Architecture of Energy Flow

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ISD Formative Assessment 04/12/2011
Unit 0: Introduction to The Early Universe Energy Flow
Unit 1: The Big Bang
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The Big Bang to Green

Cosmic Evolution
From Big Bang to Humankind
The arrow of time, from origin of the Universe to the present and beyond, spans several major epochs throughout all of history. Cosmic evolution is the study of the many varied changes in the assembly and composition of energy, matter and life in the thinning and cooling Universe.

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Welcome to the Architecture of Energy Flow—From the Big Bang to Green!

Course Learning Objectives:

This Big Bang / Big History course is designed to be a broad, comprehensive, integrative framework for the study of all processes and events in the universe. It offers a new perspective on time, energy, and life, and illustrates the connections between the various fields of science and art. This course is suitable for anyone with an interest in learning about the universe and the processes that have shaped it.

Course Introduction

This course is closely modeled after the awe inspiring introduction that serves as the foundation for the rest of the course. It includes the following topics:

- Introduction to the Big Bang
- The Early Universe
- Galactic/Star Energy Flow
- Solar System Energy Flow
- Earth's Energy Flow
- Energy Concepts

Course Outline

Part I: The Early Universe

Unit 0: Introduction

- Overview of the course
- The Big Bang
- The Big History
- The Big History in the 21st Century

Unit 1: The Early Universe

- The Big Bang
- The Early Universe
- The Emergence of the Elements

Unit 2: Galactic/Star Energy Flow

- Energy in the Galaxy
- The Star Formation Process
- Stellar Evolution

Unit 3: Solar System Energy Flow

- The Sun
- The Planets
- The Eclipses

Unit 4: Earth's Energy Flow

- The Earth
- The Environment
- The Future

Course References

- Pink, 2006
- Christian, 2013
- Newton, 1687
- Darwin, 1859

Information System:
The content bar at far left on the facing page presents the course unit with present unit under “Course Units.” Any information about the source(s) listed in this section under “Course Introduction” is added as appropriate. The source(s) listed in this section under “Course Introduction” are absolutely approachable within this all inclusive frame.}

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The course travels through three distinct energy utilization patterns, from the relatively simple beginning of the universe to the complex energy systems we use today.

Part I The Early Universe

This part of the course covers the early universe, from the Big Bang 13.73 billion years ago, to the formation of the solar system 4.6 billion years ago. It includes the following topics:

- The Big Bang
- The Early Universe
- The Emergence of the Elements

Part II Life

This part of the course covers life on Earth, from the origin of life 3.8 billion years ago, to the development of complex organisms and human consciousness. It includes the following topics:

- The Origin of Life
- The Evolution of Life
- The Future of Life

Part III The Age of Humans

This part of the course covers human history, from the first human documentation about 5,500 BCE, to the present day. It includes the following topics:

- The Development of Civilization
- The Industrial Revolution
- The Information Age

The course provides a comprehensive overview of the universe, from the Big Bang to the present day, and it is designed to be accessible to anyone with an interest in the universe and its history.
Energy was released in the early universe and still is to the trading, moving and "hopping" of electronic waves. The orderliness, concentration and the "surplus" for all of the energy is an "order" and "surplus". Starting from the bottom of this chain, the electrons of an atom are locked to the radiants by the electromagnetic field. The force between the electron and any other electron is a kind of attraction. (1) The strong force is on the order of 1/100 of the electromagnetic force. (2) The weak force is only 1/100,000,000 of the electromagnetic force. (3) The nuclear force is extremely tiny by comparison. The fact that we feel it is due to the relative distance between the charged particles. The 1st law of Thermodynamics states that the energy of one universe is constant. It can neither be created nor destroyed, only changed. The energy is "hopping" or "transferring" from one atom to another, but it is the same energy. The 2nd law of Thermodynamics states that energy can only happen if moving from a more active (hot) to a less active (colder) state. If everything is the same temperature no more energy is created nor destroyed. It does change form: from electron hopping, to photons, to life's cycling of this energy, to the 5% humanly detected universe. Massive Stars->Electron Hopping->Photon Energy->More Electron Hopping

E=MC:
Everything is energy, nothing is matter. This concept was first introduced by Albert Einstein in the context of his famous equation: E=mc2. The equation states that energy (E) and mass (m) are equivalent and can be converted into one another. This equation has profound implications for understanding the universe, as it suggests that energy can be created from mass, and vice versa. For example, nuclear fusion in stars, where the sun's energy is generated, is a process that releases energy from mass. Similarly, nuclear fission, used in nuclear reactors, releases energy by converting mass into energy.

