

# Greenhouse Gases and Global Warming

## What is the Greenhouse Effect?

EM radiation at most wavelengths from the Sun passes through the atmosphere

- Earth absorbs most radiation and heats up
- heat is radiated from the Earth as IR radiation
- some IR radiation is absorbed by greenhouse gases in the atmosphere and heats up the lower atmosphere

## Greenhouse Gases

keep temperatures on Earth high enough

...to support life

- Water vapour
- Carbon Dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Ozone (O<sub>3</sub>)

## Human Activities

increasing levels of Greenhouse Gases

such as

- driving (CO<sub>2</sub>)
  - relatively small amounts of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) are emitted
- burning fossil fuels (CO<sub>2</sub>)
  - with smaller amounts of methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O)
- using electricity (CO<sub>2</sub>)
- farming cattle (CH<sub>4</sub>)
- decay of organic waste (CH<sub>4</sub>)
- deforestation (CO<sub>2</sub>)
- growing rice (CO<sub>2</sub>)
- Heating and cooking
  - emits carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O)
- application of synthetic and organic fertilizers
  - emissions of nitrous oxide (N<sub>2</sub>O)

## Natural factors

- Orbital changes
  - of Earth about the Sun
- Volcanic activity
  - CO<sub>2</sub> released
- Solar output

fluctuations in the degree radiation from the Sun

an increase in average global temperature

## Global Climate Change

negative effects...

- changes in the distribution of species
- extinction of species
- melting of polar ice caps
  - ... raising sea levels
- decrease in crop yields
- people moving from areas suffering hardships (migration)

## Carbon Footprint

total amount of greenhouse gases emitted over the life cycle of an event or product

reduced by...

reducing emissions of carbon dioxide and methane

such as using less electricity

or planting more trees

or reducing the amount of travel