

7.014  
Lecture 16: Introduction to  
Ecology and the Biosphere  
*March 11, 2005*

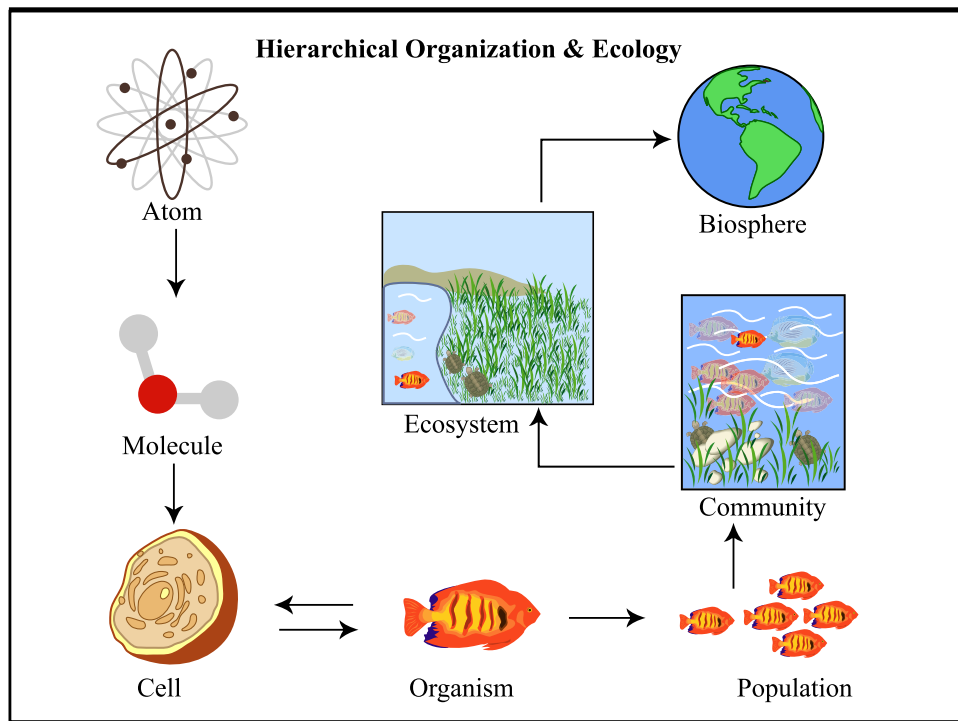


Figure by MIT OCW.

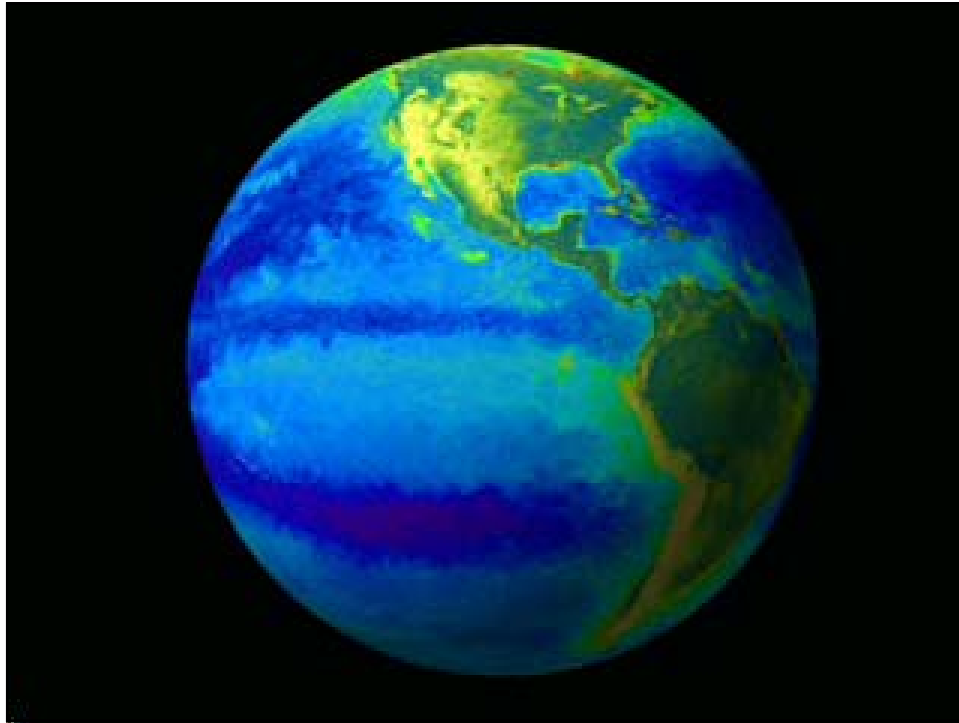


Image is taken from NASA's Web site: <http://www.nasa.gov>.