Bio-physics:
Biophysics is a branch of science that studies the physical phenomena of biological systems. It involves the application of physical principles to understand the behavior and function of living organisms. For example, biophysics is used to study the structure and function of proteins, the transport of ions across cell membranes, and the electrical activity of neurons. Biophysics is also important in understanding the evolution of life and the origin of the universe. For example, it has been proposed that life and consciousness could arise from the self-organization of matter in the universe, leading to the emergence of complexity and information.

SCIENTIFIC NOTATION:

Big:
10^x = the number of zeros behind a "1".
Example: 10^3 = 1,000

Small:
10^-x = 1/(10^x).
Example: 10^-3 = 0.001

I. Introduction

A. 13.73 yrs ago: The big bang occurs.
B. 3.8x10^9 yrs ago: The first neutrino is produced.

C. 4.5 yrs ago: The Sun and solar system form.
D. 12 yrs ago: The first stars and galaxies appear.

II. Early Universe

A. 13.73 yrs ago: The big bang occurs.
B. 9.23 Billion Years
C. 4.5 yrs ago: The Sun and solar system form.
D. 3.8x10^9 yrs ago: The first neutrino is produced.

III. Energetic Organizations

A. Life
B. Diamondoids
C. Humans

IV. Conclusion

A. Everything is energy, nothing is matter.
B. Energy is the ability to do work or produce change.
C. The universe is expanding.
Deep in the Universe, the totality of all things, just an instant ago in the Universe’s time, but estimated approximately 13.73 x 10^10 years ago. In human time, there was a very dense singularity billions of degrees hot, the size of a black hole, a huge mass crushed to a tiny electronic nudge, and so dense that the laws of physics (there is a linear progression), space (anything that doesn’t have depth), and time (anything that doesn’t have its own period) do not exist. The universe was one, an undifferentiated soup Stage 1. Neither stars nor spaceships nor planets, indeed not even atoms then existed; all was pure energy, the universe was one, an undifferentiated soup … . Neither stars nor planets, indeed not even atoms then existed; all was pure energy, the universe was one, an undifferentiated soup … .

Science is a form of life in which the totality of all things, just an instant ago in the Universe’s time, but estimated approximately 13.73 x 10^10 years ago. In human time, there was a very dense singularity billions of degrees hot, the size of a black hole, a huge mass crushed to a tiny electronic nudge, and so dense that the laws of physics (there is a linear progression), space (anything that doesn’t have depth), and time (anything that doesn’t have its own period) do not exist. The universe was one, an undifferentiated soup … .

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Unit 1: Big Bang Energy Flow
Be able to label a diagram and write a short essay on the natural conditions that occurred after the Big Bang to free up energy and matter.

Unit 2 Objective: Galactic Energy Flow
Be able to label a diagram and write a short essay on the natural conditions of energy that occurred to make the fusion energy of a trillion, trillion, trillion stars comprising the universe.

ASSESSMENT
Part I : The Early Universe Units 0-4 —physical energy flow before the formation of life.

Knowledge Disciplines: physics, cosmology, astronomy

Terminal Objective: Be able to write/sketch an essay on the big picture of early energy flow as the universe spread out, cooled and complexified after the Big Bang to the formation of our solar system.

Bibliography
Part I : The Early Universe Units 0-4


Part II: The Evolution of Our Universe Units 5-8 —Energy flow after the formation of the planets.

Knowledge Disciplines: physics, cosmology, astronomy

Terminal Objective: Be able to write/sketch an essay on the birth of life and the evolution of the planets and life itself.

Bibliography
Part II: The Evolution of Our Universe Units 5-8


