



# Intro to Environmental Science

Awareness and **Sustainability ?**

# Chapter 1

## Our Changing Environment

An example of a building using green architecture, integrating wind turbines, photovoltaic panels and solar hot water generation.



# Objective 1

*Define environmental science and explain why environmental sustainability is an important concern of environmental science.*



# What is SUSTAINABILITY

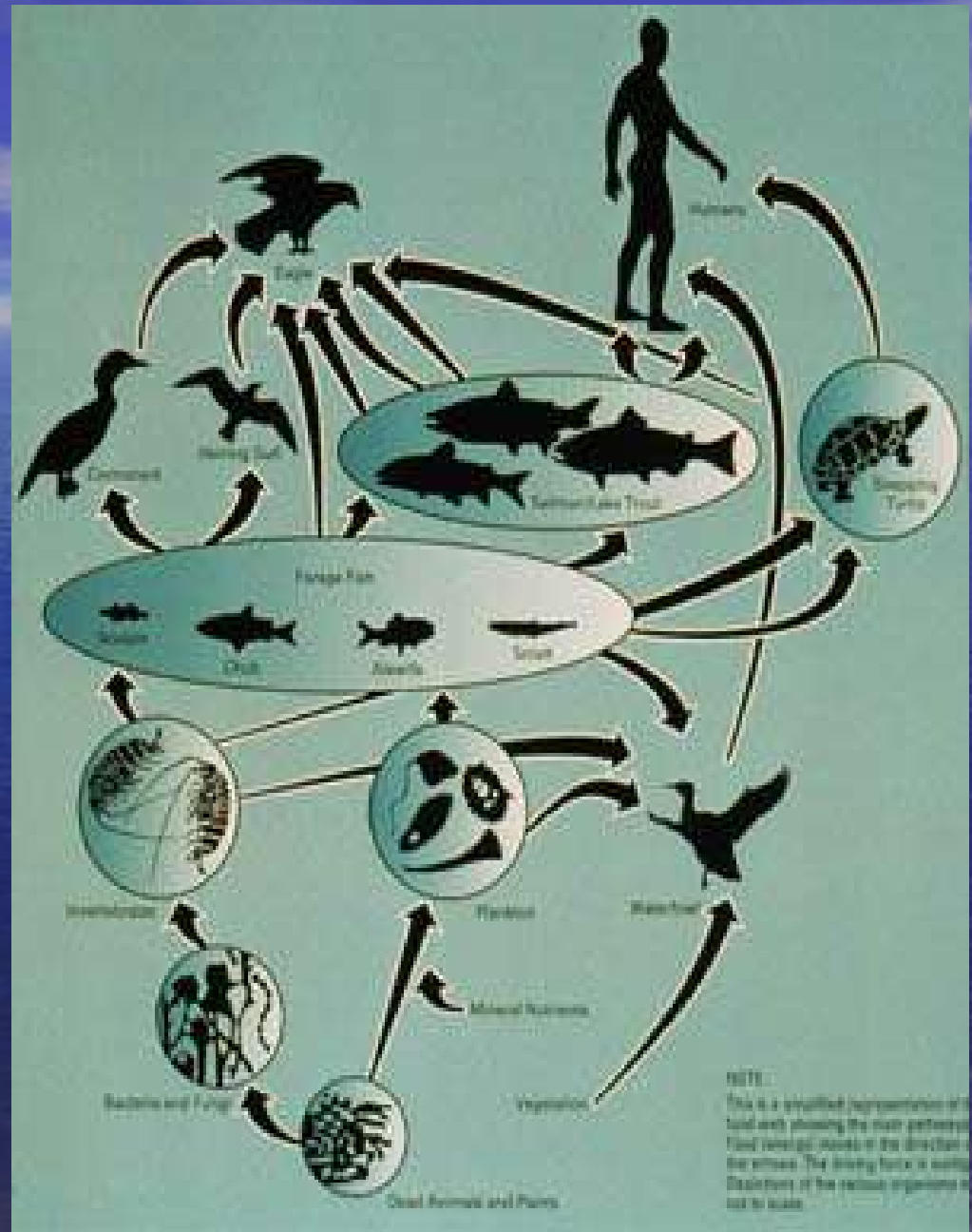
- Environmental Sustainability – the ability of the environment to function indefinitely without going into a decline from the stresses imposed by human society on natural systems (soil, water, air) that maintain life.



