



# TeachEngineering

STEM Curriculum for K-12

## INTRODUCTION TO ENVIRONMENTAL ENGINEERING



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# 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:*

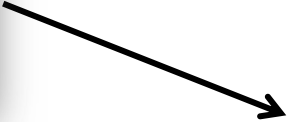
**smog**

**acid rain**

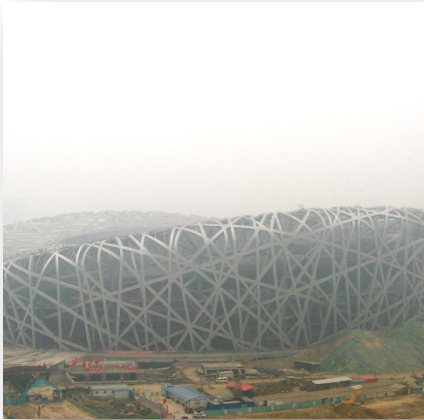
**respiratory & other  
illnesses**

**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 ( $\text{NO}_x$ )
- sulfur oxides ( $\text{SO}_x$ )
- carbon monoxide ( $\text{CO}$ )
- carbon dioxide ( $\text{CO}_2$ )



*effects of acid rain on plants*

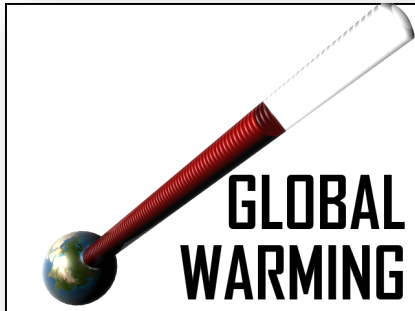


# Greenhouse Gases & Global Warming

**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.

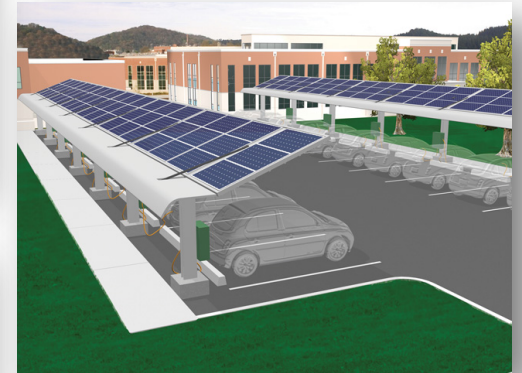
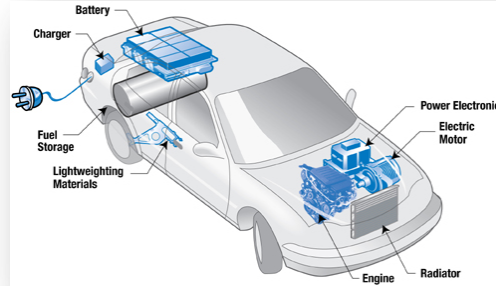
**More carbon dioxide (CO<sub>2</sub>) being released in the atmosphere traps more heat.**





# 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 pollutants?

acid mine drainage



pesticides and herbicides



landfills



# How do we reduce land pollution?

