

# PPT/NOTES Presentation

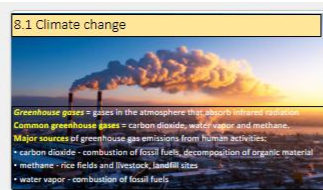
All slides are  
editable.



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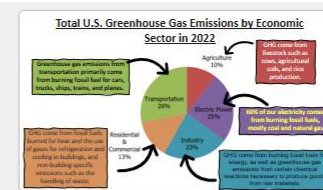
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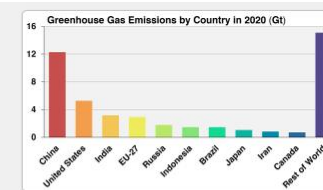
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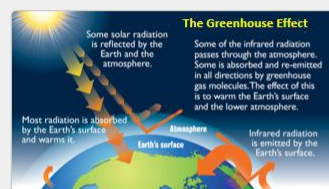
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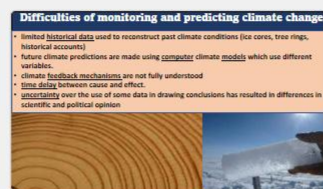
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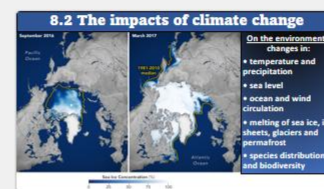
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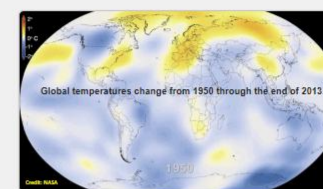
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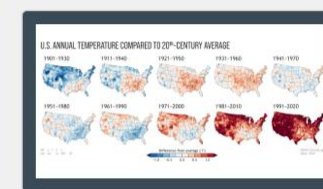
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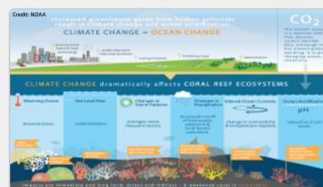
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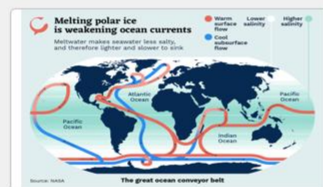
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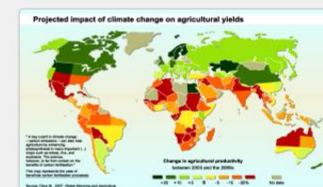
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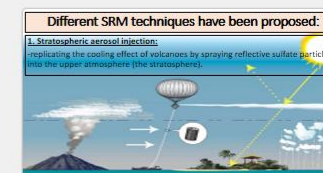
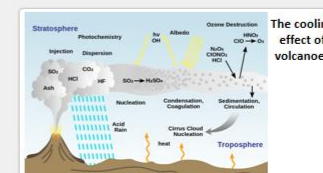
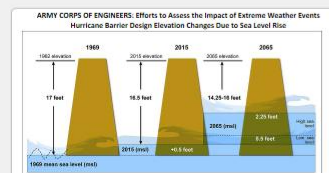
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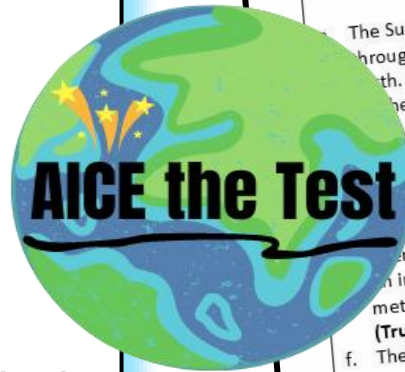


# Bell Ringers for Unit 8 Managing Climate Change

## What's *included*?

### This resource includes the following:

- 7 unique bell ringer prompts including:
  - True/False questions
  - Matching questions
  - Multiple choice
  - AICE style questions
  - One self-evaluation
  - **Answer Key**
- 100% editable
- Zero prep. Just print and distribute to students.



**AICE Environmental Management AS**

Name: \_\_\_\_\_

**8. Managing Climate Change**

**Day 1**

**Bellringer**

Match the greenhouse gas with the correct source.

