
Introduction to
Environmental Engineering

What is Environmental Engineering?

Definition: The application of science and engineering knowledge and concepts to care for and/or restore our natural environment and/or solve environmental problems.

Who does it affect?

- Everyone & Everything!
  - plants
  - insects
  - animals
  - humans
  - ecosystems
  - our planet

What are environmental issues?

- Three areas:
  - air quality
  - land quality
  - water quality

Air Quality

Why is air quality such a problem?

Poor air quality can lead to:

- smog
- respiratory & other illnesses
- acid rain
- global warming

From where do air pollutants come?

Air pollution in China

Air Quality

- **Air pollutant:** A known substance in the air that can cause harm to humans and the environment.
  - nitrogen oxides (NO_x)
  - sulfur oxides (SO_x)
  - carbon monoxide (CO)
  - carbon dioxide (CO_2)

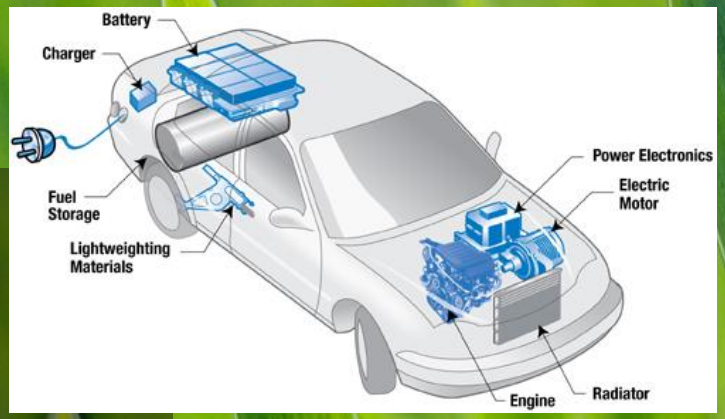
Effects of acid rain on plants

Greenhouse Gases & Global Warming

- **Global warming:** An increase in the average air temperature of the Earth.
- **Greenhouse effect**: Heat from the sun gets trapped inside the glass of a greenhouse and heats up its air.
- More carbon dioxide (CO_2) being released in the atmosphere traps more heat.

How do we reduce air pollutants?

- carpool
- hybrid cars
- EPA government regulation
- NEW: geologic carbon sequestration
- alternative fuels
- walk, bike or use public transportation



Land Quality

- **Land pollution:** Destruction of the Earth's surface caused by human activities and the misuse of natural resources.
- **Natural resources:** Land and raw materials that exist naturally in the environment undisturbed by humans.
- **Renewable resource:** A natural resource that can be replaced by a natural process.
- **Non-renewable resource:** A natural resource that cannot be produced or re-grown or reused.

Examples

Renewable Resources

Non-Renewable Resources

What problems arise from land pollution?

Acid mine drainage

Pesticides and herbicides

Landfills

How do we reduce land pollution?