



STEAM Team Lesson Climate Change Lesson 1

Lesson Title:

Understanding Climate Change: Causes, Effects, and Solutions

Objective:

4-H Youth will explore the science of climate change, identify its causes and effects, and brainstorm ways to reduce its impact through personal and global actions.

Learning Outcomes:

- Understand the difference between weather and climate.
- Identify human and natural causes of climate change.
- Explore the effects of climate change on the environment, animals, and humans.
- Propose actions to reduce climate change.

Materials:

- Printed climate fact sheet
- Student worksheet: **Climate Solutions Planner**
- Markers, chart paper, or whiteboards

Get started

Discussion Question:

“What do you already know about climate change?”

Weather vs. Climate (10 minutes)

- Explain the difference between weather (short-term) and climate (long-term).
Example: “Weather is what happens today—a rainy afternoon. Climate describes patterns—like the fact that winters are getting warmer.”
- **Quick Activity:** Have students name examples of **weather** and **climate** patterns they’ve experienced or heard about.

Small Group Research Activity:

- Distribute **fact sheets** that describe the causes of climate change. Include topics like:
 1. **Greenhouse Gases:** CO₂, methane, and their sources (fossil fuels, livestock, etc.).
 2. **Deforestation:** How cutting down forests contributes to warming.
 3. **Global Effects:** Rising sea levels, extreme weather, loss of biodiversity, etc.

Each group will choose **one cause and one effect** of climate change and create a **poster or mini-presentation** about it.

STEAM Connections:

- **Science:** Greenhouse gases, climate patterns
- **Technology:** Renewable energy sources
- **Engineering:** Climate-resilient infrastructure
- **Art:** Posters and visual storytelling
- **Math:** Data analysis (e.g., tracking rising temperatures or sea levels)

Climate Change Fact Sheet

What is Climate Change?

Climate change refers to significant changes in global temperatures and weather patterns over time. While Earth's climate has varied naturally throughout history, scientists agree that **human activities**—especially the **burning of fossil fuels**—are driving global temperatures to rise at an unprecedented rate.

Causes of Climate Change:

1. **Burning Fossil Fuels:** Coal, oil, and natural gas release **carbon dioxide (CO₂)** and other greenhouse gases into the atmosphere.
 2. **Deforestation:** Cutting down forests reduces the planet's ability to absorb CO₂ from the air.
 3. **Agriculture:** Livestock like cows produce **methane**, a potent greenhouse gas, while rice paddies also emit methane.
 4. **Industrial Processes:** Factories release pollutants and greenhouse gases during manufacturing.
 5. **Waste:** Decomposing waste in landfills releases methane, contributing to the greenhouse effect.
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Effects of Climate Change:

1. **Rising Temperatures:** Earth's average temperature is increasing, leading to more **heatwaves** and warmer climates.
2. **Melting Ice and Rising Seas:** Polar ice caps and glaciers are shrinking, causing **sea levels** to rise.
3. **More Extreme Weather:** Hurricanes, droughts, and floods are becoming more frequent and severe.

4. **Loss of Biodiversity:** Changing climates make it harder for plants and animals to survive in their natural habitats.
 5. **Impact on Humans:** Climate change leads to **food shortages, water scarcity**, and displacement of people from coastal areas.
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Fun Facts about Climate Change:

- The **last decade (2011-2020)** was the warmest on record.
- Rising ocean temperatures are causing **coral bleaching** in the Great Barrier Reef.
- Countries like **Sweden** and **Costa Rica** are leading efforts to reduce carbon emissions.
- **Electric cars** produce far fewer emissions compared to gasoline-powered cars.

DO NOT SHOW YOUTH

Solutions to Climate Change:

1. **Use Renewable Energy:** Switch to solar, wind, and hydroelectric power to reduce emissions.
 2. **Plant Trees:** Forests act as **carbon sinks**, absorbing CO₂ and cooling the atmosphere.
 3. **Reduce Waste:** Recycle, compost, and minimize the use of plastics to cut emissions.
 4. **Use Energy Efficiently:** Turn off lights, use energy-saving appliances, and reduce car travel by biking or carpooling.
 5. **Support Climate Policies:** Encourage governments to adopt laws that promote renewable energy and reduce emissions.
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Climate Solutions Planner Worksheet

Introduction:

In this worksheet, you will brainstorm solutions to fight climate change. Think about actions you can take personally, as well as larger actions communities, governments, and organizations can take. Work with your group to create goals and plans that can make a positive impact!

1. Personal Actions:

List at least **three actions** you can take in your daily life to reduce your carbon footprint and help fight climate change.

Example: Walk or bike instead of driving for short trips.

1. _____
 2. _____
 3. _____
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2. Community and Global Actions:

What actions can **schools, communities, or governments** take to reduce greenhouse gas emissions and protect the environment?

List at least **three ideas** with your group.

Example: Switch to renewable energy sources like solar and wind power.

1. _____
 2. _____
 3. _____
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3. Group Climate Goal:

Create a **SMART goal** (Specific, Measurable, Achievable, Relevant, Time-bound) as a team.

This goal should be something your group, school, or community could work toward to help the environment.

Example: "Our school will reduce paper waste by 50% within 6 months by promoting digital assignments."

SMART Goal: _____

How will we track our progress? _____

4. Reflection:

Answer these questions as a group:

- What was the most interesting thing you learned about climate change?

- What challenges do you think people face when trying to reduce climate change?

- What are you most excited to change or improve after this lesson?

Have youth create an informational poster to educate the public about your solution to climate change. Share with others.