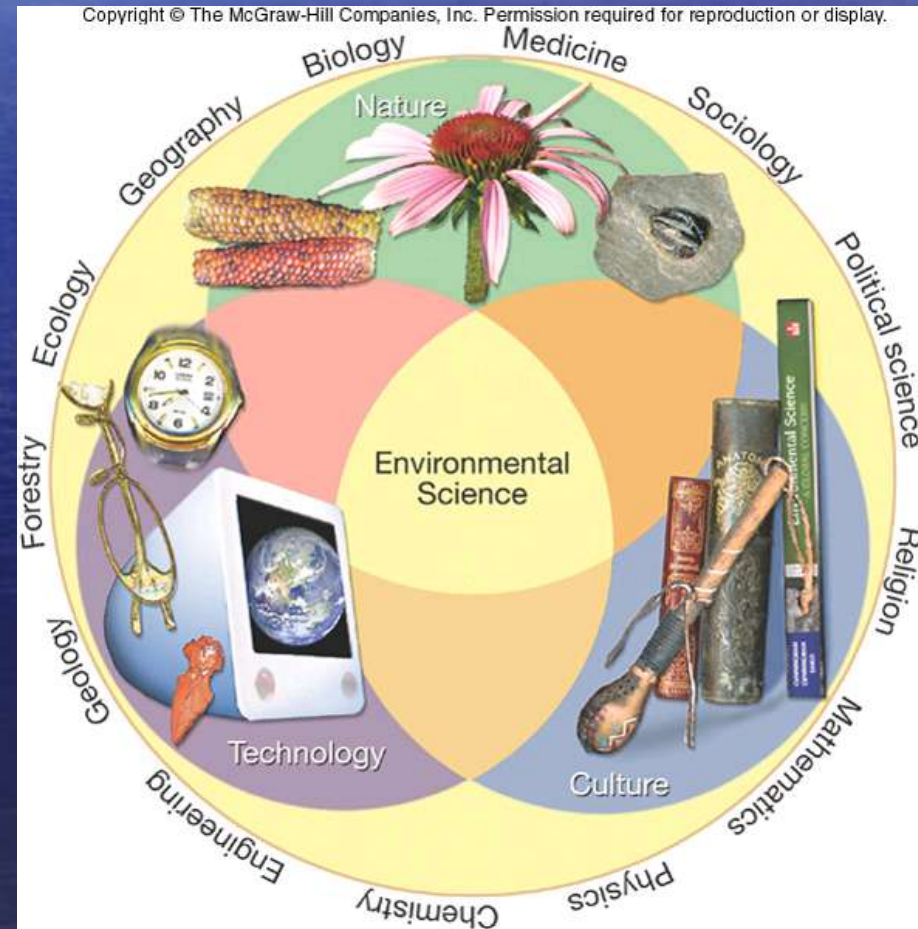
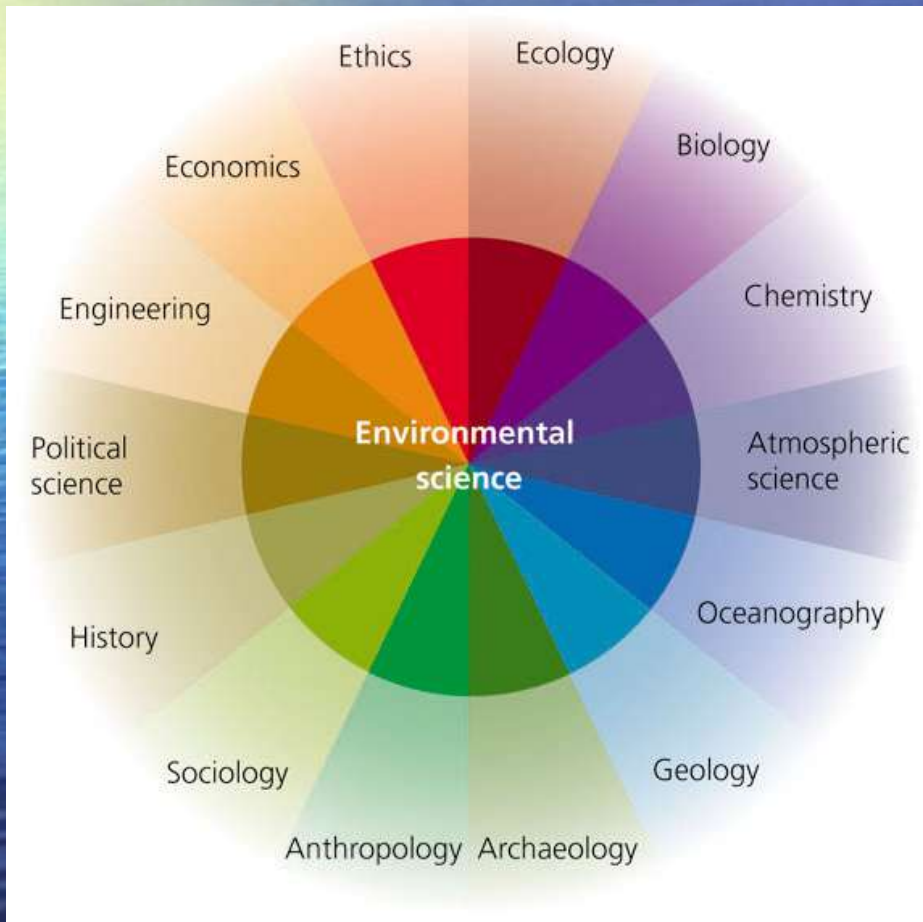
Humans are currently: Using non-renewable resources as renewable, using renewable resources faster than they can be replenished naturally, polluting the environment, and experiencing uncontrollable population growth.



