

## LESSON PLANS FOR INTEGRATED CLIMATE CHANGE

**Hand in Hand for Eco-friendly Schools Pr NR 2022-1-TR01-KA210-SCH-000080972**

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# Navigating Our Changing World - Understanding Climate Change

**To the Teachers/Trainers/Educators: You have the power to inspire the next generation."**

As educators, you play a critical role in shaping the minds and attitudes of the young people who will soon be leading our world. The knowledge, values, and sense of responsibility you instill in your students today will guide the decisions they make tomorrow.

Climate change is one of the most important challenges of our time, and it's not just a scientific issue—it's a human issue, one that affects every aspect of our lives and future. As teachers, **you have the power to inspire action** and empower your students with the understanding and tools they need to become the next generation of climate advocates, problem solvers, and changemakers.

Through this course, you'll have the opportunity to guide your students through complex issues like climate science, energy, water, waste management, and biodiversity—while emphasizing solutions and the role that individuals can play. Together, we can help students not only comprehend the challenges but also realize their potential to make a difference.

The teacher plays the role of catalyst for inspiration, strengthening the sense of purpose and empowerment in the delivery of this important subject.

**To the students: "You have the power to change the world."**

This may sound like a bold statement, but it's true. As young people, you are the future leaders, innovators, and caretakers of our planet. The decisions we make today will shape the world you inherit tomorrow. But to make the right decisions, we need to first understand the challenges we face—one of the greatest being climate change.

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Let's start by addressing a few facts and myths about climate change:

**Myth #1: "Climate change is a future problem; it won't affect us"**

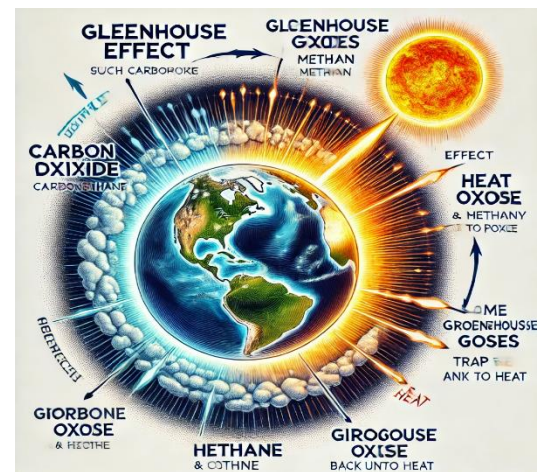
**FACT: Climate change is happening now. We are already witnessing its impacts—more intense storms, rising sea levels, wildfires, and prolonged droughts. These changes are disrupting lives around the world.**

**Myth #2: "There's nothing individuals can do to stop climate change"**

**FACT: Every action counts. Small changes like reducing energy use, cutting down on waste, and advocating for greener policies can have a big impact. Many solutions start with individuals like you!**

**Myth #3: "Climate change is only about warmer temperatures"**

**FACT: While temperatures are rising, climate change also affects weather patterns, ecosystems, food production, water supply, and even the global economy. It's a multifaceted**



A detailed diagram of the greenhouse effect showing how greenhouse gases such as carbon dioxide, methane, and nitrous oxide trap heat in the Earth's atmosphere. It should illustrate the sun's rays entering the atmosphere, heat being absorbed by the Earth, and some being radiated back into space while greenhouse gases trap a portion of the heat. The Earth, atmosphere, and greenhouse gases should be clearly labeled.



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Climate change isn't just an environmental issue—it's a human issue. It affects your communities, your future jobs, the food you eat, and even your health. But here's the good news: **we still have time to act.** Scientists, activists, and young people like you are leading the charge for change.

