Some primary goals of public health are to insure:

1. safe water supplies for all uses.
2. clean air.
3. infectious disease-free and toxin-free food supplies.
4. acceptable housing and a minimum of good medical care for all.
Small Thoughts for a Global Grid

Dr. Richard E. Smalley, a Nobel laureate famous for his study of carbon nanotubes, has turned his attention to the world’s energy needs. In June he spoke at the National Renewable Energy Laboratory in Golden, Colo.
Forecasting Agriculturally Driven Global Environmental Change

David Tilman, Joseph Fargione, Brian Wolff, Carla D’Antonio, Andrew Dobson, Robert Howarth, David Schindler, William H. Schlesinger, Daniel Simberloff, Deborah Swackhamer

During the next 50 years, which is likely to be the final period of rapid agricultural expansion, demand for food by a wealthier and 50% larger global population will be a major driver of global environmental change. Should past dependences of the global environmental impacts of agriculture on human population and consumption continue, $10^9$ hectares of natural ecosystems would be converted to agriculture by 2050. This would be accompanied by 2.4-

$10^9$ hectares is equivalent to the size of Brazil
What are the environmental health problems the world will have to face when another 2-3 billion people are added to it?
Who is this man and why is he smiling?

(He’s Benoit Mandelbrot)
\[ x_{n+1} = f(x_n) = x_n^2 + c \]
The Mandelbrot Set
POWERS OF TEN
About the Relative Size of Things in the Universe

"A brilliant pictorial and textual embodiment of a wonderful idea."
Why is this man sleeping?
Lymphocyte
Nuclear Envelope
Chromosomal DNA
SYMBIOTIC PLANET
[ A NEW VIEW OF EVOLUTION ]

LYNN MARGULIS
Evolutionary and Genetic Relationships
Some General Ecological Principles
General Scheme For Most Life On Earth

SOLAR RADIATION

PHOTOSYNTHESIS
\[ \text{CO}_2 + \text{H}_2\text{O} \rightarrow (\text{CH}_2\text{O})_n + \text{O}_2 \]

DETRITAL FOOD WEB

GRAZING FOOD WEB

RESPIRATION
\[ (\text{CH}_2\text{O})_n + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} \]

HEAT
Trophic Levels And Energy Flow

Nature Abhors A Vacuum

Evolution of Darwin’s Finches
Tolerance Limits

from Miller, *Living In The Environment* Thompson, Pub.
Trophic Levels and Food Webs

from Miller, Living In The Environment Thompson, Pub.
Trophic Levels and Food Webs

(who’s eating who)
Food Pyramids

from Miller, *Living In The Environment*, Thompson, Pub.
# WebElements: The Periodic Table on the World-wide Web

http://www.webelements.com/

<table>
<thead>
<tr>
<th>Element</th>
<th>Atomic Number</th>
<th>Symbol</th>
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**Symbols and Names:** The symbols and names of the elements, and their spellings are those recommended by the International Union of Pure and Applied Chemistry (IUPAC - http://www.iupac.org). Names have yet to be proposed for the most recently discovered elements 111–112 and 114 so those used here are IUPAC's temporary systematic names. In the USA and some other countries, the spellings aluminium and cesium are normal whilst in the UK and elsewhere the common spelling is sulphur.

**Group labels:** The numeric system (1–18) used here is the current IUPAC convention.

**Atomic weights (mean relative masses):** Apart from the heaviest elements, these are the IUPAC 2001 values and given to 5 significant figures. Elements for which the atomic weight is given within square brackets have no stable nuclides and are represented by the element's longest-lived isotope.

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The Earth - From Space
A Satellite View of The World

Courtesy NASA
The Earth At Night

More information available at:

Astronomy Picture of the Day
2000 November 27
Physical Determinants Of Ecosystems

From Miller, *Living In The Environment* Thompson Pub.
Ecozones
In the end, we only conserve what we love.  
We will only love what we understand.  
We will only understand what we are taught.

Baba Dioum, Senegalese poet
Land Use (in percentage)

- Pastures: 24%
- Agriculture: 11%
- Forests: 31%
- Other: 34%
"More than 99 percent of our food comes from the land," says David Pimentel, an agricultural scientist at Cornell University. "That's a fact that a lot of people don't appreciate." Among the many crops cultivated, grains provide at least 80 percent of food worldwide. Farmers and consumers alike benefit from grains' advantages. Yields per acre are normally abundant. Also, grains store and transport well—unlike potatoes, for instance, which are swollen with water—and they contain a nutritious mix of carbohydrates, proteins, and vitamins.

Just three crops—wheat, rice, and corn—dominate grain production. This specialization has helped drive the agricultural boom of the past 30 years, as investments in equipment and supplies targeted to one kind of plant over many acres paid off with bumper crops. Relying so heavily on such a narrow genetic base is risky, however. One virulent disease could cause crop failure and famine.

Even if crops stay healthy and cereal grain production continues to climb as projected above, the global food supply may ultimately fall short. With growing populations of their own, regions that now enjoy a surplus will likely have less and less for export to those in need.

While the world's population has doubled in the past half century, its appetite for meat has quadrupled. To produce more than 200 million tons of meat a year, livestock are now fed about 40 percent of all grain harvested.

Pounds of grain needed to produce one pound of bread or one pound of live weight gain in each animal.
Carbon sink. Two years after a warming, global plant growth seems to suck up excess CO$_2$. 
Just When We Thought We Understood How Things Worked!

CARNIVOROUS HIPPOS Although the hippopotamus's usual fare is grass, this habitual vegetarian can occasionally turn carnivore. Field biologist Joseph P. Dudley, formerly at Hwange National Park in Zimbabwe, observed a male hippo killing an impala ram that had swum through a pond to evade a wild dog. After eating some of the meat, the hippo returned to his herd. A few minutes later, ten more individuals from the group gathered at the floating carcass for a communal feast.
Determining the course grade:

25% - Midterm

25% - Final

30% - 10 abstracts. Each one must be a minimum of 300 and not exceed 500 words in length.

20% - 2 oral presentations

**Writing an abstract:**

The abstract is based on internet research of a question supplied by the presenter. Examples of faculty-generated abstracts can be found on Courseworks. Each student is required to submit 10 abstracts by e-mail to their TA. They will be graded and returned ASAP by e-mail. One of three grades will be given: Good, Fair, Poor. Three internet sites are required to be used for all 10 abstracts:


www.EPA.gov

and one other.gov site – e.g., www.USDA.gov; www.NIH.gov; www.CDC.gov; www.NOAA.gov; www.USGS.gov