**Environmental Science** – The interdisciplinary study of humanity's relationship with other organisms and the nonliving physical environment.



# Drawing a bridge of Information



# Where do we go from here...

- Coverage of environmental issues is now daily in the press.
- Legislators are now expected to have sophisticated platforms on a variety of environmental issues.
- Virtually every profession has input into environmental policies, ethics, management.
- Americans remain under-equipped to deal with environmental information because of poor training in science.



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# Why worry about warming? Think rising seas

## Scenarios for U.S. coastlines help focus on what to protect and at what cost



Michael Kappeler / AP

A ship passes by the coast of Greenland where the nearby Sermeq Kujalleq glacier, a U.N. heritage site, has thinned in recent years. Greenland experts are surprised by the rapid retreat of ice along the continent, which would raise sea levels by 20 feet if all the ice on it completely melted.

**AP** Associated Press

Updated: 6:36 a.m. PT Sept 24, 2007

Rising seas will ultimately swamp the first American settlement in Jamestown, Va., as well as the Florida launch pad that sent the first

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## ENVIRONMENT

**Bush Climate-Change Conference Has Doubters**[Listen](#) by Elizabeth Shogren

*Morning Edition*, September 27, 2007 · President Bush has invited 15 countries to a two-day conference on global climate change. But the meeting is being greeted with some skepticism.

The U.S. emits a quarter of the world's greenhouse gases, and the Bush administration has been criticized for its unwillingness to commit to cutting those emissions.

Mr. Bush took the U.S. out of the Kyoto protocol, the international treaty designed to cut greenhouse gas emissions. Some countries are afraid Mr. Bush will use this week's talks as a substitute for a binding treaty when Kyoto expires in five years.

The administration counters that the president has done far more on climate change than he is getting credit for. Officials point to President Bush's proposal to replace 20 percent of the country's gasoline with renewable fuels.

Mr. Bush is expected to propose that the group set a long-term global goal for reducing emissions, and that each nation outline its own plans by the end of next year.

There is agreement on one point: Without a strong commitment from the U.S. and China, real progress on global warming will be difficult.

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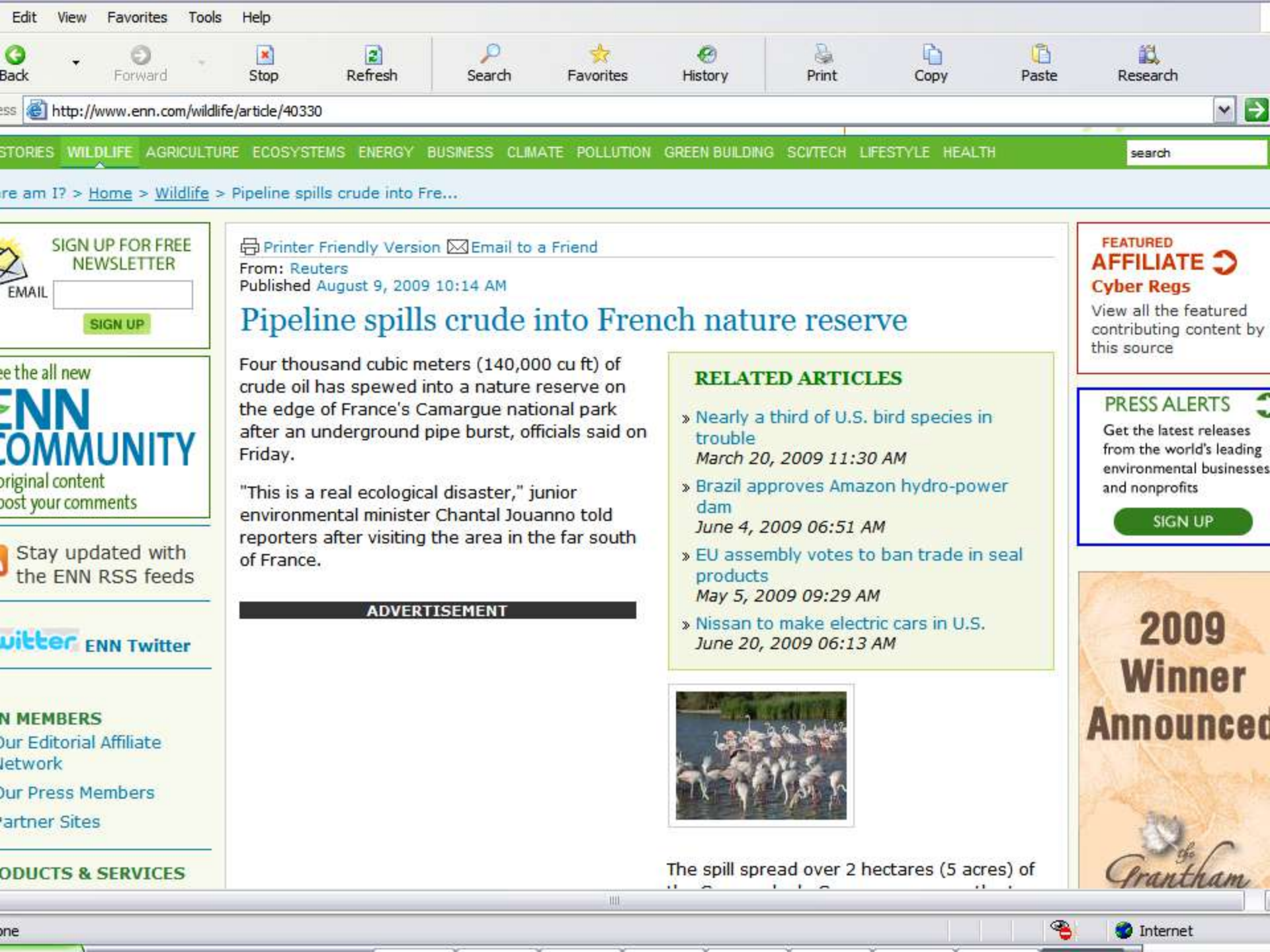
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From: Reuters  
Published August 9, 2009 10:14 AM