<b>Focus on main topic</b>	<b>SDG Goal 13 - Climate Change</b> <b>17 – 07-2023</b>
<b>Lesson Objective</b>	Understand the causes, impacts, and solutions to climate change.
<b>Key Topics</b>	<ul style="list-style-type: none"><li>▪ What is climate change? Natural vs human-induced causes.</li><li>▪ Global warming and its consequences (sea-level rise, extreme weather, etc.).</li><li>▪ International agreements (e.g., Paris Agreement).</li><li>▪ Climate change mitigation and adaptation strategies.</li></ul>
<b>Activity</b>	<ul style="list-style-type: none"><li>▪ Case studies on global and local impacts of climate change.</li><li>▪ Group project: Design a climate action plan for the school or community.</li></ul>
<b>Subjects Integration</b>	<p><b>Geography:</b> Examine climate systems, global warming, greenhouse gases, and environmental impacts. Analyze the effects of climate change in different regions (e.g., droughts, floods, forest fires).</p> <p><b>Biology:</b> Studies can be conducted on how biodiversity and ecosystems are affected by climate change. Species extinction, habitat loss, and species adaptation can be examined.</p> <p><b>Physics:</b> The physical principles of the greenhouse effect can be linked to energy transfer and atmospheric events. Renewable energy sources and energy efficiency can be addressed.</p> <p><b>Chemistry:</b> The chemical composition of greenhouse gases and their effects on the atmosphere can be examined. The carbon cycle, ocean acidification, and air pollution can be covered.</p> <p><b>Mathematics:</b> Work on data analysis, statistical modeling, and graphs related to climate change.</p>

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	<p>Carbon footprint calculations and projections can be made.</p> <p><b>History:</b> The effects of climate change on societies throughout history can be examined (for example, environmental disasters in the past). The effects of the Industrial Revolution and modernization on the climate can be discussed.</p> <p><b>Literature:</b> Literary works, poems or stories written about climate change can be analyzed. Students can be made aware of environmental sensitivity and nature-themed works.</p> <p><b>Culture and Ethical Values:</b> Environmental ethics and a sense of responsibility regarding climate change can be discussed from religious perspectives. The themes of respect for nature, sustainability and social responsibility can be emphasized.</p> <p><b>English or Foreign Language Courses:</b> International reports, articles or news regarding climate change can be analyzed. Students can have discussions about climate change on a global scale.</p> <p><b>Citizenship and Democracy Education:</b> Citizenship awareness, environmental rights and social movements regarding climate change can be discussed. Projects can be developed on climate policies and sustainable development goals. In these courses, it is possible to raise awareness in students by addressing the issue of climate change with an interdisciplinary approach.</p>
<b>Focus on main topic</b>	<b>Water</b> <b>18 – 07-2023</b>
<b>Lesson Objective:</b>	Learn about the significance of water and its relation to climate change.
<b>Key Topics</b>	<ul style="list-style-type: none"> <li>▪ The water cycle and climate systems.</li> <li>▪ The role of oceans in regulating Earth's climate.</li> <li>▪ Climate change and its impact on freshwater resources (e.g., droughts, floods).</li> <li>▪ Sustainable water management practices.</li> </ul>
<b>Activity:</b>	<ul style="list-style-type: none"> <li>▪ Water footprint calculation: Students estimate their water usage and suggest reduction strategies.</li> <li>▪ Research project on water crises in climate-affected regions.</li> </ul>
<b>Subject Integration:</b>	<b>Biology:</b>

Water ecosystems and the impact of climate on them.

Explore the impact of climate change on aquatic ecosystems, including freshwater and marine environments. Study how temperature changes, ocean acidification, and altered precipitation patterns affect aquatic species and biodiversity. Investigate the role of water in supporting life and the consequences of water scarcity.

**Geography:**

Water resource management and environmental policies.

Study the global water cycle, including evaporation, condensation, precipitation, and runoff.

Analyze how climate change affects water availability, distribution, and quality.

Use geographic information systems (GIS) to map changes in water resources and their impacts on different regions.

**Physics:**

Examine the physical properties of water, such as its heat capacity and its role in regulating climate.

Discuss how changes in water temperature affect weather patterns and climate.

Use experiments to demonstrate concepts like the greenhouse effect and water's role in energy transfer.

**Chemistry:**

Water quality and chemical changes.

Analyze the chemical composition of water and how it can be affected by pollutants and climate change.

Study processes like acid rain, water contamination, and the impact of greenhouse gases on water chemistry.

Investigate methods for testing and improving water quality.

**Mathematics:**

Data analysis and modeling related to water.

Use statistical methods to analyze data on water usage, availability, and quality.

Model the impact of climate change on water resources, including projections of future water scarcity or abundance.

Create graphs and charts to visualize trends and patterns in water data.

**History:**

Historical perspectives on water and climate.

Explore historical changes in water management and the impact of climate on societies.

