Open Digital Competences Training for School Educators (OpenDigCompEdu)

(2021-1-ES01-KA220-SCH-000027770)

Course: Climate Change in Education

English translated version

Co-funded by the
Erasmus+ Programme
of the European Union

Open Digital Competences Training for School Educators (OpenDigCompEdu): Open Digital Competences for Educators courses

Climate Change in Education	
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The creation of these resources has been co funded by the ERASMUS+ grant program of the European Union under grant no. 2021-1-ES01-KA220-SCH-000027770. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union, SEPIE or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Description

Course overview

Aim

This course aims to provide teachers with the knowledge and skills they need to effectively teach climate change in their classrooms and help students understand the importance of this issue and the role they can play in addressing it.

Prerequisites

If you are new to Moodle we suggest you take the Introduction to Moodle course before starting this one.

Format

This is a self-paced course without active moderation. You are encouraged to discuss ideas in the discussion forums and respond to other learners' queries.

Learning time

The estimated learning time to complete this course is 25 hours.

Learning outcomes

By the end of this course, participants will be able to:

- Define climate change and the impact it
- is having on our world. Identify how human activity impacts our climate.
- Investigate and plan how you can make a positive difference to climate change in the classroom.
- Discuss pedagogical and multidisciplinary approaches to introduce the climate change in the classroom.
- Discuss assessment approaches to measuring the students' understanding of the importance of the climate change.

Course structure

Multidisciplinary approaches to teach about climate change (Social, Economic, Scientific, STEAM)
Design a multidisciplinary plan to teach about climate change in class and share evidence that it has been done in class.

Welcome

Find out how the course works, check your prior understanding and join in an optional

general discussion.

Overview of Climate Change

- What is Climate Change?
- How is human activity impacting our climate?
- The debate around humans' impact on climate change:
- Debunking the myths.
- Recent climate change action (schools strikes, de-investing
- from non-renewable energy etc.). Positive signs that climate change action works.
- What is required by industry to
- minimize emissions? Positive signs that climate change action works.
- What can we do as individuals to help combat climate change?

What actions are we able to take from school?

- How can we teach students about climate change?
- What kind of activities can be done in class to increase their awareness of their everyday actions?

How can we teach people about climate change?

- Multidisciplinary approaches to teach about climate change (Social, Economic, Scientific, STEAM)
- Design a multidisciplinary plan to teach about climate change in class and share evidence that it has been done in class.

What assessment strategies can we use to evaluate students' knowledge and engagement with climate change?

- Types of assessment activities.
- Create and present an evaluation plan for a climate change unit the teachers plan to teach.

Course check

- Test your understanding in the final quiz.

Digital competences

"Being digitally competent means using digital technologies in a confident and safe way" (DigComp 2.0).

Moodle Academy courses in the Educator learning pathway use a Moodle specific version

of the Digital Competence Framework for Educators (DigCompEdu). This is the same framework used by the advanced Moodle Educator Certification (MEC).
This course relates to the

following competence(s):

General competencies:

- Digital Competence
- Personal, social and learning to
- learn competence Citizenship

  competence

Digital competencies based on DigComp 2.2:

1. Professional Engagement
   1.2 Professional collaboration
   1.3 Reflective practice
2. Digital Resources
   2.1 Selecting digital resources
   2.2 Creating and modifying digital resources
   2.3 Managing, protecting and sharing digital resources
3. Teaching and learning
   3.1 Teaching
   3.2 Guidance
   3.3 Collaborative learning
   3.4 Self-regulated learning
4. Assessment
   4.1 Assessment strategies
   4.2 Analysing evidence
   4.3 Feedback and planning
5. Empowering earners

5.3 Actively engaging learners

6. Facilitating Learners' Digital Competence

6.1 Information and media literacy

6.2 Digital communication & collaboration

Completion and assessment

To complete the course you need to complete the following activities: View

- the 'About this course' book.
- Do the different activities and
- participate in the forums. Check your understanding' quiz, achieving 80% or more.

Completing the activities

- Some activities are automatically marked as
- completed based on specific criteria. Some activities require you to manually mark them as done.

Make sure you complete the activities according to their completion conditions.

Course badge

Upon successful completion of this course you will be automatically awarded a badge to showcase the skills and knowledge you have obtained.

Moodle versions

The activities and screenshots in this course are based on the standard Boost theme and the latest version of Moodle LMS, currently 4.1. See Moodle 4.1 documentation overview and New Features 4.1 documentation.

If your Moodle site looks different, ask your Moodle support staff

about the theme and version being used. You can access

documentation about earlier, supported versions of Moodle LMS

below:

- Moodle 4.0 documentation overview and New Features 4.0 documentation Moodle 3.11 documentation overview and New

- Features 3.11 documentation Moodle 3.9
- documentation overview and New Features 3.9 documentation

License

Quiz: Course pre-check: What do you already know?

1. **What gas is primarily responsible for the greenhouse effect?**
   - o Carbon dioxide
   - o Methane
   - o All of the above
   - o Nitrous oxide
2. **What is ocean acidification?**
   - o The process by which the ocean becomes more basic due to an increase in alkaline substances.
   - o The process by which the ocean becomes warmer due to an increase in temperature.
   - o The process by which the acidity of the ocean increases due to the absorption of carbon dioxide from the atmosphere.
3. **What is the Paris Agreement?**
   - o A global agreement to combat climate change and limit global warming to well below 2°C.

- A plan to reduce carbon emissions from the aviation industry.
- An agreement to reduce greenhouse gas emissions from deforestation and forest degradation.

4. What is the primary cause of climate change?

- Asteroid impacts
- Natural cycles
- Volcanic eruptions
- Human activities

5. What is the difference between weather and climate?

- Climate refers to the conditions in a specific location, while weather refers to conditions globally.
- Weather refers to conditions in the atmosphere, while climate refers to conditions on the ground.
- Weather refers to short-term conditions, while climate refers to long-term patterns.

Module 1: *What is climate change?*

Video

As educators, it is important to equip ourselves with the knowledge and skills to teach our students about the critical environmental challenges our planet is facing today.

This video highlights the effects of the greenhouse effect caused by the increase in greenhouse gases, which has led to climate change with severe consequences for our environment, weather, food sources, health, and more. It is essential for us to understand the causes and effects of climate change to help our students develop an awareness and appreciation for the environment, and to encourage them to take action towards a sustainable future.

Through this training course, we will explore how to teach students about the impact of human activities on the environment and the solutions that can help prevent the worst effects of climate change. We will also explore how to inspire and empower students to become responsible and environmentally conscious citizens, who will take action to protect our planet for future generations.

Video: https://www.youtube.com/watch?v=G4H1N_yXBiA Causes and Effects of Climate Change | National Geographic licensed under a Creative Commons Attribution license (reuse allowed)

Introduction

Climate change is a topic that has gained significant attention in recent years and is now widely recognized as one of the most

pressing issues facing the world today. As a result, it is essential that we educate future generations about the causes and impacts of climate change, and what they can do to help mitigate its effects. This is particularly important for primary school students, who are just starting to develop an understanding of the world around them. In this course, we will outline an approach to explaining climate change to primary students, including key concepts, vocabulary, and activities that can be used to engage and educate them on this important issue.

Climate change refers to long-term changes in the Earth's climate system that result in changes in temperature, precipitation, wind patterns, and other measures of climate. These changes are caused by a combination of natural factors, such as volcanic eruptions and changes in solar radiation, and human activities, such as burning fossil fuels, deforestation, and agriculture.

Greenhouse gases, such as carbon dioxide, methane, and nitrous oxide, are the main culprits behind climate change. They trap heat in the Earth's atmosphere, which causes the planet's temperature to rise. Since the Industrial Revolution, the concentration of these
gases has increased dramatically due to human activities, such as burning fossil fuels for energy, transportation, and industrial
processes. This has led to a rapid increase in global temperatures, with the ten warmest years on record all occurring since 1998.

What is climate change?

Causes of Climate Change:

Human activities are the primary cause of climate change. The burning of fossil fuels, such as coal, oil, and natural gas, releases carbon dioxide and other greenhouse gases into the atmosphere. These gases trap heat in the Earth's atmosphere, causing the planet's temperature to rise.

Deforestation and agricultural practices, such as livestock farming and the use of fertilizers, also contribute to greenhouse gas
emissions. Deforestation reduces the amount of carbon dioxide that trees absorb, while agricultural practices release nitrous oxide and methane, two powerful greenhouse gases.

Natural factors, such as volcanic eruptions and changes in solar radiation, also contribute to climate change. However, these factors have a much smaller impact than human activities.

Effects of Climate Change:

The effects of climate change are already being felt around the world. Rising temperatures are causing more frequent and severe

heatwaves, droughts, and wildfires. They are also causing glaciers and ice caps to melt, which is leading to sea-level rise and flooding in coastal areas.

Climate change is also affecting ecosystems and wildlife. Rising temperatures are causing shifts in the timing of seasons, which is disrupting the breeding and migration patterns of many species. It is also causing changes in the distribution and abundance of species, which is affecting food webs and biodiversity.

In addition to these physical effects, climate change is also having social and economic impacts. It is affecting human health, through increased heat-related illnesses and the spread of infectious diseases. It is also causing economic disruptions, through crop failures, water shortages, and damage to infrastructure and property.

Why should we teach it in class?

Climate change is one of the most significant challenges that humanity is facing in the 21st century. It is essential for teachers to understand what climate change is, its causes, and its effects, in order to educate and empower the next generation to take action. By teaching about climate change, teachers can help students to understand the importance of reducing greenhouse gas emissions, conserving natural resources, and adapting to a changing climate.

How is human activity impacting our climate?

The Earth's climate has been changing for millions of years, but in recent decades, the rate of change has been increasing at an unprecedented rate. Human activity, particularly the burning of fossil fuels and deforestation, has greatly contributed to this acceleration. In this text, we will explore the ways in which human activity is impacting our climate and the consequences that result.

Burning of Fossil Fuels

One of the primary ways in which humans are impacting the climate is through the burning of fossil fuels such as coal, oil, and gas. These fuels release carbon dioxide and other greenhouse gases into the atmosphere, which trap heat and cause the planet to warm. This process is known as the greenhouse effect.

The greenhouse effect is a natural process that helps to keep the planet warm enough to support life. However, the increase in greenhouse gases from human activity has intensified the greenhouse effect, leading to global warming and climate change.

Deforestation

Another significant way in which humans are impacting the climate is through deforestation. Trees absorb carbon dioxide as part of the process of photosynthesis.

When forests are cleared for agriculture, logging, or urbanization, the carbon stored in the trees is released into the atmosphere.

Deforestation also reduces the number of trees available to absorb carbon dioxide, leading to an increase in atmospheric levels of greenhouse gases. In addition, deforestation can lead to changes in local climate, as trees play an important role in regulating
temperature and precipitation patterns.

Industrial Agriculture

Industrial agriculture, particularly the production of meat and dairy products, is another significant contributor to climate change. The livestock sector is responsible for around 14.5% of global greenhouse gas emissions. The production of animal feed, fertilizer, and transportation also contribute to emissions.

Furthermore, industrial agriculture often involves clearing forests and other natural habitats for agriculture, which leads to
deforestation and biodiversity loss. Agriculture is also vulnerable to the impacts of climate change, such as changes in temperature and precipitation patterns, which can affect crop yields and food security.

Transportation

Transportation is another significant source of greenhouse gas emissions. The combustion of fossil fuels in cars, trucks, and airplanes releases carbon dioxide and other pollutants into the atmosphere. The increase in global trade and travel has led to a corresponding increase in emissions from transportation.

In addition, transportation infrastructure, such as roads and airports, often involves land use changes that contribute to deforestation and biodiversity loss. The impact of transportation on the climate is significant and will require significant changes to address.

Conclusion

Human activity is having a significant impact on the Earth's climate. The burning of fossil fuels, deforestation, industrial agriculture, and transportation are just some of the ways in which we are contributing to climate change. It is crucial that we take action to reduce our greenhouse gas emissions and mitigate the impacts of climate change. As educators, we can play a critical role in teaching
students about the causes and consequences of climate change and empowering them to take action to protect our planet.

The debate around humans' impact on climate change: debunking the myths

The debate around climate change and its causes has been ongoing for many years. While the scientific consensus is that human activity is the primary driver of climate change, there are still many myths and misconceptions that persist. As educators, it's important to address these myths and provide accurate information to our students. Here are some of the most common myths and the facts
that debunk them:

Myth: Climate change is just a natural cycle

Fact: While climate change has occurred naturally in the past, the current changes we are seeing are happening at an unprecedented rate and are clearly linked to human activity. The burning of fossil fuels, deforestation, and other human activities are causing a significant increase in greenhouse gas emissions, leading to global warming and climate change.

Myth: The Earth has gone through periods of warming and cooling before, so there's nothing to worry about.

Fact: While it's true that the Earth has gone through natural cycles of warming and cooling in the past, the current rate of warming is much faster than any previous natural cycles. In addition, human activity is the primary cause of the current warming trend.

Myth: It's too expensive to address climate change.

Fact: While there may be costs associated with addressing climate change, the cost of not addressing it is much higher. The economic and social impacts of climate change, such as extreme weather events, food and water shortages, and displacement of people, will have significant financial and humanitarian costs.

Myth: Climate scientists are biased and cannot be trusted.

Fact: The overwhelming majority of climate scientists agree that human activity is causing climate change. Their research is peer- reviewed and based on scientific evidence, not personal bias. While there may be a small number of dissenting voices, the scientific consensus is clear.

Myth: Carbon dioxide is not harmful to the environment.

Fact: Carbon dioxide is a greenhouse gas that contributes to global warming and climate change. While it is necessary for life on Earth, high levels of carbon dioxide in the atmosphere can have serious consequences, such as rising sea levels and more frequent and severe weather events.

As educators, it's important that we help our students understand the facts about climate change and the impact of human activity on the environment. By debunking these common myths, we can provide a more accurate picture of the situation and help our students become informed and responsible global citizens.

Evolution of climate change

Climate change has been a topic of much debate and concern in recent years, as it poses significant threats to the world as we know it. It is important for educators to teach about the evolution of climate change, how it affects us and animals, recent weather events, and the changes that have taken place over the last 100 years.

The evolution of climate change refers to the changes that have occurred over time. Climate change is caused by a variety of factors, including greenhouse gas emissions, deforestation, and changes in land use. These factors have caused global temperatures to rise, resulting in a variety of effects such as sea level rise, more intense heat waves, and more frequent extreme weather events.

The impacts of climate change are expected to be widespread and severe. The effects of climate change on humans will be far- reaching, including health problems, economic losses, and the displacement of communities. Climate change is also affecting animals and their habitats. As temperatures rise, ecosystems are changing, and animals are struggling to adapt to the new conditions. This is particularly true for animals that are already endangered or at risk of extinction.

Recent weather events have highlighted the impact of climate change. These events have included more frequent and severe
hurricanes, wildfires, droughts, and floods. Many of these events have caused significant damage to communities and infrastructure, and have highlighted the need for action on climate change.

Over the last 100 years, the climate has changed significantly. Global temperatures have risen by about 1 degree Celsius since the late 19th century, with most of the warming occurring in the last few decades. This warming trend is largely driven by human activities,
particularly the burning of fossil fuels.

It is important for educators to teach about these topics to ensure that students understand the magnitude of the issue and are
motivated to take action to address climate change. Teachers can use a variety of resources and approaches to teach about climate change, including hands-on activities, multimedia resources, and project-based learning. By incorporating these topics into their curriculum, educators can help prepare students for a future that will be shaped by the impacts of climate change.

How climate change will affect us in the future

Climate change is an issue that is affecting our planet in a myriad of ways, and it is important for us to understand how it will impact us in the future. The scientific community has been warning us for decades that climate change is a real and pressing issue that must be addressed. In this text, we will explore how climate change will affect us in the future.

One of the most significant ways that climate change will impact us is through rising sea levels. As temperatures continue to rise,
glaciers and ice sheets are melting at an alarming rate, causing sea levels to rise. This will lead to increased flooding and storm surges in coastal areas, which will have serious consequences for infrastructure, businesses, and communities. Additionally, low-lying island nations and

coastal cities will be at risk of being completely submerged, which will have significant humanitarian consequences.

Another way that climate change will affect us in the future is through changes in weather patterns. As temperatures rise, we can
expect to see more extreme weather events such as heat waves, droughts, and hurricanes. These events can cause significant damage to infrastructure and can also lead to food and water shortages, which will have serious consequences for communities around the world.

Climate change will also have significant impacts on biodiversity and the natural world. As temperatures continue to rise, many plant and animal species will be unable to adapt to the changing conditions, leading to widespread extinction. This loss of biodiversity will have far-reaching consequences for ecosystems around the world, as well as for agriculture and human health.

Finally, climate change will have significant economic impacts, particularly in developing countries. As extreme weather events become more frequent and intense, crops will fail, homes will be destroyed, and infrastructure will be damaged. This will lead to significant economic losses and could result in increased poverty and inequality.

In conclusion, climate change is a complex and pressing issue that will have significant impacts on our planet in the future. Rising sea levels, changes in weather patterns, loss of biodiversity, and economic impacts are just a few of the ways that climate change will affect us in the years to come. As educators, it is our responsibility to teach our students about these issues and to inspire them to
take action to address this urgent problem.

