

Entomology Worksheet

Objectives: By the end of this class, students will be able to:

1. Explain the basic components of the Linnaean System of Classification.
2. Be able to Identify Key Classes within the Phylum Arthropoda
3. Be able to Identify Key Orders within the Class Insecta

The Importance of Insects

Name 4 services that insects provide to people: 1. _____ 2. _____ 3. _____ 4. _____	Name 4 things you can do to help conserve insects 1. _____ 2. _____ 3. _____ 4. _____
Name 5 crops that depend upon insect pollination. 1. _____ 2. _____ 3. _____ 4. _____ 5. _____	Notes

Linnaean System of Classification

Classification systems enable us to impart order to a complex environment. In biology, organisms may be grouped according to their overall similarity (a classification method known as phenetics) or according to their evolutionary relationships (a classification system known as cladistics). Most modern scientists tend to adopt a cladistic approach when classifying organisms.

In biology, organisms are given a generic name (reflecting the genus of the organisms), and a specific name (reflecting the species of the organism). A genus is a group of closely related organisms. Genera which are closely related are grouped into a higher (less specific) category known as a family. Families are grouped into orders, and orders into classes. Classes of organisms are grouped into phyla, and phyla are grouped into kingdoms. Domains are the highest taxonomic rank of organisms.

Domain > Kingdom > Phyla > Class > Order > Family > Genus > Species

Pre-TEST	Post-TEST
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The Arthropod Phylum

Phyla a major groups of organisms. Insects are a Class in the Phylum Arthropoda.

Characteristics of arthropods include:

1. Bodies segmented into TAGMA (distinct body regions, each with a different ‘task’)
2. Jointed legs
3. Exoskeleton

Major Phyla of the Animal Kingdom

In order to illustrate the characteristics which make an organism an arthropod, it is helpful to look at groups of organisms which are closely related to arthropods. The annelids and onychophorans are two phyla in the animal kingdom which are similar, yet ancestral to the arthropod phylum. Note the characteristics of the Arthropoda, which are lacking in these two groups.

In-Class Assignment: During the lecture, compare and contrast the major groups of animals that we discuss, and make note of key characters within the tables.

Phylum	How is the Body Segmented? Tagma? Or Segments?	Appendages	Exoskeleton? (Yes or No)	Notes
Onychophora				
Annelida				
Arthropoda				

Arachnids & Myriapods	# of Body Parts	# Antennae	# Legs	Notes (Special Features)
Scorpions				
Pseudoscorpions				
Harvestman				
Ticks and Mites				
Spider				
Millipedes				
Centipedes				
Symphylans				

Insect Metamorphosis

The rigid exoskeleton of insects enables them to do many things, but is an obstacle to growth. In order to grow, an insect must periodically shed its exoskeleton and grow a new one that is larger. The process whereby a new cuticle is formed and the old one is shed is called molting. Molting is a complex process which is controlled by hormones. During insect growth and molting, each successive stage may appear similar to the preceding stage, or the may change its appearance. This change in form from molt to molt is called metamorphosis. There are four types of metamorphosis:

- **Ametaboly** — No marked change in form between a newly hatched nymph and the adult. The adult differs from the nymph only in size and in having reproductive structures. (Ex. Collembola)
- **Paurometaboly** — The nymph does not closely resemble the adult because it lives in the water, breathes through gills, and has gradually enlarging external wings. (Ex. Odonata)
- **Hemimetaboly** — The nymph resembles the adult, except in size and the absence of wings and reproductive structures. Wing buds develop externally. (Ex. Orthoptera)
- **Holometaboly** — The larva does not resemble the adult form and frequently differs in feeding habits and habitat (where it lives). There is a pupal stage intermediate between the last larval stage and the adult. Wing development is internal.

Insect Order	# of Wings	Type of Wing	Type of Mouthparts	Type of Metamorphosis	Common Name
Collembola					
Thysanura					
Ephemeroptera					
Odonata					
Orthoptera					
Dermaptera					
Isoptera					
Thysanoptera					
Hemiptera					
Coleoptera					
Neuroptera					
Lepidoptera					
Hymenoptera					
Diptera					