**Carbon dioxide (CO<sub>2</sub>)**   **Methane (CH<sub>4</sub>)**   **Water vapor (H<sub>2</sub>O)**   **Nitrous oxide (N<sub>2</sub>O)**   **Fluorinated gases (HFCs)**

- Combustion of fossil fuels (coal, oil, and natural gas) for energy and transportation. \_\_\_\_\_
- Use of synthetic fertilizers in agriculture. \_\_\_\_\_
- Leakage from natural gas systems. \_\_\_\_\_
- Combustion of fossil fuels (as a byproduct). \_\_\_\_\_
- Deforestation and land-use changes. \_\_\_\_\_
- Rice paddies and agricultural practices. \_\_\_\_\_
- Decomposition of organic material in landfills. \_\_\_\_\_
- Use in refrigeration, air conditioning, and aerosol propellants. \_\_\_\_\_
- Livestock digestion (enteric fermentation in cattle, sheep, etc.). \_\_\_\_\_

**Identify if the following statements about enhanced greenhouse effect are true or false.**

The Sun's rays, which include infrared radiation, pass through the atmosphere and some are absorbed by the Earth. (True/False) \_\_\_\_\_

The energy from the Sun is absorbed by the Earth, with none being reflected towards space. (True/False) \_\_\_\_\_

Reflected energy causes greenhouse gas molecules in the troposphere to move more rapidly, trapping heat and warming the planet. (True/False) \_\_\_\_\_

The warming of the troposphere due to trapped heat is referred to as the greenhouse effect. (True/False) \_\_\_\_\_

An increase in greenhouse gases such as carbon dioxide and methane in the troposphere does not affect global warming. (True/False) \_\_\_\_\_

The enhanced greenhouse effect, caused by increased greenhouse gases, contributes to global warming. (True/False) \_\_\_\_\_

**Place the following statement on the diagram below.**

- Sun rays pass through the atmosphere, and some are absorbed by the Earth.
- Some UV radiation is absorbed by the clouds
- UV radiation is reflected to outer space
- Some of that energy (infrared radiation) is reflected towards space.
- Some of the infrared radiation is absorbed by greenhouse gases in the troposphere.

**AICE the Test**

**AICE Environmental Management AS**

Name: \_\_\_\_\_

**8. Managing Climate Change**

**Day 1**

**Bellringer**

Match the greenhouse gas with the correct source.

**Carbon dioxide (CO<sub>2</sub>)**   **Methane (CH<sub>4</sub>)**   **Water vapor (H<sub>2</sub>O)**   **Nitrous oxide (N<sub>2</sub>O)**   **Fluorinated gases (HFCs)**

- Combustion of fossil fuels (coal, oil, and natural gas) for energy and transportation. Carbon dioxide (CO<sub>2</sub>)
- Use of synthetic fertilizers in agriculture. Nitrous oxide (N<sub>2</sub>O)
- Leakage from natural gas systems. Methane (CH<sub>4</sub>)
- Combustion of fossil fuels (as a byproduct). Water vapor (H<sub>2</sub>O)
- Deforestation and land-use changes. Carbon dioxide (CO<sub>2</sub>)
- Rice paddies and agricultural practices. Methane (CH<sub>4</sub>)
- Decomposition of organic material in landfills. Methane (CH<sub>4</sub>)
- Use in refrigeration, air conditioning, and aerosol propellants. Fluorinated gases (HFCs)
- Livestock digestion (enteric fermentation in cattle, sheep, etc.). Methane (CH<sub>4</sub>)

**Identify if the following statements about enhanced greenhouse effect are true or false.**

- The Sun's rays, which include Infrared radiation, pass through the atmosphere and some are absorbed by the Earth. **(True)**
- All the energy from the Sun is absorbed by the Earth, with none being reflected towards space. **(False)**
- Reflected energy causes greenhouse gas molecules in the troposphere to move more rapidly, trapping heat and warming the planet. **(True)**
- The warming of the troposphere due to trapped heat is referred to as the greenhouse effect. **(True)**
- An increase in greenhouse gases such as carbon dioxide and methane in the troposphere does not affect global warming. **(False)**
- The enhanced greenhouse effect, caused by increased greenhouse gases, contributes to global warming. **(True)**

**Place the following statement on the diagram below.**

- Sun rays pass through the atmosphere, and some are absorbed by the Earth.
- Some UV radiation is absorbed by the clouds
- UV radiation is reflected to outer space
- Some of that energy (infrared radiation) is reflected towards space.
- Some of the infrared radiation is absorbed by greenhouse gases in the troposphere.

