

Echinoderms







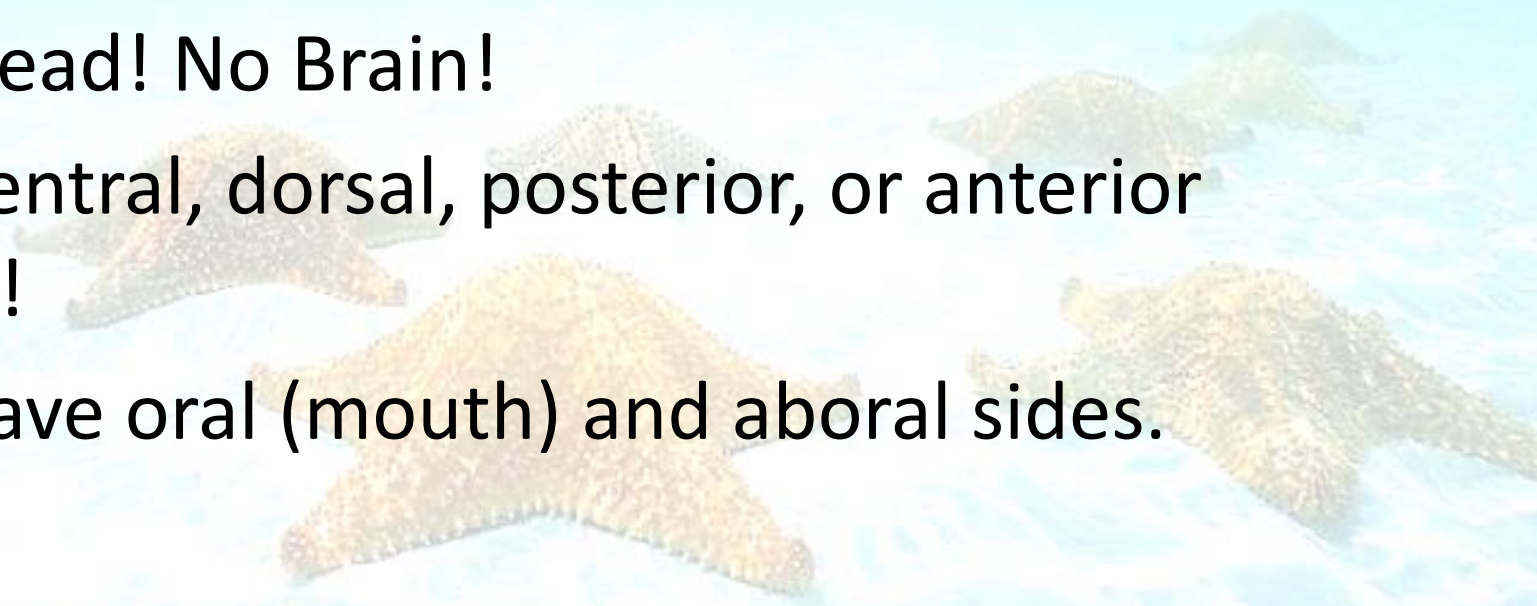






Name Means:

- Echino- Spiny
- Derm- Skin
- About 7,000 species
- No Head! No Brain!
- No ventral, dorsal, posterior, or anterior sides!
- Do have oral (mouth) and aboral sides.



Characteristics

- Symmetry:
 - Larvae are Bilateral
 - Adults are radial (body rounded) with the following forms:
 - Rounded Body
 - Cylindrical
 - Star-shaped



Larvae of a Sea Urchin

Characteristics

- Body Covering:
 - Endoskeleton of calcareous plates (ossicles)
 - Covered with spines
 - Covered by epidermis



