

# INTRODUCTION TO ARTHROPODS: I

The animals of the phylum Arthropoda comprise more members (nine hundred thousand or more species) than all the other phyla of the animal kingdom put together. Members of this phylum reflect significant evolutionary changes over the annelid worms. Among the several modifications seen in arthropods, the increased thickness of the organic layer overlaying the epidermis of the body wall deserves special mention. This multilayered cuticle (exoskeleton) consists of plates connected at joints, where the cuticle is thinned to a membrane. Every part of the arthropod body is covered by the exoskeleton except for the pores and openings, which pass through it. It is because of the many joints among the armorlike plates, especially in the limbs and between body regions, that the phylum is named Arthropoda (arthro-, joints; -poda, feet).

Arthropods of the subphylum Chelicerata (sixty thousand species) are characterized by (1) a body divided into a *cephalothorax* (fused head/thorax) and *abdomen*; (2) six pairs of appendages, of which the first pair are *chelicera* (claw or pincer bearing), the second pair are *pedipalps*, and the last four pair are *walking legs*; and (3) usually segmented abdomen, generally bearing no appendages. Chelicerate arthropods should not be confused with other arthropods, which also have large clawlike pincer appendages (see Plate 41). For practical identification purposes, the presence of eight walking legs in chelicerates easily distinguishes them from six-legged insects.

Chelicerate arthropods are generally organized into three classes, one of which (Pycnogonida; sea spiders) is not included here.

**Color the body plan and related titles, followed by the titles and structures associated with the class Merostomata, with special attention to the organization of appendages. Then read below.**

The horseshoe crab (*Limulus*) inhabits waters and shores along the Atlantic coast of the United States, Japan, and Southeast Asia. Its *cephalothorax* is covered by a large horseshoe-shaped carapace; its *abdomen* is also covered by a large shield with short lateral spines; and it projects a long spear of a telson posteriorly. Unlike other classes of chelicerates, the horseshoe crab exhibits not only the normal six pairs of appendages from the ventral surface of the *cephalothorax* but also six pairs of tightly closed

appendages from the *abdomen*. The last five of these are known as bookgills and are employed in respiration. Horseshoe crabs are well known for shoveling through the sand with their carapace and pushing with their telson, seeking food.

**Color the parts of the members of the class Arachnida and their related titles. Then read below.**

The arachnids are the most abundant of the chelicerate arthropods and include scorpions, pseudoscorpions, "daddy long legs," ticks, mites, spiders, and others. Arachnids are generally terrestrial and carnivorous, capturing prey with their *chelicerae*, injecting them with poison passing through ducts in the *chelicerae*, and bringing them into their mouth.

Scorpions, ranging in size, with few exceptions, from 3 to 10 centimeters in length, are found throughout the temperate areas of the world and especially the deserts. Scorpions hide under rocks during the day and seek their prey at night. The *chelicerae* (first paired appendages) are very small and contain minute pincers. The *pedipalps* are huge and have pincers at the extremities that are used for capturing prey and for defense. There are a number of abdominal segments, the last of which is a sting unit consisting of a sharp needlelike barb with a venom-filled base. With such a daggerlike weapon, complete with a poison tip, prey are quickly dispatched.

Ticks and mites are a highly diverse group (twenty thousand or more species) generally characterized by a fusion of head, thoracic, and abdominal regions with no visible segmentation. Ticks and mites carry the standard chelicerate arthropod arrangement of appendages.

Spiders, the most common of the arachnids, are arranged into more than thirty thousand species. Their habitats are found all over the world. Their body form consists of a *cephalothorax* connected to an *abdomen* by a narrow waist and six pairs of appendages. The first pair of appendages (*chelicerae*) contain ducts that excrete a poison through the distal fangs. *Pedipalps* are used to manipulate food. All spiders produce silk, with which they catch prey, build nests, or create safety lines while seeking food. A generalized web-weaving spider can be colored in Plates 39 and 40.

