


Phylum Echinodermata


About 7,000 species
Where: Strictly marine, mostly benthic.
Typical deuterostomes (Anus Firsts)

Sea Stars	Urchins	Sea Cucumbers
-----------	---------	---------------



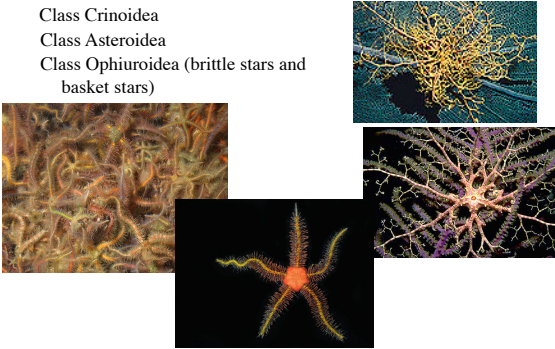
Phylum Echinodermata
Class: "Sea Star"

Class Crinoidea
Class Asteroidea (sea stars)



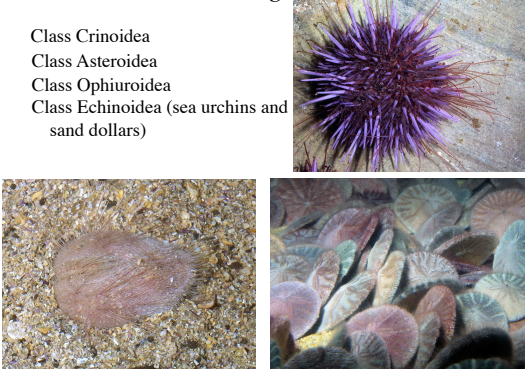
Phylum Echinodermata:
Class: We are going to skip these

Class Crinoidea
Class Asteroidea
Class Ophiuroidea (brittle stars and basket stars)



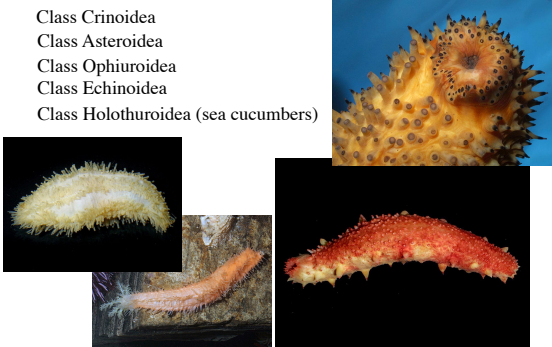
Phylum Echinodermata
Class: "Urching/Sand Dollar"

Class Crinoidea
Class Asteroidea
Class Ophiuroidea
Class Echinoidea (sea urchins and sand dollars)



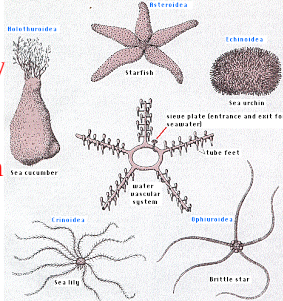
Phylum Echinodermata
Class: "Sea Cucumber"

Class Crinoidea
Class Asteroidea
Class Ophiuroidea
Class Echinoidea
Class Holothuroidea (sea cucumbers)



Unique characteristics:

- **Penta-radial symmetry**
 - 5 part round symmetry
 - Babies are bilateral (indirect development)
- **Water vascular system**
 - For circulation
 - For movement



VIDEO: [Tube feet in action \(Mute\)_2](#)
VIDEO: [Star Fish Flipping Over](#)

Water-Vascular System

- Hydrostatic pressure permits movement
 - Water pressure powered suction cups called **tube feet**
- Path of water in the Water-Vascular System
 - Enters through **madreporite**
 - Through stone canal
 - Traces a path through the ring canal encircling mouth
 - to 5 radial canals that extend to each arm
 - To ampulla: bulblike sac that each foot connects to feet contract, water enters and are able to suction
 - To tube feet

Feeding & Digestion

- Eat: mollusks, kelp, worms, slow-moving/dead animals
- Enzymes help digest food

Sea Stars Video 1	Urchins Video 1,2	Sea Cucumbers
Eviscerate: Spit out stomachs and digest externally	•5 part jaw called Aristotle's lantern •Eat kelp, passed to mouth with tube feet •Hard plates and muscles that control protraction of teeth	Suspension feeders: Eat the organic material out of sand

How do Echinoderms feed and digest?

Holothuroids

Cuvierian tubules - blind sticky tubes at base of respiratory tree.
 Entangle predators. - Poison butt glue!
 Evisceration.

Reproduction

Asexual reproduction

Most capable of regenerating lost parts. Holothuroids regenerate intestines and respiratory trees. Asteroids and ophiuroids regenerate lost arms and suckers.

Reproduction

Sexual reproduction

Most gonochoristic. - Greek offspring + disperse) or unisexualism describes sexually reproducing species in which individuals have just one of at least two distinct sexes.
 Gonads housed in **genital sinuses**. In classes with multiple gonads, each has own gonopore in an interambulacral area.

Development

Indirect

Babies are bilateral – adults pentaradial. change from a free-swimming bilaterally symmetrical larva to a bottom-dwelling adult with radial symmetry.

Ophiopluteus of brittle star
Echinopluteus of urchin.
Aricularia of sea cucumber