Figure removed due to copyright reasons.

Please see:

figure 50.12a in Freeman, Scott. *Biological Science*. Upper Saddle River, NJ: Prentice Hall, 2002. ISBN: 0130819239.

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Please see:  
figure 50.12 in Freeman, Scott. *Biological Science*. Upper  
Saddle River, NJ: Prentice Hall, 2002. ISBN: 0130819239.

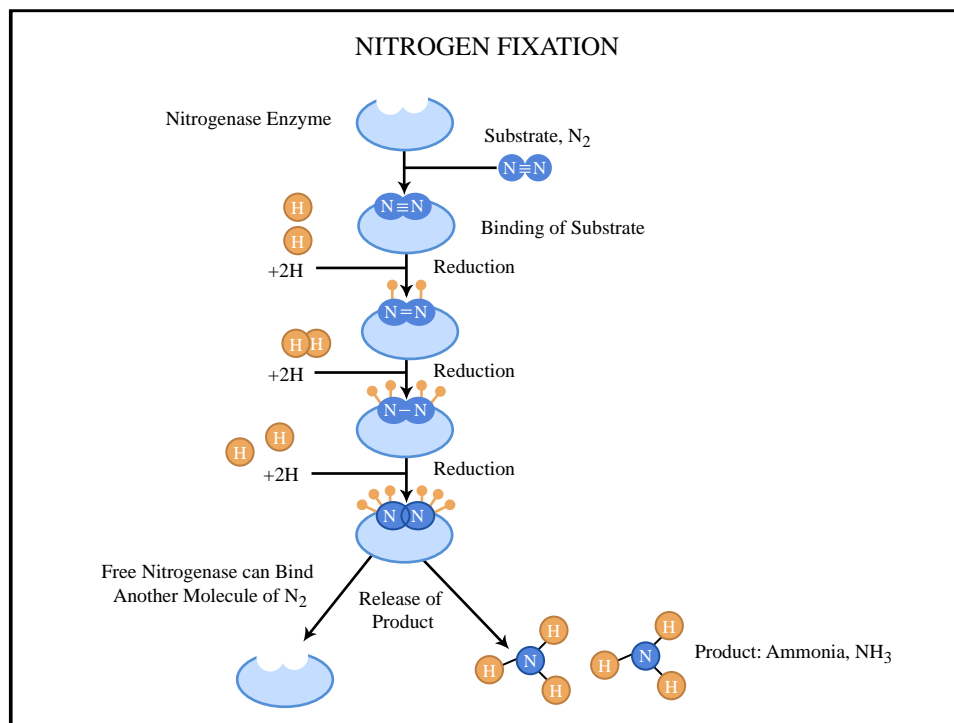
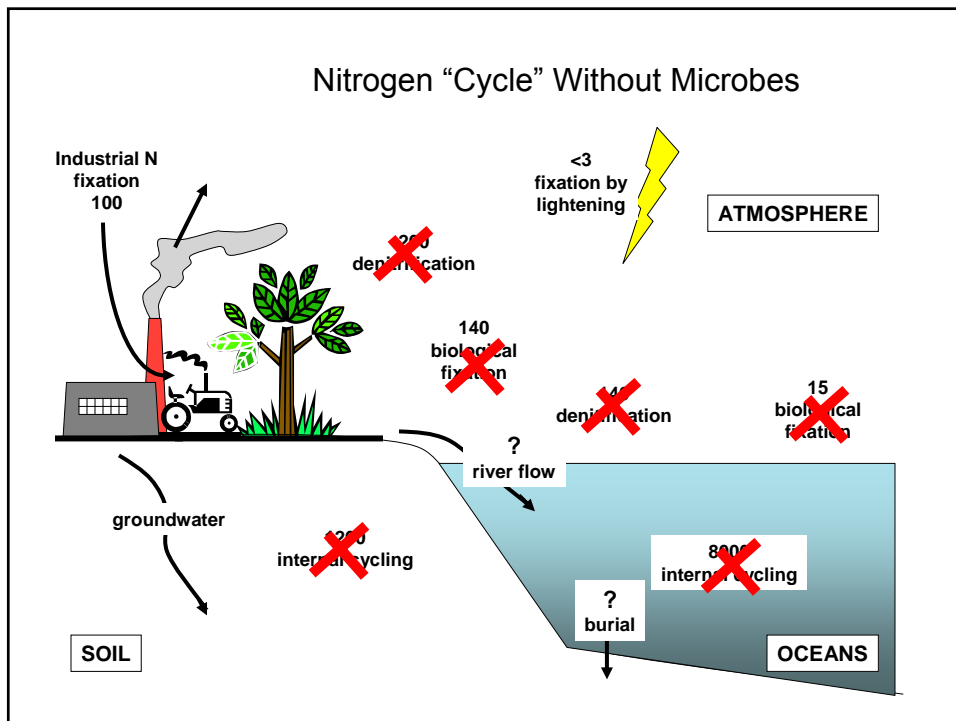
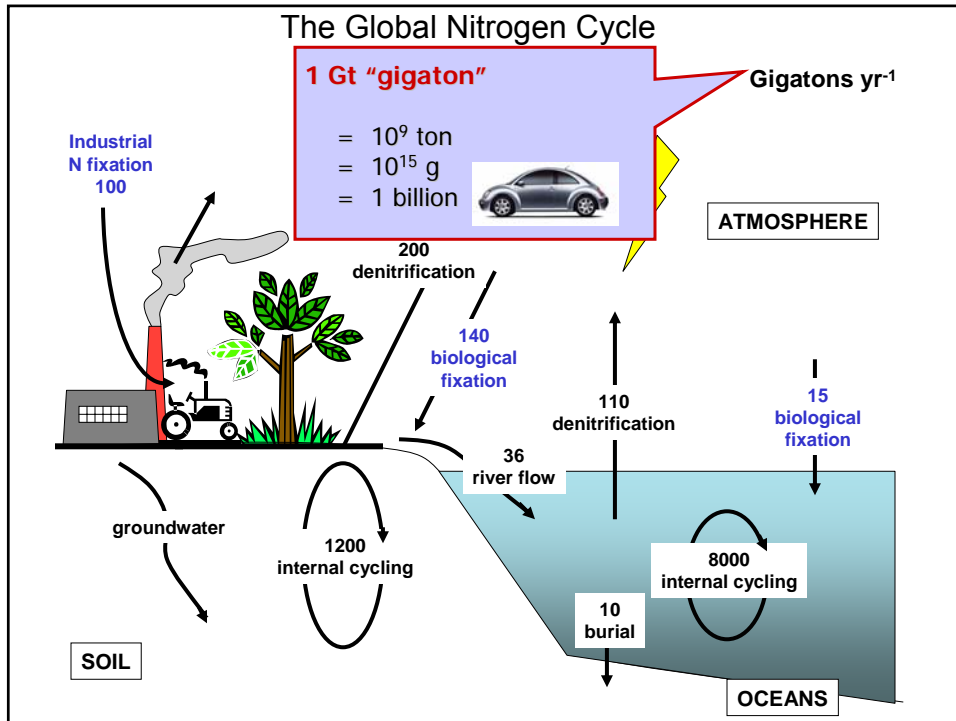


Figure by MIT OCW.