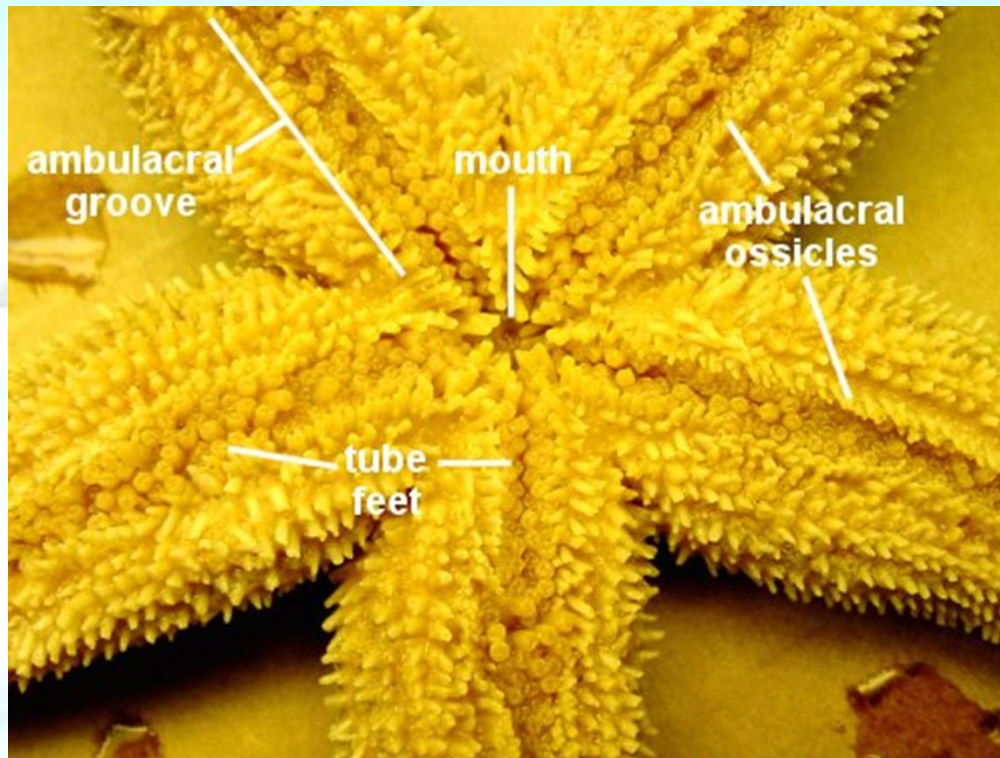
Characteristics

- Water Vascular System:
 - Hydraulic system with canals and specialized feet.
 - Tube feet are for:
 - Locomotion and attachment (slow bottom crawlers)
 - Food getting
 - When filled with water
 - » extended



Characteristics

- Tube feet or Podia
 - Muscular tubes that project through pores in body wall
 - Outer end usually has a sucker, but not in all species
 - Located in the ambulacral groove on oral side of each ray



Characteristics

- Body Cavity:
 - Large fluid filled body cavity (coelom)
 - Fluid contains amoebocytes
 - Distribution of digested food, gases, and wastes



Characteristics

- Digestive System:
 - Mouth- oral side, center
 - Stomach- Located in central disk
 - 2 chambers
 - Cardiac
 - » Lower
 - » Largest
 - » Everted during feeding
 - Pyloric
 - » Upper
 - » Connected to pyloric ceca in each ray by small ducts



Characteristics

- Digestive System:
 - Pyloric ceca
 - Digestive glands
 - Esophagus
 - Short tube connecting mouth the stomach
 - Food
 - Most are carnivores eating mollusks, crustaceans, and tube worms



