12th Grade Zoology Midterm Study Guide

Know the definition/characterization of the following:

Species
Prokaryotic cells
Eukaryotic Cells
Phtotautotrophic
Chemoautotrophic
Heterotrophic
Mixotrophic
Animal
Extremophiles

What were the main events during each geological time period, how did they influence life?

- Precambian
  - Archean
  - Proterozoic
- Phanerozoic
  - Cambrian Explosion

What is a hypothesis? What is a scientific theory? How are they different?

Describe the experiments conducted by Miller and Urey, designed to simulate early conditions on earth. What did they find? What didn't they find?

Describe the events that led to the creation of the first cells.

- What are the four main steps for the formation of life on earth?
- What evidence do we have to support these aspects of the origin of life hypothesis?

Describe the Self-Organization Principle, give examples.

What is a coacervate? Explain some of the life-like properties exhibited by these structures.

What is Endosymbiosis? About when did it occur? Why did it occur? What is the evidence we have for this hypothesis?

Describe the Colonial Flagellate hypothesis. Why is this the leading hypothesis on the origin of multicellular organisms? What evidence do we have?

What are the differences between Archaea and Bacteria?

Classifying Animals

What features do we use to classify animals?

Embryological Features of Classification:

Cleavage patterns
- Radial and Indeterminate
- Spiral and Determinate

Diplobastic vrs. Triploblastic

General Characteristics of animal phyla:

Types of symmetry
- Asymmetery
- Radial
- Bilateral

Tissue layers/complexity
Asexual vrs. Sexual Reproduction
Nervous System Structure
Digestive System Structure
Powers of Regeneration
Ecological Niche

Be able to apply the above feature categories to the animal phyla we observed. Be able to identify specific features relating to the above categories of animal specimens.

What are the basics of the process of Binary Fission?
What are the basics of the process of Conjugation? How is conjugation different from binary fission? Why might the process of conjugation emerged? What advantage does it confer to the organisms? How is it related to sexual reproduction in animals?

What are some of the ecological roles of Eubacteria? Of Archaea? (Many are outlined in the reading, "To the Ends of the Earth")

Know the structure of the modern system of classification:

Domain → Kingdom → Phylum → Class → Order → Family → Genus → Species

From The Reading, *To the Ends of the Earth*:
What are the 3 Domains of life? How are they different?
What is the Biosphere? What are some of the ideas/hypotheses on how the biosphere operates? Evidence?
What is Biodiversity? What are the three levels of Biodiversity? How do energy and matter relate within earth's ecosystem?
Describe the range of adaptive diversity found in the Archean Domain. Give examples.

The Emergence o fEvolutionary Theory
Be able to describe each of the following person's contributions to the emergence of Darwin's theory:

- Linneaus
- Hutton
- Cuvier
- Lyell
- Malthus
- Lamarck

Be able to explain the basic **framework** of Darwinian evolution. At what level of organization does evolution happen? How does speciation occur?.

Be able to explain how natural selection works.

Describe the various forms of evidence we have for the theory of evolution.

Kingdom Protista
What are the general characteristics of paramecium? Euglenozoans? Amoeba? Diatoms? Radiolarians? Volvox? Stentor? BE able to identify these organisms from your diagrams and descriptions.

What makes a protist a protist? Why are protist cells generally more complex than animal cells?

Kingdom Animalia
Know the characterizations of each Phylum, what are the unique characteristics of each phylum? What are the qualities that unite the animals in each phylum? How has each phylum contributed to the arc of evolution? What did each phylum contribute to the animal kingdom? Be able to give a picture of how each phylum builds upon the successes of the previous while generating new features and adding complexity. Be able to identify organisms from each phylum utilizing your observations and drawings.

Phylum Porifera

Phylum Cnidaria

- Class Hydrozoa
- Class Syphozoa
- Class Anthozoa

Phylum Platyhelminthes

- Class Turbellaria
- Class Trematoda
- Class Cestoda

Analysis Questions

Why is our picture of evolution incomplete? How does studying living organisms today help us understand evolutionary history? Why is this study also insufficient for completing the evolutionary story?

If microorganisms are so successful on earth today, why have more complex forms of life evolved?

Why do different levels of organization (cellular, tissue, etc.) possess properties different from other levels? Why can't we explain the properties at one level by simply reducing it to its parts? Examples?

How is the shape of life today a direct manifestation of irreversible/unrepeatable past events?