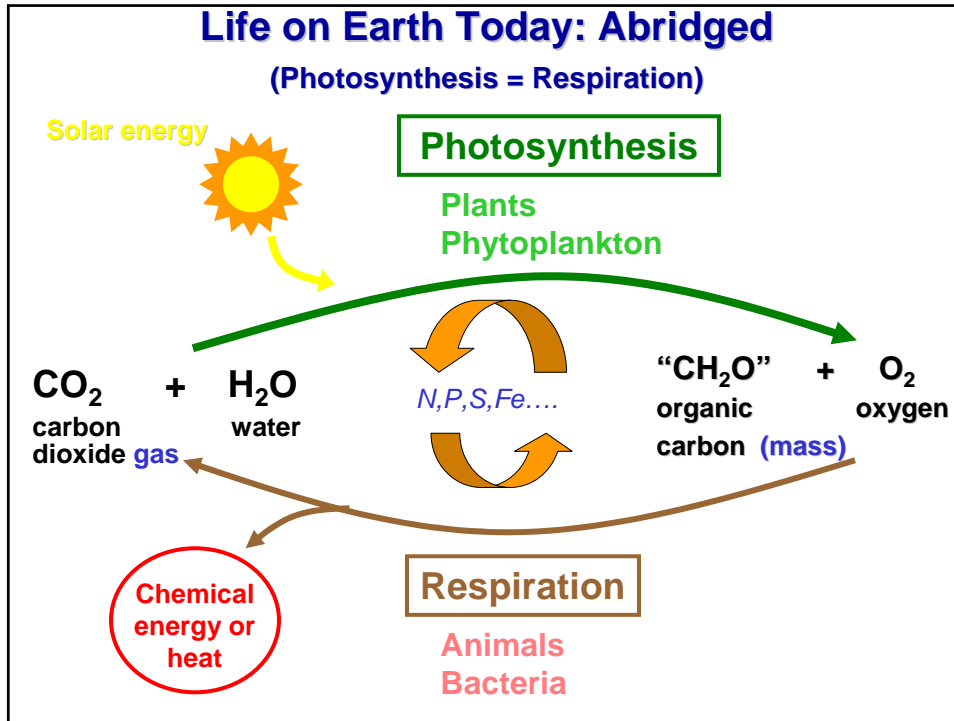


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Please see:

figure 6.9, 7.10a, and 7.13 in Freeman, Scott. *Biological