

Form and Function in Echinoderms

All organisms within a phylum are similar, but not identical, in form and function. For this reason, it is important for biologists to organize information about organisms within a particular phylum by using charts. In this activity you will complete a chart containing descriptions of different echinoderms.

Echinoderms are spiny-skinned animals that are characterized by five-part radial symmetry, an internal skeleton, a water vascular system, and tube feet. Despite this common definition, however, echinoderm species vary greatly in form and function. Echinoderms have evolved different methods of feeding, defense, and movement, for example.

The following list includes the names of eight species of echinoderms and three descriptions of particular echinoderms. Complete the chart on the next page using the letters before the information listed.

Species

- a. Sea lilies
- b. Basket stars
- c. Brittle stars
- d. Sand dollars
- e. Feather stars
- f. Heart urchins
- g. Sea urchins
- h. Sea cucumbers

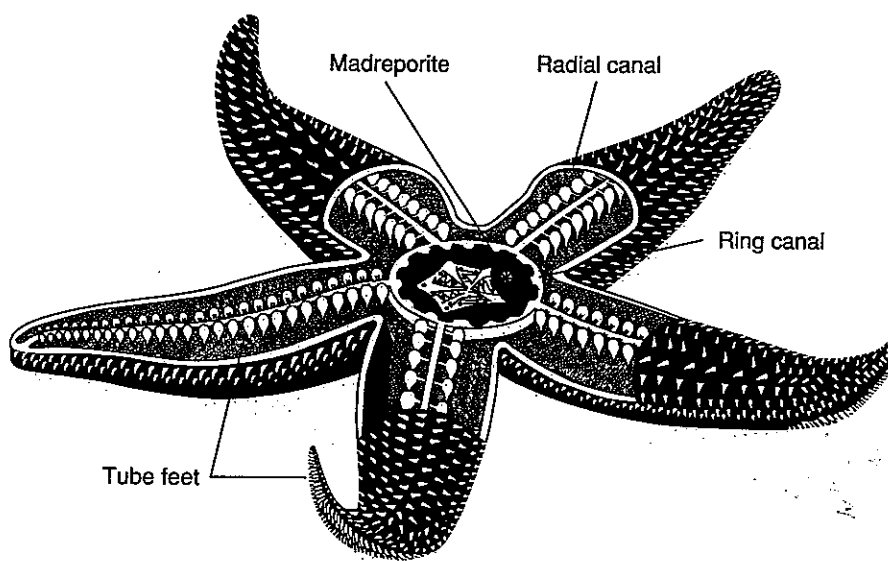
Descriptions

- i. Filter feeders that use tube feet on flexible arms to capture plankton that floats by on ocean currents
- j. Detritus feeders that expel a sticky substance that attaches to their predators
- k. Echinoderms that live hidden in the burrows they dig in the sand or mud

Characteristics	Echinoderms
Detritus feeders that take in a mixture of sand and detritus, digest the organic material, and excrete sand grains	1.
2.	Sea lilies, basket stars, and brittle stars
Organisms that have plates that are fused together to form a rigid box that encloses their internal organs	3.
Organisms with skeletal plates that move around in a series of flexible joints enabling them to use their arms for locomotion	4.
5.	Sand dollars and sea urchins
Filter and detritus feeders that hide by day and search for food at night, sometimes shedding one or more arms when attacked	6.
7.	Sea cucumbers
Echinoderms that wedge themselves in crevices in rock during the day and defend themselves with long, sharp spines, some of which have poison sacs on the end	8.

Investigating Starfish

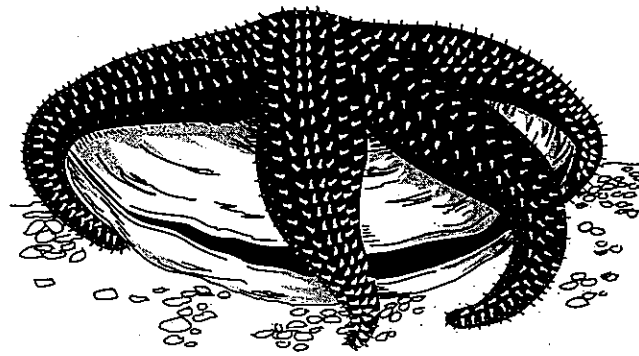
Starfish, also known as sea stars, are found in abundance in coastal waters and along seashores. Starfish vary greatly in size and color. These organisms are important because they demonstrate many features of echinoderms in general. In this activity you will summarize information about starfish and draw conclusions from it.