How climate change affects animals

Climate change is not only impacting humans but also wildlife and the natural world as a whole. The impact on animals can be seen in their behavior, migration patterns, reproduction, and survival. Here are some of the ways climate change is affecting animals:

Habitat Loss: As temperatures rise, animals that are adapted to specific habitats are forced to move to new locations to find suitable living conditions. This can result in habitat loss, which can affect an entire ecosystem, leading to species decline and extinction.

Changes in Migration: Climate change is disrupting migration patterns of many animals. Birds, for instance, rely on seasonal changes in temperature to know when to migrate to their breeding grounds, but the changing climate can lead to the mismatch between the
timing of their migration and the availability of food at their destination.

Disruption in Reproduction: Changes in climate can affect breeding seasons, leading to mismatched timing with the availability of resources necessary for the survival of offspring. For instance, warmer temperatures can cause birds to lay eggs earlier than usual, but if the food resources are not available at that time, the chicks may not survive.

Spread of Diseases: Climate change can lead to the spread of diseases, as some animals migrate to new areas and bring with them diseases that are not native to that region. In addition, as temperatures rise, diseases that were previously limited to certain areas can now

spread to new locations.

- **Changes in Food Availabilit**y: Climate change can affect the availability of food for animals. Warmer temperatures can lead to changes in the timing and availability of plant growth, which in turn affects the animals that rely on those plants for food.

Extinction Risk: Climate change is one of the leading causes of animal extinction. As habitats shrink and food sources become scarce, many animals are at risk of disappearing from the planet forever.

It is essential for teachers to incorporate the impact of climate change on animals in their lesson plans to help students understand the significance of taking action to reduce the impact of climate change on our planet. Teachers can use different resources such as videos, articles, and images to show how climate change is affecting animals and the natural world. By educating students about the impact of climate change on animals, teachers can encourage them to think critically and develop a sense of responsibility towards protecting the environment.

Recent climate change weather events

Climate change is having a significant impact on the planet, and this can be seen in the increasing frequency and severity of extreme weather events. These events include heatwaves, droughts, floods, hurricanes, and wildfires. The impacts of these events can be devastating for communities, ecosystems, and economies.

One of the most significant recent weather events that was exacerbated by climate change was Hurricane Maria in 2017. The Category 5 hurricane struck Puerto Rico and caused widespread destruction, including power outages, flooding, and infrastructure damage. The hurricane resulted in an estimated 3,000 deaths and caused billions of dollars in damages.

Another recent weather event that was impacted by climate change was the 2020 wildfire season in Australia. The country experienced its worst wildfire season on record, with fires burning across 46 million acres of land. The fires destroyed homes and habitats, killed wildlife, and caused health problems for people living in affected areas.

In addition to these specific events, there have been many other instances of extreme weather events around the world in recent years. These include the 2021 Texas winter storm, which caused widespread power outages and water shortages, and the 2021 floods in Germany and Belgium, which resulted in over 200 deaths and significant infrastructure damage.

It is clear that climate change is causing an increase in extreme weather events, and it is likely that we will continue to see more of these events in the future. It is important that we take action to reduce greenhouse gas emissions and prepare for the impacts of climate change to minimize their effects on human and animal populations.

Evolution of the climate change over the last 100 years

Over the past century, the Earth's climate has undergone significant changes. The climate has become warmer, and these changes are largely attributed to human activities that emit greenhouse gases such as carbon dioxide, methane, and nitrous oxide into the atmosphere.

The industrial revolution of the late 19th century marked the beginning of significant changes in human activities and the resulting impact on the climate. The combustion of fossil fuels, such as coal and oil, became widespread, leading to an increase in greenhouse gas emissions. The atmospheric concentration of carbon dioxide, the most significant greenhouse gas, has increased by about 30%
since the beginning of the industrial revolution.

The 20th century saw several significant events that impacted the climate, including periods of warming and cooling. In the early 20th century, the Earth experienced a cooling trend, which was followed by a warming trend from the 1920s to the 1940s. From the mid- 1940s to the late 1970s, there was a period of slight cooling. However, since the late 1970s, the Earth's climate has been consistently warming.

The effects of climate change are becoming more apparent, with rising global temperatures, melting glaciers and sea ice, and increasing sea levels. The frequency and intensity of extreme weather events such as heatwaves, droughts, and heavy rainfall are also increasing.

Climate models suggest that the Earth's temperature will continue to rise in the future, with significant impacts on the environment, human societies, and the global economy. These impacts include increased sea levels, changes in precipitation patterns, more frequent and intense heatwaves and extreme weather events, and the potential for ecological disruptions.

Understanding the evolution of climate change over the last century is essential to appreciate the severity and urgency of the current situation. Educating students about the history of climate change can help them develop a deep understanding of the problem and inspire them to take action to mitigate its effects. As teachers, it is our responsibility to provide students with accurate information about climate change and equip them with the knowledge and skills to tackle this global challenge.

Recent climate change action (schools strikes, de-investing from non-renewable energy etc.)

Climate change is a global issue that affects everyone, and as such, there have been many recent actions taken to address it. One notable trend has been the rise of youth-led climate strikes, with students around the world walking out of their classrooms to
demand action on climate change. The movement was inspired by the activism of Swedish teenager Greta Thunberg, who began striking outside the Swedish parliament in August 2018.

Since then, the movement has grown to include strikes in over 100 countries, with millions of students participating. The strikes have been accompanied by demands for governments and businesses to take action on climate change, with a focus on transitioning to renewable energy and reducing greenhouse gas emissions.

Another recent trend has been the de-investing from non-renewable energy sources, such as fossil fuels. This has been driven by a growing recognition of the negative impact of these industries on the environment, as well as a recognition of the economic potential of renewable energy sources. Many universities, pension funds, and other institutions have divested from fossil fuels and invested in clean energy instead.

In addition, there have been numerous international agreements and initiatives aimed at addressing climate change. Perhaps the most significant of these is the Paris Agreement, a global treaty signed in 2015 that aims to limit global warming to below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius.

The Paris Agreement has been signed by nearly every country in the world and has led to increased investment in renewable energy, as well as the development of new technologies and policies aimed at reducing greenhouse gas emissions.

Overall, there has been a growing recognition of the urgent need to address climate change, and a growing commitment from Governments, businesses, and individuals to take action. While much more work remains to be done, these recent actions represent an important step in the right direction.

What is required by industry to minimize emissions?

In recent years, there has been a growing awareness of the role that industry plays in contributing to climate change through greenhouse gas emissions. As a result, there has been an increasing demand for industries to take action to minimize their emissions and reduce their impact on the environment. But what exactly is required by industry to minimize emissions?

The first step for industries to minimize their emissions is to understand their carbon footprint. This involves identifying and measuring the amount of greenhouse gases that are emitted as a result of their operations, including the use of energy, transportation, and the production of goods and services. Once industries have identified their carbon footprint, they can then begin to take action to reduce their emissions.

One approach that industries can take to minimize their emissions is to adopt cleaner production technologies and practices. This can involve investing in renewable energy sources, improving energy efficiency, and reducing waste and emissions from production processes. Industries can also reduce their emissions by optimizing their supply chains, for example, by reducing transportation and shipping distances or by using more sustainable materials and production methods.

Another important strategy for reducing emissions is to promote sustainable consumption patterns among consumers. Industries can do this by educating consumers about the environmental impact of their products and encouraging them to make more sustainable choices, such as choosing products with lower carbon footprints or using energy-efficient appliances.

In addition to these measures, industries can also take part in government-led initiatives to

reduce emissions, such as carbon pricing schemes, emission reduction targets, and other regulatory measures. By participating in these initiatives, industries can help to create a more supportive policy environment for climate action, as well as benefiting from financial incentives and other forms of support.

Ultimately, the key to minimizing emissions from industry is to take a collaborative and proactive approach, involving not only industry leaders but also policymakers, consumers, and other stakeholders. By working together to address the challenges of climate change, we can create a more sustainable and resilient future for all.

Positive signs that climate change action works.

Climate change is a global problem that requires action from all sectors of society. While the situation may seem dire, there are many positive signs that climate change action works. In recent years, governments, businesses, and individuals have taken steps to reduce their carbon footprint, and the results are encouraging.

One positive sign of progress is the growth of renewable energy sources. The International Energy Agency (IEA) reported that renewable energy accounted for 72% of new power capacity installed globally in 2019, surpassing the capacity of fossil fuel power plants for the first time. The cost of renewable energy sources, such as solar and wind power, has also decreased significantly, making them more competitive with traditional energy sources.

Another positive sign is the increasing number of countries committed to reducing greenhouse gas emissions. The Paris Agreement, signed in 2015 by 195 countries, aims to limit global warming to well below 2 degrees Celsius above pre-industrial levels, with a goal of limiting warming to 1.5 degrees Celsius. As of 2021, 189 countries have ratified the agreement and submitted their own emissions reduction targets, known as nationally determined contributions (NDCs).

Businesses are also taking action to reduce their carbon footprint. Many companies have set ambitious sustainability goals, such as reaching net-zero emissions by 2050 or earlier. Some companies have even gone further by committing to science-based targets, which align their emissions reduction goals with the level of decarburization required to keep global warming below 2 degrees Celsius. Investors are also increasingly interested in sustainable investing, putting pressure on companies to prioritize environmental and social responsibility.

Individuals are also making a difference in the fight against climate change. Many people are choosing to reduce their personal carbon footprint by driving less, using public transportation, and eating less meat. The youth-led climate strikes, which began with Swedish activist Greta Thunberg in 2018, have also drawn attention to the urgency of the issue and put pressure on governments to take action.

There are also positive signs that climate change action can lead to other benefits, such as improved public health and economic growth. For example, reducing air pollution from fossil fuel combustion can lead to fewer cases of respiratory illnesses and save billions of dollars in healthcare costs. Investing in renewable energy can also create new jobs and spur economic growth.

In conclusion, while the challenges posed by climate change are significant, there are many positive signs that climate change action works. The growth of renewable energy, the increasing number of countries committed to reducing emissions, the actions taken by businesses, and the efforts of individuals all show that progress is being made. By working together, we can build a more sustainable and resilient future for ourselves and future generations.

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Design a video for your students and share your creations!

This activity introduces the basics of climate change, including its causes and consequences.

Watch a video or find an interactive presentation that provides a clear, concise overview of the science behind climate change. After viewing the presentation or video, design and record one for your own students and share it in the forum.

Materials needed:

- A computer or device with internet access
- Book about recording videos and online free software
- Access to online resources such as websites, articles, and videos related to the science of climate change:
  - NASA's Climate Kids website (https://climatekids.nasa.gov/): This website provides a comprehensive overview of climate change, including information on the causes, impacts, and solutions. It is written in an accessible and engaging way for students, and includes interactive games and activities.
  - Climate.gov (https://www.climate.gov/teaching/interactive-tools): This website, run by the US National Oceanic and Atmospheric Administration, provides a wealth of resources for teaching about climate change, including lesson plans, interactive activities, and multimedia resources.

Video: https://www.youtube.com/watch?v=05Cwp8QIjRA Department d'Educació - Àrea de Cultura Digital licensed under a Creative Commons Attribution license (reuse allowed)

How can we record a video for the students?

Introduction

Here are some online video editors that you can use to create a video with emojis and animations about climate change. Some of these include:

- **Canva** - A graphic design platform that also has a video editor feature. You can add emojis and animations to your videos using the various tools available.
- **Edpuzzle** - An online video maker that lets you create animated videos with questions and texts.
- **Capcut** - An online animation video editor that allows you to create videos.
- **Openshot** - is a free and open-source video editor for Linux, Mac, and Windows.
- **Kapwing** - A free online video editor that allows you to add emojis and animations to your videos.
- **Animaker** - An online animation video maker that allows you to create animated videos with emojis and other visual elements.

Each of these tools has its own unique features and capabilities, so it's worth trying out a few to see which one suits your needs best. Here we will explain how to use three of them to create videos in class.

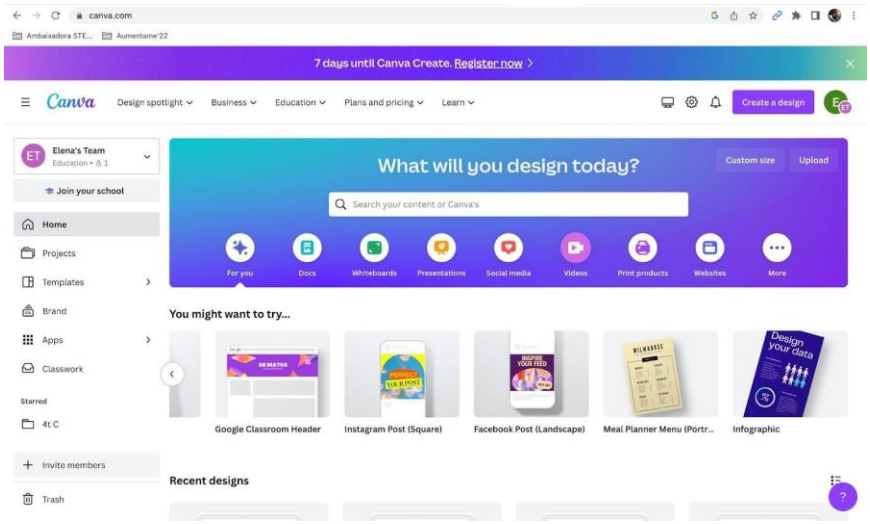
Canva

https://www.canva.com

Canva is a popular graphic design platform that also offers video creation tools. Here are the steps to create a video about climate change using Canva:

1. Sign in to your Canva account or create a new one if you don't have one yet.

2. Click on the "Create a design" button on the homepage, and then select "Video" from the options.



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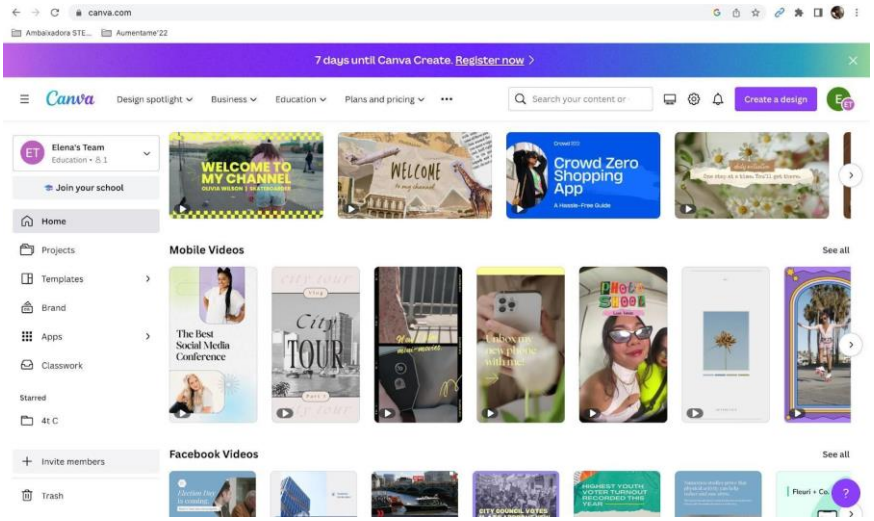
3. Choose the video format you want to use. Canva offers a variety of options such as Instagram Stories, YouTube video, or Facebook cover video.



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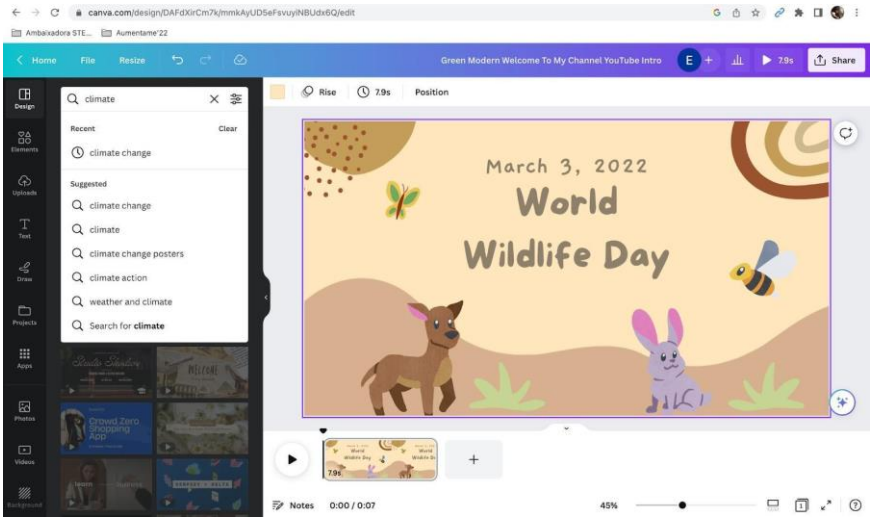
4. In the search bar, type "climate change" or related keywords to find relevant templates, images, and videos. Canva has a vast library of media assets you can use to create your video.



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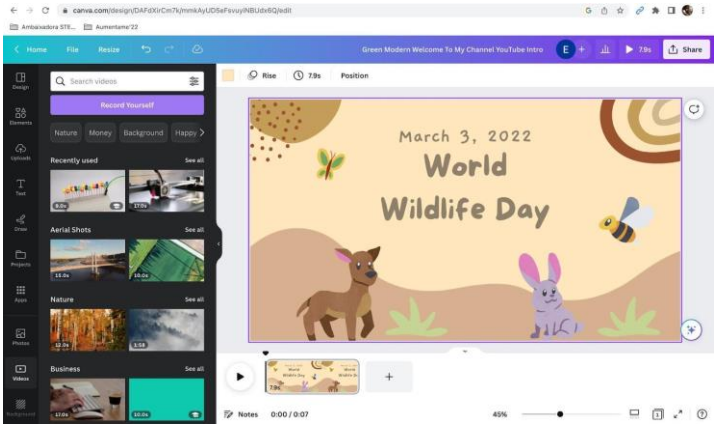
5. Once you've found a template or image that you like, drag and drop it into your video project. You can customize the size and position of the image or template as needed.