Science*. Upper Saddle River, NJ: Prentice Hall, 2002. ISBN: 0130819239.

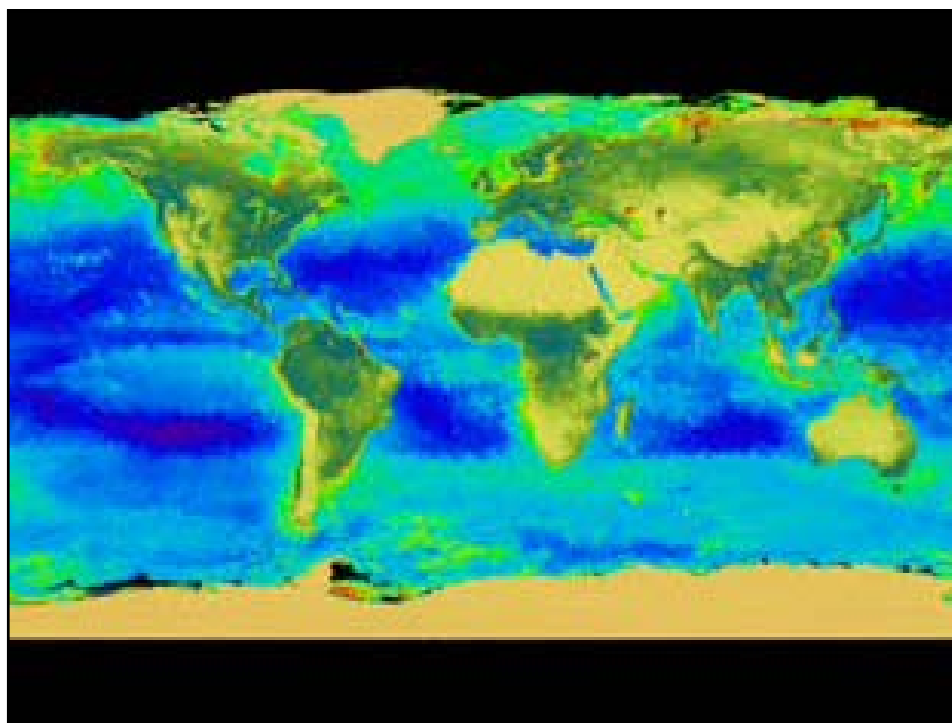
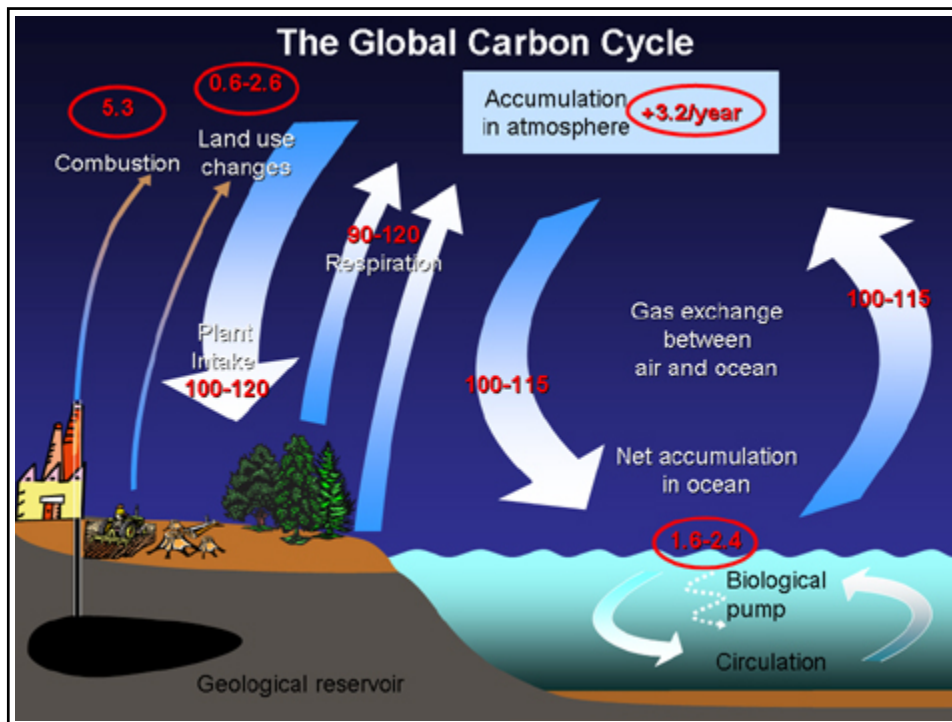