Study past water crises and how they influenced historical events and civilizations.

Discuss how historical practices and policies have shaped current water management strategies.

	<p><b>Literature:</b> Water in literature and environmental themes. Analyze how literature and poetry address water as a symbol and its connection to nature and climate. Examine works that explore themes of water scarcity, floods, and environmental stewardship. Discuss the emotional and cultural significance of water in different literary contexts.</p> <p><b>Culture and Ethical Values:</b> Cultural attitudes towards water and climate ethics. Investigate how different cultures view water and its importance. Discuss ethical issues related to water use, conservation, and access. Explore how cultural values influence water management practices and responses to climate change.</p> <p><b>English or Foreign Language Courses:</b> Water-related topics in texts and media. Read and analyze texts, articles, or media that discuss water issues and climate change. Engage in writing essays, debates, and presentations on water conservation and climate impacts. Translate and interpret international perspectives on water and climate from various languages.</p> <p><b>Citizenship and Democracy Education:</b> Advocacy and policy-making for water conservation. Discuss the role of citizens in advocating for water conservation and climate action. Study water-related policies and the role of government and NGOs in managing water resources. Engage in projects that promote water conservation and address local water issues. These approaches can help students appreciate the significance of water and its critical relationship with climate change across various disciplines.</p>
<b>Focus on main topic</b>	<b>Energy 19 – 07-2023</b>
<b>Lesson Objective</b>	Explore sustainable energy solutions and their role in combating climate change.
<b>Key Topics:</b>	<ul style="list-style-type: none"> <li>▪ Non-renewable vs renewable energy sources (solar, wind, hydro, biomass, etc.).</li> <li>▪ Energy efficiency and reducing carbon footprints.</li> <li>▪ Global energy consumption trends and their environmental impact.</li> <li>▪ Innovations in clean energy technologies.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Experiment: Build a simple solar-powered device.</li> </ul>

<b>Activity:</b>	<ul style="list-style-type: none"> <li>▪ Group debate: Fossil fuels vs renewable energy.</li> </ul>
<b>Subjects Integration:</b>	<p><b>Physics:</b> Energy conversion, electricity generation, thermodynamics.</p> <p><b>Chemistry:</b> Fossil fuel combustion, environmental pollutants.</p> <p><b>Geography:</b> Global energy resources and sustainable solutions.  Study the distribution of different energy resources around the world, including renewable and non-renewable sources. Analyze the geographical advantages and limitations for various types of sustainable energy (solar, wind, hydro, geothermal). Discuss the impact of energy consumption patterns on climate change and explore regional case studies of successful sustainable energy initiatives.</p> <p><b>Biology:</b> Energy in ecosystems and bioenergy. Examine how energy flows through ecosystems, from producers to consumers, and the role of bioenergy. Study the use of biological resources for energy, such as algae and plant-based fuels. Discuss the impacts of different energy sources on ecosystems and biodiversity, and explore how sustainable energy practices can benefit biological systems.</p> <p><b>Physics:</b> Energy principles and renewable technologies. Explore the fundamental principles of energy, including energy transfer, conservation, and efficiency. Study how renewable energy technologies, such as solar panels, wind turbines, and hydroelectric systems, harness energy. Conduct experiments to demonstrate energy conversions and efficiencies of different energy sources.</p> <p><b>Chemistry:</b> Chemical processes in energy production. Analyze the chemical processes involved in different energy production methods, including combustion, electrolysis, and fuel cells. Study the impact of fossil fuels and renewable energy sources on the environment and human health. Explore how sustainable energy solutions reduce greenhouse gas emissions and other pollutants.</p>



**Mathematics:**

Data analysis and energy modeling.

Use statistical methods to analyze data on energy consumption, efficiency, and production.

Create models to predict the impacts of adopting various sustainable energy solutions.

Engage in activities like calculating energy savings, carbon footprints, and cost-benefit analyses of different energy technologies.

**History:**

Historical development of energy technologies.

Explore the history of energy use, including the transition from fossil fuels to renewable energy sources.

Study historical energy crises and their impact on society and technology.

Discuss how historical developments in energy have influenced climate change and conservation efforts.

**Literature:**

Energy themes in literature and media.