6. Add text to your video. Click on the "Text" tab on the left-hand side of the screen to see the available text options. You can choose from different fonts, colors, and sizes to make your text stand out.



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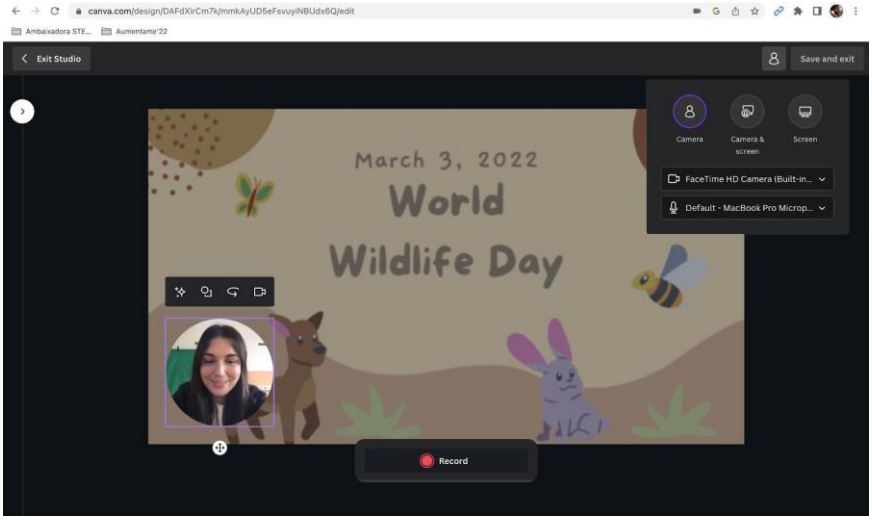
7. To record a video of yourself, click on the “Video” tab and then, on “record yourself”



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8. To add music or sound effects to your video, click on the "Audio" tab on the left-hand

side of the screen. Canva offers a variety of royalty-free music and sound effects that you can use.

9. Once you've finished creating your video, preview it to make sure everything looks and sounds good. You can make further adjustments as needed.

10. Finally, when you're happy with your video, click on the "Download" button to save it to your computer or share it directly on social media platforms.

That's it! With these steps, you can create a video about climate change using Canva. Remember to choose relevant images and text to convey your message effectively.

EdPuzzle

https://edpuzzle.com

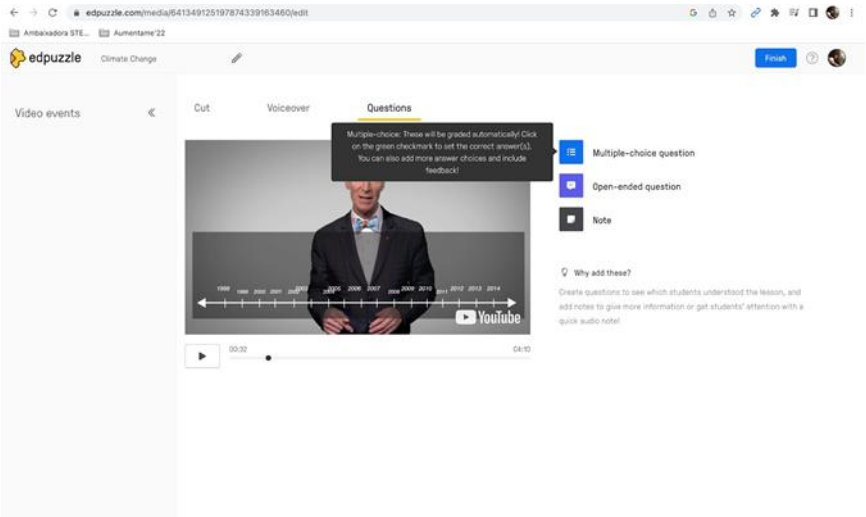
Edpuzzle is an interactive video platform that allows you to create engaging videos with embedded questions. Here's how you can create a video with questions about climate change using Edpuzzle:

1. Sign in to your Edpuzzle account or create a new one if you don't have one yet.

2. Click on the "Create video" button on the homepage.

3. Upload or select a video about climate change that you want to use. You can either choose a video from Edpuzzle's library or upload your own.

4. Once you've selected a video, you can add questions to it. To do this, click on the "Questions" button that appears below the video player.



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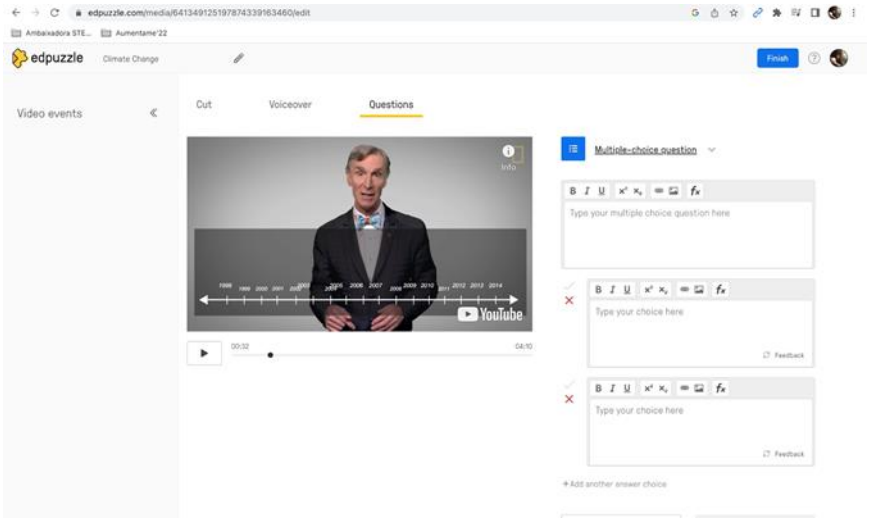
5. Choose the type of question you want to add. Edpuzzle offers a variety of question types such as multiple-choice, open-ended or a note.

6. Write the question and add answer choices if needed. You can also set a time limit for the question if you want.



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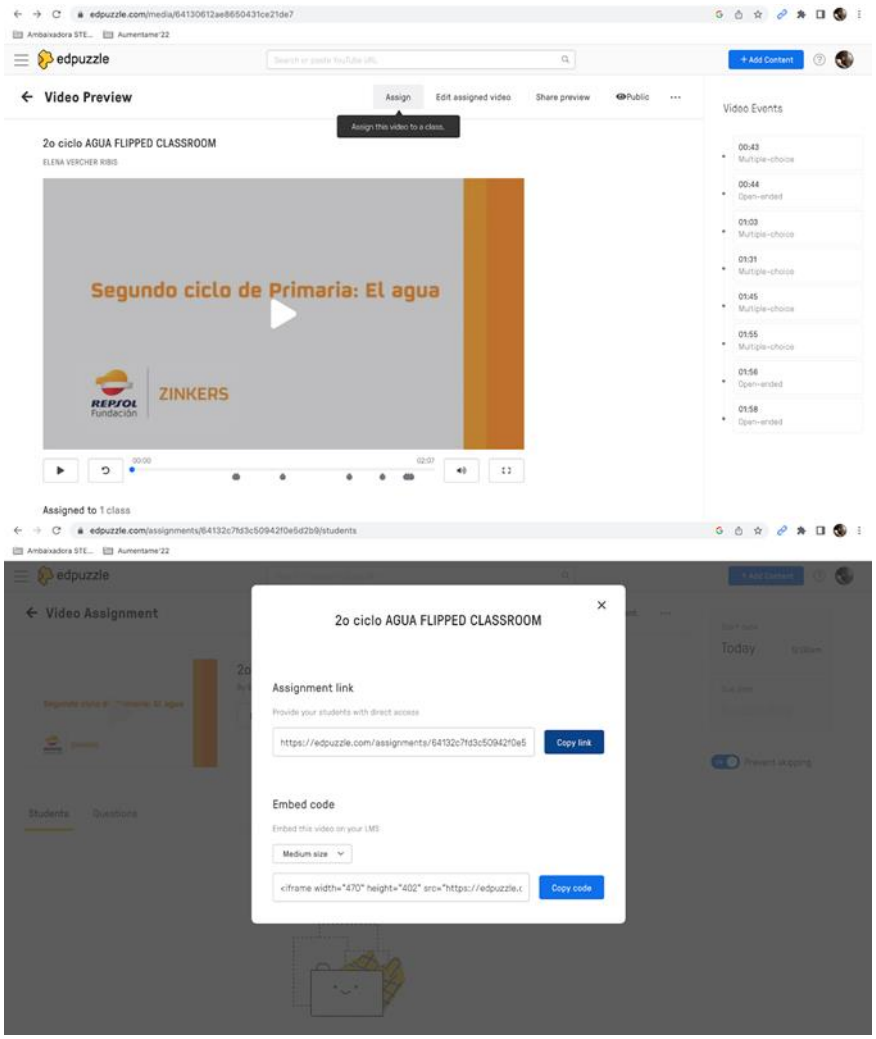
7. Repeat steps 4-6 to add more questions to your video. You can add as many questions as you like.

8. Once you've finished adding questions, preview your video to make sure everything looks good. You can make further adjustments as needed.

9. When you're happy with your video, click on the "Finish" button to save it.

10. Finally, you can share your video with your students or audience by sharing the Edpuzzle link. You can also embed the video on your website or share it on social media platforms.



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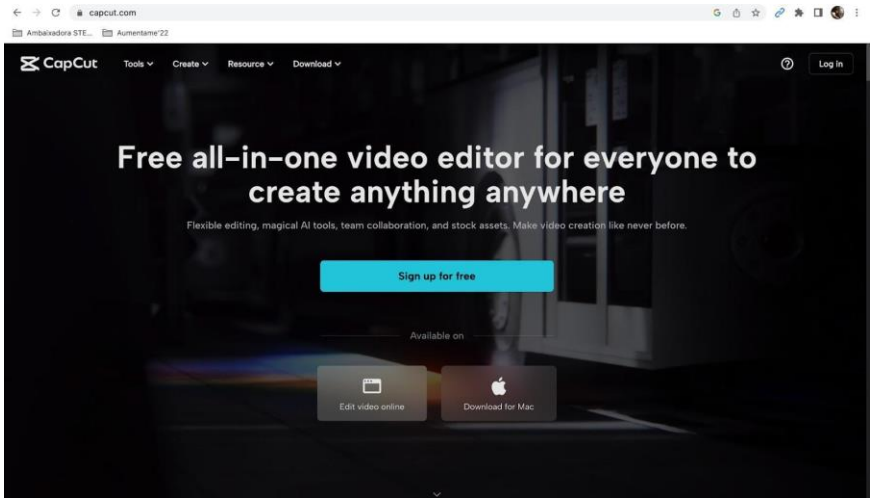
That's it! With these steps, you can create a video with questions about climate change using Edpuzzle. Remember to choose relevant questions and answers to test your students' knowledge and understanding of the topic.

CapCut

https://www.capcut.com

CapCut is a video editing app that you can use to create videos with emojis and animations. Here's how you can create a video about climate change using CapCut:

1. Access the website and click on the "Edit video online" button to create a new project.



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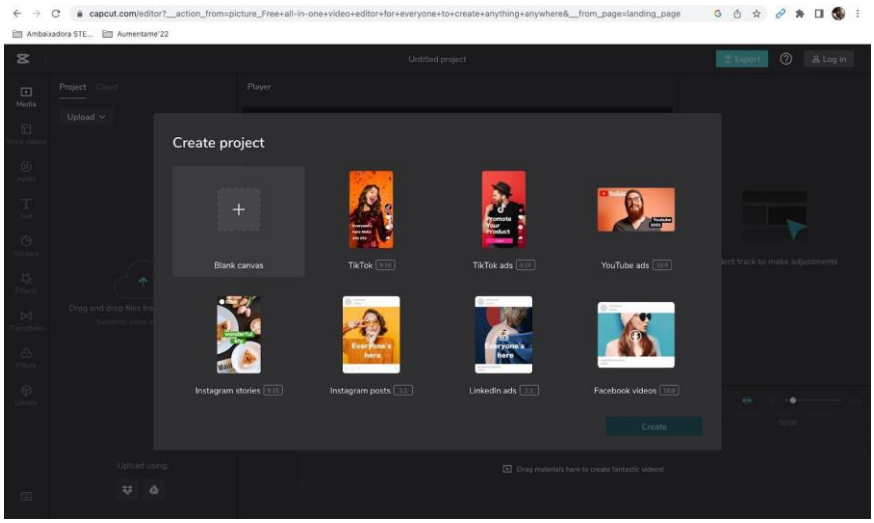
2. Select the video clips and images you want to use in your video. You can either upload them from your device or use CapCut's built-in media library.



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3. Drag and drop the media clips onto the timeline at the bottom of the screen. You can rearrange them as needed.

4. To add emojis and animations to your video, click on the "Stickers" button at the bottom of the screen. Here, you'll find a range of animated stickers and emojis that you can use in your video.

5. Drag and drop the stickers and emojis onto your video where you want them to appear. You can resize them by pinching or zooming in/out.

6. To add animations to your stickers and emojis, click on the "Animation" button on the right-hand side of the screen. Here, you'll find a variety of animation effects you can use.

7. Apply the animation effect to your stickers and emojis by selecting it and dragging it onto the clip. You can adjust the animation settings as needed.

8. Once you've finished adding stickers, emojis, and animations, preview your video to make sure everything looks good. You can make further adjustments as needed.

9. When you're happy with your video, click on the "Export" button to save it to your device.

That's it! With these steps, you can create a video with emojis and animations about climate change using CapCut on your Chromebook. Remember to choose relevant media clips and stickers to convey your message effectively.

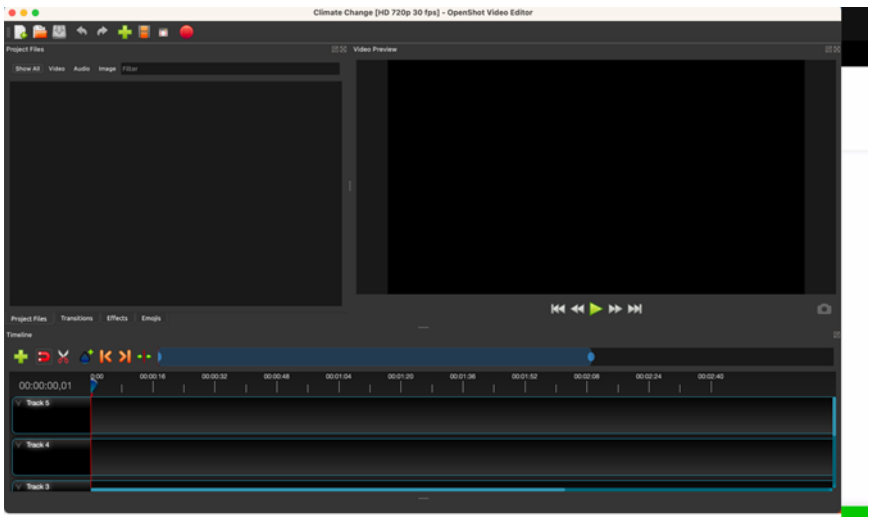
Openshot

https://www.openshot.org/es/download/

OpenShot is a free and open-source video editing software that provides powerful tools for creating professional-looking videos. It offers a user-friendly interface, a wide range of features, and support for multiple video, audio, and image formats.

To create a video about climate change using OpenShot, you can follow these steps:

1. Open OpenShot on your computer.



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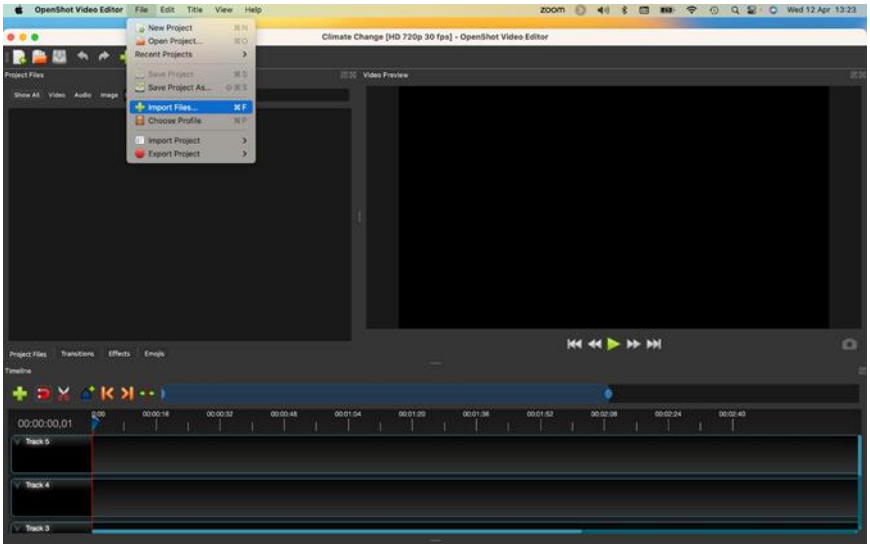
2. Click on the "File" menu and select "New Project".
3. Give your project a name and click "Create".
4. Click on the "File" menu again and select "Import Files".