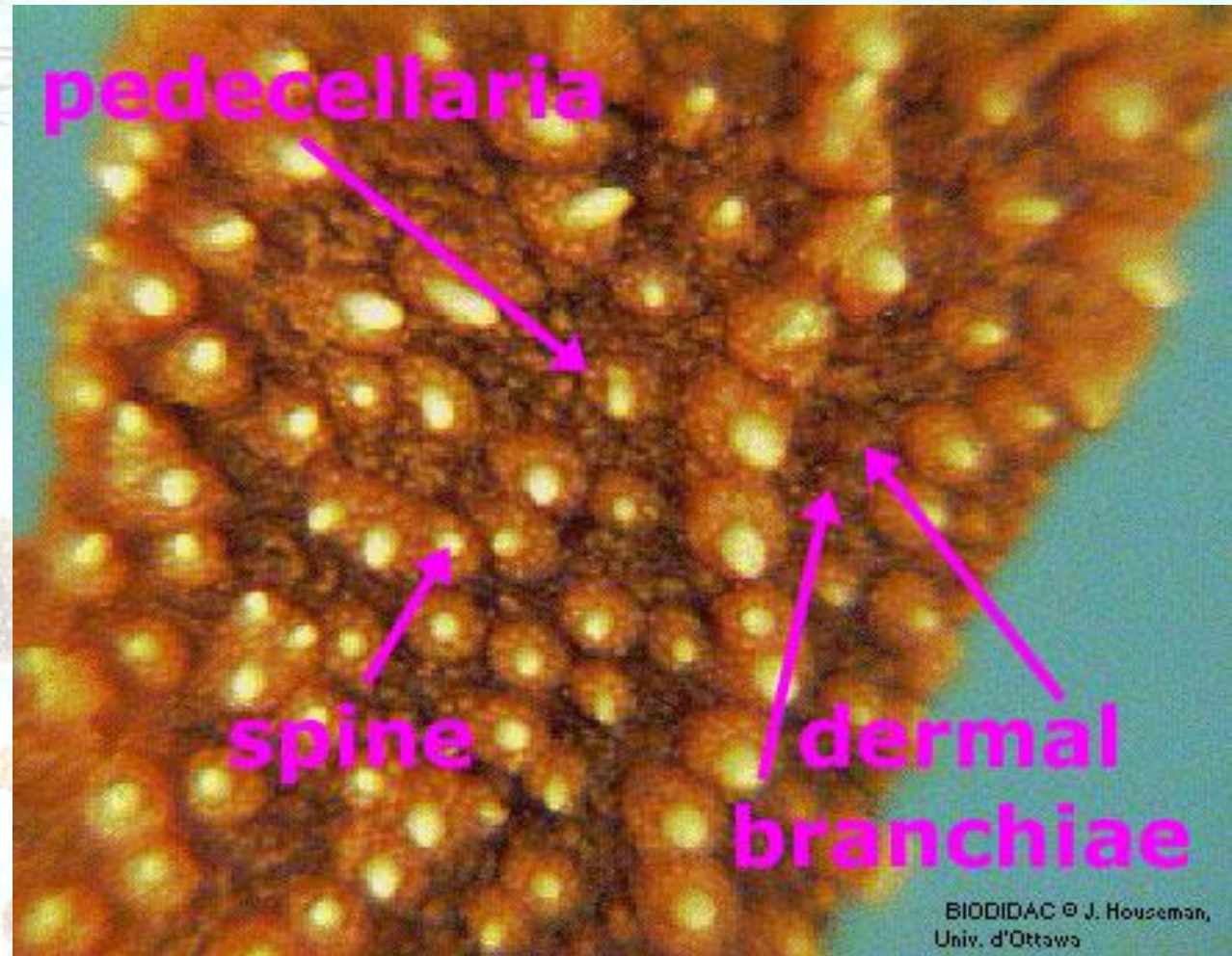
Characteristics

- Feeding
 - Eversion of stomach
 - Very little feces because very little indigestible material is ingested



Characteristics

- Excretory Systems
 - No specialized system
 - Amoebocytes gather waste
 - Waste given off through dermal branchiae



Characteristics

- Respiratory System:
 - Dermal branchiae (skin gills)
 - Project through pores in body wall
 - Gas exchange takes place here



Characteristics

- Nervous System:
 - Very simple, no brain
 - Nerve ring
 - Eyespot (ocelli) at tip of each ray
 - Sea stars usually more active at night- they are photonegative