**Diagram:** A diagram of the Earth showing the greenhouse effect. Sun rays (A) pass through the atmosphere (B) and are absorbed by the Earth (C). Some UV radiation is absorbed by the clouds (D). UV radiation is reflected to outer space (E). Some of that energy (infrared radiation) is reflected towards space. Some of the infrared radiation is absorbed by greenhouse gases in the troposphere.

# How to use the *Bell Ringers*

- ✓ **Edit:** you can customize it for your students.
- ✓ **Use** as Bell Ringer/Warm-up or as Exit Ticket.
- ✓ **Print:** print one day/page at a time, or all the bell ringers for the chapter at once.
- ✓ **Practice:** students can work individually or with a partner.
- ✓ **Discuss:** use the bell ringer a tool for class discussion each day.

**Enhances classroom management:** Bell ringers improve classroom management by providing students with a structured activity as soon as they enter the room.



**AICE Environmental Management AS**

**8. Managing Climate Change**

**Bellringer**

Name: \_\_\_\_\_

Day 5

Answer the following AICE style questions.

1. Explain why climate feedback mechanisms present a difficulty in predicting climate change. [3]

2. State one reason why there are differences in scientific and political opinions on climate change. [3]

3. Identify two types of climate feedback mechanisms that are difficult to predict. [1]

4. Describe how limited historical data affects the accuracy of climate predictions. [2]

5. Explain how differences in variables used in computer models contribute to uncertainty in climate predictions. [2]

Choose the correct answer:

1. Which of the following geo-engineering strategies aims to reflect sunlight by mimicking the cooling effect of volcanic eruptions?

A. Albedo enhancement  
B. Stratospheric aerosol injection  
C. Marine cloud brightening  
D. Carbon capture and storage

2. What is the primary goal of marine cloud brightening?

A. To increase rainfall in arid regions  
B. To make clouds lighter and more reflective, cooling the planet  
C. To enhance the concentration of greenhouse gases  
D. To capture carbon dioxide from the atmosphere

3. Which of the following statements about solar radiation management (SRM) is true?

A. SRM directly reduces greenhouse gas concentrations in the atmosphere.  
B. SRM could provide a complete solution to global warming.  
C. SRM is in the early stages of research and development.  
D. SRM focuses solely on increasing Earth's temperature.

4. What is albedo enhancement, and how does it help counteract climate change?

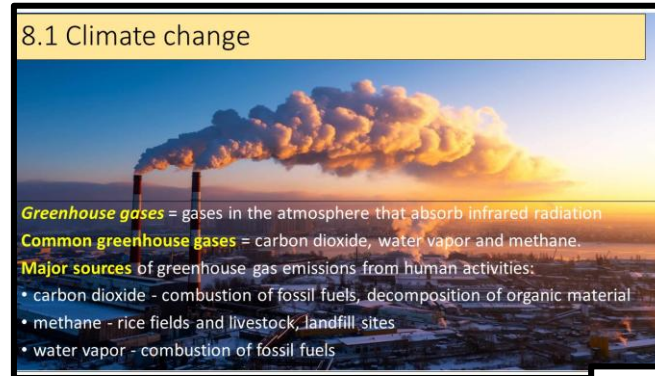
A. It increases the reflectivity of surfaces to reduce absorbed solar radiation.  
B. It injects greenhouse gases to trap more heat.  
C. It removes carbon dioxide from the atmosphere through chemical processes.  
D. It enhances cloud formation in the lower atmosphere.