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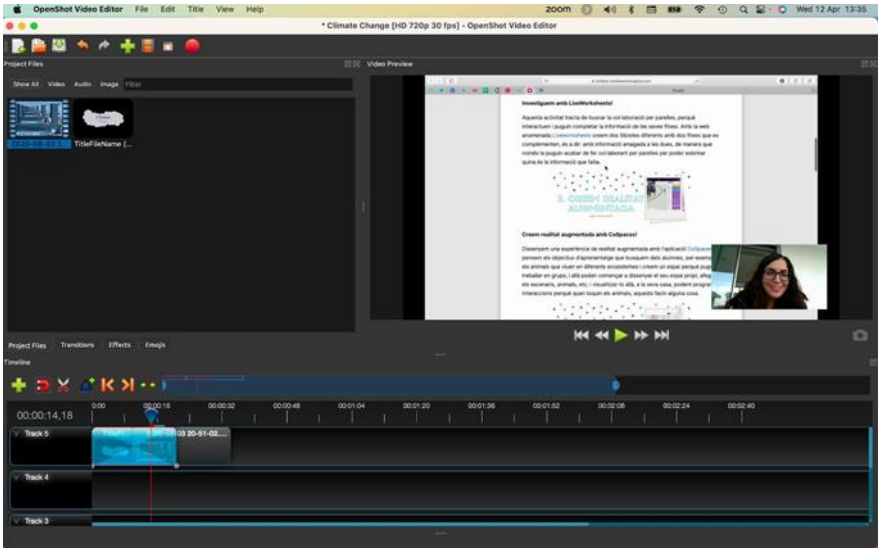
5. Navigate to the folder where you have your video clips or photos saved and select them. Click "Open".
6. Drag and drop the clips or photos onto the timeline at the bottom of the screen in the order you want them to appear in your video.



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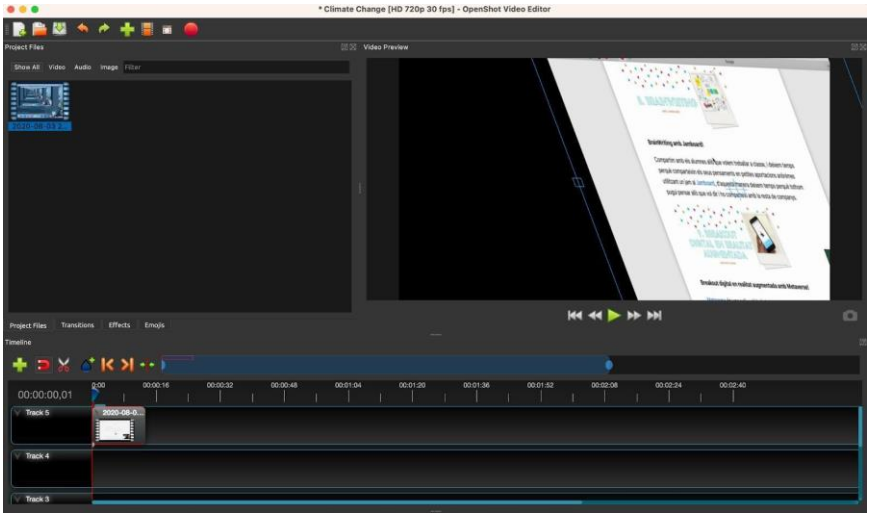
7. Click on each clip or photo to adjust its length and position on the timeline.



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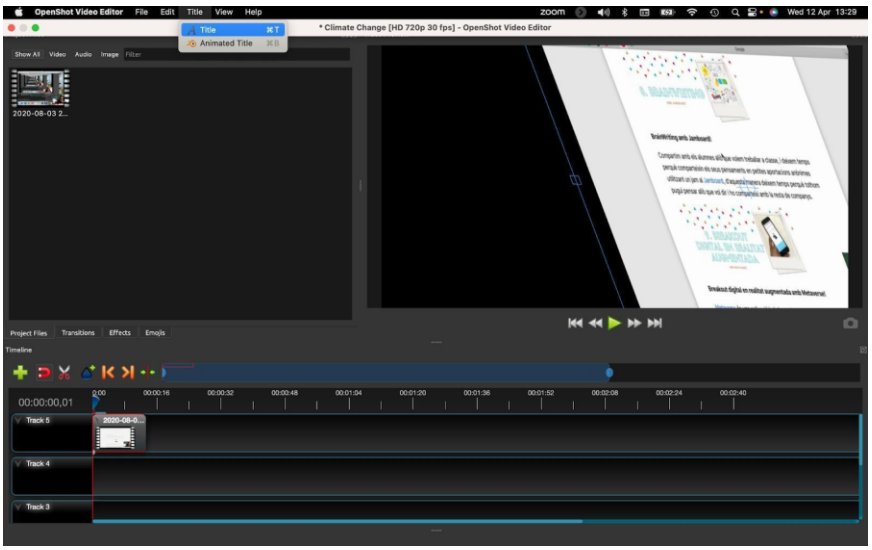
8. Click on the "Title" tab in the upper-left corner of the screen and select "New Title".
9. Type in your title, choose the font, size and colour, and click "Create".



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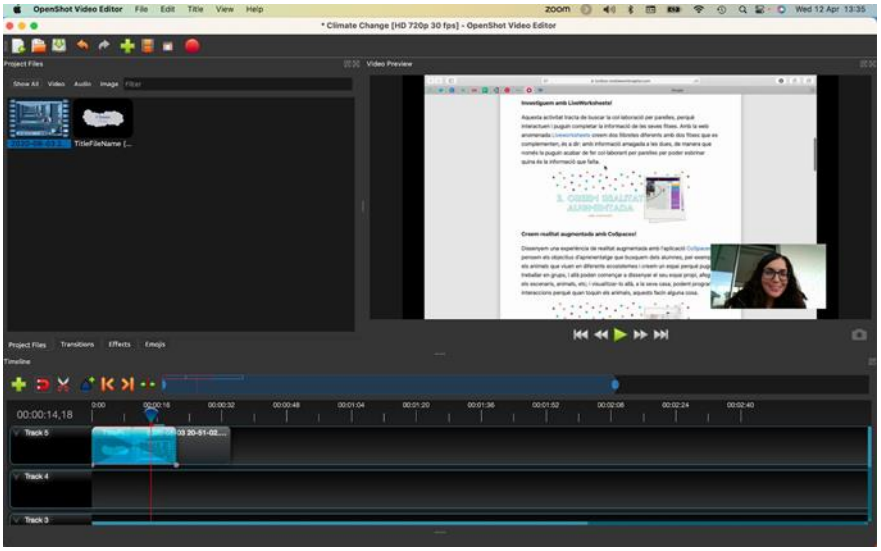

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10. Drag the title to the timeline to add it to your video.

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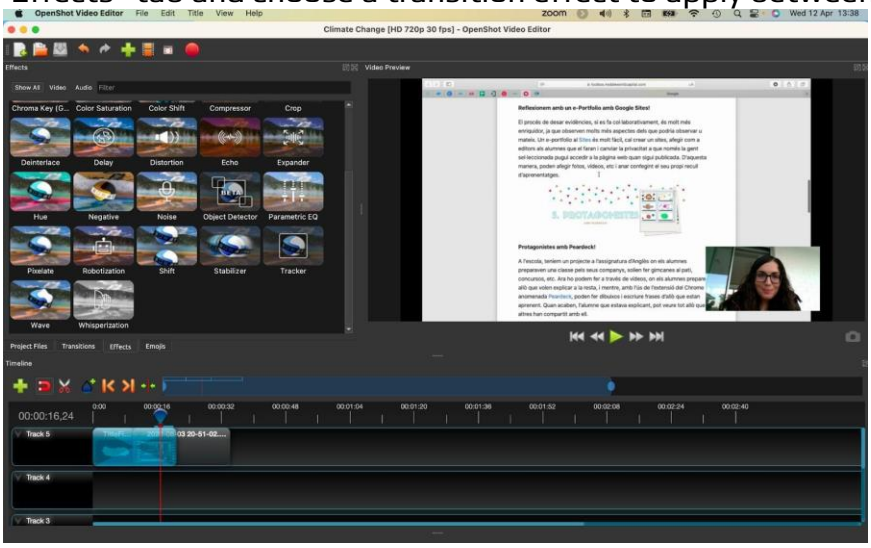
11. Click on the "Effects" tab and choose a transition effect to apply between clips.



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12. Drag the effect to the timeline to add it to your video.
13. Click on the "Export" button in the top menu bar.
14. Choose the format you want to export your video as (e.g. MP4), the location where you want to save it, and click "Export".

That's it! You now have a video about climate change created with OpenShot.

Activity ideas

A lecture by a climate scientist that provides a clear and concise explanation of the science behind climate change and its impacts.

An interactive visual that shows the historical and projected global temperature trends, and how this is linked to the increased concentration of greenhouse gases in the atmosphere.

A video that showcases the impacts of climate change on different regions of the world, including changes in ecosystems, shifts in species ranges, and increased frequency of extreme weather events.

A discussion of the Paris Agreement and other international efforts to address climate change, and the role that individuals and communities can play in reducing their carbon footprint and promoting sustainability.

Quiz: What is climate change?

1. What is climate change?

- Changes in the Earth's climate system caused only by human activities.
- Long-term changes in the Earth's climate system caused by a combination of natural factors and human activities.
- Short-term changes in the Earth's climate system caused by human activities.

2. What are greenhouse gases?

- Gases that cool the Earth's atmosphere.
- Gases that have no effect on the Earth's atmosphere.
- Gases that trap heat in the Earth's atmosphere.

3. What impact does deforestation have on climate change?

- It leads to an increase in atmospheric levels of greenhouse gases
- It can lead to changes in local climate
- All of the above

- It reduces the number of trees available to absorb carbon dioxide

4. **How do rising temperatures affect ecosystems and wildlife?**
   - By increasing the abundance of species.
   - By increasing the number of breeding and migration patterns.
   - By disrupting the timing of seasons, which affects breeding and migration patterns, and the distribution and abundance of species.
5. **Why can carbon dioxide be harmful to the environment?**
   - It is necessary for life on Earth.
   - It is not a greenhouse gas.
   - It contributes to global warming and climate change.
   - It has no effect on the environment.
6. **What is the importance of debunking common myths about climate change?**
   - To provide a more accurate picture of the situation.
   - To protect the fossil fuel industry.
   - To make people more skeptical about climate change.
   - To confuse people about climate change.
7. **What are some of the factors that contribute to climate change?**
   - Solar flares, asteroid impacts, and gravitational forces
   - Greenhouse gas emissions, deforestation, and changes in land use
   - Volcanic eruptions, earthquakes, and tsunamis
8. **What are some recent weather events that have been linked to climate change?**
   - Long periods of drought followed by heavy rainfall
   - More frequent and severe hurricanes, wildfires, droughts, and floods
   - Mild winters and rainy summers
9. **What is the Paris Agreement?**
   - An agreement between two countries to reduce emissions
   - An agreement between 195 countries to limit global warming
   - An agreement between businesses to use renewable energy
10. **How are businesses contributing to the fight against climate change?**

- By ignoring the issue completely
- By increasing their carbon footprint
- By setting sustainability goals and committing to science-based targets

Module 2: School actions for Climate Change

What can we do as individuals to help combat climate change?

Introduction

Teaching students about climate change is an important part of their education. It is a complex and multifaceted topic that requires a deep understanding of science, social studies, economics, and ethics. As educators, we have a responsibility to prepare our students to understand and address the challenges of climate change.

Image copyright: Canva Free Content License

Here are some strategies that can help us teach students about climate change:

Start with the basics

Before diving into the details of climate change, it's important to ensure that students have a strong foundation in the scientific
principles that underpin it. This includes concepts such as the greenhouse effect, the carbon cycle, and the role of human activity in causing climate change.

Use age-appropriate language

Climate change is a complex topic, and it's important to present it in a way that is accessible to students at all levels. Use age- appropriate language and avoid technical jargon whenever possible.

Incorporate interdisciplinary perspectives

Climate change is a problem that requires a multidisciplinary approach. Incorporate perspectives from science, social studies, economics, and ethics to help students understand the interconnectedness of these fields.

Use real-world examples

Climate change is not just an abstract concept, but a real-world problem with real-world consequences. Use examples from the news and current events to help students understand the impacts of climate change on our planet and our society.

Encourage critical thinking

Encourage students to ask questions and think critically about the causes and effects of climate change, as well as the potential solutions. Use open-ended questions and facilitate classroom discussions to promote critical thinking.

Promote action

Finally, it's important to empower students to take action on climate change. Encourage them to get involved in local initiatives and
to advocate for policies that address the issue. Help them understand that they have a role to play in shaping the future of our planet.

Teaching about climate change can be a daunting task, but it is also a critical one. By providing our students with the knowledge and tools they need to understand and address this global challenge, we are helping to create a more sustainable future for all.

What kind of activities can be done in class to increase their awareness of their everyday actions?

Examples of activities for any level:

- A hands-on activity where students create a model of the greenhouse effect and explore how it works.
- A case study that explores the impacts of climate change on a specific community or ecosystem, and how individuals and organizations are working to address these challenges.
- A lesson plan that integrates climate change into a science unit on weather and climate, and includes opportunities for students to analyze real-world data and make connections to their own experiences.
- A service-learning project where students research and implement ways to reduce their school's carbon footprint, and share their findings with the wider community.

Carbon Footprint Game

In this activity, students can calculate their carbon footprint and understand the impact their daily activities have on the environment. They can learn about the ways to reduce their carbon footprint and the importance of sustainable living.

Image copyright: Canva Free Content License

Preparation

1. Gather materials needed for the game, including a set of cards that represent different actions and their corresponding carbon footprint impact, a large sheet of paper and a marker to record scores, and a timer.
2. Divide the players into teams of 2-4.
3. Understanding Carbon Footprint:
4. Start by explaining to the players what a carbon footprint is and how it relates to climate change.
5. Discuss the different actions that can contribute to a person's carbon footprint, such as transportation, energy use, and waste management.

Gameplay

1. Each team takes turns selecting a card that represents a specific action.
2. Read the description on the card and discuss the impact the action has on the carbon footprint.
3. Teams can choose to take the action described on the card or pass.
4. Teams that take the action must complete a task related to the action, such as calculating the carbon footprint of a hypothetical car trip or reducing energy usage in the classroom.
5. Teams receive points for successfully completing the task and reducing their carbon footprint.
6. The team with the highest score at the end of the game wins.

Debrief

After the game, have a discussion with the players about what they learned about their carbon footprint and what steps they can take to reduce it.

Encourage the players to think about how they can apply what they learned in their daily lives.

Note: The specific actions and tasks will vary depending on the specific Carbon Footprint Game you are playing, but the overall goal is to educate players about the impact of their actions on the environment and encourage them to take steps to reduce their carbon footprint.

› Here is an editable example of a set of cards that can be used

Climate Change Scavenger Hunt

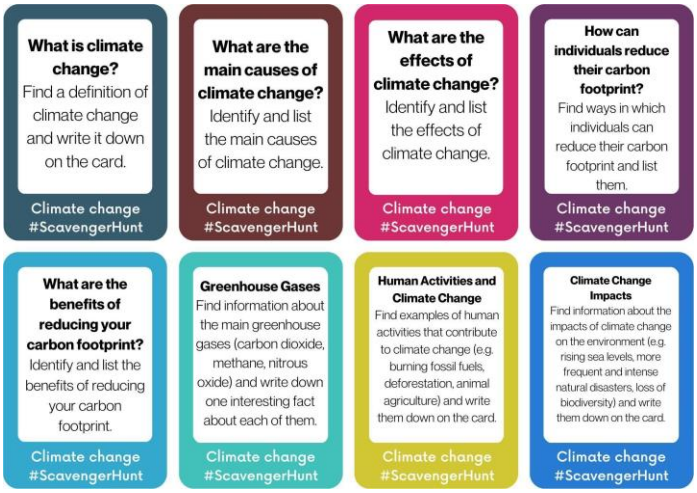
This is a fun and interactive activity that encourages students to learn about the causes and effects of climate change. Students can be divided into teams and given a list of clues related to climate change. The first team to find all the answers wins.

Objective

The objective of this activity is to raise awareness about the causes and effects of climate change, and to encourage critical thinking about the ways in which individuals can reduce their carbon footprint.

Materials

- Pens or pencils
- A set of scavenger hunt cards



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Instructions

1. Divide the students into small groups (2-4 students per group).
2. Provide each group with a set of scavenger hunt cards and a pen or pencil.
3. Explain to the students that they will be going on a scavenger hunt to find information about the causes and effects of climate change, and ways in which they can reduce their carbon footprint.
4. Instruct the students to start at the first card and find the information indicated on the card. They can use books, the internet, or other resources to find the answers.
5. Once they have found the answer, they should write it down on the card.
6. The students should then move on to the next card and repeat the process until they have completed all the cards.
7. The first group to complete all the cards wins the scavenger hunt.

Example of cards (editable)

Climate Change Debate

In this activity, students can work in pairs or small groups to research and debate about the causes and solutions to climate change. The debate can be moderated by the teacher and students can present their arguments and counterarguments to the class. This activity helps students develop critical thinking and communication skills while learning about climate change.

1. Divide the participants into two groups, one to argue for and one against the following statement: "Human activities are the main cause of climate change."
2. Provide each group with information and resources to support their argument.
3. Allocate time for each group to prepare their argument, discussing and selecting the best points to present.
4. When both groups are ready, they will present their arguments to the class, taking turns to present their strongest points and rebutting the other group's arguments.
5. Encourage the class to ask questions and provide feedback during the debate.
6. After both groups have presented, facilitate a discussion where the class can reflect on what they have learned from the debate.
7. Finally, conclude the activity by summarizing the key points made by each group and encouraging the class to consider the importance of considering different perspectives and opinions when discussing complex issues like climate change.