## Pipeline spills crude into French nature reserve

Four thousand cubic meters (140,000 cu ft) of crude oil has spewed into a nature reserve on the edge of France's Camargue national park after an underground pipe burst, officials said on Friday.

"This is a real ecological disaster," junior environmental minister Chantal Jouanno told reporters after visiting the area in the far south of France.

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The spill spread over 2 hectares (5 acres) of

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Published August 3, 2009 09:49 AM

## Study: Pollution Causing Cancer in Animals

A recent report published in July's Nature Reviews Cancer reveals the consequences of improper disposal and dumping. According to "Wildlife Cancer: a conservation perspective," scientists are now concerned about humans' contribution to carcinogenesis in wild animal habitats.

"The more we contaminate the environment, the more we will see problems. If you dump a pollutant, it doesn't just go away," Frances Gulland, director of veterinary science at the Marine Mammal Center in Sausalito, Calif., tells Newsweek.

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Printer Friendly Version Email to a Friend. From: Timothy Gardner, Reuters. Published August 5, 2009 08:24 AM

# Would You Pay \$100 to Reduce Our Climate Impacts?

A new U.S. government study on Tuesday adds to a growing list of experts concluding that climate legislation moving through Congress would have only a modest impact on consumers, adding a bit more than \$100 to household costs in 2020.

Under the climate legislation passed by the House of Representatives in June, electricity, heating oil and other bills for average families will rise \$114 in 2020 and \$288 in 2030, according to the Energy Information Administration, the country's top energy forecaster.

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# Overview of Environmental Science

What are the problems?

# The Challenge...

- Regardless of your reasons for taking this course, my challenge to you is to think for yourself. Within this course, you not only will learn a lot about science, you will learn about the complex issues facing our environment. You will explore different points of view and be exposed to a variety of differing opinions. Don't feel that you have to accept any particular opinion as your own. As your knowledge and skills in environmental science grow, so will your ability to draw your own conclusions.
- **What do you hope to get out of this class?**

## Objective 2



*Summarize human population issues, including population size and level of consumption.*

