EVOLUTION

1. INTRODUCTION

central theme of biology
- explain history & diversity of life
- social abuse, religious conflicts

individual variability
- small genetic diffs among organisms
- incr between generations over time
- leads to development of diff species

Lamarck - 1809, inheritance of acquired characteristics (use & disuse)

Darwin - 1859, natural selection

2. NATURAL SELECTION

1. genetic variation among individuals in a population
2. more organisms are produced than can survive
3. competition for the resources necessary for survival
4. individuals better adapted to envi are more likely to survive & repro
5. small differences over time lead to the evolution of different species

fitness - only criteria is survival & reproduction

selection - by the environment

evidence - lots

3. SPECIES CONCEPTS

biological species - "a group of interbreeding natural populations that are reproductively isolated from other groups"
- problems - protozoa, extinct, plants

typological species
- similar within, different from others
- problems - different morphs

geographical variation
- Bergman's - larger body in north
- Allen's - shorter appendage in north
- Gloger's - lighter color in cool/dry

4. SPECIATION

speciation - evolution of new species
- geographic (pop split by barrier)
  or temporal (pop shift thru time)

isolating mechanisms
- maintain separation of existing species
- pre-mating - prevent mating
  - different ecol, time, behav, anat
- post-mating - prevent survival

extinction - overadapt to single envi
- undermined when habitat changes

5. PATTERNS OF EVOL.

adaptive radiation - 1 species evolve many <u>different</u> species in new envi

divergent evol - 2 related species become <u>different</u> to avoid compete

convergent evol - 2 unrelated species become <u>similar</u> in similar habitats

parallel evol - 2 distant-related species become <u>similar</u> independently

coevolution - 2 different species influence each other's evolution

sexual selection - sexual dimorphism
- males emphasize repro over survival

6. ORIGIN OF LIFE

4.6 by - earth (big bang)
4 by - rocks (igneous)
3.4 by - fossils (bacteria)

primordial soup
- lab experiment recreate ancient envi
- H**+**, CH4, NH4, H2O, heat/electricity
- 24 hrs (half C's in amino acids)
- later (all other organic molecules)
- protenoid microspheres
  (membrane, chem rxs, division)

chemical evolution
- demonstrate possible origin of life
- requires lots of time

7. PROGRESS

'progress' - not complex or advanced
- only need adapt to changeable envi

physical evol - reduced in humans
- surv/repro not determined by fitness
- now modify envi. to suit needs

cultural evol - dominant in humans
- faster than physical or genetic evol.

nonmoral nature - bleak philosophy
- sole purpose in life is survive & repro

religion - diff function & view of life
- belief vs acceptance, faith vs expt.
- provides guidance, not opposites