# How to use the Notes/PowerPoint, Guided Notes and Bell Ringers to prep students for AICE Exam

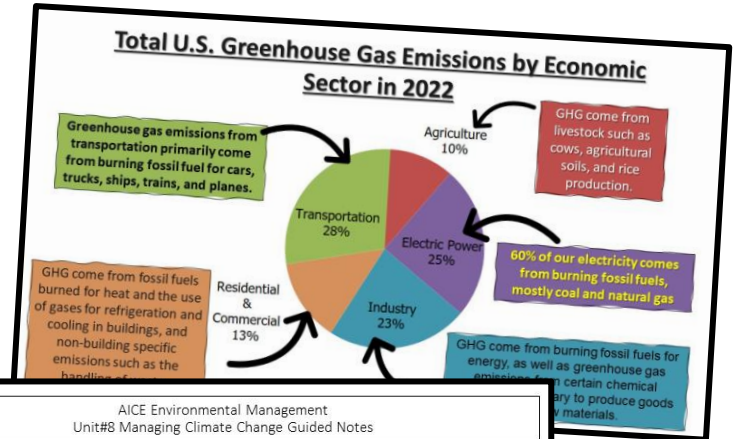
1. Assign students to read specific sections of the **PowerPoint/Notes** (example slides)

8.1 Climate change



**Greenhouse gases** = gases in the atmosphere that absorb infrared radiation  
**Common greenhouse gases** = carbon dioxide, water vapor and methane.  
**Major sources** of greenhouse gas emissions from human activities:

- carbon dioxide - combustion of fossil fuels, decomposition of organic material
- methane - rice fields and livestock, landfill sites
- water vapor - combustion of fossil fuels



2. Have students take notes using the **Student Guided Notes** format as homework (example page one)

AICE Environmental Management  
Unit#8 Managing Climate Change Guided Notes

**8.1 Climate Change**

What are greenhouse gases?

Examples of greenhouse gases	Sources of greenhouse gases

3. Upon entering class, provide them with a **bell ringer** activity (example Day 1 Bell Ringer)

AICE Environmental Management AS

Name: \_\_\_\_\_

**8. Managing Climate Change**

**Bellringer**

Day 1

Match the greenhouse gas with the correct source.


Carbon dioxide (CO <sub>2</sub> )	Methane (CH <sub>4</sub> )	Water vapor (H <sub>2</sub> O)	Nitrous oxide (N <sub>2</sub> O)	Fluorinated gases (HFCs)
1. Combustion of fossil fuels (coal, oil, and natural gas) for energy and transportation.				
2. Use of synthetic fertilizers in agriculture.				
3. Leakage from natural gas systems.				
4. Combustion of fossil fuels (as a byproduct).				
5. Deforestation and land-use changes.				
6. Rice paddies and agricultural practices.				
7. Decomposition of organic material in landfills.				
8. Use in refrigeration, air conditioning, and aerosol propellants.				
9. Livestock digestion (enteric fermentation in cattle, sheep, etc.).				

Identify if the following statements about enhanced greenhouse effect are true or false.

- The Sun's rays, which include infrared radiation, pass through the atmosphere and some are absorbed by Earth. (True/False)
- All the energy from the Sun is absorbed by the Earth, none being reflected towards space. (True/False)
- Reflected energy causes greenhouse gas molecules in the troposphere to move more rapidly, trapping heat and warming the planet. (True/False)
- The warming of the troposphere due to trapped heat is referred to as the greenhouse effect. (True/False)
- An increase in greenhouse gases such as carbon dioxide and methane in the troposphere does not affect global warming. (True/False)
- The enhanced greenhouse effect, caused by increased greenhouse gases, contributes to global warming. (True/False)

Place the following statement on the diagram below.

\_\_\_\_\_ pass through the atmosphere, and some are \_\_\_\_\_.



**This approach ensures that students preview the concepts before you teach them in class, facilitating content mastery even among lower-level students.**

# Practice Q's - 8 pages with answer key included

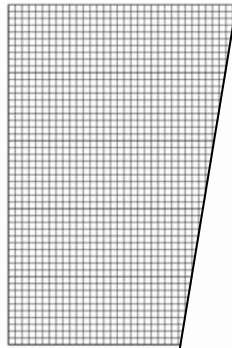
## AICE Environmental Management Chapter#8 Managing Climate Change – Practice Questions

1. The table below shows the levels of carbon dioxide in ppm from 1960 to 2024. Graph the data, in millions of square Km for the same period.

Year	Carbon dioxide levels (ppm)
1960	316
1970	325
1980	340
1990	353
2000	371
2010	391
2020	413
2024	423

Table 1

(a) Graph the data.



(b) Carbon dioxide is a greenhouse gas. Define the term greenhouse gas.

(c) List two other examples of greenhouse gases.

(d) For each of the greenhouse gases listed in question (c) identify a possible source.