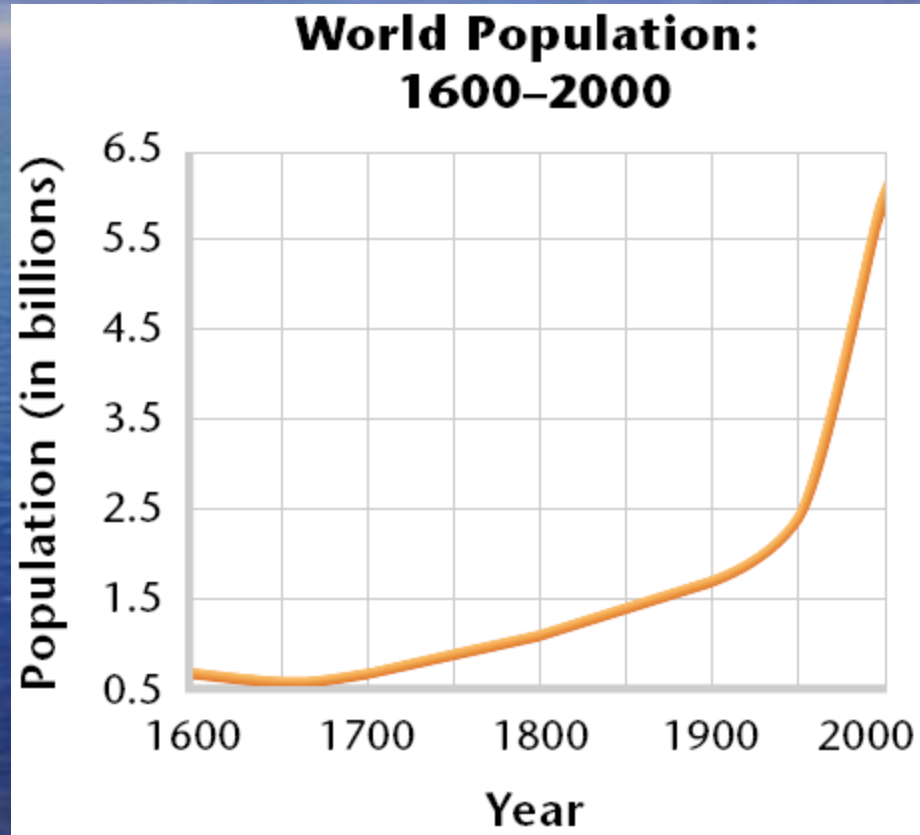


# World Population Growth

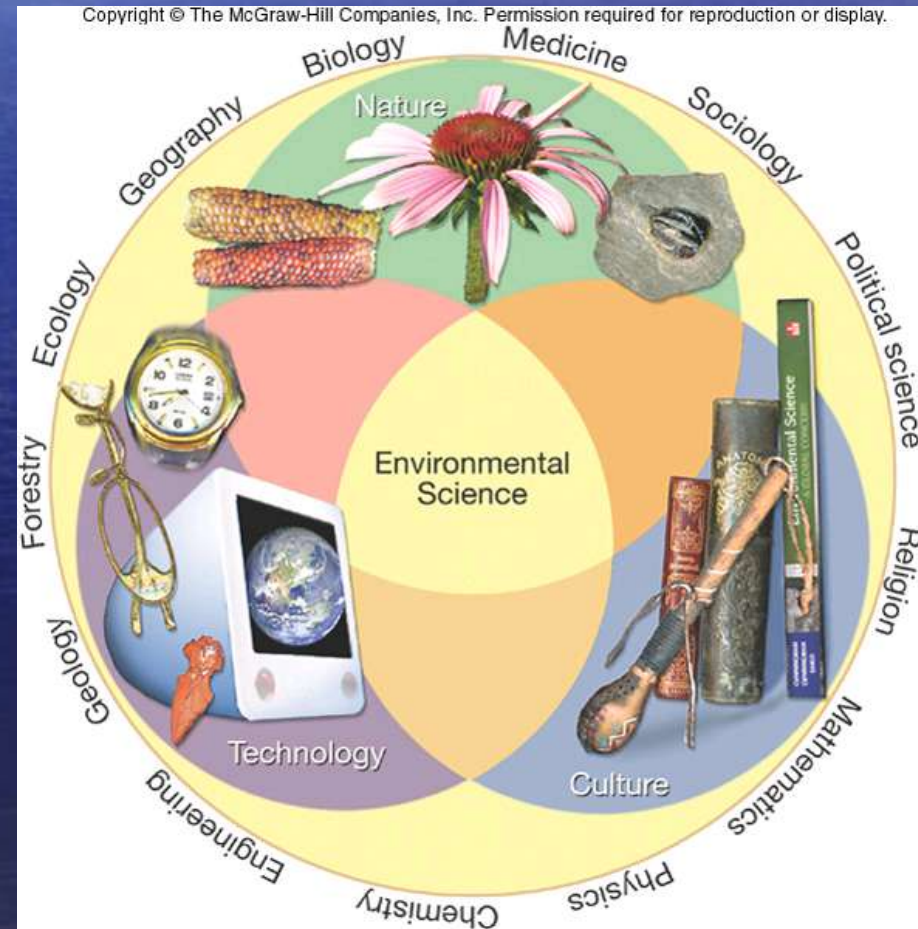
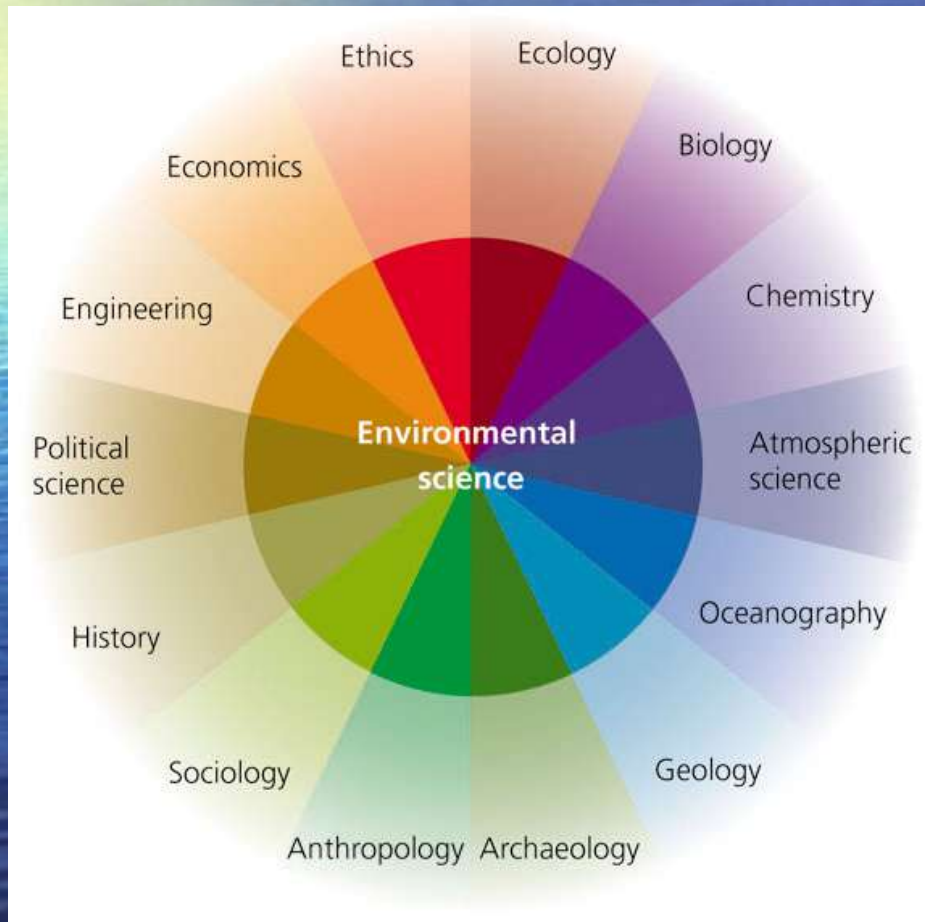
Thousands of years to reach 1 billion, 130 years to reach 2 billion, 15 years to reach 3 billion, 12 years to reach 4 billion, 12 years to reach 5 billion, and 12 years to reach 6 billion.