Characteristics

- Circulatory System
 - Poorly developed
 - Series of ill-defined channels
 - Ring vessel around mouth
 - Radial vessels in each ray



Characteristics

- Reproductive System
 - Dioecious
 - Glands in each ray
 - Eggs and sperm shed into water in early summer
 - Fertilization is external
 - Larvae stages are free swimming!
 - Regeneration (Asexual)
 - Can regenerate lost arms



Classification

- Class Asteroidea (Sea Stars- true starfish)
 - *Luidia alternata*
 - *Astropecten*
 - *Asterias*



Classification

- Description
 - Star shaped; most with 5 arms
 - Arms not sharply marked off from disc
 - Ambulacral grooves with up to 50 tube feet on oral side
 - Tube feet with suckers



Classification

- Description
 - Anus and madreporite (pore through which water enters the water vascular system) on aboral surface
 - Gonads located in rays
 - Digestive glands located in rays



Classification

- Class Echinoidea
 - Examples:
 - Sea urchins- Arabacia
 - Sea biscuits
 - Sand dollars- Mellita



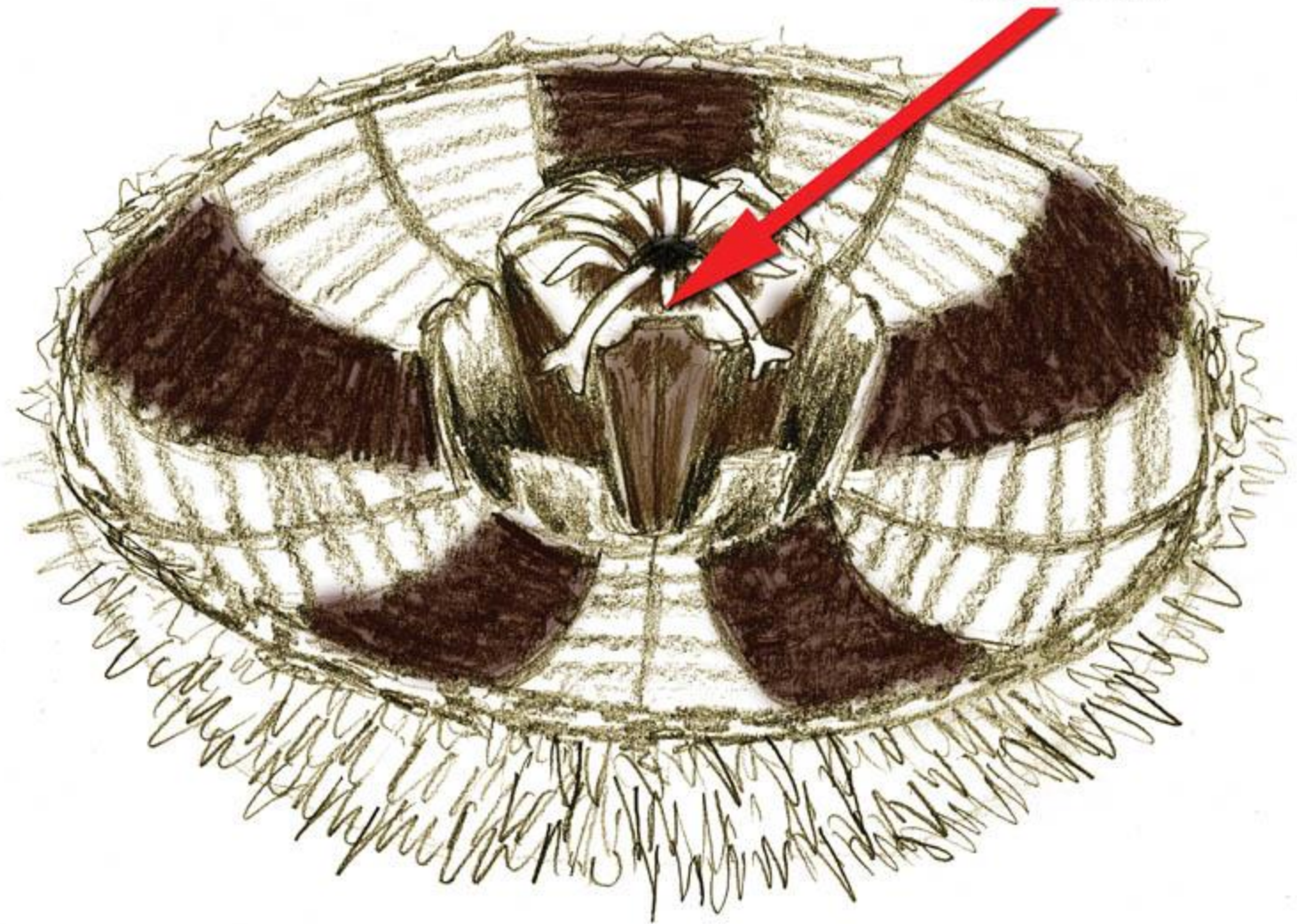
Classification



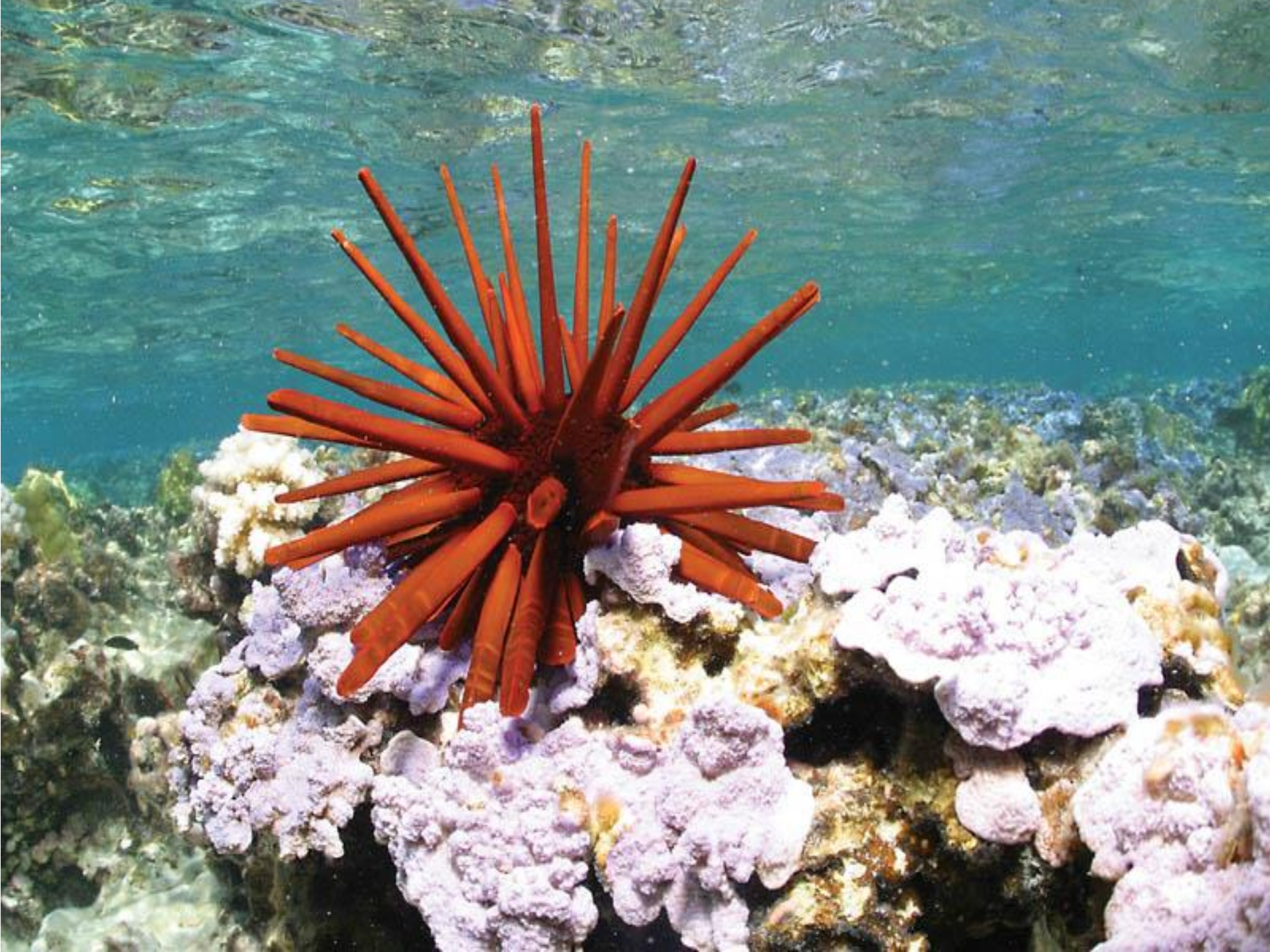
- Description
 - Globular in shape
 - No arms
 - Compact skeleton or “test” of calcium carbonate
 - Movable spines for locomotion
 - Ambulacral groove covered with ossicles
 - 5 rows of Tube feet with suckers
 - Urchins eat plants, algae, and sometimes small animals
 - Mouth on bottom
 - Anus on top

