

Echinoderm Introduction

PART ONE: *What did you learn from the three brief articles on the website (Echinoderm brief readings)? Write your major take-aways below.*

Article 1: When the heat is on, starfish lose an arm to survive. New Scientist Journal

Article 2: Starfish eyes show them the way home. By: MacKenzie, Debora, New Scientist Journal

Article 3: Pheromones to protect GBR from crown-of-thorns? Ecos; November 2013, Issue 189, p1-2, 2p

PART TWO: *How do echinoderms survive without a head, eyes, or a brain?*

Background: Echinoderms have evolved unlike any other animals on Earth. Lacking eyes and a brain, they also have no heart, and pump seawater through their bodies rather than blood. Echinoderms can change their endoskeletons from rock hard to nearly liquid within seconds. Some can purposely break off an arm to distract a predator. Sound unusual? Not for echinoderms.

Question: How do echinoderms survive in the competitive marine environment?

Instructions

1. Choose **one species** from **three of the five major classes** of echinoderms. List the species in your data table. You should have three species filled in the Classes below.
2. Research the species you chose and fill in information in your data table. Observe the echinoderms in their natural habitat by viewing a video online.

Data and Observations

Species	Physical Characteristics	Food Sources/Strategies For Obtaining Food	Predators	Defense Strategies	Reproduction and Development	Other Interesting Facts
ASTROIDEA - Starfish						

ECHINOIDEA – Sea urchin

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HOLOTHIURIDEA – Sea Cucumber

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OPHIURODEA – Brittle Stars

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CRINOIDEA – Sea Lilies

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Analyze and Conclude

1. Describe some basic physical characteristics shared by echinoderms.

2. What are the major food sources of the echinoderms you studied?

3. Are echinoderms well-adapted to survive in the marine environment? Justify your answer.

PART THREE: Starfish Facts (Phylum Echinodermata → Class Astroidea) Read all the way to the bottom, activity is at the end.

Starfish belongs to a large group of marine animals called echinoderms. They can be found in all oceans of the world. Largest populations of starfish live in the Indian and Pacific oceans. Starfish (also known as sea stars) are usually located in the shallow water. There are more than 2000 species of starfish and not a single one can survive in the freshwater.

Interesting Starfish Facts:

Although they are named "starfish", they are not related to fish at all. Starfish belong to the group of marine invertebrates which also include sea cucumber, sea urchin and sand dollar.

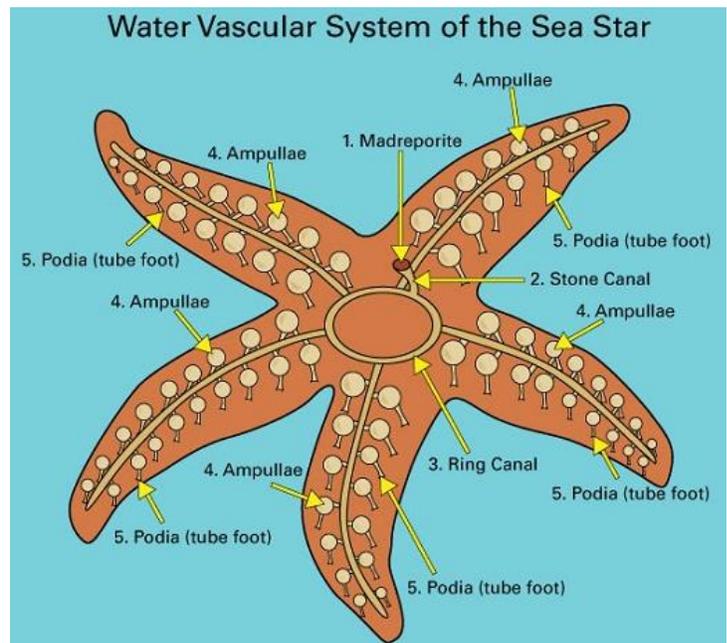
Their star-like shape is the reason why they are named starfish or sea stars. Most species have five arms, but there are sea stars with ten, twenty or even forty arms. Sea star with forty arms is called "sun star".

Starfish vary in size. They usually have five to ten inches in length and weigh up to 11 pounds.

Common feature for all starfish is that their body is radially symmetrical. That means that their body can be divided in five equal pieces (even if they have more than five arms).

Another impressive characteristic of the starfish is their ability to regenerate different (missing) parts of their body. If predator eats part of the starfish, remaining part (one arm for example) will develop missing arms and bring back previous look after some time. This process is not always fast and it may last up to one year.

Starfish is a carnivore who likes to eat clams, shells and mussels. It has two stomachs, one of which can be pushed outside the body during eating. This tactic allows them to eat large prey (that cannot be swallowed with their small mouth). Starfish mouth is located on the underside of its body. Anus is located on the upper side of the body.



