

February 27, 2008

Name _____

1. Define the following terms. Make your definitions brief and to the point, but use complete sentences. (5 pts each)

1a. monophyly- **condition where a group includes the most recent common ancestor and all descendants. Also a group that is defined by a shared derived homology.**

1b. uniramous- **Arthropod appendages with only one branch from the base.**

1c. homology- **Similarity among organisms that occurs because both organisms inherited it from their common ancestor.**

1d. tagmosis- **Fusion of segments in a metamerized animal into body regions.**

2. Describe four different functions that arthropod appendages serve (Hint: Think about the appendages on each body region. (12 pts) **Feeding-manipulating or chewing food**

Sensory-smell, taste, touch or hearing

Locomotion- movement through environment

Reproduction- clasping during mating or laying eggs in appropriate location

3. Name four major arthropod groups and distinguish them by the following features (16 pts)

Group	Body Regions	Mouthpart type	Appendage morphology	Respiration
Crustacea	Cephalothorax and abdomen	mandible	biramous	gills
Chelicerata	Cephalothorax and abdomen	chelicera	uniramous	Book gills, lungs
Myriopoda	head and trunk	mandible	uniramous	Tracheal system
Hexapoda	Head, thorax and abdomen	mandible	uniramous	Tracheal system

4. Of these groups, which evolved first in the marine environment, and which evolved later and are known as exclusively terrestrial arthropods? (4 pts).

Marine: Crustacea, Chelicerata

Terrestrial: Myriopoda, Hexapoda

5. What are three main precautions we should observe when interpreting the fossil record. (6 pts).

Condition in fossils isn't necessarily primitive

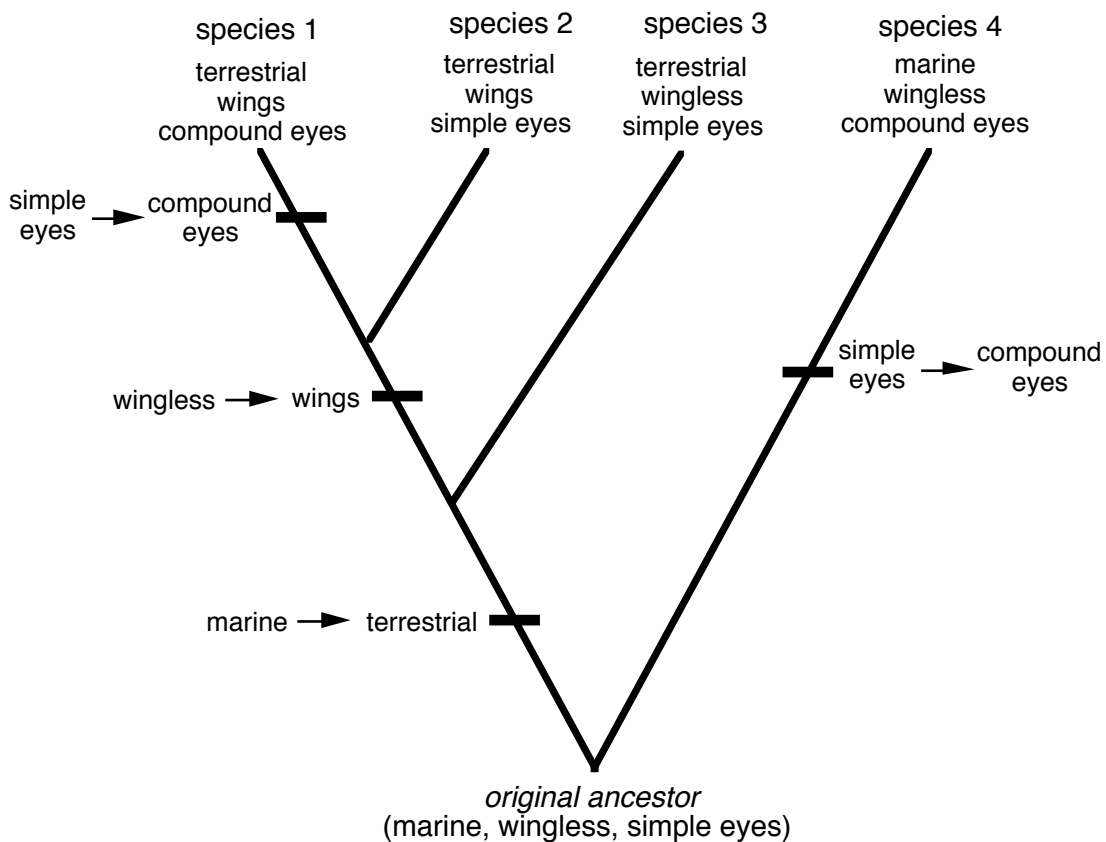
Fossils aren't necessary ancestors to living organisms

Fossils just show minimum dates for a group

6a. Name the thickest part of the insect cuticle and describe its main chemical components (6 pts).

Procuticle contains chitin and proteins

7. You have watched the evolution of the imaginary group the Archeopods, which started as a marine, wingless species with simple eyes, which later split into four daughter species according to the phylogeny shown here. You have traced the evolution of three characters in this group.



7a. Name a character that has convergently evolved to be similar in two taxa, and name the two taxa that share the similar derived state of this convergently evolved character. (8 pts).

Compound eyes

7b. Name two species that belong to a monophyletic group. (6 pts).

Species 1, 2, 3 (can't be species 2 and 3 alone because it doesn't include all descendants)

7c. If you were to group species 1,2,3 together based on their being terrestrial, what kind of character would terrestriality be? (4 pts).

Derived homology

8. Rank the body regions of an insect with respect to their degree of tagmosis. (6 pts).

Highest Tagmosis head, function(s) of appendages sensory, feeding

Intermediate thorax, function(s) of appendages locomotion

Lowest Tagmosis abdomen, function(s) of appendages reproduction

9. Order and provide approximate dates for the following evolutionary events in insects (8 pts).

Event	Order	Date
Appearance of wings	<u>2</u>	<u>350 MYA</u>
Evolution of metamorphosis	<u>3</u>	<u>300 MYA</u>
Appearance of hexapod body plan	<u>1</u>	<u>400 MYA</u>
Evolution of ecological associations with flowering plants	<u>4</u>	<u>130 MYA</u>

10. Name the three major parts of the insect antenna and list one major function that antennae may serve (4 pts).

Pedicel

Scape

Flagellum

Sense of smell, hearing, or hearing