Phylum Echinodermata   ✱ advances

General Characteristics:

✱ - "Echino" = spiny   "derm" = skin   "spiny-skin"

✱ - pentaradial symmetry - arranged in parts of 5
    although, ✱larvae is bilaterally symmetrical
                    (similar to chordates)

✱ - endoskeleton

✱ - water vascular system

    - tube feet

Classes and Examples: Diagram:

    Sea star

    Sea urchin

    Sand dollar

    Sea cucumber

    Brittle Star

Digestion:

- 2 openings   mouth → anus   ... one way tube
    Pathway   mouth → stomach (s) —   intestine - anus
                            ╱   ╲   (short)
                        cardiac   pyloric

    - sea star feeding ... tube feet pull clam shell open
                       ... sea star "everts" stomach thru mouth
                            - stomach extends into clam to digest it;
                              & pulls stomach & contents back inside

- sea urchin   - vegetarians / kelp

                  - teeth on bottom   ; 5 part jaws
                                            (Aristotle's Lantern)

Respiration:

    - diffusion through skin gills

- O_2 diffuses into water vascular system to
  circulate around starfish

- tube feet have thin walls for diffusion as well

Circulation / Internal Transport

- Water vascular system
- Closed circulation system
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- Sea water enters through madreoporite into
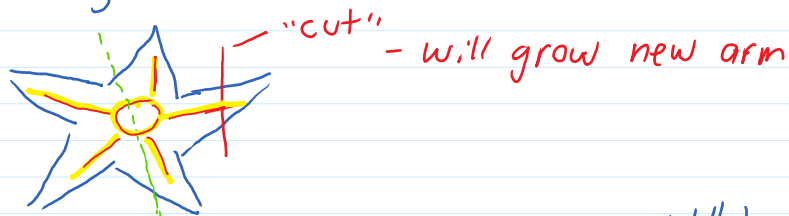 ring canals & Radial canals and circulates
  around body

Excretion:

- wastes diffuse into water vascular system &
  exits by madroporite

- nitrogen wastes in the form of ammonia (NH_3) exits
  through "skin gills"

- digestive wastes exit through anus (dorsal/top side of body)

Nervous System

Response : not highly developed Nervous system

: have Ring & Radial nerve cords

: sensory cells detect light, gravity, chemicals

: eyespot on end of arm

: can regenerate

"cut" - will grow new arm

(middle)
"cut" - get a piece of Ring nerve
then both sides grow/
regenerate a starfish

Movement:

(hydrolics)
- tube feet : ampullae cause pressure changes to
  extend & contract tube feet

: joints/plates in endoskeleton to
  flex legs

Asexual Reproduction:

flex legs

Asexual Reproduction:

- none, but can   regenerate

Sexual Reproduction:

- external fertilization

- Seperate sexes (dioecous)

- release egg & sperm into sea water

- bilaterally symmetrical larvae is
  similar to chordates