

# Science, Society & Self

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How our scientific beliefs form our self and our world

— A 3 day workshop or a full semester course —

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## Detail Outline

### UNIT I

- Sustainable Science: Part I Science Seeks Truth
- Observation versus Analysis
- Observing the Moon
- The Nature of Science
- Newton's Bucket
- Quantum Physics I
  - UNCERTAINTY
  - CO-LOCATION
  - ENTANGLEMENT
  - LIGHT THEORY
  - Pythagoreans (550 BC)
  - Empedocles (450 BC)
  - Plato (400 BC)
  - Euclid (300 BC)
  - Newton (1700 AD)
  - Huygens (1700 AD)
  - Young (1801)
  - Maxwell (1862)
  - Hertz (1887)
  - Einstein (1905)
- Wholeness of Nature Holograms
  - The Golden Ratio
  - Mach & Einstein
  - INFINITY & ETERNITY
  - AS ABOVE, SO BELOW
  - THE HIVE MIND

- The Lives of a Cell by Lewis Thomas, 1974.
- FIBONACCI ... FIBONACCI'S NUMBERS
- KANT ... Science is circular, answering its own questions.
- QUANTITATIVE VS. QUALITATIVE
- GALILEO & NEWTON
- FARADAY & MAXWELL
- The Wholeness of Nature by Henri Bortoft, physics, Oxford.
- Analysis, Observation, & Imagination
- Goethe: thinking as perception – observation as thinking.
- Aristotle: knowledge of opposites is one.
- Sufi poet Jalaluddin Rumi
- Logical versus Holistic
- The language of the intuitive mind
- Being & Knowing
- Developing a Theory
- Ralph Waldo Emerson ... ideas may create matter
- Ancient Science to Present
  - Ancient Astronomy & Ancient Science
    - Ancient Africa: The Kushites
    - Ancient India: Zero and Calculus
    - Ancient China: The Big Four
    - Ancient South America: The Olmecs
    - Ancient Mesopotamia: The Babylonians
    - The Greeks, Sumerians, Andeans, Mayans, & Egyptians
    - World Views: Ptolemy to Copernicus to Galileo
  - Present Science
    - Newton's Bucket
    - Quantum Effect
    - Consciousness as Agent

## UNIT II

- BioPhysics
  - The Wisdom of Your Cells by Bruce H. Lipton, Ph.D.
  - Epigenetics
  - Cell's Life < Protein Movement < DNA < RNA < Thought
  - The Complexity of Wholeness
  - Perception & Survival
  - Programming & Perception
  - The Future of Human Evolution
- Fields
  - Fields & Philosophy
    - Centralized Force vs Distributed Force
    - Central Processor vs Network

- Brain vs Body
- Commander vs Hive Mind
- Matter vs Field
- Physical vs Non-Physical
- Electrostatic Fields
- Magnetic Fields
- ElectroMagnetic Fields
- Electromagnetism
  - Great Scientists
    - Franklin 1706-1790, USA, Static Electricity
    - Galvani 1737-1798, Italy, Galvanoscope
    - Volta 1745-1827, Italy, Battery
    - Goethe 1749-1832, Germany, Matter as Field
    - Ampere 1775-1836, France, Current
    - Oersted 1777-1851, Denmark, Electromagnetism
    - Ohm 1789-1854, Germany,  $E = I * R$
    - Faraday 1791-1867, England, BIG 3, Field
    - Maxwell 1831-1879, England, Field Equations
    - Edison 1847-1931, USA , DC, Light Bulb
    - Tesla 1856-1943, Croatia/USA, AC, Resonance
    - Hertz 1857-1894, Germany, Frequency
    - Marconi 1874-1937, Italy/England, Radio
  - Electric Current
  - Ohm's Law
  - Resistance
  - Electric Power