(e) Describe the trend in CO<sub>2</sub> emissions from 1960 to 2024 as seen in the graph.

(f) Calculate the percent change in the amount of CO<sub>2</sub> emissions from 1960 to 2024.

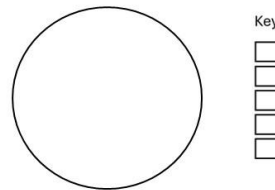
(g) Suggest two reasons for the change in CO<sub>2</sub> levels between 1960 and 2024.

2. Table 2 shows data on total US greenhouse gas emissions by economic sector. Calculate the % of greenhouse gas emission from agriculture. Fill out the chart.

Economic Sector	% of greenhouse gas emissions
Transportation	29
Agriculture	...
Commercial and Residential	13
Industry	23
Electric Power	25

Table 2

(b) Graph Table 2 data in the space provided below.



(c) Identify the economic sector that generates the highest percent of greenhouse gas emissions.

(d) Identify one example of greenhouse gases released from agriculture and one example of greenhouse gases released from transportation.

agriculture

transportation

(e) Describe two management strategies to reduce greenhouse gas emissions from transportation.

(f) State two strategies that could be used to reduce residential emissions of greenhouse gases.

(g) Identify one international agreement that works to reduce greenhouse gas emissions.

(h) Solar radiation management (SRM) is a theoretical approach to managing climate change. Describe how stratospheric aerosol injection works and identify two disadvantages.

3. Carbon dioxide emissions and the Arctic sea ice levels have been measured from 1970 to 2020 and the data is presented in Table 3.

Year	Carbon dioxide levels (ppm)	Arctic sea ice levels (Millions Km <sup>2</sup> )
1970	325	6.5
1980	340	6.5
1990	353	5.8
2000	371	5.7
2010	391	4.2
2020	413	3.4

Table 3

(a) Describe the trends in levels of carbon dioxide and the Arctic sea ice levels from 1970 to 2020, as seen in Table 3.

- As carbon dioxide levels increase, the extent of Arctic sea ice decreases.
- The lowest levels of CO<sub>2</sub> (325 ppm) were recorded in 1970; by 2020 the levels of CO<sub>2</sub> increased by 88 ppm reaching 413 ppm.
- In 1970 the Arctic sea ice was at its highest surface area (6.5 million Km<sup>2</sup>); the Arctic sea ice declined to 3.4 million Km<sup>2</sup> by 2020.
- Arctic sea ice declined by 48% between 1970 to 2020.

(b) Explain two impacts an increase in carbon dioxide levels in the atmosphere could have on the Arctic Ocean.

- Reduction in sea ice causes habitat loss and impacts biodiversity.
- Melting of ice causes a change in ocean salinity which could further impact ocean currents.

(c) The increase in greenhouse gases in the atmosphere causes global warming. Describe the impacts global warming could have on a coastal region.

- Global warming causes glaciers to melt which further causes sea level rise; sea level rise causes coastal flooding.
- Coastal flooding could impact the economy, as property could be lost, and people are forced to migrate.
- Sea level rise could cause saltwater intrusion, which leads to aquifer contamination. This could further cause water insecurity.
- Sea level rise impacts coastal ecosystems, such as coral reefs, wetlands and mangroves.
- This could further lower their biodiversity and impact fishing industry.
- Coastal flooding impacts tourism.

