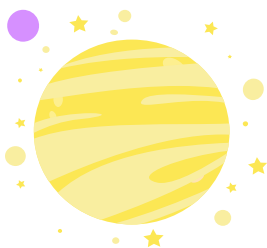




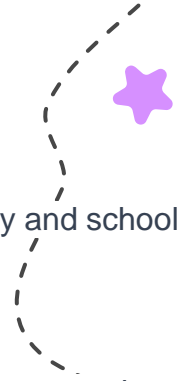
6th WEEK



- ✓ Presentation process for local community, school community, local municipality,
(mini garden-bus stop model irrigated with air conditioner condensation water, for carbon dioxide absorption)
- 



Lesson 11 & 12 :
Presentation to the Community
(2 couple hours)



Objectives:

- Present the final bus stop-mini garden model and findings to the local community and school staff

Engage:

- Discuss the for a long period importance of sharing their findings with the wider community.

Explore:

- Students will finalize their presentations, focusing on their mini garden's design and its environmental, climat change chalenge benefits.

Explain:

- Prepare for the presentation, discussing how to effectively communicate their project goals.

Note to present follovngs by students:

- ✓ presence of significant amount of condensation water from condenser operation in all homes and workplaces
- ✓ suitability of this water for irrigation purposes
- ✓ oxygenation of this water in vertical drip irrigation
- ✓ the possibility of turning every home, bus stop near the workplace or small areas into a small garden with this water
- ✓ This model process allows the communités to initiate a more responsible approach to water conservation, microclimate, climate change issues, etc.

Elaborate:

- Conduct a preliminary presentation in class for feedback before the actual presentation.
- A real presentation in a real model - a mini garden in a bus stop or a mini garden in a school yard - will have a more effective impact on community members. And by applying this in the near term, it will expand its scope and the program will have reached its goals.

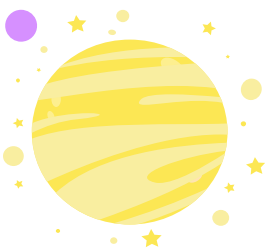
Evaluate:

- Video watching for final presentation community participants
<https://www.youtube.com/watch?v=EuwMB1Dal-4>
- Students will present their mini garden model with an emphasis on water conservation and its impact on the microclimate to the different communités
- Wall for peer assignment, feedbacks for final presentations
<https://digipad.app/p/873003/f02144a6d8d61>



Assesment rubrics

This rubrics assesses students' understanding and skills related to water conservation and microclimate solutions through a structured evaluation of their engagement, creativity, critical thinking, collaboration, presentation, reflection, and application of interdisciplinary concepts.



The rubric for the whole program

Criteria	1 - Needs Improvement	2 - Developing	3 - Proficient	4 - Accomplished	5 - Exemplary
Engagement in Discussions	Rarely contributes to discussions (0-30%)	Sometimes contributes (31-60%)	Often contributes (61-80%)	Frequently contributes (81-90%)	Consistently leads discussions (90-100%)
Creative Solutions	No project proposal or unclear solutions	Basic proposal with limited creativity	Clear proposal with practical solutions	Innovative proposal with strong ideas	Highly creative and practical solutions
Critical Thinking	Minimal critical thinking demonstrated	Some critical thinking shown	Adequate critical thinking displayed	Strong critical thinking evident	Exceptional critical thinking displayed
Collaborative Skills	Rarely collaborates with others	Occasionally collaborates	Collaborates well with peers	Actively facilitates collaboration	Inspires and leads collaborative efforts
Presentation Skills	Poorly organized and unclear presentation	Basic presentation with minimal clarity	Clear and organized presentation	Engaging and well-structured presentation	Outstanding presentation, highly engaging
Reflection and Self-Assessment	Little to no reflection noted	Limited reflection and self-assessment	Some reflection and self-assessment	Thoughtful reflection and self-assessment	Deep and insightful reflection noted
Application of Interdisciplinary Concepts	Little to no application of concepts	Basic application of few concepts	Adequate application of interdisciplinary concepts	Strong application of concepts	Exceptional integration of multiple concepts