Aristotle's Lantern

tooth

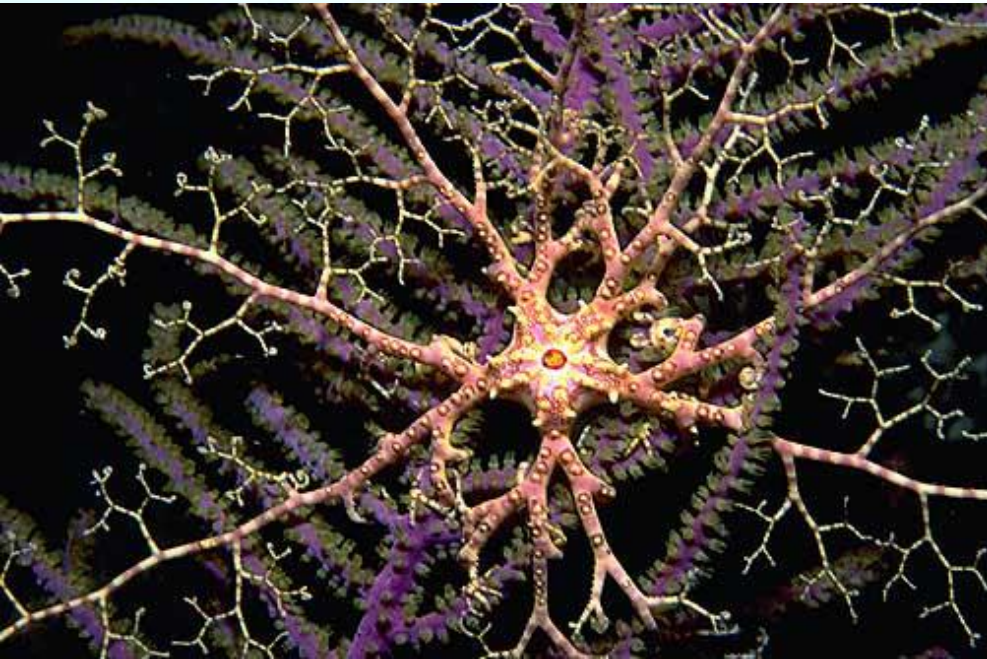






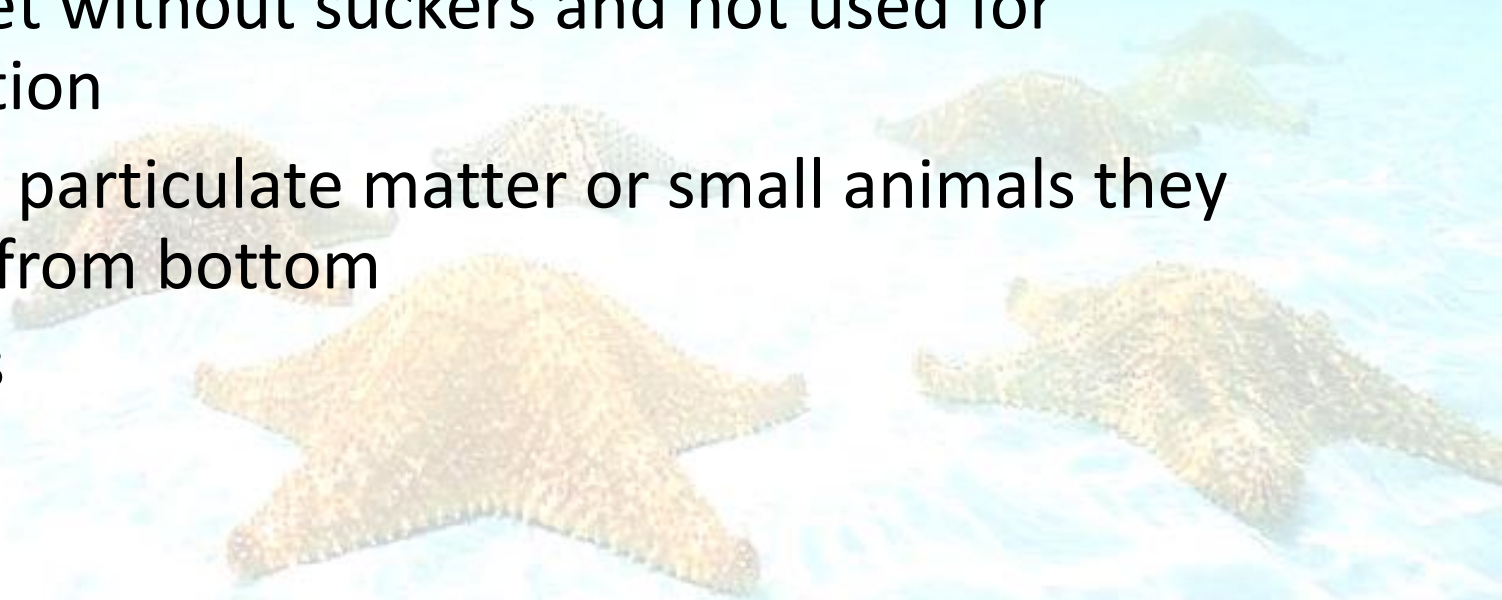
Classification

- Class Ophioroidea
 - Examples:
 - Brittle stars
 - Basket stars



Classification

- Description
 - Star shaped
 - Arms sharply marked off from disc
 - Ambulacral grooves absent or covered by ossicles
 - Tube feet without suckers and not used for locomotion
 - Feed on particulate matter or small animals they pick up from bottom
 - No anus



Classification

- Class Holothuroidea
 - Examples:
 - Sea Cucumbers



Classification

- Description
 - Cucumber shaped
 - Endoskeleton made up of microscopic calcareous spicules scattered through warty skin
 - No Arms
 - Spines absent
 - Tube feet with suckers
 - Circumoral tentacles



Classification

- Description
 - Some burrow to hide
 - Some secrete a toxic substance
 - self mutilation when irritated
 - Will discharge gut and other internal organs through mouth (*evisceration*)



Classification

- Class Crinoidea
 - Examples:
 - Feather stars
 - Crawl
 - Shallow and deep
 - Sea Lilies
 - Attached to bottom



Classification

- Description
 - Suspension feeder
 - Feathery arms

