

Echinoderms

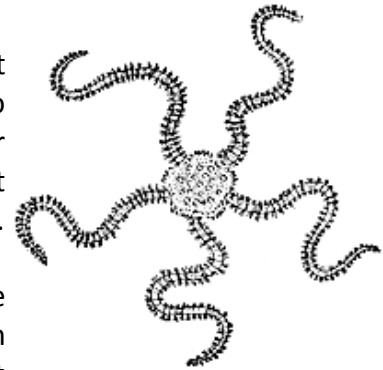
Starfish, sand dollars, and sea urchins all belong to a group (phylum) of invertebrates known as echinoderms. The word "echinoderm" means spiny skin, which describes most of the organisms in this phylum. Echinoderms all live in water and are predators or scavengers, the underside of the animal has a mouth and their arms are used to pry open shelled prey such as mollusks.



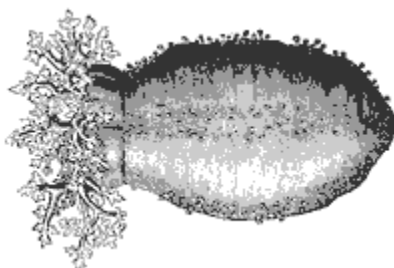
One of the more unusual aspects of echinoderms is their ability to regenerate lost arms. A starfish that loses an arm can grow a new one if just a couple of weeks. Echinoderms are radially symmetrical, which is obvious from the way their stars (which can vary in number) radiate from the mouth opening.

Echinoderms are usually found in the shallow water near the shore. They spend much of the time resting in the sand or on rocks. Starfish can move using specialized structures called tube feet. Each arm of the starfish has hundreds of tubes with suckers on them to help them navigate over rocks and sand. The suction of the tube feet is powerful enough to open even the most stubborn clam shell. The movement and circulation of a sea star is accomplished by canals within the animal that fill with water, a system called the water vascular system.

Echinoderms do not have a highly developed nervous system, but they do have a nerve ring that surrounds the mouth and helps to coordinate their movements and responses. Sensory cells on their arms gather information about their surroundings, such as light and temperature to help the organism respond to its environment.



Starfish are an important part of shoreline ecosystems. In one experiment, a starfish (*Pisaster ochraceous*) was removed from an area. This starfish was a predator of many mussel species in that location. With the starfish removed, it was thought that the mussels would achieve greater diversity. On the contrary, with the top predator gone, one particular species of mussel came to dominate the community and crowded out all of the other species. In this sense, the starfish is known as a "keystone" species, which is an animal that is important for maintaining a community's biodiversity. A relative of the starfish, the sea urchin, is an important part of kelp communities where sea otters live.



There are several distinct groups of echinoderms related to sea stars (also known as starfish). Sea urchins and sand dollars are grouped together because they have large solid plates that form around their soft bodies. Sea urchins have hundreds of spines sticking off of their bodies, which can serve as a defense against predators. Sand dollars tend to be flat and will spend most of

