

Poster: Echinoderms: Spiny-skinned creatures from the ocean

Region

North Coast, Gascoyne Coast, West Coast, South Coast, Indian Ocean Territories

Summary

Spiny-skinned creatures from the ocean. With echino meaning spiny and derm meaning skin - 'echinoderms' have to be spiny-skinned animals.

ECHINODERMS: SPINY-SKINNED CREATURES FROM THE OCEAN

What's in a name?
With *echino* meaning spiny and *derm* meaning skin – "echinoderms" have to be spiny-skinned animals. All members of this group have a skeleton consisting of hard plates under the skin, giving it a spiny texture. They have water-filled "tube feet" which may be used for locomotion, respiration and collecting food. Echinoderms are also "radially symmetrical" – their body can be divided into radial parts, like rays extending out from the centre.

Strange But Common
There are about 6,000 different species of echinoderms throughout the world. They are an exclusively marine group and can be found from shallow intertidal areas right down to the bottom of deep-sea trenches. Echinoderms are very common – if you go snorkelling, diving or even for a walk along the beach, you are likely to see an example of an echinoderm – or even the remains of one!
The echinoderms are divided into five classes: *Asteroida* (meaning star-like) – sea stars; *Echinoidea* (meaning spiny-like) – sea urchins; *Ophiuroidea* (meaning snake-like) – brittle stars; *Cnidaria* (meaning jelly-like) – feather stars; and *Holotheroidea* – sea cucumbers.

Cross section of a sea urchin.
Labels: water intake, anus, gut, gonad, tube feet, pedicellaria (nippers), spines, mouth with jaws, tooth, canal carrying water to tube feet, test (skeleton).

Sea stars
Also known as starfish, these often brightly coloured echinoderms consist of five or more arms radiating out from a central disc, an oesophagus at the top of each arm, a mouth under the centre of their body and an anus in the centre on their upper side. Their tube feet, which in most species end in suckers, are set in grooves along the undersides of the arms.
Sea stars are very strange feeders. If they are feeding on brittle molluscs, such as oysters and mussels, they gently but steadily pull apart the shells of these molluscs with their tube feet. They then push their stomach out of their own body to surround the soft-fleshy parts inside the shells, which are then dissolved into a "soup". Once the meal is digested, the stomach is pulled back into the body of the sea star. They also feed on other organisms using their stomachs in this way.
Note: Not all sea stars are five-armed. Some have as few as two arms and some have as many as 50 arms.

Sea urchins
Sea urchins consist of a rounded shell, called a "test", covered with movable spines. These echinoderms use their spines to help them move around as well as protect them from predators. The spines can be long or short, fine or thick. They break off when the urchin dies and the empty tests are all that is left of the animal. Between the spines are rows of tube feet and "pedicellaria", nippers on the end of tube feet that keep the urchin's surface free of rubbish and small crustaceans.
Sea urchins are grazers, feeding on encrusting organisms such as sponges and algae. Their mouth is in the centre on the underside and contains a set of jaws and horny teeth, named "Aristotle's lantern".

Brittle stars
Brittle stars have snake-like arms radiating out from a central disc. They are called brittle stars as their arms break off easily, but then regrow. Like sea stars they have a mouth on their underside but lack an anus! A brittle star's tube feet also lack suckers. They use their arms to move and are much faster than a sea star.
Brittle stars hide under rocks, coral and sand, reaching out their arms in search of food. Two specialised types of brittle stars – basket stars and serpent stars – are well disguised. They coil up into tight knots or wrap around corals and other organisms, so look more like rope than animals.

Feather stars
These delicate echinoderms catch food in their many feathery arms. These "feathers" are actually modified tube feet that help sweep the food down each arm into their mouth, which is located on the upper side of the central disc. Feather stars move around and attach themselves to rocks using appendages called "cirri" and can even swim by waving their arms.

Sea cucumbers
These sausage- or cucumber-shaped animals lie on their sides on the sea floor and move using their tube feet or by squeezing up and then stretching out their bodies. Sea cucumbers feed by sucking sand in through their mouth and filtering out any organic material for food. The clean, filtered sand is then expelled out through their anus. If you are snorkelling or scuba diving, you can often see these trails of sand, which look like scattered footprints, being left behind.
Other sea cucumbers feed using tentacles around the mouth, which are actually modified tube feet. The tentacles extend to pick up plankton and other organic particles of food, and transfer it into their mouths.
Note: Brittle stars and sea cucumbers, like some other echinoderms, have five eyes, which they can then regrow.

A Unique Body – and upside down too!
The majority of echinoderms have their mouth on the underside of their body and their anus on the upper side of their body. That's quite a bit different to other animals! Most echinoderms don't have a real head or tail.
The echinoderm body is arranged around a central disc, with arms or parts "radiating" out from the centre. When the body is divided into these radial sections, each arm or part is identical to the other – including the internal organs. This is known as radial symmetry, which in echinoderms is often based on the number five – that is, their body can be divided into five identical parts. This five-part body plan is unique in the animal kingdom.

Do the Locomotion
Echinoderms need to be able to move around so that they can feed or escape from predators. They don't have any obvious legs, fins or flippers – but a feature that all echinoderms possess is a unique water-filled "vascular" system (like a circulatory system) that is used for locomotion.
Seawater is pumped in and fed to hundreds of hollow tube feet, also called "pneids", through a system of canals. The water pressure in the tube feet allow them to be expanded, retracted or waved about in any direction – and the echinoderm is in motion. Many echinoderms have suckers on the ends of their tube feet, which assists them to capture food or cling to surfaces.

Divide and Conquer
Many echinoderms are able to regrow lost or damaged parts of their bodies, such as an arm. Some species can even grow back a complete new body from a single arm. If part of the central disc is attached, if cut in half, some sea stars can survive to become two separate animals. Some even reproduce in this way – which is known as "asexual" reproduction (requiring only one sex).
Other echinoderms use "sexual" reproduction (requiring both males and females), in which thousands of eggs and sperm are produced and released into the water. Some species of echinoderms are "hermaphrodites" – individuals with both male and female reproductive organs!

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