Analyze how literature and media address themes of energy use, sustainability, and environmental stewardship. Examine works that discuss the consequences of energy consumption and the benefits of renewable energy. Discuss the representation of energy issues in different cultural contexts.

**Culture and Ethical Values:**

Cultural attitudes towards energy and sustainability.

Investigate how different cultures view energy consumption and conservation.

Discuss ethical considerations related to energy use, including fairness, equity, and the impact on future generations.

Explore cultural practices and values that influence energy policies and sustainable solutions.

**English or Foreign Language Courses:**

Energy topics in communication and writing.

Read and analyze texts, articles, and media related to energy and sustainability.

Engage in writing essays, debates, and presentations on energy issues and solutions.

Translate and interpret international perspectives on energy and climate change from various languages.

**Citizenship and Democracy Education:**

Advocacy and policy-making for sustainable energy.

Discuss the role of citizens in promoting sustainable energy practices and influencing energy policies. Study existing policies and initiatives related to

	energy conservation and renewable energy. Engage in projects that involve community efforts to adopt and advocate for sustainable energy solutions.
<b>Focus on main topic</b>	<b>Waste Management</b> <b>20– 07-2023</b>
<b>Lesson Objective</b>	<ul style="list-style-type: none"> <li>Understand the role of waste management in reducing environmental impact.</li> </ul>
<b>Key Topics:</b>	<ul style="list-style-type: none"> <li>The impact of waste on ecosystems and the climate (landfills, pollution, etc.).</li> <li>3Rs: Reduce, Reuse, Recycle.</li> <li>Circular economy and sustainable resource use.</li> <li>Composting, recycling technologies, and innovative waste management.</li> </ul>
<b>Activity:</b>	<ul style="list-style-type: none"> <li>Audit the school's waste and create a waste reduction plan.</li> <li>Design and implement a recycling or composting program at school.</li> </ul>
<b>Subject Integration:</b>	<p><b>Geography:</b> Waste management systems and their geographic impacts. Study the distribution of waste management facilities (e.g., landfills, recycling centers) and their environmental impacts. Analyze how different regions handle waste and the geographical challenges involved. Discuss the impact of waste management practices on local ecosystems and communities.</p> <p><b>Biology:</b> Waste decomposition and its effects on ecosystems. Examine the biological processes involved in waste decomposition, including microbial activity and nutrient cycling. Study the impact of waste on soil and water quality, and how improper waste management affects wildlife and plant life. Explore biological methods for waste treatment, such as composting and bioremediation.</p> <p><b>Physics:</b> Energy and material recovery from waste. Explore the physical processes involved in waste management, such as waste sorting, recycling, and incineration. Study how energy can be recovered from waste through methods like waste-to-energy (WTE) technologies. Discuss the efficiency and environmental impact of these technologies.</p> <p><b>Chemistry:</b> Chemical processes and pollution control.</p>

Analyze the chemical composition of various types of waste and the reactions involved in waste treatment. Study how different waste management methods handle chemical pollutants and hazardous materials. Explore the role of chemicals in waste recycling and resource recovery.

**Mathematics:**

Data analysis and modeling of waste management.

Use statistical methods to analyze data on waste generation, recycling rates, and waste treatment efficiency.

Create models to predict the impact of different waste management strategies on environmental outcomes.

Engage in activities like calculating the carbon footprint of waste and assessing the economic aspects of waste management.

**History:**

Historical development of waste management practices.

Explore the history of waste management, including the evolution of practices from open dumps to modern recycling and waste-to-energy technologies.

Study historical case studies of waste management challenges and innovations.

Discuss how historical events and technological advancements have shaped current waste management practices.

**Literature:**

Waste and environmental themes in literature.

Analyze how literature and media address themes related to waste and environmental impact.

Examine works that explore the consequences of waste mismanagement and advocate for sustainable practices.

Discuss the portrayal of waste and environmental issues in different cultural contexts.

**Culture and Ethical Values:**

Cultural attitudes towards waste and ethical considerations.

Investigate how different cultures approach waste management and sustainability.

Discuss ethical issues related to waste generation, disposal, and responsibility.

Explore cultural practices and values that influence waste management policies and behaviors.

**English or Foreign Language Courses:**

Waste management topics in communication and writing.

Read and analyze texts, articles, and media related to waste management and environmental impact.