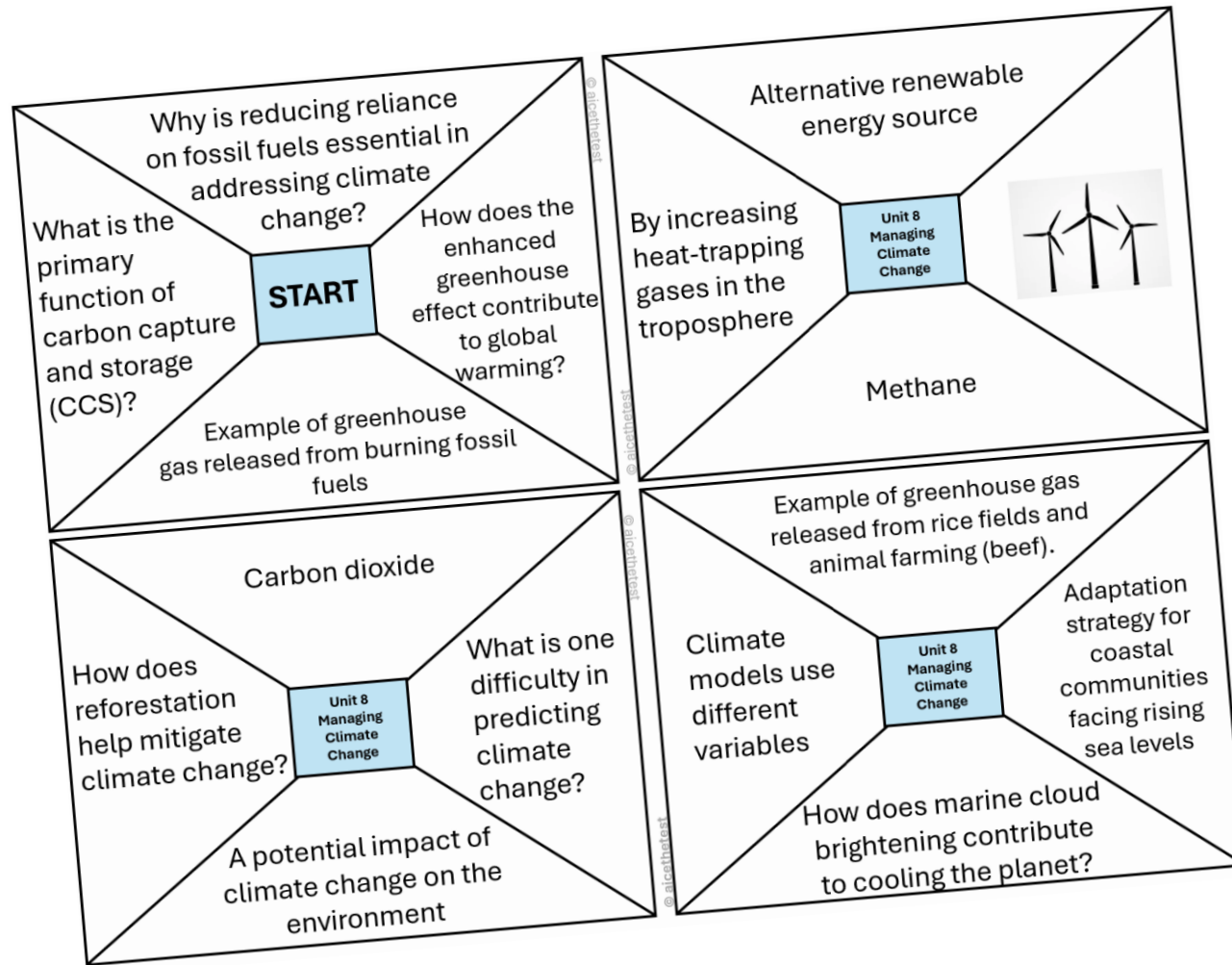


Thought-provoking questions encourage critical thinking, data evaluation, and problem-solving—key components of the AICE curriculum.

Regular exposure to exam-style questions builds familiarity, reducing test anxiety and helping students perform better under timed conditions.

Students arrange the puzzle pieces to match the statement/question with the answer.

**Get ready to engage your students, reinforce key concepts, and make learning about climate change more interactive and fun!**



## **Puzzle Review Game for Unit 8: Managing Climate Change!**

By transforming chapter review into an interactive game, students become active participants in their learning process—motivated to solve puzzles rather than passively memorize facts.



1. Data table below shows different chemicals released from human activities.

Chemical	Greenhouse gas
Methane	
VOC's	
Carbon dioxide	
CFC	
Nitrogen oxide	
F-gases	
Sulfur dioxide	

(a) Identify which of the chemicals listed in the table above represent greenhouse gases. Insert an "X" into the corresponding boxes.

(b) List two sources for greenhouse gases.

(c) List and describe two management strategies that are used to reduce greenhouse gases.

(d) Describe how stratospheric aerosol injection strategy works to manage climate change.

(e) List two advantages and two disadvantages of stratospheric aerosol injection strategy.