1. Describe the functions of the madreporite, the ring canal, and the tube feet in the water vascular system of a starfish. _____

2. How do the tube feet act like living suction cups? _____

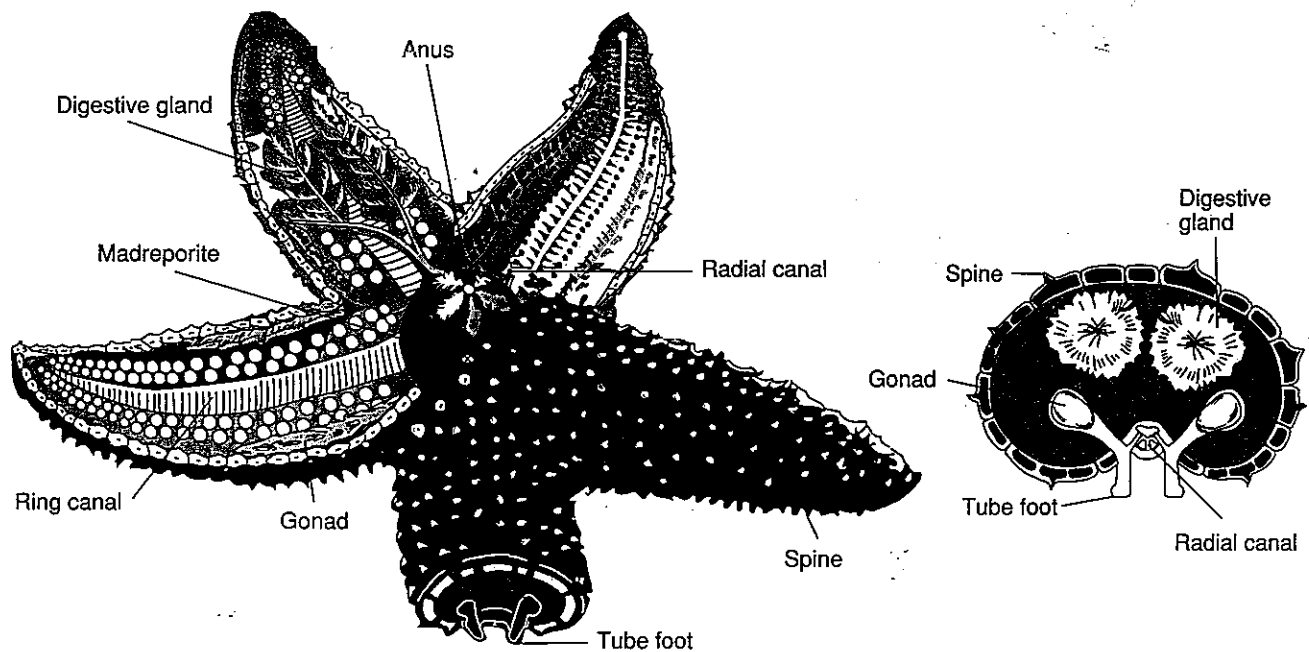
3. Why does a starfish have hundreds of tube feet rather than just a few? _____



4. How can a starfish get to a clam that is inside its shell?

5. Explain how a starfish feeds on a bivalve once its shell is opened.

6. Starfish have scattered sensory cells that enable them to detect potential sources of food. In addition, they can determine whether it is light or dark. Explain how this is possible.



7. What happens during the reproductive season when a starfish detects gametes of its own species?

8. Where does fertilization take place? _____

9. Describe what happens to starfish larvae after fertilization.

10. Why do starfish produce millions of eggs? _____

Word Scramble

Fill in the blanks in the paragraphs below with the correct words by unscrambling the letters to the left of the blanks.

SDHMOCRNEEI _____ are spiny-skinned animals. They are characterized by five-part DALAIR _____ symmetry and have an internal skeleton. Another feature of these animals is their unique RTWEA SCRAALUV _____ system. This system is essential to many of the animals' life functions. It consists of an internal network of fluid-filled canals connected to external appendages called EUBT ETEF _____.

Tunicates and EEACNLLTS _____ make up the group of animals known as the invertebrate RASOTEDHC _____. There are three characteristics that distinguish these animals from other organisms. First, they have long flexible supporting rods, or HDOSTROONC _____, usually located along the dorsal surface. Just above this rod is a OLWOLH RLAOSD REVNE RCOD _____ from which nerves leave and connect to internal organs, muscles, and sense organs. The third characteristic consists of paired structures called LYGPAHRNAE ITSSL _____ that connect the throat cavity to the outside of their bodies.