# Population Growth



# Sciences Involved with Environmental Science



# Environment Through Time...

- Hunter – Gatherers
  - Collecting and scavenging
- Agricultural Revolution
  - Growing, breeding, caring for plants
  - Population grow at high rate
- Industrial Revolution
  - Energy shift – animal, water, fossil fuel
  - Factories – Less farming
  - Quality of life improved

# Environmental Problems

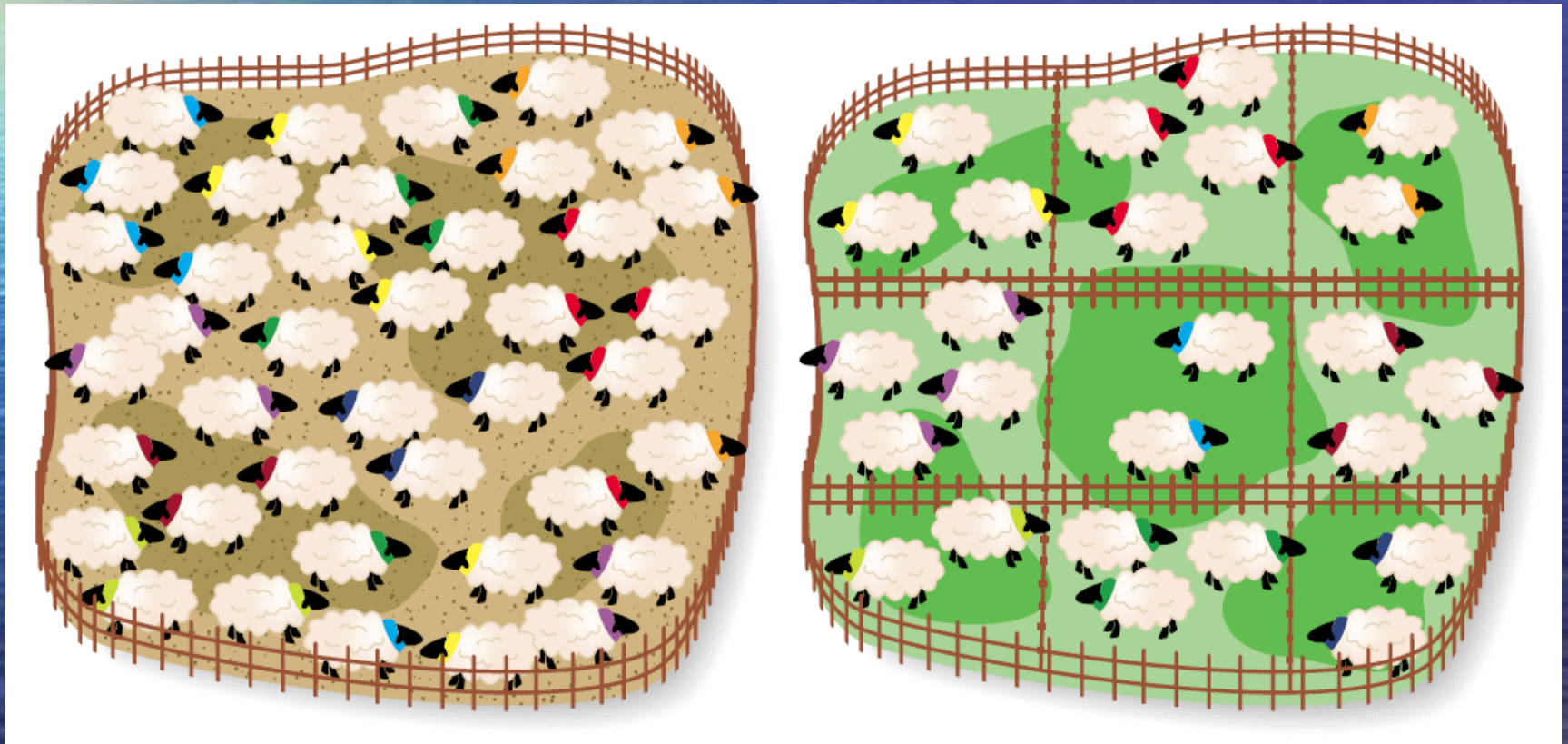
- Resource Depletion
  - Natural resources
  - Renewable to Nonrenewable
- Pollution
  - Air, water, soil (Biodegradable/Non-Biodegradeable)
- Loss of Biodiversity
  - Natural Resource (Food, oxygen, resources)

