

Key invertebrate phyla								
Characteristics	Porifera	Cnidaria	Platyhelminthes	Nematoda	Annelida	Mollusca	Arthropoda	Echinodermata
Examples of organisms	Sponges							
Number of tissue layers in embryo	Doesn't apply	2; ectoderm and endoderm						
Tissue versus organ level development	Quasi-tissue level	Tissue level						
True muscle cells?	No	No; have epithelial-muscular cells						
Symmetry? Cephalization?								

Name _____

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Coelom? Type?								
Digestive tract? Type?								
Circulatory system? Type?								
Nervous system? Type?								
Other								

Using the information in the chart and in Chapters 32 and 33 of *Biology*, 8th edition, answer the questions.

1. What set of characteristics is shared by all of the invertebrate animal phyla in the chart?

2. What unique combination of characteristics defines each of the invertebrate phyla as separate from the other phyla?

3. If you compare the characteristics of one phylum of the invertebrates with the next, what key differences separate the groups from each other?

4. a. Looking across the rows, what major trends appear to occur in the evolution of various organs or organ systems in these animal groups?

b. What developmental evidence is used to link Annelids, Arthropods, and Molluscs evolutionarily?

c. What evidence is used to separate the phylum from the Echinoderms and Chordates?

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- d. Does this analysis provide evidence for or against the statement: "Evolution adds onto or modifies what already exists"? Explain.
5. The chart organizes the major groups of animals based on grade, or shared body plan features. What changes would you need to make in this organization to reflect the possible phylogenetic relationships uncovered using molecular evidence? To answer this:
- a. On a separate sheet of paper, redraw the chart to reflect the new phylogenetic relationships based on molecular evidence.
- b. What specific molecular characteristics/data are being used to determine evolutionary relationships among animal phyla?
6. How would your answers to questions 2, 3, and 4 differ (if at all) when the chart is redrawn and filled in to reflect changes in relationships based on molecular evidence?

7. In biological terms, a group of organisms is said to be successful if it is represented by a large number of species or if the mass of all the organisms in the group is large. (In both cases, "large" is determined relative to other groups or organisms.) Given this definition of success, which of the major groups of animals would you argue is the most successful? Be sure to provide evidence for your argument.