Ideas of Modern Physics

1: Classical Physics: The Foundation.
   - The development of the concept of gravity
   - The foundations of classical physics: the concept of the observer
   - Mathematics as a language of science
   - Newton’s laws and the industrial world
   - The concept of a field

2: Relativity, Electro-magnetism and a Window on the Modern World
   - Electromagnetism and Maxwell’s equations
   - The concept of unification and elegance
   - The foundations for relativity
   - Special relativity and the concept of the speed of light
   - General relativity and the description of the universe

3: Quantum Mechanics
   - The need for a quantum theory: unexplained results
   - The concept of quantum science
   - The science and philosophy of describing a world that is ‘beyond understanding’
   - Quantum mechanics as a tool and a language
   - Quantum concepts in our world

4: The world beyond small
   - Sub atomic particles: their discovery and what they are
   - Languages to describe particle physics: competing mathematics
   - The idea of grand unification
   - The idea and importance of time in modern physics

5: Cosmology: The origin as we understand it
   - Einstein’s universe, general relativity and the cosmological constant
   - Approaching the Big Bang: the role of quantum and particle physics
   - Current description of the formation of our universe
   - The idea of multiple universes

6: Recent Observations and Discoveries
   - Higgs boson and the idea of mass
   - Gravity waves
   - Dark matter: what’s missing to make the math work