

November 11, 2019  
MSE 2101 topics

- 4+ billion years ago: early microbial evolution
  - anaerobic chemoautotrophs
- 3.5+ billion years ago: rapid diversification
  - evolution of photosynthesis in steps
- 2.5 billion years ago: initial oxygen buildup
  - everything balances everything, adaptation rules!
- 2.1 billion years ago: first cell nuclei; symbiotic relationships
  - complex structures → more diversity
  - compartmentalized structure, mitochondria, chloroplasts
- 1.2 billion years ago: first multi-cellular eukarya
  - repeatable independent evolution
- 542 million years ago: the Cambrian explosion
  - 30 phyla within ~40 million years
  - clues for sudden, unrepeated diversification?
- 475 million years ago: the colonization of land
- 245 million years ago: hello, dinosaurs!
- Impacts and extinctions
  - 65 million years ago: the K-T boundary layer
  - the frequency of extinctions of this magnitude?
  - the frequency of 10-15km body impacts?