

Exercise walk-through

9.4

Increases in the Greenhouse Gases

AP Environmental Science

The greenhouse effect

A *natural* warming: sunlight warms the ground, which radiates **infrared radiation** ; **greenhouse gases** trap some heat.

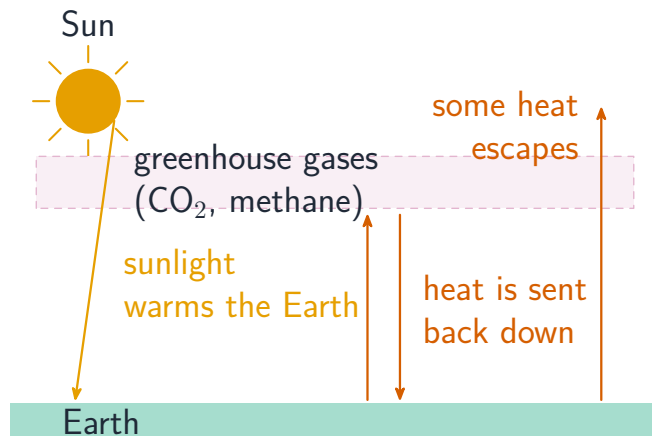
- CO₂, methane , water vapor

Keeps Earth **habitable** :
+15°C, not -18°C. The problem
is making it **too** strong.



Endangered coral

Greenhouse gases absorb the heat the Earth



greenhouse gases trap some of the Earth's heat, so less escapes to space and the Earth warms up

Greenhouse gases absorb the heat the Earth gives off and send some back

Exercises 2.1-2.3

2.1 Name one human source of methane.

[1]

2.2 What does global warming potential compare?

[1]

2.3 Which traps more heat per kilogram: CO₂ or methane?

[1]

Exercises 2.1-2.3

2.1 Name one human source of methane.

[1]

2.1

- Any one: livestock, rice paddies, landfills, natural-gas leaks
-

2.2 What does global warming potential compare?

[1]

2.2

- How much heat a gas traps relative to the same mass of CO₂
-

2.3 Which traps more heat per kilogram: CO₂ or methane?

[1]

2.3

- Methane

Exercise 3.1

3.1 Compared with CO_2 , methane has a

[1]

☐

A much lower global warming potential

B much higher global warming potential per molecule

C identical effect

D cooling effect

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3.1 B

- a much higher global warming potential per molecule

Exercise 3.2 (a)

3.2 A country has large livestock herds and burns much coal.

(a) Name the main greenhouse gas from each activity.

[2]

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(a) Name the main greenhouse gas from each activity.

[2]

(a)

- Livestock
- methane; coal
- CO₂

Exercise 3.2 (b)

3.2 A country has large livestock herds and burns much coal.

(b) Explain why methane leaks are a concern despite being smaller in volume than CO₂ emissions. [2]

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(b) Explain why methane leaks are a concern despite being smaller in volume than CO₂ emissions. [2]

(b)

- Methane has a much higher global warming potential, so even small amounts trap a lot of heat

Exercise 3.3

3.3 Explain why atmospheric CO₂ has risen since the Industrial Revolution.

[2]

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3.3

- Industrialization greatly increased the burning of fossil fuels (and deforestation), releasing CO₂ faster than natural processes remove it, so it accumulates