A simple dichotomous identification key to the common phyla of marine benthic invertebrates is shown on page 23. Common features such as size and body shape are indicated to make phylum determinations of animals using this key. But, so that more precise phylum determinations of benthic animals can be made with this key, additional characteristics are also emphasized. Some of the most important differentiating features are described below.

A. Skeleton
Several types of skeletal systems can be observed in benthic invertebrates. The skeleton may consist of a series of internal rigid parts covered by soft tissue. Or the skeleton may be external, such as the skeleton of a crab or a clam, with the soft tissues inside. Other invertebrates lack rigid skeletal units entirely and, instead, utilize their body's enclosed fluids as a hydrostatic skeleton against which the muscles of the body wall can work.

B. Segmentation
Several animal phyla feature body plans that are subdivided along the animal's length to form a linear series of body segments, each one similar to those adjacent to it. Internal segmentation is usually evident at the body surface as a repetitive pattern of body divisions, each one frequently equipped with a pair of appendages.

C. Body Symmetry
Multicellular animals exist in two basic patterns of body symmetry: radial or bilateral (fig. 3.2). Animals with radial symmetry are circular. Several different planes of symmetry can be drawn to divide the animal into mirror-image halves (fig. 3.2A). If a mouth is present, it is located at the center of the circular body. Without a head or tail, the animal has neither a right nor a left side. The side with the mouth is defined as the oral side; the opposite side is the aboral side.

![Figure 3.2](image)

Figure 3.2 Radial (A) and bilateral (B) body symmetry of two generalized marine animals. Several planes of symmetry exist in A, but only one exists in B.

Tentacles or spines often radiate outward from the axis of the body. Sensory cells or organs, such as light receptors, balance organs, and touch receptors, are also distributed radially around the body. Radially symmetrical animals are characterized by a simply organized nerve net without a true brain. As a result, their responses to external stimuli are usually slow and limited.

Most radially symmetrical animals are sessile. Radial symmetry appears in some sponges, all cnidarians and ctenophores, and most adult echinoderms. The radial symmetry of adult echinoderms is a secondary condition because they develop from larval forms that are not radially symmetrical.