Starfish move using tube feet, which consists of hundreds projections on the underside of their bodies. They are used for walking and catching of the prey.

Starfish do not have a brain. They also do not have blood like other animals. Instead of blood, sea water circulates through their body with the help of sieve plate.

Surface of the starfish body is covered with bony skeleton which often contains different kind of spikes and thorns. They serve as excellent protection against predators.

Typical predators of the starfish are sea otters, rays, sharks, seagulls and different types of fish.

Starfish can reproduce sexually (by combining reproductive cells of males and females) or asexually (by dividing its body at the center and by regenerating the missing part).

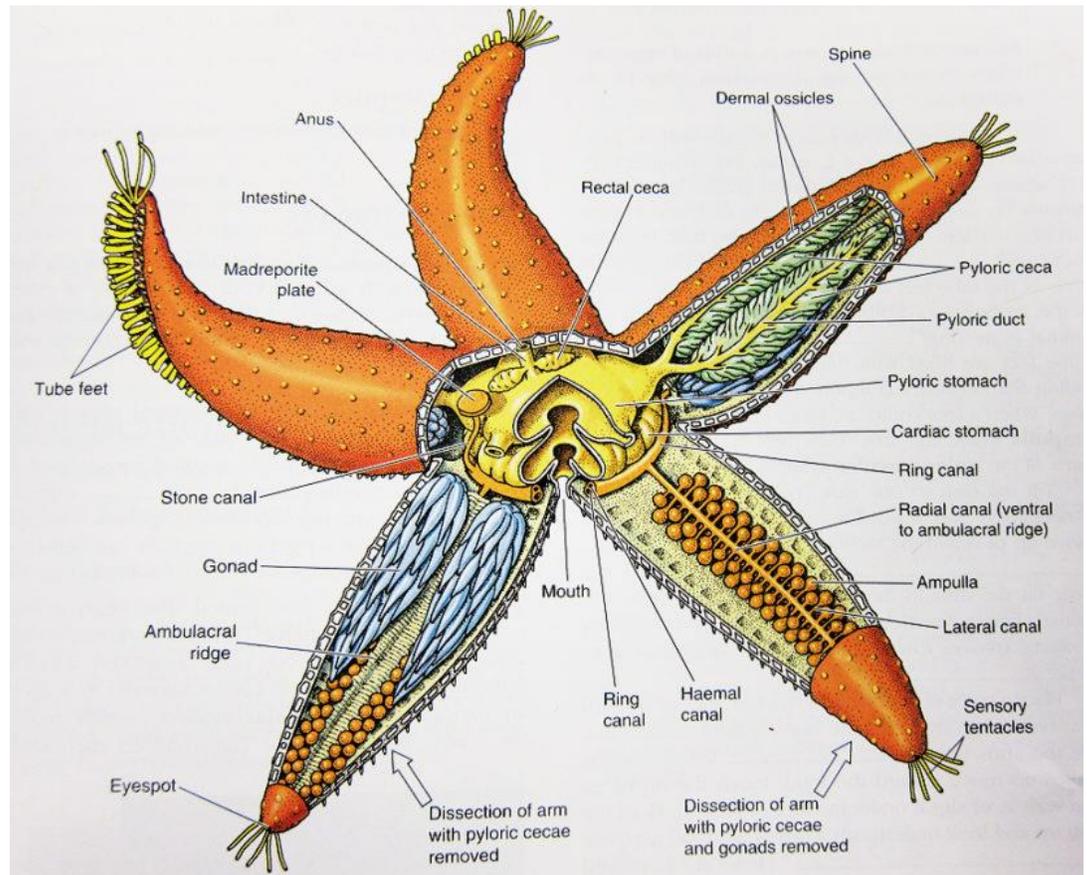
During sexual reproduction, males and females release millions of sperm and eggs in the water, where they mix together to form a fertilized egg that develops into new starfish. Female is capable of producing millions of eggs at once. This is important because small portion of the eggs survive to become adult starfish.

Starfish are not hermaphrodites (animals which have characteristics of both genders) but they are capable of changing the gender whenever they like during their lifetime.

Starfish can survive up to 35 years in the wild.

When you get to this point, go to the following quizlet link on the website and test yourself on the major anatomical features of this stellar creature:

- Arm/ray*
- Madreporite*
- Ampulla*
- Ambulacral groove*
- Tube feet*
- Oral surface*
- Aboral surface*
- Cardiac stomach*
- Pyloric stomach*
- Ring canal*
- Digestive glands*
- Gonads*



My score on the quizlet was: _____