Image is taken from NASA's Web site: <http://www.nasa.gov>.

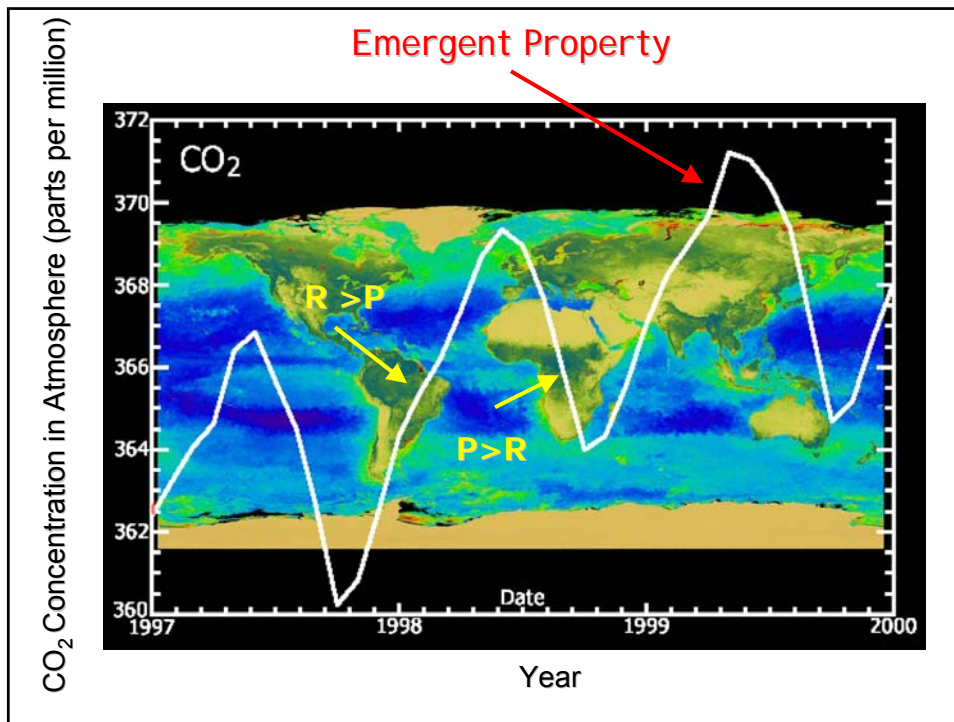
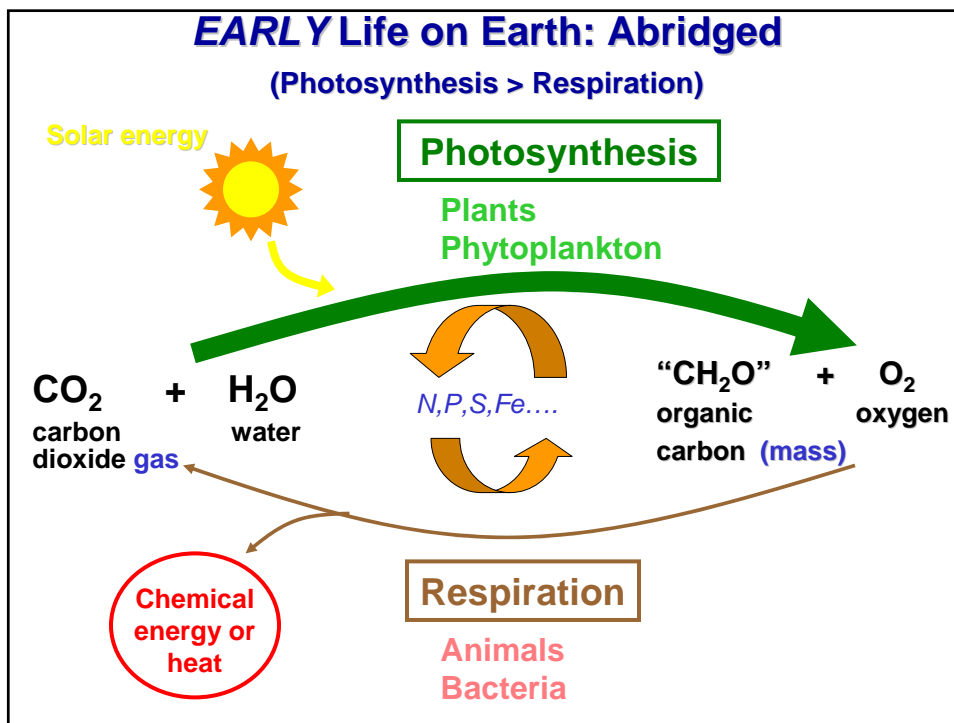


Image is taken from NASA's Web site: <http://www.nasa.gov>.



