

A Short History of Nearly Everything

Concepts You Should Become Familiar With

As we cover topics from cosmology to human genetics to biotechnology, you should be keeping track of the concepts covered each week. We will not be doing a big synthesis project at the end of this unit, but you will be assessed for this content throughout the next 11 weeks.

On a **scale of 1-5**, rate how much you think you understand about the following concepts in the column labeled **before**. At the end of the unit, we will assess our knowledge again.

1 = I don't know anything about this topic **5** = I could teach this concept to a classmate

<u>Cosmology</u>	<u>Before</u>	<u>After</u>
Size of the universe (how big is big?)		
Age of the universe (how old is old?)		
Origin of universe: Big Bang theory		
Universe is constantly expanding		
Theories about the fate of the universe: open (expand forever), flat (expansion slows to zero) and closed (everything pulls together in the big crunch)		
Planets: their names, order, relative size, potential for life		
<u>Origin of Life on Earth</u>		
Conditions necessary for life		
Conditions on Earth before life		
What is life?		
Theories of how life originated: extraterrestrial, divine, deep ocean, ocean's edge, clay, etc.		
Timeline of when major life forms appeared on earth		
When different types of animals and plants appeared relative to each other		
<u>Classification of Life</u>		
Levels of taxonomic classification (Kingdom to species)		
Taxonomy		
Six kingdoms of life on earth: names and what defines them		
<u>Genetics</u>		
Process of Meiosis		
Chromosome		

Gene		
Genotype and phenotype		
How to set up and use a Punnett Square		
Dominant and recessive traits		
How to construct a pedigree for one trait (aka family tree)		
Mutation		
Genetic variability		
<u>Evolution of Life</u>		
Adapt		
Evolve		
Habitat		
Species		
Speciation		
Evidence for evolution (from Eric's lecture) with examples		
Hypothesis vs. theory vs. law		
Antibiotic resistance		
<i>Darwin:</i> His big ideas		
Influences on his thinking		
<i>Ways evolution can happen:</i> Natural selection		
Gene flow		
Nonrandom mating		
Sexual selection: intersexual vs. intrasexual		
Genetic drift		
Adaptive radiation		
Co-evolution		
<i>Rates/scales of evolution:</i> Punctuated equilibrium		
Gradualism		
Macro vs. micro evolution		
<i>Human evolution:</i> Adaptations that got us where we are today		
Human relationship to modern apes and monkeys		
<u>Evolution in the Future</u>		
Major extinctions in the past		
Are we in an extinction event now?		
Possible directions of future human evolution		
<u>Biotechnology</u>		
How humans have controlled the "evolution" of other species		
Artificial selection		
Genetic engineering (recombinant DNA)		
Cloning		

