

Quiz 1 Key
BI-102-1, Fall '06, Dr. C. S. Tritt

General comments: Don't provide more information than I asked for (there is no explicit penalty for doing so, but I'll deduct points for anything that is incorrect); Don't just think of multi-cellular organisms; Organisms (individuals) don't evolve, species do.

1. Name or briefly describe any 3 characteristics that are shared by all living things on Earth.

Cellular organization (or cellularity)

Order (or organization)

Sensitivity (poke it with a stick to see if it moves)

Continuity (growth, development & reproduction – includes heredity)

Energy use

Evolutionary adaptation (includes individual variability)

Homeostasis

Require water for at least part of their life cycle (not in lecture)

2. Describe a modern type of evidence that is generally accepted as supporting Darwin's hypothesis of evolution by inheritance and natural selection.

For full credit, answers had to make clear how the evidence supported the theory. Carbon dating is generally not correct (it does span enough time).

Fossil Record – Intermediate forms found. Evidence of sequential change.

Age of Earth – Radiometric methods show the Earth is very old (4 billion) years so there has been time of evolutionary change.

Mechanism of Heredity (modern genetics) – Traits are passed to offspring such that offspring are unique but similar to parents.

Comparative Anatomy – The same structures (particularly bones) can be found having different functions in different species.

Developmental sequences (not in book) – Early in development certain metabolic reactions and anatomic structures seem to mimic ancestral forms.

Molecular Evidence (DNA) including genetic (molecular) clocks – Animals that seem to differ greatly based on appearance, history or geography also differ greatly genetically.

Comparison of molecular and fossil phylogenetic trees – Genetic changes can be tracked in consistent ways among species known to share common ancestors.

3. Describe one of the unifying themes of biology mentioned you your textbook.

Answer must address the unification of material in biology.

The Unity and Diversity of Life through Evolution (evolution provides a connection between an array of otherwise conflicting observations)

Cell Theory (even virus need cells in which to reproduce)

Molecular Basis of Inheritance (even RNA virus use DNA in part of their life cycle)

4. Explain why the bicarbonate buffer system is of such interest in biology.

It provides a mechanism by which plasma pH can be maintained via respiratory changes. Must say something about plasma (or body) pH and respiratory (or lung) changes for full credit. Describing buffers in general was only worth 5 points.

5. List 3 factors that typically affect the rate of chemical reactions.

Any 3 of the following:

Temperature

pH

Concentrations of reactants and/or products

Presence (and concentrations) of catalysis (enzymes).