### UNIT III

- BioChemistry
  - Biology vs Chemistry
  - The Branches of Chemistry
    - Organic Chemistry
    - Inorganic Chemistry
    - Biological Chemistry
    - Physical Chemistry
    - Analytical Chemistry
  - Aristotle's Four Kingdoms
    - MINERAL
    - VEGETABLE
    - ANIMAL
    - MAN
  - Aristotle's Four Elements
    - EARTH
    - WATER
    - AIR

- FIRE
  - The Four Foods
    - MINERAL
    - CARBOHYDRATE
    - PROTEIN
    - FATS & OILS
- Earth Science: Nature's Cycles
  - The Hydrosphere
  - The Carbon Cycle
  - The Role of Experimentation
    - HISTORICAL MODEL
    - PRESENT MODEL
    - A POSSIBLE FUTURE MODEL
  - The Calcium Cycle
  - Collecting CO<sub>2</sub>, O<sub>2</sub>, & H<sub>2</sub>
  - The Photosynthesis Cycle
  - Other Cycles
- Thermal Trends
  - The SUN & Water
  - Heat Transfer & The Greenhouse Effect
  - Phase Changes
    - Evaporation
    - Condensation: Rain, Dew, Relative Humidity, Fog, Cloud
    - Steam
    - Ice
    - Sublimation
    - Regelation
    - Heat of Fusion and Heat of Vaporization
  - Thermodynamics
    - 1st & 2nd Laws of Thermodynamics
    - Adiabatic Weather – Upper Atmospheric Phenomena
    - Temperature Inversion
    - Entropy: Is there a one way street in Nature?

## UNIT IV

- Color, Waves, & Perception
  - The Nature of Wave Phenomena
  - Sound Waves
  - Music
  - The Nature of Light
    - Photons & Waves
    - Astronomy
    - The Eye
  - The Nature of Color
    - Lightening Primaries

- Darkening Primaries
  - After Image
  - The Sunset and The Sky
  - Newton's vs Goethe's Theory of Color
  - Complementaries
  - The Colors of Shadows
  - Subjective Effects of Color Immersion/Observation
- Relativity
  - The Importance of Relativity in the 21st Century
    - The History of Relativity
    - Newton's Theory of Gravity – 1687
    - Einstein's Special Theory of Relativity – 1905
    - General Theory of Relativity – 1916
    - Comparison of Newtonian vs. Einsteinian
    - Speed of light
    - Maxwell
    - Speed of Gravity waves
    - Equivalence Principle
    - GRAVITY – MOTION – CURVATURE OF SPACE
    - The Basics of Relativity
      - space not empty
      - space filled with structure
      - structure is “spacetime”
    - The Tests of Relativity
      - Starlight Deflection from the Sun
      - Mercury's Perihelion Precession
      - Gravitational Redshift
      - Gravity Probe B Gyroscopes
  - $e = mc^2$
- Sustainable Science: Part II
  - The Major Sciences
  - The Nature of Science
  - Quantum Physics II
    - Concept: Quantum Theory
    - Quantum Exp #1: Photoelectric Effect
    - Quantum Exp #2: Millikan Oil Drop
    - Quantum Exp #3: Young's Double Slit
    - Quantum Exp #4: de Broglie's Wavelength
    - Quantum Exp #5: Heisenberg's Uncertainty Principle
    - Concept: Complementarity
    - Concept: Schrodinger's Wave Equation

## APPENDIX

REMEMBER MATE® Quizzes  
Masters of Transformation

Great Scientists  
High Tech Favorites  
Low Tech Greatest Hits of All Time  
Dimensional Analysis Introductory Problems #1a  
Introductory Problems #1b  
Introductory Problems #2  
Student Written Problems #1  
Student Written Problems #2  
Student Written Problems #3  
Student Written Problems #4  
Student Written Problems #5  
Student Written Problems #6  
Student Written Problems #7  
Da Vinci & Plato  
Fermi Problems  
A Gazillion  
Little & Larger  
Speed  
Fastest Speeds  
Triangulation  
Estimation The Rules  
Easy Practice  
Advanced Practice  
Significant Figures  
Which Doesn't Belong & Why General Knowledge  
Observation & Analysis  
Astronomy  
Who Am I's?

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