Echinoderms

Name _____
Date _____
Block _____

General Stuff

- Echinoderms belong to the Phylum_____, meaning "_____".
- Echinoderms have _____.
- They have _____ symmetry.
- They lack body segmentation.
- There are more than _____ species of Echinoderms.

Types are sea stars, sea urchins, sea cucumbers, sand dollars.

Diversity

- Echinodermata means "spiny skin"
- Echinoderms usually inhabit shallow coastal waters and _____
- Organisms in this class include:
    - _____
    - _____
    - _____
    - _____

Characteristics

- change from a _____larva to a _____ adult with radial symmetry.
- Most have five radii or multiples which is known as _____ symmetry
- They have an _____ that is made up of calcium plates, may include protruding _____
- Have small feet called tube feet that aid in _____, _____, _____, & _____.
- Do not have circulatory, respiratory of excretory systems.
- Have a nervous system but no _____ or _____.
- There are two sexes and they can reproduce _____ and _____.

Evolution & Classification

- Echinoderms are from the _____ period & date back to over _____ years ago
- scientist believe that they evolved from _____ symmetrical ancestor.
- The inferred ancestral larva is very similar to the modern Sea star larva.
- Records show that conditions have changed which had caused them to evolve from _____ organisms to free-living ones.

Taxonomists have divided 6,000 species of echinoderms into five classes:

Types of Echinoderms

- _____
- _____
- _____
- _____
- _____

Structure & Function

Crinoidea ("lilylike")

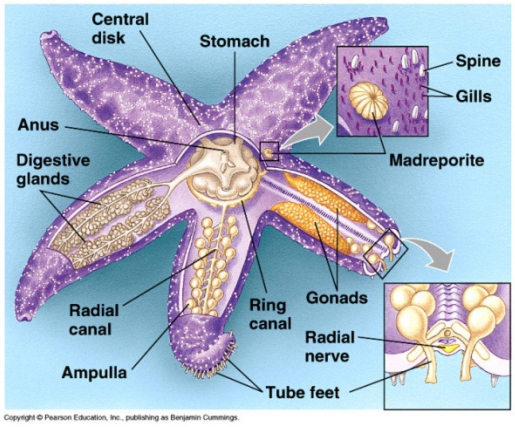
They include:
- Sea lilies
- Feather stars

Crinoidea are _____
- they have _____ that attach to rocks or to the ocean floor
- feather stars eventually detach themselves
- Sticky tube feet that are at the end of each arm catch _____ and serve as a _____.

Asteroidea ("star-like")
- _____ belong in this class
- found all over coastal shores around the world
- prey on _____, and other sea food that is used by people

Sea Stars- Starfish
- Have _____ symmetry.
- Most starfish have 5 _____.
- Starfish have tube feet for locomotion, and strong suction to hold them in place.
- They also have a _____ system that enables them to store water in their tube feet so they can survive while the tide is out.
- They breathe through _____ in their skin.
- Their mouths are located on the underside of their bodies.
- Starfish can _____. (must have the _____ attached).
- Sea Stars are _____, They eat mostly shellfish, snails, and barnacles.
- They use their tube feet to pry open the shells and then throw their own _____ out into the shell to digest the meat before it's brought back into its body!
- There are lots of different types of Sea Stars, about _____ different kinds.
- Most Sea Stars have _____.

Sea Star Anatomy



Body Plan of the Sea Star

- oral surface: mouth located on the _____
- _____ surface: top of the body
- _____: sharp protective spines made of calcium plates, covered with thin epidermal layer
- _____: tiny forceps that protect and clean the body surface

Water-Vascular System

- hydrostatic pressure permits _____
- Path of water in the Water-Vascular System
    - enters _____
    - passes through _____
    - traces a path from the ring canal encircling mouth to 5 radial canals that extend to each arm
- _____: bulblike sac that each foot connects to
- feet contract, water enters and are able to suction onto surface of slippery rocks

Feeding & Digestion

- uses _____
- eat mollusks, worms, and slow-moving animals
- _____ help digest food

Other Body Parts

- fluid in _____ bathes organs & distributes _____
- _____ : protect coelom lining; gases are exchanged
- _____: surrounds mouth & branches off into nerve cords in each arm.
- _____: on each arm that responds to light
- _____: responds to touch

Reproduction

- each arm produces sperm & egg
- occurs _____
- _____: free-swimming larva that a fertilized egg develops into
- settles in the bottom and develops into an adult through _____
- reproduce asexually by regenerating lost parts

Ophiuroidea ("snakelike")

- largest echinoderm class
- includes _____
- primarily reside under stones & in crevices and holes of coral reefs
- have thin _____ that break off & _____ themselves quickly
- feed by raking food off the ocean floor with their arms and bottom of tube feet
- also trap food with _____ between their spines.