1. Data table below shows different chemicals released from human activities.

Chemical	Greenhouse gas
Methane	X
VOC's	
Carbon dioxide	X
CFC	X
Nitrogen oxide	
F-gases	X
Sulfur dioxide	

(a) Identify which of the chemicals listed in the table above represent greenhouse gases. Insert an "X" into the corresponding boxes. [2]

(b) List two sources for greenhouse gases.

- Carbon dioxide – burning fossil fuels
- F-gases – is an alternative to CFC used as refrigerant

(c) List and describe two management strategies that are used to reduce greenhouse gases. [2]

- Switching from burning fossil fuels to renewable energy sources to reduce emissions of carbon dioxide;
- Plant based diet reduces greenhouse gases as meat production releases methane and meat processing facilities release carbon dioxide in the atmosphere.

(d) Describe how stratospheric aerosol injection strategy works to manage climate change.

- Sulfate aerosol is injected into the stratosphere;
- Using airplanes or balloons;
- Reduces UV radiation that gets to the surface of our planet.

(e) List two advantages and two disadvantages of stratospheric aerosol injection strategy.

- Advantages: reflects some of the incoming UV radiation and creates a cooling effect;
- Disadvantages: side effects are not fully known; sulfate particles can cause acid rain.

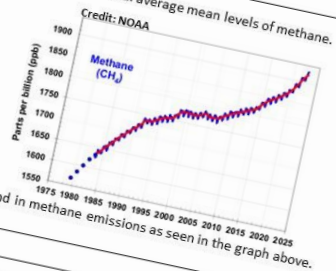


The resource mimics real AICE Environmental Management exam questions, giving students targeted practice for the test format they'll face.

Includes math calculations, data interpretation, and content-based questions to develop all the essential skills needed for success.

(f) Explain the possible impact of future greenhouse gas emissions from newly industrialized countries.

2. The graph below shows the global average mean levels of methane.



(a) Describe the trend in methane emissions as seen in the graph above.

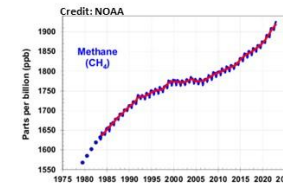
- Methane levels have steadily increased from 1980 to 2023
- Increased by about 300ppb

(b) Calculate the percent change in methane between 1985 to 2020. Write your answer using three significant figures.

(f) Explain the possible impact of future greenhouse gas emissions from newly industrialized countries.

- As more countries move through demographic transition and become industrialized, they will use more fossil fuels in industry and transportation; This releases greenhouse gases such as carbon dioxide;
- Which will increase the concentration of GHG in the troposphere;
- Leading to an enhanced greenhouse effect.

2. The graph below shows the global average mean levels of methane.



(a) Describe the trend in methane emissions as seen in the graph above.

- Methane levels have steadily increased from 1980 to 2023
- Increased by about 300ppb

(b) Calculate the percent change in methane between 1985 to 2020. Write your answer using three significant figures.

- %change =  $1875 - 1650 / 1650 \times 100 = 13.6\%$

3. Describe the impacts global warming has on coastal regions of your choice. Any seven

- In Florida, global warming can lead to water insecurity because the melting of glaciers leads to sea level rise causing saltwater intrusion (contaminate the aquifers);
- Soil can be contaminated with salt, lowering crop productivity;
- Loss of land because of sea level rise
- Coastal erosion and loss of property – because of sea level rise
- Loss of ecosystems such as mangroves which further cause a loss of biodiversity;
- This could negatively impact tourism
- Leading to loss of jobs
- Negative impacts on coral reefs (coral bleaching) leading to loss of biodiversity which impacts fishing industry and jobs;
- Further can lead to food insecurity.



## How To Use the Task Cards

### Individual Practice:

- Distribute the task cards to each student, allowing them to work through the questions independently. Students can use the answer key after attempting each question.
- Encourage students to write down any questions or concepts they find challenging for a follow-up discussion in class.

**36 cards with AI CE Style Q's**

8. Managing Climate Change  
Task Card # 2

8.1  
List three examples of greenhouse gases. For each, state its source.

8. Managing Climate Change  
Task Card # 7

8.1  
Explain why livestock farming is a major source of greenhouse gases.

- Organic matter biodegrades within the digestive tract of ruminants, releasing methane.
- This process releases methane, a potent greenhouse gas.