It's important to emphasize that the goal of the debate is not to win or lose, but to encourage critical thinking and to help the students understand the different perspectives on climate change.

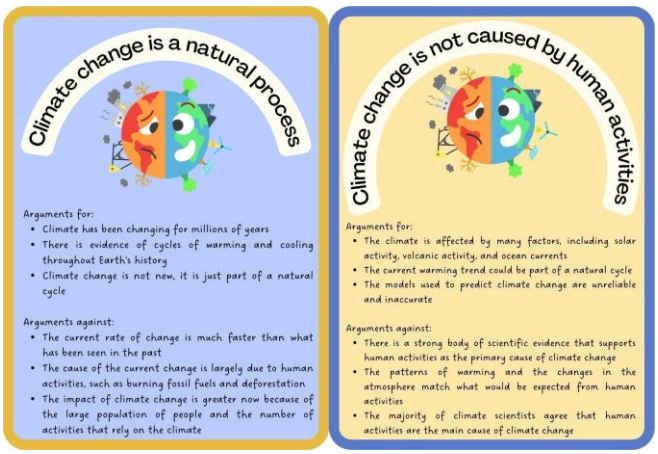

Image copyright: Canva Free Content License

›Here is an editable example of debate cards

Climate Change Poster Campaign

In this activity, students can work in groups to create posters that educate others about the causes and effects of climate change and how to reduce their carbon footprint. The posters can be displayed in the classroom or school for everyone to see.

They can use online free resources such as Canva to design their posters, adding interaction (links, videos...).

Instructions:

- Introduce the topic of climate change to the students, using age-appropriate language and visuals.
- Explain to the students that they will be creating a digital collage about climate
- change using a website called Canva. Show the students how to access Canva, and guide them through the process of creating an account.
- Once the students have logged into Canva, provide them with a selection of images related to climate change. These can be found online or in educational materials.
- Demonstrate how to add images to the collage, resize and move them around, and add text.
- Encourage the students to get creative with their collages, and to express their thoughts and feelings about climate change through their designs.
- Once the students have completed their collages, guide them through the process of saving and downloading their creations.
- Allow time for the students to share their collages with the rest of the class, and encourage a discussion about the different themes and messages conveyed in each design.
- Finally, remind the students of the importance of taking action to address climate change, and encourage them to share their newfound knowledge with their families and friends.

Examples of posters:

Image copyright: Canva Free Content License

Plant a Tree

This is a practical and hands-on activity that helps students understand the importance of planting trees in reducing carbon
emissions. Students can plant a tree in the school garden or local park, and learn about how trees absorb carbon dioxide from the atmosphere.

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Activity: Design your learning scenario

In this activity, you will reflect on your own teaching practices and explore different strategies for teaching climate change in your classroom.

You will be prompted to design a learning scenario, choosing amongst this range of pedagogical approaches and considering which ones might work best for you.

Finally, share your learning scenario in the forum.

Materials needed:

A computer or device with internet access
Template of the learning scenario in Canva, you can edit it as much as you would like.
Template of the learning scenario in downloadable PDF version.
Access to online resources such as websites, articles, and videos on effective teaching methods for climate change
The Climate Literacy and Energy Awareness Network (CLEAN) (https://cleanet.org/): This website provides a collection of educational resources for teaching about climate change, including strategies for effective instruction and hands-on activities.

Project WET (https://www.projectwet.org/): Project WET provides a variety of water-focused educational resources that can be used to teach about climate change, including lesson plans, activities, and multimedia resources.

Quiz: How would you approach teaching about climate change?

1. **There are multiple approaches to teaching about climate change, and each one has its own strengths and weaknesses.**
   - o Strongly disagree
   - o Somewhat disagree
   - o Neither agree nor disagree
   - o Somewhat agree
   - o Strongly agree

2. **It's important to approach teaching about climate change from a holistic perspective, taking into account scientific, social, cultural, and economic factors.**
   - o Strongly disagree
   - o Somewhat disagree
   - o Neither agree nor disagree
   - o Somewhat agree
   - o Strongly agree

3. **Teaching about climate change should be grounded in accurate and up-to-date scientific information, but should also include discussions of ethics, values, and worldviews.**
   - o Strongly disagree
   - o Somewhat disagree
   - o Neither agree nor disagree
   - o Somewhat agree

- Strongly agree

4. **It's important to create a safe and inclusive learning environment where students feel comfortable discussing their thoughts and feelings about climate change**.
   - Strongly disagree
   - Somewhat disagree
   - Neither agree nor disagree
   - Somewhat agree
   - Strongly agree

5. **Effective teaching about climate change should focus on both the impacts of climate change and potential solutions, including individual and collective actions.**
   - Strongly disagree
   - Somewhat disagree
   - Neither agree nor disagree
   - Somewhat agree
   - Strongly agree

6. **Incorporating hands-on activities and projects can help students understand the science of climate change in a more meaningful way.**
   - Strongly disagree
   - Somewhat disagree
   - Neither agree nor disagree
   - Somewhat agree
   - Strongly agree

7. **It's important to help students understand that climate change is a complex and multifaceted issue that requires interdisciplinary solutions.**
   - Strongly disagree
   - Somewhat disagree

- o Neither agree nor disagree
- o Somewhat agree
- o Strongly agree

8. **Incorporating indigenous knowledge and perspectives can help students understand the cultural and historical dimensions of climate change**.
   - o Strongly disagree
   - o Somewhat disagree
   - o Neither agree nor disagree
   - o Somewhat agree
   - o Strongly agree

9. **Teaching about climate change should encourage critical thinking and inquiry, allowing students to ask questions and explore different perspectives.**
   - o Strongly disagree
   - o Somewhat disagree
   - o Neither agree nor disagree
   - o Somewhat agree
   - o Strongly agree

10. **Technology and digital resources can be used to enhance teaching about climate change, but should be used judiciously and with a critical eye.**
    - o Strongly disagree
    - o Somewhat disagree
    - o Neither agree nor disagree
    - o Somewhat agree
    - o Strongly agree

Module 3: *Teaching People About Climate Change*

Introduction

Climate change is a global challenge that requires collective action from individuals, communities, and governments. While significant change requires systemic change, there are many things that individuals can do to help combat climate change in their daily lives. As educators, it is important to teach our students about these actions and empower them to make a positive impact.

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Reduce energy consumption

One of the most effective ways to combat climate change is to reduce energy consumption. We can do this by turning off lights and electronics when not in use, using energy-efficient light bulbs, and unplugging chargers when they are not needed. Additionally, we can reduce our reliance on non-renewable sources of energy by using public transportation, carpooling, or biking instead of driving alone, and using renewable sources of energy, such as solar panels or wind turbines.

Reduce water usage

Conserving water is also an important way to combat climate change. We can do this by taking shorter showers, fixing leaks, and using low-flow showerheads and toilets. Additionally, we can reduce our water usage by using a rain barrel to collect rainwater for watering plants or gardens.

Reduce waste

Another way to combat climate change is to reduce waste. We can do this by recycling, composting, and reducing our consumption of single-use plastics, such as straws and plastic bags. Additionally, we can reduce our food waste by planning meals and only buying what we need, and by donating excess food to food banks or composting it.

Eat a plant-based diet

The food we eat also has an impact on the environment. Eating a plant-based diet can help reduce greenhouse gas emissions and combat climate change. This is because the production of meat and dairy products generates more greenhouse gas emissions than the production of plant-based foods. Encourage your students to eat more fruits, vegetables, grains, and legumes and less meat and dairy products.

Plant trees

Trees absorb carbon dioxide from the atmosphere and help combat climate change. Encourage your students to plant trees in their communities, or participate in tree-planting events.

Advocate for change

Finally, individuals can make a difference by advocating for change at the local and national level. Encourage your students to write letters to elected officials or participate in peaceful protests to demand action on climate change.

In conclusion, combating climate change requires collective action from individuals, communities, and governments. As educators, it is our responsibility to teach our students about the importance of taking action to combat climate change and empower them to make positive changes in their daily lives. By reducing energy consumption, water usage, waste, and meat consumption, planting
trees, and advocating for change, individuals can make a positive impact on the environment and help combat climate change.

What is required by industry to minimize emissions?

Industry plays a significant role in contributing to global greenhouse gas emissions. To combat climate change, it is essential that industries take measures to minimize their carbon footprint. There are various approaches that industries can take to minimize their emissions, including reducing energy consumption, using renewable energy sources, and implementing efficient production methods.

One of the critical steps that industries can take to reduce their emissions is to increase energy efficiency. They can do this by improving their production processes, such as upgrading equipment, optimizing systems, and ensuring proper maintenance. Industries can also implement energy-efficient practices, such as using LED lighting, installing smart meters, and improving insulation. These measures help reduce energy consumption and save costs while minimizing greenhouse gas emissions.

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Another crucial aspect is to use renewable energy sources such as solar, wind, or hydropower. Industries can install their renewable energy systems or source renewable energy from external providers. By using renewable energy, industries can reduce their dependence on fossil fuels, which are significant contributors to greenhouse gas emissions.

Industries can also adopt more sustainable production practices, such as using eco-friendly raw materials and reducing waste. They can recycle or reuse materials to reduce the amount of waste sent to landfills. Reducing waste not only helps minimize emissions but also lowers costs associated with waste disposal.

Moreover, industries can take advantage of emerging technologies such as carbon capture and storage (CCS) to reduce emissions. CCS is a process that captures carbon dioxide before it is released into the atmosphere and stores it in geological formations.
Industries can also use biofuels as an alternative to fossil fuels. Biofuels are renewable fuels made from organic matter such as crops, waste, or algae. They produce fewer greenhouse gas emissions than fossil fuels and help reduce the carbon footprint.

In conclusion, industries must take action to minimize their carbon footprint and contribute to the fight against climate change. They can implement measures such as increasing energy efficiency, using renewable energy, adopting sustainable production practices, and using emerging technologies to minimize emissions. These steps not only benefit the environment

but also provide cost savings and help industries remain competitive in a changing business environment.

Recent climate change action (schools strikes, de-investing from non-renewable energy etc.)

In recent years, there has been a growing awareness of the need for action to combat climate change. This has led to a number of movements and initiatives aimed at reducing greenhouse gas emissions and promoting sustainability. In this text, we will look at some of the recent climate change action taken by schools, businesses, and individuals.

One of the most visible forms of climate change action has been the series of global school strikes organized by the youth-led movement Fridays for Future. Started by 16-year-old Swedish activist Greta Thunberg, these strikes involve students from around the world walking out of school to demand action on climate change from their governments. The movement has gained significant media attention and has inspired similar protests in other sectors, such as the Global Climate Strike in September 2019, which saw millions of people from around the world taking to the streets to demand action on climate change.

Another area where significant climate change action has taken place is in the world of finance. Over the past decade, there has been a growing trend towards divestment from non-renewable energy sources such as coal, oil, and gas. This divestment movement has been led by a coalition of environmental groups, faith-based organizations, and socially responsible investors. By pressuring institutions to divest from fossil fuels, this movement aims to reduce the financial support for the fossil fuel industry and promote a shift towards renewable energy sources.

In addition to these large-scale movements, there have also been many individual efforts to combat climate change. These include initiatives such as reducing energy consumption at home, using public transport or cycling instead of driving, and reducing meat consumption. Social media has played a key role in promoting and spreading awareness of individual climate change action, with hashtags such as #climatestrike, #climateaction, and #climatecrisis gaining widespread use.

Overall, recent climate change action has highlighted the urgent need for society as a whole to take action to combat climate change. Whether through large-scale global movements or individual actions, it is clear that everyone has a role to play in reducing greenhouse gas emissions and promoting a more sustainable future.

Multidisciplinary approaches to teach about climate change (Social, Economic, Scientific, STEAM)

Introduction

Climate change is a global problem that requires immediate attention from all sectors of society. The education sector has a critical role to play in raising awareness and encouraging action on this issue. The teaching of climate change should be incorporated into the curriculum at all levels, including primary and secondary education. To effectively address this issue, a multidisciplinary approach is needed, bringing together a range of subjects, such

as science, geography, economics, and social studies, to provide a comprehensive understanding of the problem and its potential solutions.

Science-Based Approaches

One of the most straightforward ways of teaching about climate change is through science-based approaches. Science classes, such as physics, chemistry, and biology, can provide students with a detailed understanding of the scientific processes and mechanisms that contribute to the warming of the planet. By teaching the causes and effects of climate change through science, students can understand the issue in a more objective and data-driven manner. For example, lessons on the greenhouse effect, ocean acidification, and the impacts of deforestation can help students understand how human activities are contributing to the problem.

Geography-Based Approaches

Geography is another subject that can play an important role in teaching about climate change. Geography-based approaches provide a spatial perspective on the issue and allow students to understand the different impacts that climate change is having on different regions of the world. This approach can help students understand the interconnectedness of the planet and the ways in which climate change is affecting different ecosystems and communities. For example, lessons on climate zones, the polar regions, and ocean currents can help students understand the complex relationships between the earth's climate and its physical systems.

Economics-Based Approaches

Economics-based approaches can help students understand the economic impacts of climate change and the potential solutions that are available. This approach can help students understand the costs and benefits of different actions, as well as the trade-offs that must be made in order to address the problem. For example, lessons on carbon pricing, renewable energy, and sustainable development can help students understand the economic dimensions of the issue.

Social Studies-Based Approaches

Social studies-based approaches provide a social and historical perspective on the issue, allowing students to understand the cultural and political dimensions of climate change. This approach can help students understand the ways in which different societies have responded to the problem, as well as the challenges that must be overcome in order to achieve meaningful action. For example, lessons on environmental activism, the history of environmental policy, and the role of the media in shaping public opinion can help students understand the social and political aspects of the issue.

Art-Based Approaches

Art-based approaches provide a creative and imaginative way of teaching about climate change. This approach can help students develop a deeper understanding of the issue by encouraging them to think critically, reflect, and express themselves. For example, lessons on climate change poetry, climate change photography, and climate change murals can help students understand the emotional and creative dimensions of the issue.

STEAM

The importance of educating students about climate change cannot be overstated. Climate change is one of the greatest challenges facing our planet and it is critical that students understand the causes, effects and solutions. One effective way to engage students in the

subject is through STEAM (Science, Technology, Engineering, Arts and Mathematics) approaches.

STEAM approaches are designed to encourage students to think critically and creatively about the issues surrounding climate change. By incorporating science, technology, engineering, arts and mathematics, students are able to gain a deeper understanding of the complexity of the problem and potential solutions.

Science

Science is an essential component of climate change education. Students need to understand the basic science behind the
greenhouse effect, the role of carbon dioxide and other greenhouse gases in the atmosphere, and the impact of human activities on the environment.

To help students understand these concepts, teachers can use hands-on experiments, simulations and interactive activities to show the impact of human activities on the environment. For example, students can observe the effects of increased carbon dioxide levels on plants by conducting experiments in a greenhouse. Teachers can also use simulations to demonstrate the impacts of sea level rise and ocean acidification.

Technology

Technology plays a critical role in addressing the challenges posed by climate change. It is important for students to understand the role of technology in mitigating the impacts of climate change and in developing solutions.

For example, teachers can use interactive tools such as computer simulations and online resources to help students understand the impact of various technologies on the environment. For example, students can explore the different technologies used to reduce
greenhouse gas emissions and learn about the trade-offs between different solutions.

Engineering

Engineering is a critical component of addressing the challenges posed by climate change. Engineers are responsible for designing and developing new technologies to mitigate the impacts of climate change and to develop sustainable solutions.

To help students understand the role of engineering in addressing climate change, teachers can use hands-on activities, simulations and interactive tools to help students understand the design and development process. For example, students can work in groups to design and build prototypes of sustainable technologies, such as wind turbines or solar panels.

Arts

Arts are a powerful tool for engaging students in the subject of climate change. By incorporating the arts into climate change education, teachers can help students develop a deeper understanding of the issue and its impact on the environment.

For example, teachers can use storytelling, film, music, and visual arts to help students understand the causes and effects of climate change. Students can also use the arts to express their own ideas and emotions about the issue. For example, students can create
posters, paintings or sculptures to communicate their ideas and feelings about climate change.

Mathematics

Mathematics is an essential component of climate change education. It is important for students to understand the mathematical models and algorithms that are used to study the

impacts of climate change and to develop solutions.

- To help students understand the role of mathematics in climate change education, teachers can use simulations, interactive tools, and hands-on activities to help students understand the mathematical models and algorithms used to study the impacts of climate change. For example, students can use computer simulations to explore the impact of various emissions scenarios on the environment.

Conclusion

Incorporating STEAM approaches into climate change education can help students understand the complex challenges posed by the issue and develop critical thinking skills. By using hands-on activities, simulations, interactive tools, and incorporating the arts, teachers can engage students in a deeper and more meaningful learning experience. It is important that students understand the importance of addressing the issue and feel empowered to take action to create a more sustainable future.

Teaching about climate change requires a multidisciplinary approach that brings together a range of subjects and perspectives. By incorporating science, geography, economics, social studies, and art into the curriculum, students can develop a comprehensive understanding of the issue and its potential solutions. Through this interdisciplinary approach, students will be better equipped to tackle the challenges of the future and to play an active role in addressing this critical global issue.