# Resource Depletion

<b>Renewable and Nonrenewable Resources</b>	
<b>Renewable</b>	<b>Nonrenewable</b>
energy from the sun	metals such as iron, aluminum, and copper
water	nonmetallic materials such as salt, sand, and clay
wood	fossil fuels
soil	
air	

# The Tragedy of the Commons

–Short Term vs. Long Term Society Welfare

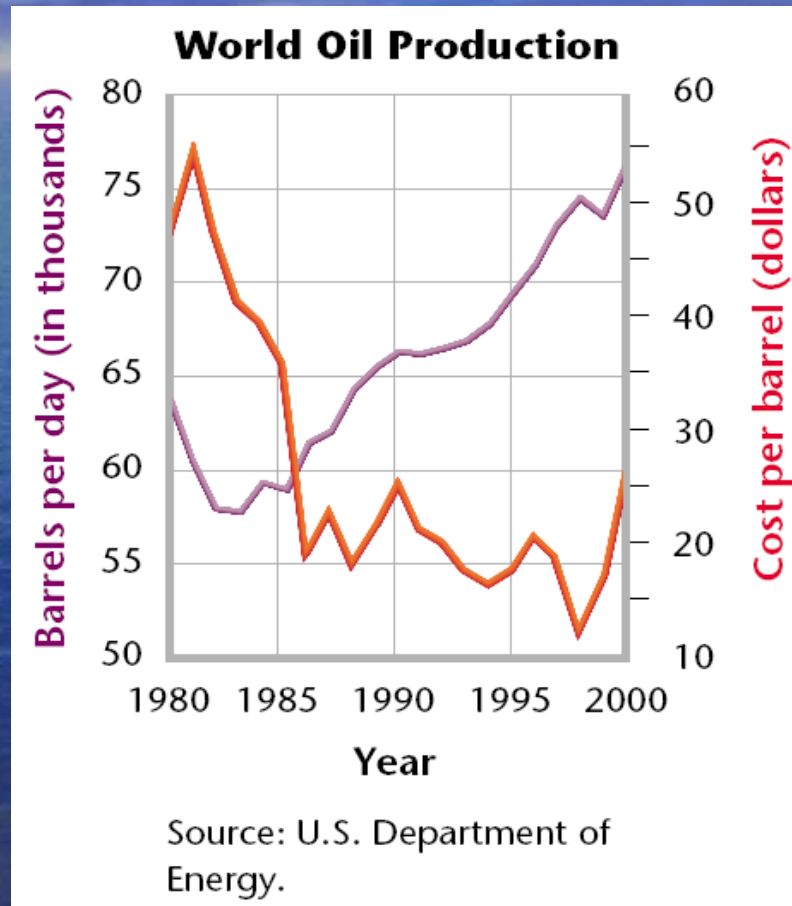


# Economics and the Environment

- Supply and Demand
  - Greater demand limited supply / more worth
    - Oil supply decrease, then what?
- Cost and Benefits
  - Bias – Who pushes for environmental regulations
- Risk Assessment