8. Managing Climate Change  
Task Card # 4

8.1  
The combustion of fossil fuels releases two greenhouse gases. What are the two greenhouse gases?

8. Managing Climate Change  
Task Card # 9

8.1  
Explain the enhanced greenhouse effect.

8. Managing Climate Change  
Task Card # 10

8.1  
Describe how ice cores provide evidence used to support climate change.

8. Managing Climate Change  
Task Card # 25

8.2  
Explain how climate change leads to energy insecurity.

- Droughts lower river's water supply, which further impacts hydroelectrical energy production.
- Change in wind patterns affect wind energy production.
- Increase in storms can damage infrastructure such as solar panels and electrical poles.

8. Managing Climate Change  
Task Card # 26

8.3  
Describe two ways to mitigate climate change.

- Reducing the use of fossil fuels to reduce greenhouse gases being emitted in the atmosphere.
- Switching to alternative forms of energy such as solar and wind power.

8. Managing Climate Change  
Task Card # 11

8.1  
Explain how sources such as tree rings and corals are used to obtain data on past climates.

8. Managing Climate Change  
Task Card # 12

8.1  
Explain how computer climate models are used to predict future climate.

8. Managing Climate Change  
Task Card # 27

8.3  
Explain how switching to low carbon fuels can be used to manage climate change.

- Low carbon fuels such as biofuels release less carbon dioxide when combusted.
- Growing biofuels reduces the amount of carbon dioxide in the atmosphere. Vegetation uses carbon dioxide in the process of photosynthesis.

8. Managing Climate Change  
Task Card # 28

8.3  
Describe how updating transport policies can be used to manage climate change.

- Vehicle emissions can be reduced through the use of technology such as catalytic converters.
- Electric vehicles don't release GHG.
- Development of public transportation to reduce GHG emissions.

### Group Practice:

- Divide students into small groups and provide each group with a set of task cards. Students can take turns reading questions aloud and discussing their answers before revealing the correct answer.
- This method fosters collaboration and allows students to clarify their understanding of the topics as they discuss potential answers with peers.



**Check out my blog for lesson plans, curriculum pacing guides, activities and more. <https://aicethetest.com/>**

Unit#8 Managing Climate Change– 3 weeks/7 class periods			
Day#	Date	Topic/Objectives	Activities/Resources
1		<b>8.1 Climate change</b> <ul style="list-style-type: none"> <li>define greenhouse gases</li> <li>state the major sources of greenhouse gas emissions from human activities</li> <li>explain how increased concentrations of greenhouse gases in the atmosphere cause the enhanced greenhouse effect leading to global warming</li> <li>outline the difficulties of monitoring and predicting climate change</li> </ul>	<ul style="list-style-type: none"> <li><b>Bellringer#1</b></li> <li><a href="#">Lecture/Notes (PPT – slides 1-9)</a></li> <li><a href="#">Student Guided Notes</a></li> <li>Investigative skills 8.1 – page 305-306</li> </ul>
2		<b>8.2 The impacts of climate change</b> <ul style="list-style-type: none"> <li>state the impacts of climate change on the environment</li> <li>describe the impacts of climate change on human populations</li> </ul>	<ul style="list-style-type: none"> <li><b>Bellringer#2</b></li> <li><a href="#">Lecture/Notes (PPT – slides 10 – 17)</a></li> <li><a href="#">Student Guided Notes</a></li> <li>Case Study: The impact of climate change on the Great Barrier Reef, east coast of Australia. – page 316-318 (Coursebook)</li> <li>8.2 Questions 1-4 page 315 (Coursebook)</li> </ul>
3		<b>Quiz 8.1 and 8.2</b> <b>8.3 Managing climate change</b> <ul style="list-style-type: none"> <li>describe strategies for managing climate change through the reduction of greenhouse gas emissions</li> <li>outline geo-engineering strategies to counteract climate change</li> <li>evaluate strategies for managing climate change</li> </ul>	<ul style="list-style-type: none"> <li><b>Bellringer#3</b></li> <li><a href="#">Lecture/Notes (PPT – slides 18-33)</a></li> <li><a href="#">Student Guided Notes</a></li> <li><b>QUIZ (8.1 and 8.2)</b></li> <li>8.3a Questions 1-4 page 324 (Coursebook)</li> <li>Extended Case Study: Island nations and sea level rise -page 327-329 (Coursebook)</li> </ul>