

**Subject Area:** Science  
**Unit Title:** Exploring Global Warming  
**Grade Level:** 9th Grade  
**Lesson Number:** 1 of 10

**Duration:** 60 minutes  
**Date:** March 10, 2023  
**Teacher:** Ms. Jane Smith  
**Room:** Science Lab 101

## Curriculum Standards Alignment

### Content Standards:

- Understand the concept of global warming and its impact on the environment
- Explain the carbon cycle and its role in regulating Earth's climate

### Skills Standards:

- Analyze data and information to understand the effects of global warming
- Evaluate the impact of human activities on the environment

### Cross-Curricular Links:

- Geography: Understanding the impact of global warming on different ecosystems
- Mathematics: Analyzing data and graphs related to global warming

## Essential Questions & Big Ideas

### Essential Questions:

- What is global warming and how does it affect the environment?
- How do human activities contribute to global warming?

### Enduring Understandings:

- Global warming is a complex issue with significant impacts on the environment
- Human activities play a crucial role in contributing to global warming

## Student Context Analysis

### Class Profile:

- Total Students: 25
- ELL Students: 5
- IEP/504 Plans: 3
- Gifted: 2

### Learning Styles Distribution:

- Visual: 40%
- Auditory: 30%
- Kinesthetic: 30%

## Lesson Objectives

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### Foundation Level:

- Describe the basic concept of global warming and its impact on the environment

### Core Level:

- Explain the carbon cycle, including the role of greenhouse gases, and discuss how human activities contribute to global warming

### Extension Level:

- Analyze the effects of rising sea levels and geological changes on ecosystems like the Great Barrier Reef, proposing potential solutions to mitigate these effects

## Prior Knowledge

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### Required Prior Knowledge:

- Basic understanding of the water cycle
- Introduction to ecosystems
- Basic geography and map skills
- Fundamental science concepts such as photosynthesis and the greenhouse effect

## Lesson Plan

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### Introduction and Hook (Minutes 1-5)

- Show a visually striking image or video of the Great Barrier Reef
- Introduce the topic of global warming

### Direct Instruction (Minutes 6-10)

- Provide a concise overview of global warming
- Explain the carbon cycle and greenhouse gases

### Guided Practice (Minutes 11-15)

- Have students match causes of global warming with their effects on the environment

### Independent Practice (Minutes 16-20)

- Have students work individually on a case study of a specific location affected by rising sea levels or geological changes

### Closure and Reflection (Minutes 21-25)

- Have a class discussion on the findings from the case studies
- Reflect on what was learned and how students can contribute to mitigating the effects of global warming

### Assessment and Conclusion (Minutes 26-30)

- Distribute a short quiz to assess students' understanding of the key concepts

## Guided Practice

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### Carbon Cycle Diagramming (Foundation)

- Have students work in pairs to create a simplified diagram of the carbon cycle

### Case Study Analysis (Core)

- Divide the class into small groups, each assigned a different case study of a location affected by global warming

### Debate Preparation (Extension)

- Have advanced students prepare for a debate on the topic "Should governments prioritize economic growth over environmental protection?"

## Independent Practice

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### Beginner: Carbon Cycle Matching Game

- Have students play an online matching game where they pair terms related to the carbon cycle with their definitions

### Intermediate: Research Project

- Have students conduct research on a specific aspect of global warming and create a short presentation or poster

### Advanced: Policy Proposal

- Have advanced students write a policy proposal for their school or local community on how to reduce carbon emissions and mitigate the effects of global warming

## Assessment and Evaluation

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### Written Report (Foundation Level)

- Have students write a short report describing the causes and effects of global warming on the Great Barrier Reef

### Case Study Presentation (Core Level)

- Have students work in groups to research and present a case study on a specific location affected by rising sea levels or geological changes due to global warming

### Debate (Core Level)

- Have students participate in a class debate on the topic "Should governments prioritize economic growth over environmental protection?"

### Research Project (Extension Level)

- Have students conduct an in-depth research project on a specific aspect of global warming, including a literature review, data analysis, and recommendations for policy changes

## Conclusion

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In conclusion, the topic of global warming, its effects on the Great Barrier Reef, rising sea levels, and geological changes, along with the carbon cycle, is complex and multifaceted. Through this lesson, students have gained a deeper understanding of the causes and consequences of global warming, as well as the importance of the carbon cycle in regulating Earth's climate.

## Next Steps

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The next steps in the learning progression involve building on the foundational knowledge acquired in this lesson, with a focus on deeper exploration and application of the concepts. Future lessons could include topics such as sustainable practices, climate change mitigation strategies, and project-based learning, where students design and propose a community action plan to address global warming.

## Reflection and Evaluation

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### Engagement and Understanding

- Were the students engaged throughout the lesson, and did they demonstrate a clear understanding of the key concepts?

### Differentiation and Inclusion

- Were the learning needs of all students met, including those with mixed abilities?

### Real-World Application and Empowerment

- Did the lesson successfully convey the real-world implications of global warming and empower students to feel they can make a difference?