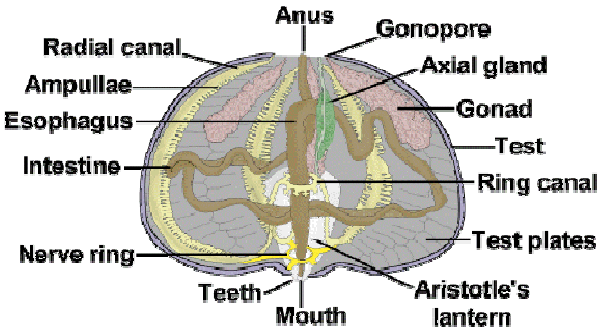
Echinoidea ("hedgehoglike")

- _____
- Rigid _____-- that the internal organs are compacted in
- _____: complex jaw-like mechanism that is used to grind their food
- locomotion: tube feet
- protection: _____ that are sometimes venomous

Sea Urchins

- Sea Urchins look like big _____.
- They use these spines for protection against predators.
- The spines also act like _____ to keep their bodies up off the ground so the tube feet can pull them around!
- They eat mostly _____.
- They live mostly attached to rocky crevices, which protect them from waves and tide surges.
- They have become a popular item to eat and are being harvested in alarming numbers.

Sea Urchin Anatomy



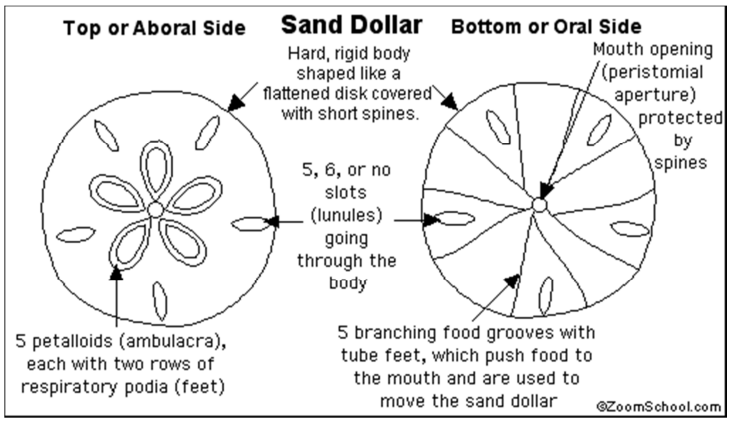
Sand dollars

- live along seacoasts & sandy areas
- flat, round shape bodies; and adaptation for _____
- locomotion: short spines (also aid in burrowing & cleaning their bodies)
- use _____out of water

Sand Dollars

- Are found on the sandy shore or muddy bottoms.
- They feed _____ with their tube feet acting as _____.
- The star pattern seen on top of the sand dollars is actually caused by special _____!
- The _____ is found on the under side of the animal.

Sand Dollar Anatomy



Holothuroidea

- sea cucumbers belong in this class
- bodies are _____
- how they feed: tentacles around the mouth sweep up sediment from the water
- protection: _____.
- Lost parts are later regenerated.
- Process called _____

Sea Cucumbers

- Sea cucumbers have _____ at their mouth openings to grab and hold food.
- They look like snails, but have radial symmetry and spiny bodies like all other echinoderms.
- When provoked, or annoyed, Sea cucumbers throw out their _____ to entangle, frighten, or confuse their predator! Then the intestines are regenerated. They are _____ and have a _____ that covers their tentacles and lets them grab particles from the ocean floor.
- Sea Cucumbers are considered a delicacy in Asian cultures.

Interesting Stuff

- Some Sea cucumbers are quite _____, and the poison has been used as an inhibitor of _____.
- Sea Cucumbers secrete a sticky glue as a defense mechanism that has been used as a bandage to _____.
- Sea Cucumbers will stick each tentacle in their mouths, lick them off and then do the same with the next one- kind of like you licking your fingers after eating!

Sea Cucumber Anatomy