Examples of multidisciplinary lessons

In this chapter, as well as in the following subchapters, we will examine diverse examples of multidisciplinary activities that can be effectively integrated into the classroom setting, catering to the needs of pre-primary, primary, and secondary level students.

Before you start, here are some cool projects that everyone in your school can do together! They involve different subjects, so you'll learn a lot while having fun.

- A lesson plan that brings together science, social studies, and language arts to explore the causes and consequences of climate change, and the role of policy and politics in addressing the issue.
- An interdisciplinary project that combines art and science to create a mural that portrays the impacts of climate change on the local environment, and the ways that people can help to reduce their impact.
- A lesson that uses music and poetry to explore the emotional and psychological aspects of climate change, and to encourage students to reflect on their own values and beliefs related to sustainability.

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Activity: Include multidisciplinary activities in your lesson plan and bring them to action in class

In this activity, you will have to explore how climate change can be taught across different subjects and disciplines. Choose some subjects, such as science, social studies, or language arts, and develop the previous lesson plan or activity created in the previous topic that integrates climate change into that subject. Then, share your work with the rest of the group in the forum and receive feedback from your peers.
After this, bring it to action with your students and share the materials and some evidences in the forum.

Materials needed:

- A computer or device with internet access
- Access to online resources such as websites, articles, and videos on interdisciplinary approaches to teaching climate change
    - The Climate Change and Biodiversity website (https://www.climatediversity.com/): This website provides information and resources on how climate change is affecting biodiversity and ecosystems. It includes a section specifically dedicated to educational resources, including lesson plans, activities, and multimedia resources.
    - The Climate and Energy Education website (https://cleanet.org): This website provides information and resources for teaching about climate change and energy, including lesson plans, activities, and multimedia resources.

Module 4: *Assessing knowledge on climate change*

Quiz: Effect on the current assessment and evaluation strategies you use for climate change education.

1. **How often do you assess student understanding of climate change concepts?**
    - Daily
    - Weekly
    - Monthly
    - Only at the end of the unit
    - I do not assess student understanding of climate change concepts
2. **Which types of assessments do you use to evaluate student learning about climate change?**
    - Multiple choice tests
    - Short answer questions
    - Essays
    - Projects or presentations
    - Other
3. **How do you provide feedback to students about their understanding of climate change concepts?**
    - Written comments on assignments
    - Verbal feedback during class discussions
    - Rubrics
    - Other
4. **How do you assess student understanding of the impact of climate change on different regions and communities?**
    - Multiple choice tests

- Short answer questions
- Essays
- Projects or presentations
- Other

5. **Do you provide opportunities for students to self-assess their understanding of climate change concepts?**
    - Yes, frequently
    - Yes, occasionally
    - No, but I would like to start
    - No, I do not believe it is necessary
6. **How do you use assessment results to inform your instruction on climate change?**
    - I use assessment results to plan future lessons
    - I use assessment results to adjust my teaching during a lesson
    - I do not use assessment results to inform my instruction on climate change
7. **How do you accommodate students with different learning needs in your assessments of climate change concepts?**
    - I provide accommodations based on individual student needs
    - I use the same assessments for all students
    - I do not accommodate for different learning needs in my assessments of climate change concepts
8. **How do you evaluate the effectiveness of your climate change education instruction?**
    - Through student assessments and evaluations
    - Through feedback from students and colleagues
    - Through my own self-reflection and evaluation
    - Other
9. **How do you address misconceptions or misunderstandings that students may have about climate change concepts?**

- Through class discussions and activities
- Through individual meetings with students
- Through additional resources and readings
- Other

10. Do you provide opportunities for students to apply their understanding of climate change concepts to real-world situations?

- Yes, frequently
- Yes, occasionally
- No, but I would like to start
- No, I do not believe it is necessary

Assessment strategies

Positive signs that climate change action works

While climate change situation may seem dire, there are several positive signs that climate change action works. These positive signs show that we can make a difference and that the efforts of individuals and organizations are having a meaningful impact.

One positive sign is the increased use of renewable energy. Over the last few years, there has been a significant increase in the use of renewable energy sources such as solar, wind, and hydropower. This increase is largely due to the efforts of individuals and organizations who have recognized the need to move away from fossil fuels. By using renewable energy, we can significantly reduce our carbon footprint and help to combat climate change.

Another positive sign is the decrease in deforestation rates. Deforestation is a significant contributor to climate change as it releases large amounts of carbon into the atmosphere. However, in recent years, there has been a decrease in deforestation rates, particularly in tropical regions. This decrease is largely due to the efforts of organizations and governments who are working to protect forests and promote reforestation.

Additionally, there has been a growing awareness of the importance of reducing waste and increasing recycling efforts. By reducing waste and increasing recycling rates, we can reduce the amount of greenhouse gases that are emitted into the atmosphere. Many countries and organizations have implemented programs to encourage waste reduction and recycling, and these efforts are starting to show positive results.

Finally, there has been a significant increase in public awareness and action on climate change. More and more people are becoming aware of the issue and are taking action to reduce their carbon footprint. This includes individuals who are making changes in their daily lives to reduce their impact, as well as organizations and governments who are

implementing policies and programs to combat climate change.

- In conclusion, while the issue of climate change is still a significant concern, there are several positive signs that climate change action works. These positive signs demonstrate that we can make a difference and that the efforts of individuals and organizations are having a meaningful impact. By continuing to work towards a more sustainable future, we can help to mitigate the effects of climate change and create a better world for future generations.

Types of assessment activities

Climate change is one of the most pressing issues of our time, and it is essential that students are equipped with the knowledge and skills to understand and address it. To achieve this goal, it is important that teachers use effective evaluation methods to measure student learning and understanding, and to make improvements to their teaching practices. In this article, we will explore the purpose and importance of evaluation in the classroom, and provide an overview of formative and summative evaluation methods and their benefits and challenges.

What is the purpose of evaluation in the classroom?

The primary purpose of evaluation in the classroom is to measure student learning and understanding. Evaluation provides teachers with valuable information about what students know and can do, and helps to identify areas for improvement in their teaching practices. Evaluation can be used for a variety of purposes, including grading students based on their performance, measuring the effectiveness of instructional strategies, and providing feedback to students on their progress.

Evaluation is also important for helping students to reflect on their own learning and identify areas for improvement. By providing students with feedback on their performance, teachers can help them to develop a better understanding of what they need to work on to improve their understanding of the subject matter. In this way, evaluation can play a crucial role in promoting student engagement and motivation.

What is formative evaluation?

Formative evaluation is a type of evaluation that is used to improve instruction and learning. Unlike summative evaluation, which occurs after instruction has taken place, formative evaluation takes place during instruction and provides teachers with immediate feedback on student understanding. This feedback can be used to make adjustments to instruction and ensure that students are on track to meet the learning objectives.

Formative evaluation can take many different forms, including quizzes, assessments, and project-based assessments. One of the benefits of formative evaluation is that it provides teachers with the opportunity to adjust instruction in real-time based on student needs. For example, if a teacher realizes that many students are struggling with a particular concept, they can take the time to re-teach the concept or provide additional support to help students overcome their difficulties.

What are some benefits of using formative evaluation in the classroom?

There are many benefits to using formative evaluation in the classroom. One of the most important benefits is that it provides
teachers with immediate feedback on student understanding. This information can be used to make adjustments to instruction and ensure that students are on track to meet the learning objectives.

Another benefit of formative evaluation is that it can increase student engagement and motivation. By providing students with regular feedback on their performance, teachers can help them to develop a better understanding of what they need to work on to improve
their understanding of the subject matter. In this way, formative evaluation can play a crucial role in promoting student engagement and motivation.

Finally, formative evaluation can help to improve teacher effectiveness. By providing teachers with feedback on the impact of their instructional strategies, they can make adjustments and improve their practices over time. This can help to increase student learning and understanding, and ultimately lead to better outcomes.

What are some challenges of using formative evaluation in the classroom?

Despite the many benefits of formative evaluation, there are also some challenges associated with its use in the classroom. One of the biggest challenges is that it can take up valuable instructional time. Teachers need to be careful to balance the time they spend
evaluating student understanding with the time they spend teaching and providing support.

Another challenge of formative evaluation is that it can be difficult to measure student understanding accurately. This is especially true when using assessments such as quizzes or project-based assessments, which may not provide a comprehensive picture of
student learning

Example of assessment activities

Tools and strategies

These are some examples of assessment tools and strategies in Climate Change Education:

Concept maps

Concept maps can be used as a form of pre- and post-assessment to gauge students' understanding of the topic. Students can create a concept map before learning about climate change and then update it as they learn more.

Performance tasks

Performance tasks, such as creating an action plan for reducing greenhouse gas emissions in their community, can be used to assess students' ability to apply what they have learned to real-world situations.

Science notebooks

Science notebooks can be used as a form of ongoing assessment, allowing students to record their observations, questions, and ideas related to climate change over time.

Argumentation tasks

Argumentation tasks can be used to assess students' ability to construct and defend arguments related to climate change. For example, students can be asked to write a persuasive essay on the need for climate action.

Group projects

Group projects can be used to assess students' ability to work collaboratively and communicate effectively about climate change. For example, students can be tasked with creating a public service announcement about the impacts of climate change on their community.

Quizzes and tests

Quizzes and tests can be used to assess students' knowledge of key concepts related to climate change. These can be given in traditional written format or through digital platforms.

Peer evaluation

Peer evaluation can be used as a form of formative assessment, allowing students to provide feedback to their peers on their work related to climate change.

Rubrics

Rubrics can be used to assess student work based on a set of predetermined criteria. Rubrics can be developed for a variety of assessment types, such as group projects, performance tasks, and argumentation tasks.

Reflection activities

Reflection activities can be used to assess students' metacognitive skills related to climate change education. For example, students can be asked to reflect on how their understanding of climate change has changed over time and identify areas where they still have questions or need more information.

Portfolios

Portfolios can be used as a form of summative assessment, allowing students to compile their work related to climate change over time and reflect on their learning journey. Portfolios can include a variety of artefacts, such as concept maps, science notebook entries, and group project materials.

Concept maps

Concept maps can be used as a form of pre- and post-assessment to gauge students' understanding of the topic. Students can create a concept map before learning about climate change and then update it as they learn more.

Tool: MIRO

https://miro.com/

Miro is a web-based collaborative white boarding platform that can be used to create concept maps, diagrams, and other visual representations. It allows for real-time collaboration, allowing multiple users to work on a single board at the same time, and provides a variety of pre-built templates and shapes to help users create their maps more quickly and easily.

Here is a step-by-step guide on how to create a concept map using Miro:

1. Sign in to your Miro account and create a new board.

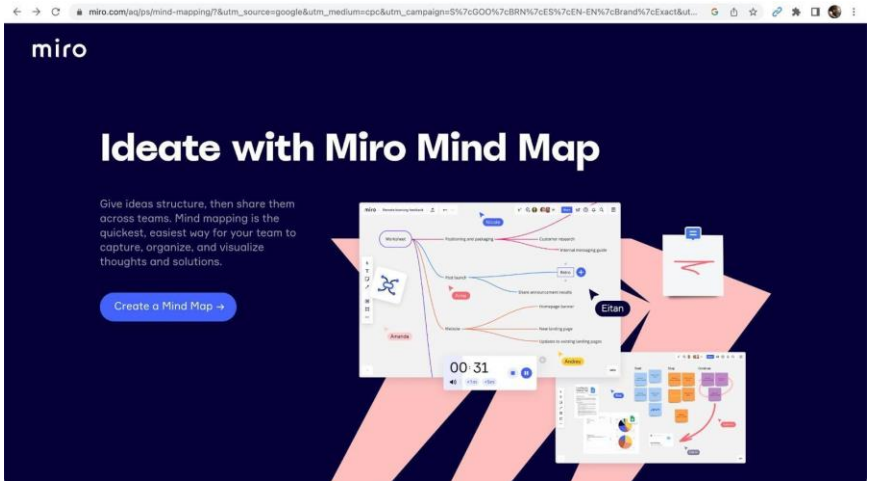
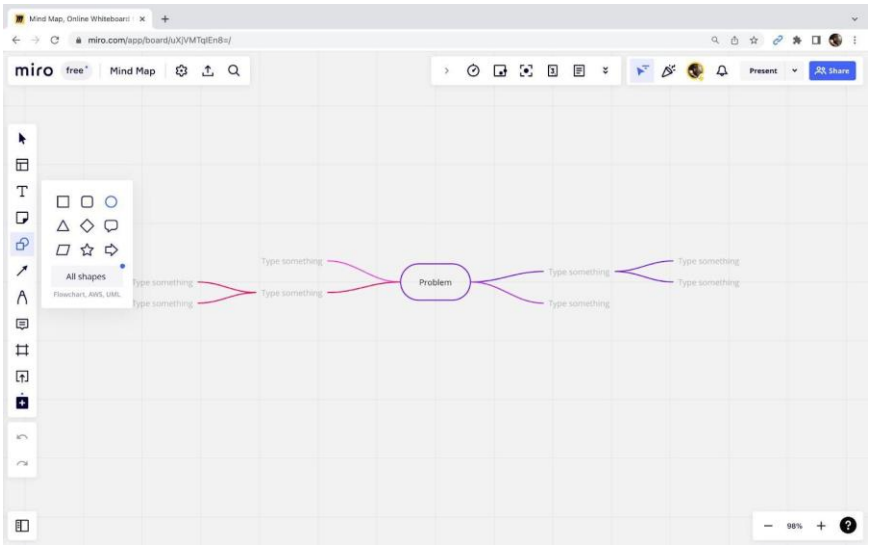


Image: Elena Vercher licensed under a Creative Commons Attribution license (reuse allowed)

2. In the toolbar on the left side of the screen, click on the "Shapes" icon and select the "Circle" shape.



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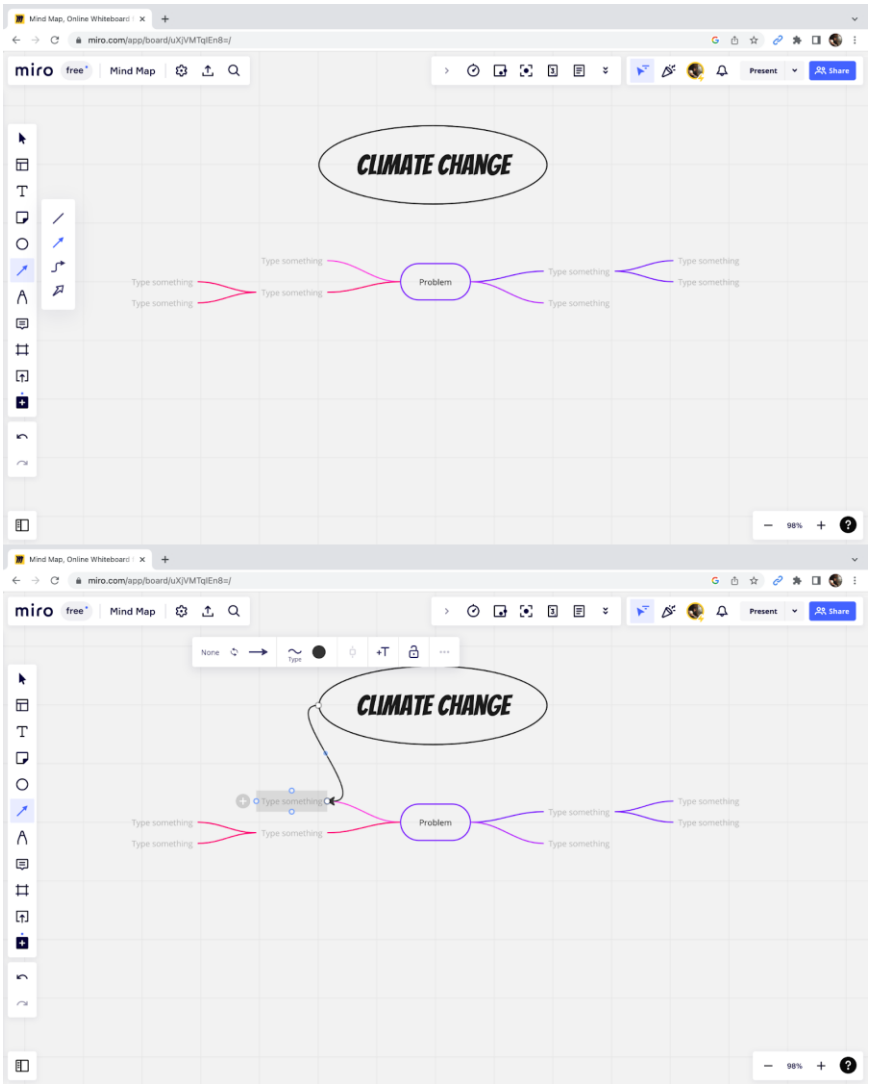
3. Click and drag the circle shape onto the board to create your first concept. Double-click on the circle to edit the text and add the name of the concept.

4. To create additional concepts, click on the "Duplicate" button at the top of the screen, or use the keyboard shortcut Ctrl/Cmd + D to duplicate the circle. Move the duplicated circle to where you want it on the board and edit the text to add the name of the new concept.

5. To connect the concepts, click on the "Connector" icon in the toolbar on the left side of the screen. Click and drag from the edge of one circle to the edge of another to create a line between them. This will create a link between the two concepts.