Self-assessment rubric

Criteria	1 - Needs Improvement	2 - Developing	3 - Proficient	4 - Accomplished	5 – Exemplary
Engagement in Discussions	Rarely participates or contributes to discussions.	Occasionally participates but contributions are minimal.	Participates in most discussions with relevant ideas.	Actively engages and contributes meaningful insights.	Consistently leads discussions and encourages peers.
Project Proposal Creativity	Proposal lacks originality and practicality.	Proposal shows some creative ideas but lacks feasibility.	Proposal demonstrates creativity and practicality.	Proposal is innovative and offers practical solutions.	Proposal is exceptionally creative and highly feasible.
Critical Thinking Skills	Shows limited understanding of climate change issues.	Demonstrates basic understanding but lacks depth.	Understands key concepts and engages in critical thinking.	Analyzes and evaluates information effectively.	Exhibits exceptional critical thinking and insightful analysis.
Collaboration and Teamwork	Rarely collaborates; often works independently.	Sometimes collaborates but often takes a back seat.	Works well with others and contributes to group efforts.	Actively collaborates, supports team dynamics.	Leads collaboration and fosters a positive group environment.
Presentation Skills	Presentation is unclear and lacks organization.	Presentation conveys some ideas but is disorganized.	Presentation is clear, organized, and mostly engaging.	Presentation is well-structured, engaging, and informative.	Presentation is outstanding, highly engaging, and impactful.

Product evaluation rubric

Criteria	4 - Exceeds Expectations	3 - Meets Expectations	2 - Approaching Expectations	1 - Below Expectations
Drip Irrigation Scheme with Condensation Water	Innovative and efficient design; clearly explains the use of condensation water.	Functional design; adequately explains the use of condensation water.	Basic design; limited explanation of the use of condensation water.	No functional design; fails to explain the use of condensation water.
Adaptability of Cultivated Plants to the Climate	Excellent selection of plants; clearly demonstrates understanding of climate adaptability.	Good selection of plants; demonstrates some understanding of climate adaptability.	Limited selection of plants; minimal understanding of climate adaptability.	Poor selection of plants; no understanding of climate adaptability.
Carbon Dioxide Absorption by Selected Plants	Detailed explanation of the carbon dioxide absorption benefits of selected plants.	Good explanation of the carbon dioxide absorption benefits of selected plants.	Basic explanation; lacks depth on carbon dioxide absorption benefits.	No explanation of carbon dioxide absorption benefits.
Design of Mini Garden Model Imitating a Bus Stop	Highly creative and detailed design that closely resembles a bus stop.	Good design that resembles a bus stop.	Basic design with minimal resemblance to a bus stop.	Poor design; does not resemble a bus stop.
Additional Functionalities of Mini Garden Model Imitating a Bus Stop	Highly innovative functionalities that enhance the project significantly.	Good additional functionalities that add value to the project.	Minimal additional functionalities present.	No additional functionalities; lacks innovation.

Annex:

1. Week 1 presentation

https://drive.google.com/file/d/14PXQ9DNreG0e1XDR0cm1RR49_N8uaZj5/view?usp=sharing



2. Video questions : https://youtu.be/t6FiJr_J1qI

3. Photos from student, water flowing from the air conditioner, wasted water

<https://photos.app.goo.gl/CWRUGk5rxruQqZR5A>

4. Week 1_group task cards

https://drive.google.com/file/d/1rLJpUTL7rtZ4UKu9r66K6GvPXpd4EA_G/view?usp=sharing

5. 3D virtual exhibition generator <https://www.artsteps.com/>

6. Mind mapping generator for brain storming, ideation

<https://mymap.ai/share/reuse-of-air-conditioning-condensation-water-v95Y9zCMs1RDc>

7. Different question types for effective critical thinking and problem solving

https://docs.google.com/document/d/19E8XDnesBZMN8_0jt4HBAAu7PUVHxw6P1VFm0695M5Q/edit?usp=sharing

8. Mini garden - selected seeds and plants

https://padlet.com/ahmadovaaliya/Minigarden_seeds_plants

9. Week 4_video questioner <https://learningapps.org/watch?v=pxtwh5gnv24>



10. “Drip irrigation planning app”

<https://www.growveg.com.au/garden-planner-intro.aspx>

11. “Life Terra Mission” monitoring online map system. <https://www.lifeterra.eu/en/do-you-have-land>

12. Mini garden cost analysis estimator tool

<https://fastercapital.com/content/Gardening-Cost-Estimator-Tool--How-to-Grow-and-Harvest-Your-Own-Food.html>

13. Carbon footprint calculator:

<https://www.carbonfootprint.com/calculator.aspx>

14. Wall for questions inviting to school professionals :

<http://linoit.com/users/ahmadovaaliya/canvases/%20%C2%ABprofesionals%20back%20to%20school%C2%BB>

15. Wall for peer assignment, feedbacks for final presentations

<https://digipad.app/p/873003/f02144a6d8d61>

16/ Creating word art by students about climate change challenge

<https://wordart.com/ovmi32x7dfz4/students-climate%20%20change%20minde>

17. Activity drag and drop essential climate change terms and concepts

<https://learningapps.org/watch?v=p2uciugpt24>