

Starfish and Other Echinoderms

Biological Classification Series

Grade Levels:

Grades 5-10

Subject Areas:

Science

Life Sciences

Biology

Synopsis:

Live-action film footage isolates the characteristics of echinoderms, or “animals with spiny skin,” whose 6,000 species include starfish, sea urchins, and sea cucumbers. Close-up photography of spiny starfish, cushion starfish, serpent starfish, sea urchins, and sea cucumbers, focuses on their method of locomotion, their five-armed structure, their calcareous skeletons, their branchiae, and their carnivorous behaviors. Sequences on male and female sea urchins highlight spines, teeth, and cleaning pincers and the process of spermatozoid fertilization of unfertile eggs released by the female. Tropical species filmed include long-spined sea urchins, huge starfish that devour coral and enormous, brightly colored sea cucumbers.

Learning Objectives: Students will:

Describe the common characteristics of all echinoderms.

Explain why varieties of starfish, sea urchins and sea cucumbers are echinoderms.

Explain how sea urchins reproduce and metamorphose.

Describe how starfish capture and digest their prey.

Vocabulary:

locomotion, branchiae, calcareous, carnivore, prey, embrace, immobilize, tentacles, pentagonal, sea urchin, echinoderms, spermatozoids, pincers, larva, metamorphose, sea urchin, sea cucumber, anus, tests (sea urchin skeletons), devour

Pre-Viewing Discussion:

Have you ever touched or seen a starfish? What color are they? How many arms do they have? How do they grasp rocks? How do they move?

What is a sea cucumber? What is a sea urchin? Are these creatures animals? How do they resemble the starfish?

Can starfish be found all over the world? Where are they most likely to be found?

What do starfish sea cucumbers or sea urchins eat?

Post-Viewing Discussion:

What enables starfish to move? How does a serpent starfish move?

What enables starfish to breathe?

How do starfish capture and digest their prey?

Do starfish have skeletons? How are they similar or different to those of sea cucumbers or sea urchins?

How can an observer tell the difference between male and female sea urchins?

How do echinoderms that live in tropical seas differ from those in the Northern hemisphere?

Further Activities:

Find out which of the five major classification groups starfish and other echinoderms are in (i.e. Kingdom, Phylum, Class, Order, Family). Chart the relationships of animals in the largest to the smallest taxonomic groups around them. What characteristics make this group similar to and different from the other groups to which they are related? Then, pick one species from the program and determine its genus and species name, writing them in the proper scientific terminology. Find out why the genus and species name is written the way it is.

If you live near the sea, investigate the species of starfish, sea cucumbers and sea urchins you might find on your local beach. Describe the characteristics that make each an echinoderm.

Investigate the common species of starfish and their characteristics. How do the tropical species differ from those that live in the Northern hemisphere?

Investigate the process that enables a starfish to regenerate a lost arm. Explain it in biological terms. Is regeneration of lost arms common to all echinoderms?

Find samples of ten kinds of echinoderm tentacles or calcareous plates and show how each is used in a unique way to benefit the species.

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