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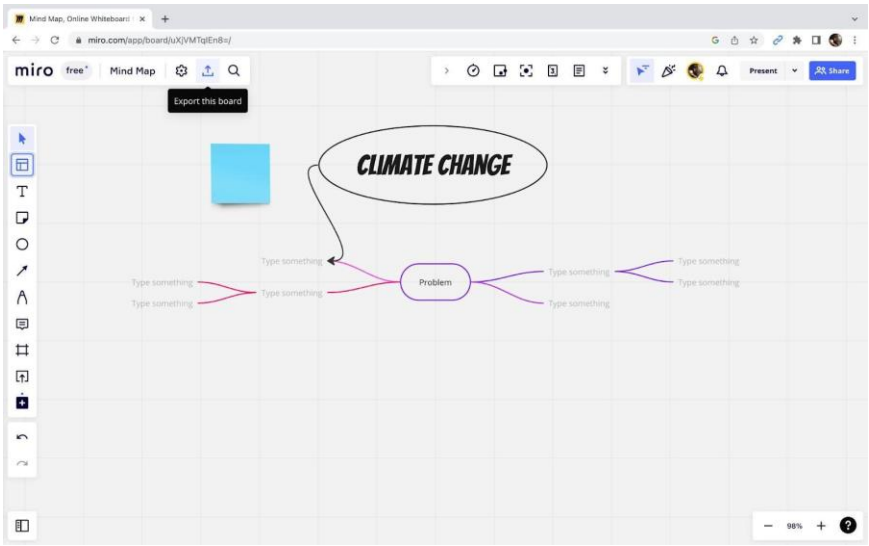
6. To add more details to each concept, you can use Miro's sticky notes feature. Click on the "Sticky Note" icon in the toolbar on the left side of the screen and drag a sticky note onto the board. Double-click on the note to edit the text and add additional details about the concept

7. To format and style your concept map, you can change the color and font of the text, change the thickness and style of the connector lines, and adjust the spacing and alignment of the concepts.

8. Once you have finished creating your concept map, you can export it as an image or PDF by clicking on the "Export" button at the top of the screen.



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That's it! With these simple steps, you can create a concept map in Miro to assess your students' learning about climate change.

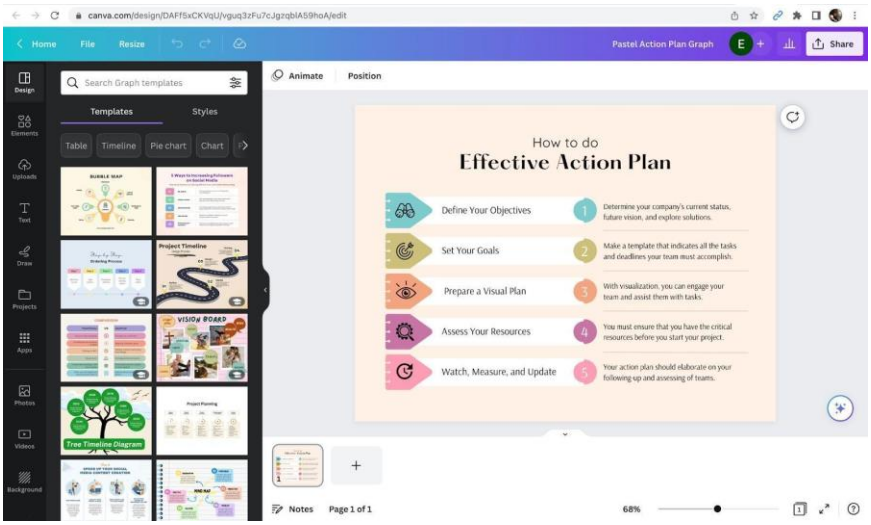
Performance tasks

Performance tasks, such as creating an action plan for reducing greenhouse gas **emissions in their community, can be used to assess students' ability to apply what they have learned to real-world situations.**

Tool: Canva

https://www.canva.com/

Canva is a graphic design platform that allows users to create a wide range of visual content, such as social media graphics,
presentations, posters, flyers, and more. It offers a user-friendly interface with drag-and-drop features, a vast library of templates, graphics, images, and fonts, and a range of customization options.



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1. Choose a template

Open Canva and choose a template that suits your needs. You can search for templates using keywords such as "climate change," "sustainability," or "greenhouse gas reduction." Alternatively, you can create a custom design from scratch.

2. Add headings and subheadings

Add headings and subheadings to the template to provide an overview of your action plan. Use clear and concise language to communicate your objectives, strategies, and goals.

3. Create a timeline

Create a timeline to outline the milestones and deadlines for your action plan. This will help you and your team stay on track and measure progress.

4. Add graphics and images

Add graphics and images to your design to make it more engaging and visually appealing. You can use icons, illustrations, and charts to convey data and statistics related to greenhouse gas emissions.

5. Include a call-to-action

Include a call-to-action to encourage people to take action towards reducing greenhouse gas emissions. You can provide links to resources, websites, or social media channels where people can learn more and get involved.

6. Customize the design

Customize the design by changing the font, colors, and background to match your brand or style. You can also add your logo or other branding elements to make the design more personalized.

7. Download and share

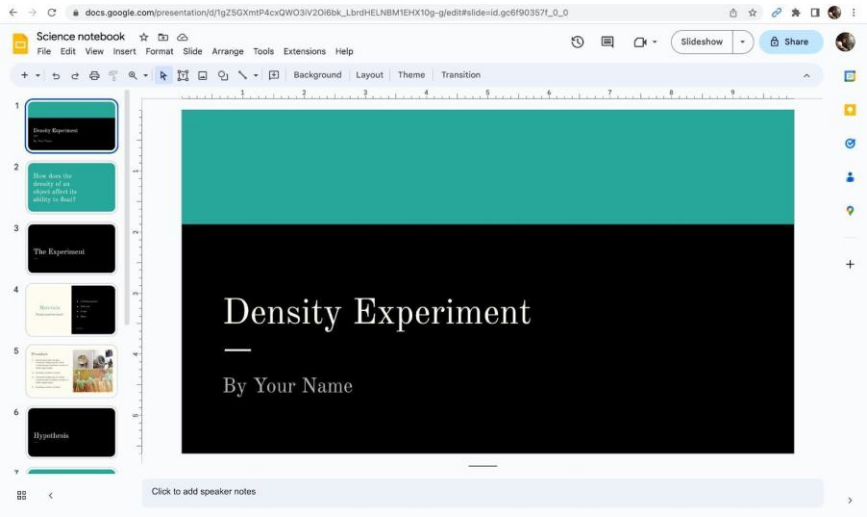
Download the design in your preferred format, such as PDF or JPEG, and share it with your team or stakeholders. You can also publish it on your website or social media channels to reach a wider audience.

Science notebooks

Science notebooks can be used as a form of ongoing assessment, allowing students to record their observations, questions, and ideas related to climate change over time.

Tool: Google Slides / Microsoft Powerpoint

https://docs.google.com/presentation/



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1. Create a new Google Slides presentation

Open Google Slides and click on "Blank" to create a new presentation.

2. Choose a background

Choose a background that suits your science notebook. You can use a solid color, a gradient, or an image. To change the background, go to "Slide" > "Change background."

3. Add a title slide

Add a title slide that introduces your science notebook. You can use a title such as "My Science Notebook" or something more specific to your project.

4. Create a table of contents slide

Create a table of contents slide that lists the sections of your science notebook. This will help you organize your content and make it easier to navigate. Use a simple design with clear headings and subheadings.

5. Add section divider slides

Add section divider slides to separate the different sections of your science notebook. Use a different background color or image to distinguish each section.

6. Insert text boxes and images

Insert text boxes and images to add content to your science notebook. Use a consistent layout with a title and text for each page, and add images or diagrams to illustrate your ideas.

7. Include interactive elements

Include interactive elements such as links, videos, or quizzes to make your science notebook more engaging. You can embed YouTube videos, Google Forms, or other interactive tools.

8. Customize the design

Customize the design by changing the font, colours, and background to match your style or preferences. Use a clear and easy-to-read font and a colour scheme that is easy on the eyes.

9. Save and share

Save your science notebook on Google Drive or download it as a PDF or PowerPoint file. You can share it with your teacher, classmates, or anyone else who might be interested in your project.

Argumentation tasks

Argumentation tasks can be used to assess students' ability to construct and defend arguments related to climate change. For example, students can be asked to write a persuasive essay on the need for climate action.

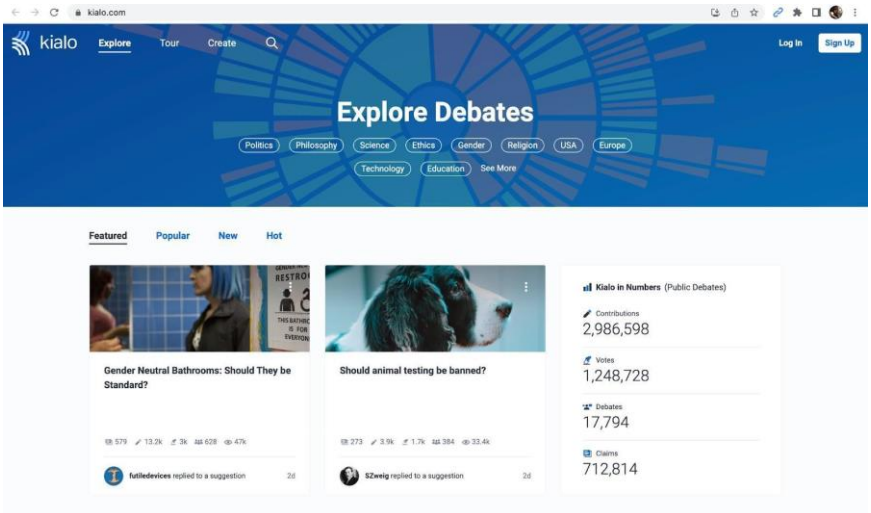
Tool: Kialo

https://www.kialo.com/

Kialo is an online platform for engaging in debates and discussions on various topics. The platform uses a tree structure to organize ideas and arguments in a clear and logical way, making it easy to follow the progression of a discussion. Kialo is designed to facilitate productive, respectful, and evidence-based discourse, and it allows users to engage with people from diverse backgrounds and
perspectives.

Here's a step-by-step guide on how to create a debate using the online tool "Kialo":

1. Go to the Kialo website (www.kialo.com) and sign up for a free account.



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2. Once you've logged in, click on the "Create" button in the top right-hand corner of the screen.

3. Choose the "Debate" option from the drop-down menu.

4. Give your debate a title and a description. You can also add an image or video to make your debate more engaging.

5. Click on the "Create New Topic" button to add your first argument. You can either start with a claim or a counter-argument.

6. Once you've added your argument, you can start adding supporting evidence and reasoning. You can also add sub-arguments or rebuttals to make your case stronger.

7. Invite other users to join your debate by sharing the link or emailing them an invitation. You can also make your debate public and share it on social media.

8. Encourage participants to engage in respectful and constructive dialogue by using Kialo's features such as voting, commenting, and flagging.

9. Monitor the progress of your debate and respond to any feedback or questions that participants may have.

10. At the end of the debate, you can summarize the key points and conclusions, and encourage participants to continue the conversation offline or in future debates.

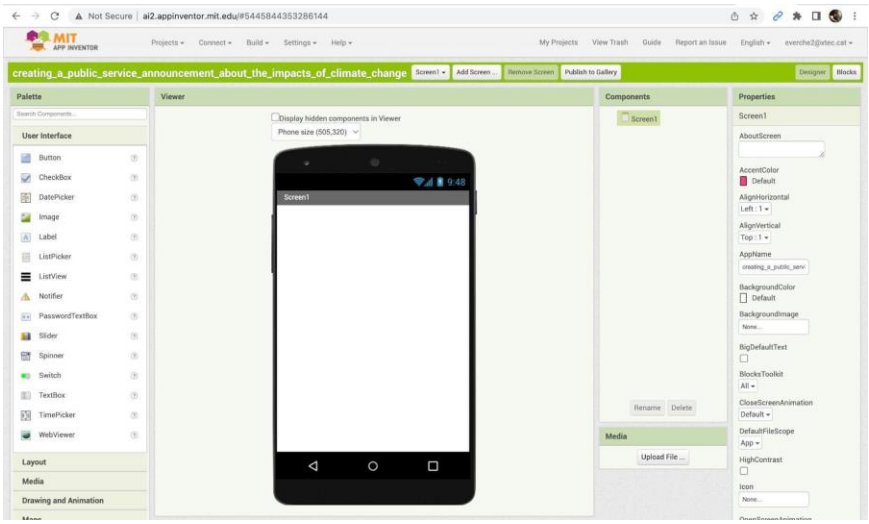
Group projects

Group projects can be used to assess students' ability to work collaboratively and communicate effectively about climate change. For example, students can be tasked with creating a public service announcement about the impacts of climate change on their community.

Tool: App Inventor

https://appinventor.mit.edu/

App Inventor is a web-based platform for creating mobile applications for Android devices. It uses a visual block programming language that allows users to create apps without writing code. App Inventor is designed for beginners and non-programmers and is free to use.



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By following these steps, you can create a powerful and engaging public service announcement about the impacts of climate change using App Inventor:

1. Plan your public service announcement (PSA)

Before you start creating your PSA, think about what message you want to convey and how you want to convey it. Consider what impacts of climate change you want to focus on and who your target audience is.

2. Open App Inventor

Go to the App Inventor website (https://appinventor.mit.edu/) and log in with your Google account. Click on "Create New Project" to get started.

3. Design your layout

Use the drag and drop interface to design the layout of your PSA. You can add buttons, labels, images, and other components to your app screen.

4. Add media

To create a more engaging PSA, you can add images or videos that illustrate the impacts of climate change. To add an image, click on the "Media" option and upload your image. To add a video, use the "VideoPlayer" component.

5. Add text

Use the "Label" component to add text to your app screen. You can write a message that emphasizes the importance of taking action against climate change.

6. Record your message

Use the "SoundRecorder" component to record your voice delivering the PSA message.

7. Add interactivity

You can add interactive elements to your PSA to make it more engaging. For example, you can add a button that links to a website with more information about climate change or a quiz to test the viewer's knowledge on the subject.

8. Test and publish

Test your app on an emulator or on your mobile device to make sure it works properly. Once you are satisfied with the result, you can publish your PSA on the App Inventor Gallery or the Google Play Store to reach a wider audience.

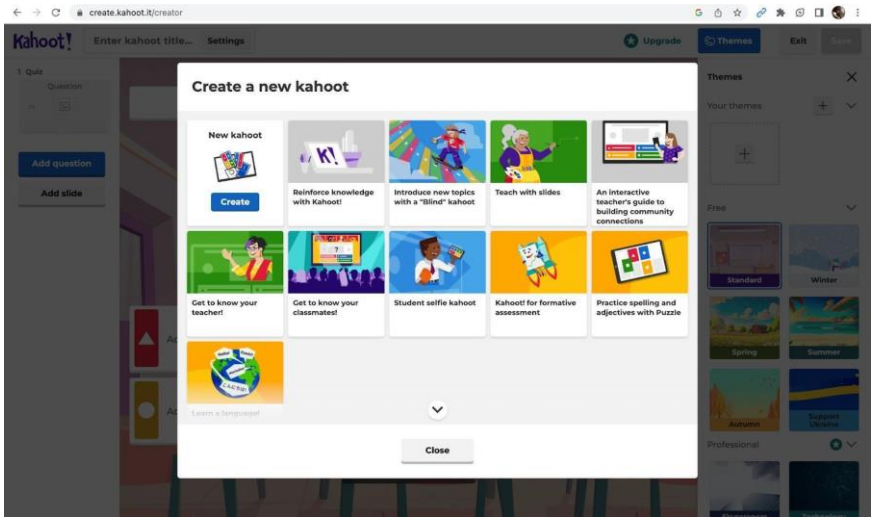
Quizzes and tests

Quizzes and tests can be used to assess students' knowledge of key concepts related to climate change. These can be given in traditional written format or through digital platforms.

Tool: Kahoot

https://create.kahoot.it/

Kahoot is a game-based learning platform that allows users to create and participate in interactive quizzes, surveys, and games. It is designed for students, educators, and businesses who want to make learning more engaging and fun. Kahoot offers a wide range of features, including customizable quizzes and games, a library of public quizzes, real-time feedback, and the ability to track
performance and progress. Users can access Kahoot through a web browser or mobile app and can participate in live or self-paced games. Kahoot is a popular tool for educators to create engaging and interactive learning experiences, as well as for businesses to train and engage employees. It is free to use for basic features, with premium options available for advanced functionality.



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1. Sign in to Kahoot and click "Create" to start a new quiz.
2. Enter a title for your Kahoot and add a cover image if you like.
3. Click "Add question" to create your first question.

4. Choose a question type, such as multiple choice, true or false, or open-ended.
5. Enter your question and add any relevant images or videos.
6. Add at least two answer choices and mark the correct one.
7. Set a time limit for each question, if desired.
8. Repeat steps 3-7 to add more questions to your Kahoot.
9. Click "Save" to save your Kahoot as a draft or "Play" to test it out.
10. Once you're happy with your Kahoot, click "Share" to make it public or share it with a specific group.
11. When creating a climate change Kahoot, you could include questions about the causes of climate change, the impacts of climate change, and solutions for addressing climate change. You could also include images or videos to make your Kahoot more engaging and informative.