# Supply and Demand



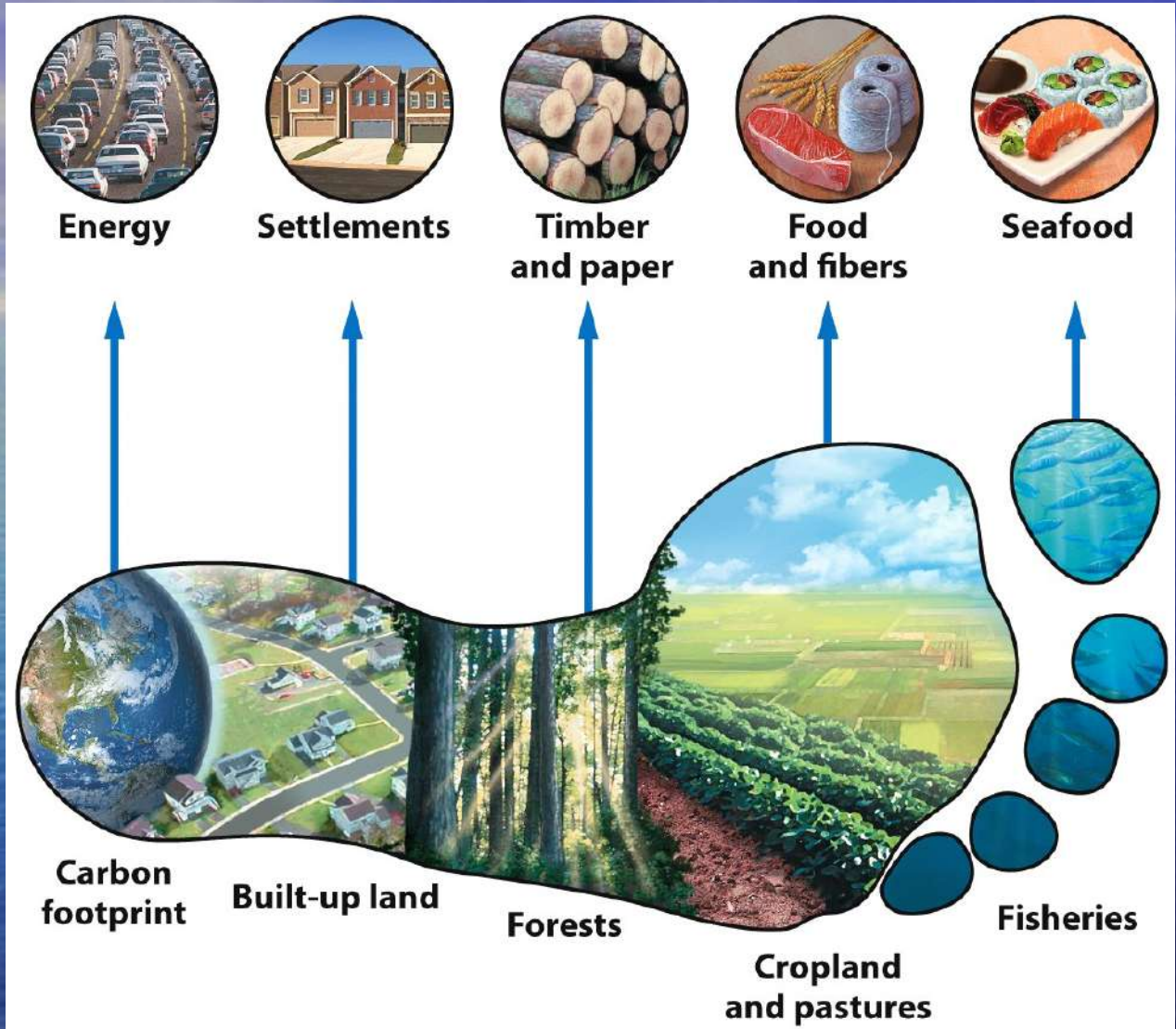
# Indicators of Development

Indicators of Development for the United States, Japan, Mexico, and Indonesia

	Measurement	U.S.	Japan	Mexico	Indonesia
Health	life expectancy in years	77	81	71.5	68
Population growth	per year	0.8%	0.2%	1.7%	1.8%
Wealth	gross national product per person	\$29,240	\$32,350	\$3,840	\$640
Living space	people per square mile	78	829	133	319
Energy use	per person per year (Btu)	351	168	59	18
Pollution	carbon dioxide from fossil fuels per person per year (tons)	20.4	9.3	3.5	2.2
Waste	garbage produced per person per year (kg)	720	400	300	43

# The Ecological Footprint

- A measure of how much a person consumes, expressed in area of land.



**Figure 1.14**  
*Environmental Science*  
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**Present-day  
footprint of  
global human  
population**



**Footprint of global  
population if all  
had average U.S.  
lifestyle**

**Figure 1.15**

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