BB 450 / 550
In the Beginning

Dr. Kevin Ahern
Our Living Planet
Diversity and Spread
Views of Life
An evolving perspective

• Diversity and Spread of Life
  • Life is Everywhere
Views of Life
An evolving perspective

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• Visual Perspectives
Views of Life
An evolving perspective

- Diversity and Spread of Life
  - Life is Everywhere

- Visual Perspectives
  - Anatomy
Views of Life
An evolving perspective

• Diversity and Spread of Life
  • Life is Everywhere

• Historical Perspectives
  • Anatomy

• Philosophical Perspectives
Views of Life
An evolving perspective

- Diversity and Spread of Life
  - Life is Everywhere
- Historical Perspectives
  - Anatomy
- Philosophical Perspectives
Views of Life
An evolving perspective

• Diversity and Spread of Life
• Historical
• Philosophical
Views of Life
An evolving perspective

• Diversity and Spread of Life
• Historical
• Philosophical
• The Role of Technology
Views of Life
An evolving perspective

• Diversity and Spread of Life
• Historical
• Philosophical
• The Role of Technology
• The Movement to Molecules
Views of Life
An evolving perspective

• Diversity and Spread of Life
• Historical
• Philosophical
• The Role of Technology
• The Mind Shift to Molecules
• Modern Views
Systems of Life
Naming and Categorizing

Classification
Systems of Life

Naming and Categorizing

Classification

Relation
Life
The Role of Technology

The Microscope

• “Animalcules”
Life
The Role of Technology

The Microscope
- “Animalcules”

The Concept of the Cell
- Fundamental Unit of Life
Life
The Movement to Molecules

Early Perspectives

• Friedrich Miescher’s “Nuclein”
Early Perspectives

- Friedrich Miescher’s “Nuclein”
- Gregor Mendel’s Peas
Life
Modern Views

Molecular Biology

• Schrödinger
  • Molecular Roots
Life
Modern Views

Molecular Biology

• Schrödinger
  • Molecular Roots

• Avery, MacLeod and McCarty

http://www.scienceimage.csiro.au/pages/about/
Life
Modern Views

Molecular Biology

• Schrodinger
  • Molecular Roots
• Avery, MacLeod and McCarty
• Watson and Crick
  • Complementarity and Inheritance
Molecular Biology

- Schrodinger
  - Molecular Roots
- Avery, MacLeod and McCarty
- Watson and Crick
  - Complementarity and Inheritance
- Central Dogma
  - DNA makes RNA makes Protein
Autotrophs vs Heterotrophs

Plants, algae, many bacteria (Autotrophs)

Carbon dioxide

Oxygen

Water

Organic compounds

Animals, fungi, many bacteria (Heterotrophs)
The Tardigrade
Prokaryotes vs Eukaryotes vs Archaeans

<table>
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<th>Cellular Difference</th>
<th>Prokaryotes</th>
<th>Eukaryotes</th>
<th>Archaeans</th>
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Cell Biology
Cell Biology

- Rough Endoplasmic Reticulum
- Nucleus
- Mitochondrion
- Centrosome
- Smooth Endoplasmic Reticulum
- Golgi Apparatus
- Vesicles
Cell & Tissue Biology

Cytoskeleton
Tissues

Epithelial Tissue
Connective Tissue
Nerve Tissue
Muscle Tissue
A Parting Thought

Excuse me for feeling superia
To all of the lowly bacteria
You should know very well
There is no organelle
Inside of their tiny interia
Students study molecules with
All of the structures they possess
Proteins, fats and DNAs
There must be a million ways
To evaluate our knowledge for the test

Biochem is beautiful
Our professor says
From the sugar in our cells
To actions of HDLs

And molecules are dutiful
In every way
Substrates for the enzymes are
Converted e-ver-y day

There is no enzyme
That can lower Delta G
They just work all the time
On transition energy

Catalysis provides to cells
Metabolic jump-startin
They all capitalize
By giving rise
To reactions ‘tween the carbons

Biochem is beautiful
Saying it with zest
Would be so much easier
If I could just ace the test

Biochem is beautiful
Saying it with zest
Would be so much easier
If I could just ace the test
Biochemistry Biochemistry
I wish that I were wiser
I feel I’m in way o’er my head
I need a new advisor

My courses really shouldn’t be
Such metabolic misery
Biochemistry Biochemistry
I wish that I were wiser

Biochemistry Biochemistry
Reactions make me shiver
They’re in my heart and in my lungs
They’re even in my liver

Biochemistry Biochemistry
I promise I would not complain
If I could store them in my brain
Biochemistry Biochemistry
I wish that I were wiser

I’m truly in a panic
The mechanisms murder me
I should have learned organic

For all I have to memorize
I ought to win the Nobel Prize.
Biochemistry Biochemistry
I wish that I were wiser

(To the tune of "Oh Christmas Tree")

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