# PHYLUM ARTHROPODA.

## THE CHELICERATES \*

### BODY PLAN \*

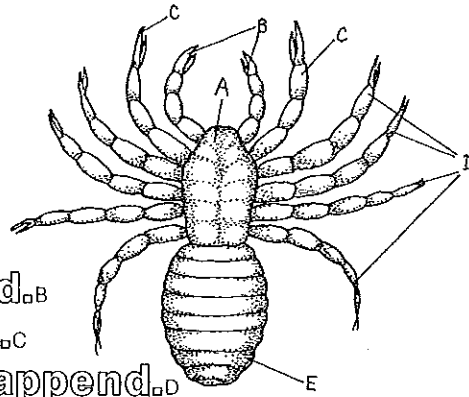
### CEPHALOTHORAX.

CHELICERA: 1st pair of append.:

PEDIPALP: 2nd pair of append.:

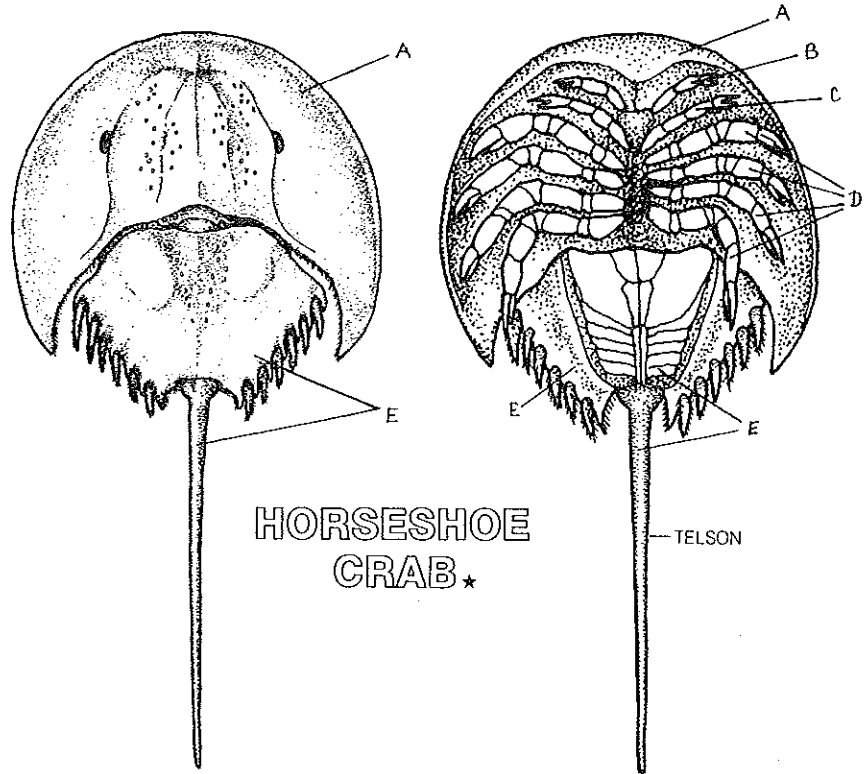
WALKING LEG: 3rd-6th pr. of append.:

### ABDOMEN:



## CLASS

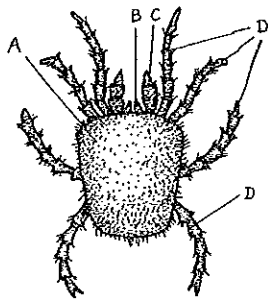
### MEROSTOMATA \*



HORSESHOE CRAB \*

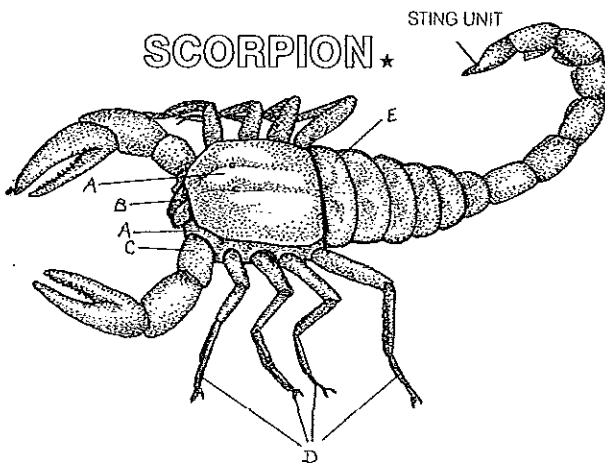
## CLASS

### ARACHNIDA \*



MITE \*

## SCORPION \*



## SPIDER \*