Engage in writing essays, debates, and presentations on waste reduction and recycling.

	<p>Translate and interpret international perspectives on waste management from various languages.</p> <p><b>Citizenship and Democracy Education:</b> Advocacy and policy-making for waste management. Discuss the role of citizens in promoting effective waste management and influencing policies. Study existing waste management policies and initiatives, including recycling programs and waste reduction strategies. Engage in projects that involve community efforts to improve waste management practices and advocate for environmental sustainability. These approaches can help students appreciate the importance of effective waste management and its role in reducing environmental impact across different subjects.</p>
<b>Focus on main topic</b>	<b>Biodiversity</b> <b>21 – 07-2023</b>
<b>Lesson Objective</b>	Explore the relationship between climate change and biodiversity.
<b>Key Topics:</b>	<ul style="list-style-type: none"> <li>▪ The importance of biodiversity for ecosystems and human survival.</li> <li>▪ The effects of climate change on habitats, species migration, and extinction risks.</li> <li>▪ Conservation efforts and policies protecting biodiversity.</li> <li>▪ Human impact on ecosystems and species.</li> </ul>
<b>Activity:</b>	<ul style="list-style-type: none"> <li>▪ Field trip to local ecosystems to observe biodiversity and its threats.</li> <li>▪ Research project on endangered species and their importance.</li> </ul>
<b>Subject Integration:</b>	<p><b>Geography:</b> Ecosystem distribution and biodiversity hotspots. Explore the geographical distribution of different biomes and their unique biodiversity. Discuss the impact of human activities, such as deforestation and urbanization, on these ecosystems. Use maps to identify biodiversity hotspots and analyze environmental changes over time.</p> <p><b>Biology:</b> Species diversity and ecological interactions. Study different species, their roles in ecosystems, and how they interact with each other. Investigate concepts like food webs, genetic diversity, and the importance of keystone species. Discuss the effects of habitat loss and climate change on biodiversity. Ecosystems, adaptation, species interaction.</p>

**Environmental Science:**

Conservation efforts, ecosystems management.

**Physics:**

Energy transfer in ecosystems.

Examine how energy flows through ecosystems, from producers to consumers.

Discuss concepts such as energy pyramids, trophic levels, and the impact of energy loss on ecosystem health. Investigate how human activities can disrupt energy balance in ecosystems.

**Chemistry:**

Chemical cycles and pollution.

Analyze how chemical elements cycle through ecosystems, including carbon, nitrogen, and phosphorus cycles.

Discuss the impact of pollutants on these cycles and on biodiversity.

Explore how chemicals like pesticides and fertilizers affect ecosystem health.

**Mathematics:**

Data analysis and modeling.

Use statistical methods to analyze biodiversity data, such as species population trends and conservation status.

Create models to predict the impacts of various factors on biodiversity.

Engage in activities like calculating species richness and evenness.

**History:**

Historical perspectives on biodiversity and conservation.

Explore historical changes in biodiversity, including extinctions and conservation efforts.

Discuss how human societies have impacted biodiversity through agriculture, industry, and colonization.

Analyze historical case studies of species recovery and conservation movements.

**Literature:**

Biodiversity in literature and symbolism.

Examine how different authors and poets portray biodiversity and nature.

Analyze works that highlight environmental themes and the human relationship with nature.

Discuss symbolism and how biodiversity is used to convey broader messages about human experience and values.

**Culture and Ethical Values:**

Cultural attitudes towards biodiversity and conservation ethics.

	<p>Explore different cultural perspectives on nature and biodiversity. Discuss ethical considerations in conservation efforts and the impact of cultural values on environmental policies. Engage in debates on the balance between development and conservation.</p> <p><b>English or Foreign Language Courses:</b> Biodiversity-related topics in literature and media. Read and analyze texts, articles, or media that focus on biodiversity and environmental issues. Engage in discussions, write essays, and create presentations on biodiversity topics. Translate and interpret biodiversity-related materials from different languages and cultures.</p> <p><b>Citizenship and Democracy Education:</b> Civic responsibility and environmental advocacy. Discuss the role of individuals and communities in protecting biodiversity. Explore case studies of environmental activism and policy-making. Engage in projects that involve local conservation efforts and promote sustainable practices within the community.</p>
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The

power to shape a better, greener future is in our hands!

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