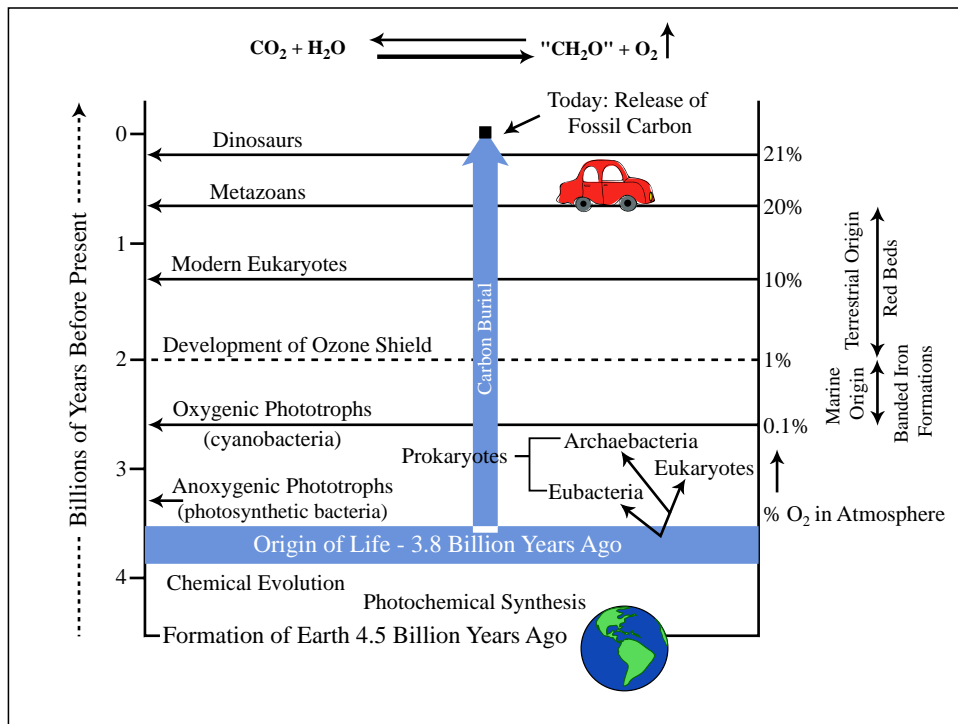


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Please see:

figure 25.7 in Freeman, Scott. *Biological Science*. Upper Saddle River, NJ: Prentice Hall, 2002. ISBN: 0130819239.



### Present Day Planetary Atmospheres

	Mars	Earth	Venus
<b>CO<sub>2</sub></b>	95 %	0.035 %	98 %
<b>N<sub>2</sub></b>	2.5 %	78 %	2 %
<b>O<sub>2</sub></b>	0.25 %	21 %	Trace
<b>H<sub>2</sub>O</b>	0.1 %	1 %	0.05 %
<b>Temp (°C)</b>	-53	16	474

Adapted from Slesinger, W. 1991. Biogeochemistry: An Analysis of Global Change. Academic Press. P.34

*The same processes operate at all scales*

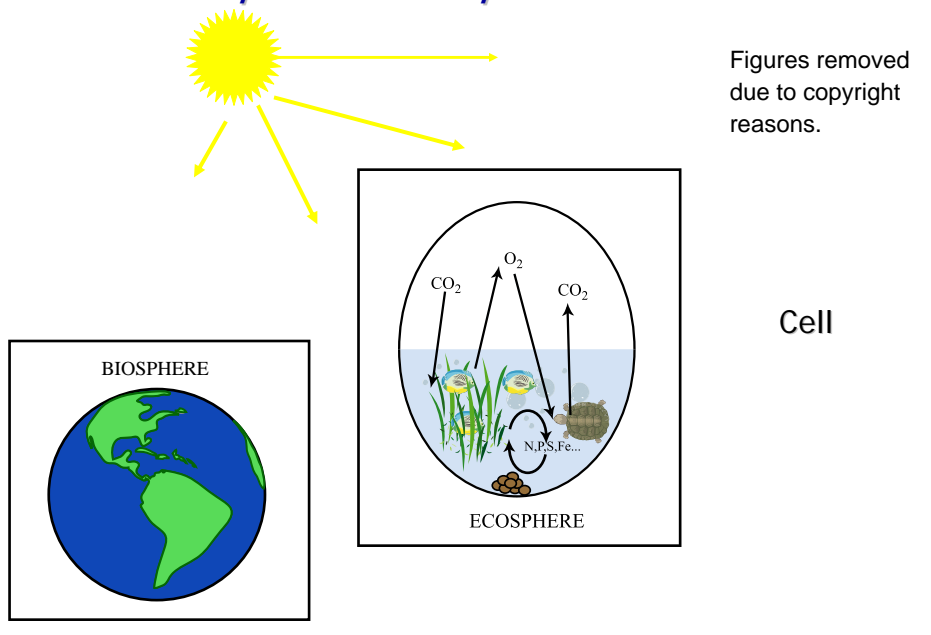


Figure by MIT OCW.

# Molecular Ecology

Viewing the Biosphere  
as a network of genes

A Sea of Organisms Is... A Network of Genes ("dissolved information")

- 1 billion microbes per liter
- 99.9 % have not been cultivated
- information content of 1 liter = that in human genome
- most of unknown function

Cover of Wired Magazine featuring photo of Craig Venter,  
August 2004, removed due to copyright considerations.

Screenshots of the Sorcerer II web site have been  
removed due to copyright considerations.  
Please see:  
<http://www.sorcerer2expedition.org/version1/HTML/main.htm>

## Take Home Messages

- Ecology – life at different scales
- Emergent Properties
- Organism ↔ Environment *TWO WAY*
- Life has shaped Earth's features
- Biosphere - geosphere have co-evolved
- Genetic inventory unknown
- Microbes Rule!