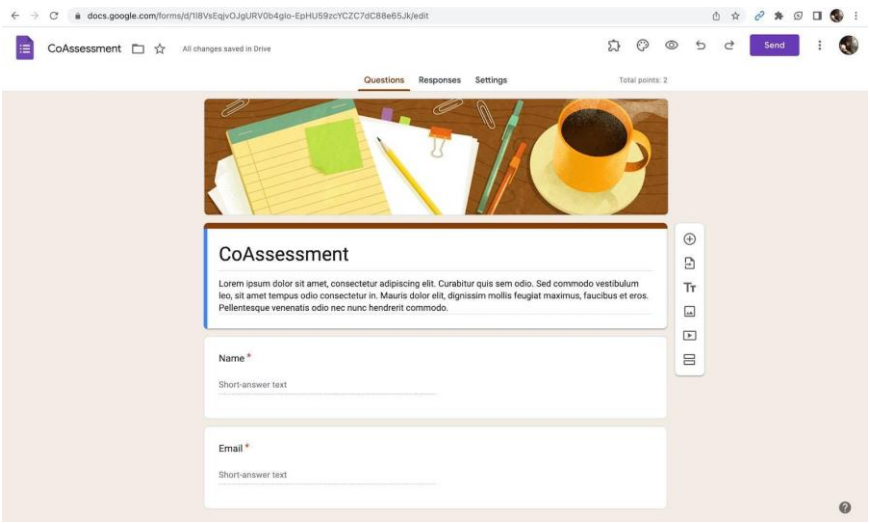
Peer evaluation

Peer evaluation can be used as a form of formative assessment, allowing students to provide feedback to their peers on their work related to climate change.

Tool: Google Forms

https://docs.google.com/forms/

By using Google Forms to allow students to provide feedback to their peers on their work related to climate change, you are fostering a collaborative and supportive learning environment. You can also use the feedback to identify areas where students may need additional support or instruction.



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1. Sign in to your Google account and open Google Forms.
2. Click the "+" sign to start a new form.
3. Give your form a title and description, such as "Climate Change Feedback Form".
4. Create a short answer or paragraph question asking students to provide their name and the name of the person whose work they are providing feedback on.
5. Create a series of questions asking students to evaluate their peer's work on different aspects related to climate change, such as accuracy, creativity, and presentation skills.
6. Use the "scale" or "checkbox" question type to allow students to rate their peer's work on a scale from 1 to 5 or to select multiple options.
7. Include a question asking students to provide constructive feedback or suggestions for improvement.
8. Use the "required" feature to ensure that all questions are answered.
9. Customize the theme and design of your form as desired.
10. Preview and test your form to make sure it works correctly.

11. Share your form with your students by sending the link or embedding it on a website or blog.

12. Once students have submitted their feedback, you can view the responses and share them with the appropriate students.

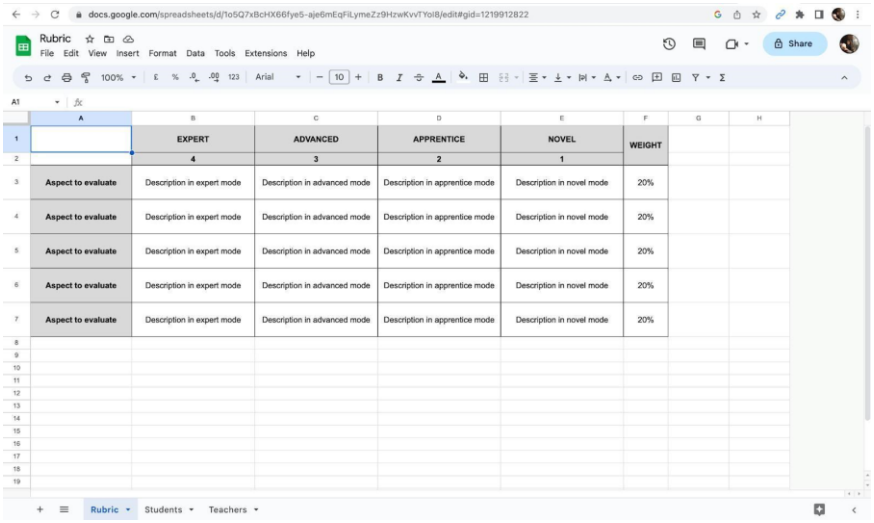
Rubrics

Rubrics can be used to assess student work based on a set of predetermined criteria. Rubrics can be developed for a variety of assessment types, such as group projects, performance tasks, and argumentation tasks.

Tool: Google Sheets and CoRubrics

https://workspace.google.com/marketplace/app/corubrics/969519855495

CoRubrics is a Google Sheets add-on that helps educators create and share rubrics with their students. It allows you to quickly and
easily create customizable rubrics using a variety of criteria and levels of achievement. With CoRubrics, you can also easily share your rubrics with your students and provide them with real-time feedback on their work through a Google Forms.



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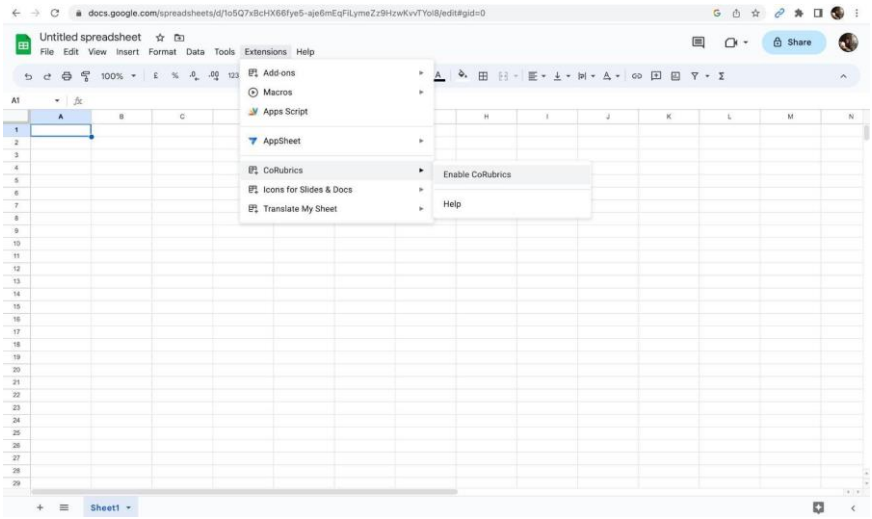
1. Open a new or existing Google Sheet in your Google Drive account.

2. Click on the "Add-ons" tab in the menu bar, then select "Get add-ons."

3. In the "Add-ons" window, search for "CoRubrics" and click "Install" to add the extension to your Google Sheets account.

4. Once the CoRubrics extension is installed, click on the "Add-ons" tab again, then select "CoRubrics" and "Open sidebar" to launch the CoRubrics sidebar.



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5. In the CoRubrics sidebar, click on the "Create new rubric" button to start building your rubric.
6. Enter the name of your rubric and the criteria you want to assess. You can also assign point values for each criterion and add optional descriptions.
7. Once you have completed your rubric, click on the "Save rubric" button to save it.
8. To use your rubric for grading, create a new sheet in your Google Sheets account and enter the names of your students in the first column.
9. In the second column, select the "CoRubrics" option from the "Add-ons" tab, then choose the rubric you want to use.
10. Assign scores to each student by selecting the appropriate rating for each criterion in the rubric.
11. Once you have graded all students, you can view the results in the CoRubrics sidebar or download them as a CSV file.

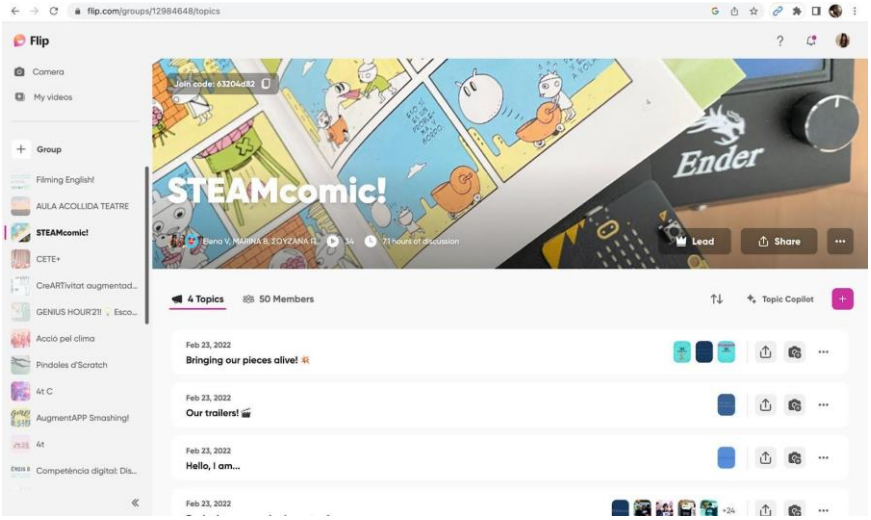
Reflection activities

Reflection activities can be used to assess students' metacognitive skills related to climate change education. For example, students can be asked to reflect on how their understanding of climate change has changed over time and identify areas where they still have questions or need more information.

Tool: Flip

https://flip.com/

With Flip, you can create engaging reflection activities that allow students to share their thoughts and ideas through video.



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1. First, create an account on Flip if you haven't already.

2. Click on "Topics" at the top of the screen and then click "Add Topic."

3. Give your topic a title that reflects the theme or question for the reflection activity.

4. Write a brief introduction to the topic and explain what you want students to reflect on.

5. Click on the "Record a Video" button to create your own video prompt for students, or you can upload a pre-recorded video from your computer or from YouTube.

6. Under the "Settings" tab, set the video length, privacy settings, and other preferences for your reflection activity.

7. Under the "Responses" tab, you can choose to moderate student responses, require student approval before publishing, and add a rubric for grading.

8. Click on the "Share" button to copy the link to your reflection activity and share it with your students.

9. Encourage your students to click on the link and record their own video response to your prompt.

10. Once your students have submitted their responses, you can view and moderate them under the "Responses" tab.

11. Use the responses to evaluate student understanding, facilitate discussion, and provide feedback for improvement.

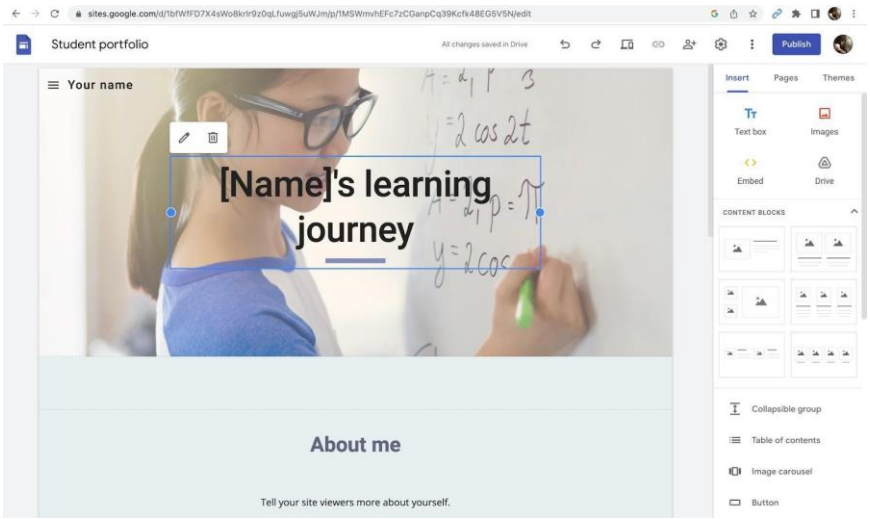
Portfolios

Portfolios can be used as a form of summative assessment, allowing students to compile their work related to climate change over
time and reflect on their learning journey. Portfolios can include a variety of artefacts, such as concept maps, science notebook entries, and group project materials.

Tool: Google Sites

https://sites.google.com/

Google Sites is a website builder tool that allows users to create a website without needing to know how to code. It's a simple and user-friendly way to create online portfolios, as well as other types of websites, using pre-made templates and drag-and-drop functionality.



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Follow these steps to use Google Sites to compile student work related to climate change and reflect on their learning journey:

1. Log in to your Google account and go to Google Sites.
2. Click on the "+" sign to create a new site.
3. Choose a name and theme for your site and click "Create."
4. In the sidebar, click on "Pages" and then "Create page" to add a new page to your site.
5. Choose a page type (e.g. standard, announcements, file cabinet) and click "Create."
6. Add content to your page using the various editing tools available. You can add text, images, videos, links, and more.
7. To compile student work, create a page or section specifically for their submissions. You can embed Google Docs, Slides, Forms, or Sheets that students have created, or you can add links to their work stored elsewhere online.
8. Encourage students to reflect on their learning journey by creating a page or section specifically for reflection activities. You can embed a Google Form or Flipgrid to collect their thoughts and ideas, or you can add a text box for them to write their reflections directly on the page.

9. Publish your site and share it with your students so they can access it and add to it over time.
10. Remember to regularly update your site with new pages and content as the class progresses, and encourage students to revisit their previous work and reflections as they continue to learn and grow.

Some examples of summative and formative assessments

A formative assessment that involves a class discussion on the science and impacts of climate change, and provides opportunities for students to ask questions and clarify their understanding.

Materials:

- Whiteboard or
- chalkboard Markers
  or chalk
- Handouts on the science and impacts of climate change (optional)

Instructions:

- Begin by introducing the topic of climate change to the class and explaining its
- importance in the world today. Provide students with handouts that outline the basic science and impacts of climate change (optional).
- Encourage students to ask questions and clarify their understanding of the topic.
- Use the whiteboard or chalkboard to write down key concepts and ideas that the class discusses.
- As the discussion progresses, ask open-ended questions to guide the conversation and help students to think critically about the topic.
- Encourage students to share their own experiences and perspectives on climate change.
- Summarize the key points of the discussion and provide students with feedback on their understanding of the topic.

Assessment:
As the discussion progresses, the teacher can assess students' understanding of the science and impacts of climate change by observing their participation in the discussion and listening to their questions and comments. The teacher can also use the whiteboard or chalkboard notes to assess the class's understanding of key concepts and ideas. After the discussion, the teacher can provide feedback to individual students on areas where they need further clarification or reinforcement.

A summative assessment that requires students to create a podcast, video, or written report that showcases their understanding of the issue and the ways that they can reduce their own carbon footprint and promote sustainability.

Title: Creating a Podcast/Video or Written Report on Climate Change Solutions

Instructions:

- Introduce the project to students, explaining that they will be creating a podcast, video, or written report that showcases their understanding of climate change solutions and how they can reduce their own carbon footprint.
- Provide students with research materials on climate change solutions, such as renewable energy, sustainable agriculture, and transportation alternatives.
  Give guidelines for creating a podcast, video, or written report, including length,

- format, and content requirements. Students will conduct research and create their podcasts, videos, or written reports individually or in groups.
- Set a deadline for submission of the project.
- Use a rubric to grade the final projects, focusing on content, organization, creativity, and effectiveness in promoting sustainability and reducing carbon footprint.

Example Guidelines for a Podcast/Video or Written Report:

Introduction: Students should begin with an introduction that explains the purpose of the project and their goals for the podcast, video, or written report.

Science of Climate Change: Students should discuss the science behind climate change and its impact on the environment, human health, and society.

Climate Change Solutions: Students should present solutions to climate change, including renewable energy, sustainable agriculture, and transportation alternatives. They should explain the benefits and drawbacks of each solution and provide examples of how they can be implemented in their own lives.

Personal Carbon Footprint: Students should discuss their own carbon footprint and provide specific actions they can take to reduce their carbon footprint and promote sustainability.

Conclusion: Students should conclude with a summary of their key points and a call to action for others to take steps to reduce their carbon footprint.

Assessment:
By creating this type of summative assessment, students are given an opportunity to showcase their understanding of climate change solutions and how they can take actions to reduce their own carbon footprint. It encourages creativity, critical thinking, and communication skills while promoting sustainability and a deeper understanding of climate change.

A self-reflection activity where students reflect on their own learning and understanding of climate change, and set goals for how they can continue to engage with the issue in the future.

Materials:

- Writing utensils
- Reflection worksheet, some questions that
  - can be added are: What did you learn about climate change during this unit?
  - What are some of the impacts of climate change that concern you the most?
  - How has your understanding of climate change changed since the
  - beginning of the unit? What actions have you taken to reduce your own carbon footprint?
  - What are some additional steps you can take to promote sustainability
  - and combat climate change? What are your goals for continuing to engage with the issue of climate change in the future?
  - How can you use what you've learned about climate change to educate others and inspire change in your community?

Instructions:

- Provide students with the reflection worksheet and explain that this activity is an opportunity for them to reflect on their learning about climate change and set goals for how they can continue to engage with the issue in the future.

Ask students to spend a few minutes reflecting on their understanding of climate change and the ways in which they have engaged with the topic in the past. They should consider the following questions:

- What have you learned about climate change?
- How have you engaged with the topic of climate change in the past?
- What are your strengths and areas for improvement when it comes to understanding and engaging with climate change?

Once students have completed their reflections, ask them to set one or two goals for how they can continue to engage with the issue of climate change in the future. These goals should be specific, measurable, achievable, relevant, and time-bound (SMART). For example, a goal could be to reduce their personal carbon footprint by 10% in the next year, or to attend a climate change rally in their community.

After students have set their goals, ask them to share their reflections and goals with a partner or in a small group. This can provide an opportunity for students to learn from each other and support one another in achieving their goals.

Finally, collect the reflection worksheets and review them to gain insights into students' understanding and engagement with the issue of climate change. This information can be used to inform future instruction and to support individual students in achieving their goals.

Assessment:

It's important to create a safe and supportive environment for this activity, as discussing climate change can sometimes be an emotional or contentious topic. Teachers should be prepared to handle any sensitive or controversial discussions that may arise.

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