Name: _____

Period: ___ Date: _____

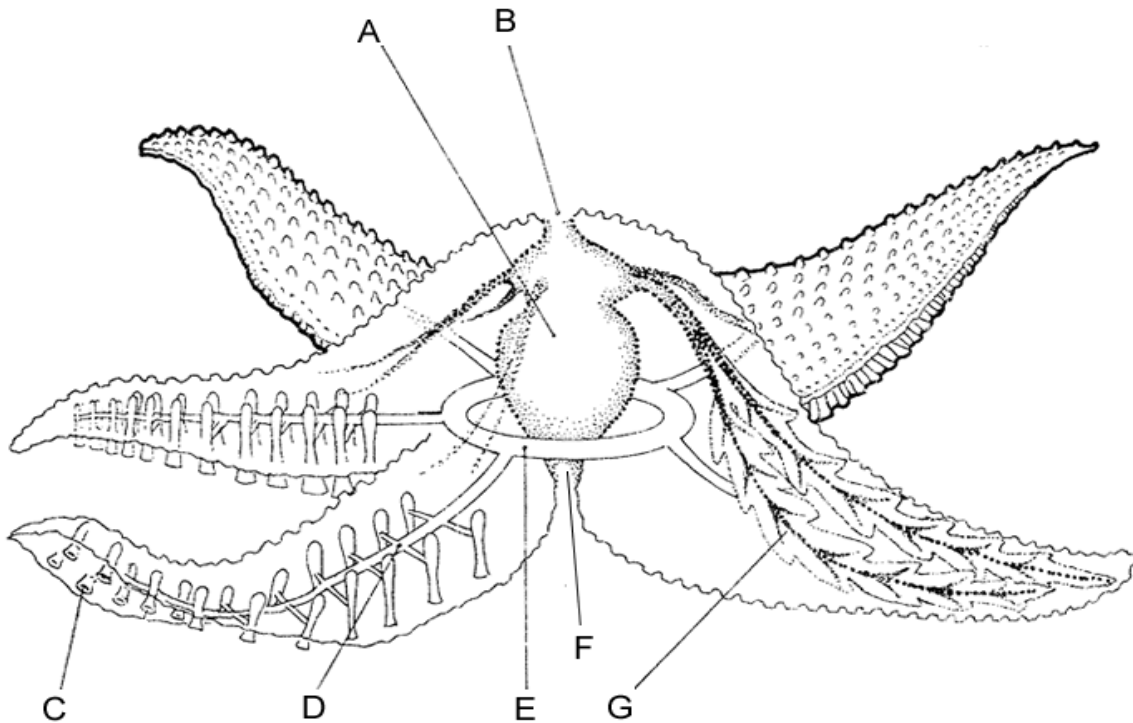
their time submerged under the sand in shallow waters.

Brittle stars are a group of echinoderms found mainly on coral reefs. They have very long flexible arms that can break off (and regenerate later). These broken arms will continue to wiggle and move to distract a predator and allow the organism to escape.

Sea cucumbers are odd little creatures that resemble a cucumbers, hence their name. Sea cucumbers usually feed on dead or decaying organic matter on the ocean floor.

Anatomy of a Starfish - match the letter to the description

1. The anus is found on the top of a starfish, this is where wastes are removed. _____
2. The mouth is on the opposite side of the anus, food is taken in here: _____
3. Large and centrally located between the mouth and anus is the stomach, where food is digested: _____
4. The ring canal surrounding the stomach, part of the starfish's water vascular system: _____
5. The radial canal extends from the ring canal and into the starfish's arms, also part of the vascular system: _____
6. Attached to the radial canal are the tiny tube feet with suckers: _____
7. Digestive glands are located within the arms of the starfish, chemicals help break down food: _____



Name: _____

Period: ____ Date: _____

Questions:

1. What type of echinoderm has flexible arms that are easily broken to escape predators:
 Brittle Stars Sea Stars Sea Cucumbers Sea Urchins
2. Sea stars belong to what Phylum?
 Invertebrata Arthropoda Nematoda Echinodermata
3. How do most star fish get their food?
 Filter feeding Scavenging Predation of small animals Eating plants and algae
4. Which echinoderm is grouped with a sea urchin?
 sea cucumber sand dollar sea star brittle star
5. An echinoderm that has a large number of spines attached to it is probably a:
 sand dollar brittle star sea star sea urchin
6. Ring canals and radial canals are both part of the _____ system.
 circulatory water vascular muscular digestive
7. The process of regrowing body parts is called:
 regeneration homeostasis vasculature biodiversity
8. What type of symmetry does a brittle star have?
 bilateral open-ended radial oblong
9. Where is the anus of a starfish located?
 At the end of an arm on its underside on its top side starfish do not have an anus
10. A "keystone" species is often a(n):
 top predator endangered species dominant species parasite
11. Sea otters share their habitat with what other important organisms?
 starfish & brittle stars kelp & sea urchins sea cucumbers & mussels whales & sharks
12. If you remove the starfish from a shoreline area, what happens to the mussel populations:
 they become extinct one species crowds out all of the others the area becomes more biodiverse
13. The word "echinoderm" means:
 big foot hairy toe tube feet spiny skin