

Biology/Geology 350
Invertebrate Paleontology: The History of Life on Earth
Exam Number 2

QUESTION TWO
ARCHEAN EVOLUTION AND ECOSYSTEMS

QUESTION TWO:

Beginning with the **Archean** and ending with the **Proterophytic**, construct a discussion exploring the evolution of life's biochemistry and adaptive strategies, and the accompanying evolution of geo-ecosystems, during this span of time. Be sure to distinguish empirical evidence (the rock and fossil record) from theory and hypothesis (explanations for the record).

If this question is chosen I will provide with the test slip a blank copy (i.e. all text removed but outlines remaining) of the handout "Evolutionary Strategies in the Evolution of Life."

You may also use while answering this question these handouts:

- ☞ ***"Major Developments in the History of Life and the Earth"*** (filled out version),
- ☞ ***"The 16 Phyla of The Monera Kingdom"***

That is, it is not description of the raw information that is important, but explanations of processes and why things occurred and behaved when and the way they did.

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Include discussion of the essential core information and energy dissipating components in several centuries of speculation and experimentation on the spontaneous generation of life from

dead organic life systems. **Question Three**
PROTEROZOIC EVOLUTION AND ECOSYSTEMS
Assumptions of all scientific

QUESTION TWO: **ORIGIN OF LIFE, PROTOZOIC**
Beginning with the Proterozoic and ending with the end of the Proterozoic, construct

a discussion exploring the evolution of life from the Proterozoic to the present. Be sure to discuss the accompanying evolution of open systems during this period of time. Be sure to distinguish empirical evidence (the rock and fossil record) from theory and hypothesis (explanations for the record).

If this question is chosen I will provide with the test slip a blank copy (i.e. all text removed) of the handout "Evolutionary Strategies in the Evolution of Life."

You may also use while answering this question these handouts: Refer to Exam Number One for a discussion of these rules and procedures:

- Major Developments in the History of Life and the Earth (filled out version)
- Major Developments in the History of Life and the Earth (filled out version)
- The 16 Phyla of the Monera Kingdom (filled out version)
- The 16 Phyla of the Monera Kingdom (filled out version)

That is, it is not description of the raw information that is important, but explanations of processes and why things occurred and behaved when and the way they did.

To exit, to grow, to function, to live, more living system that most of us are familiar with must do two things.

1. Obtain and dissipate energy - (traditionally as ATP)
2. Obtain and dissipate information for their (biochemical) - (traditionally as RNA and DNA.)

That is, they must, as any open system must, be in a positive and negative feedback relationship. It is then axiomatic that once such a system comes into existence it will increase the quality of its information (and complexity.)

These are the traditional assumptions that underlie the search for the origin of life. But are they true? Using the handout "Biases and Assumptions About the Origin of Life" as a framework, write a plausible scenario for how life could have arisen spontaneously from the inorganic stuff of the universe.

In your discussion you should address each bias and assumption in the list, but do not have to discuss them in any particular order. Plus, you may combined and discussed more than one together, just make it clear that you are doing so.

Be sure to approach the problem from the point of view of evolving, open dissipative systems, and the necessary stratified stabilities along the way.