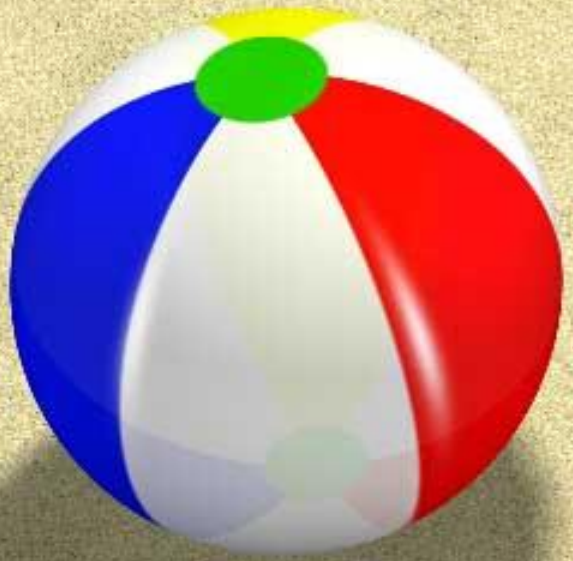
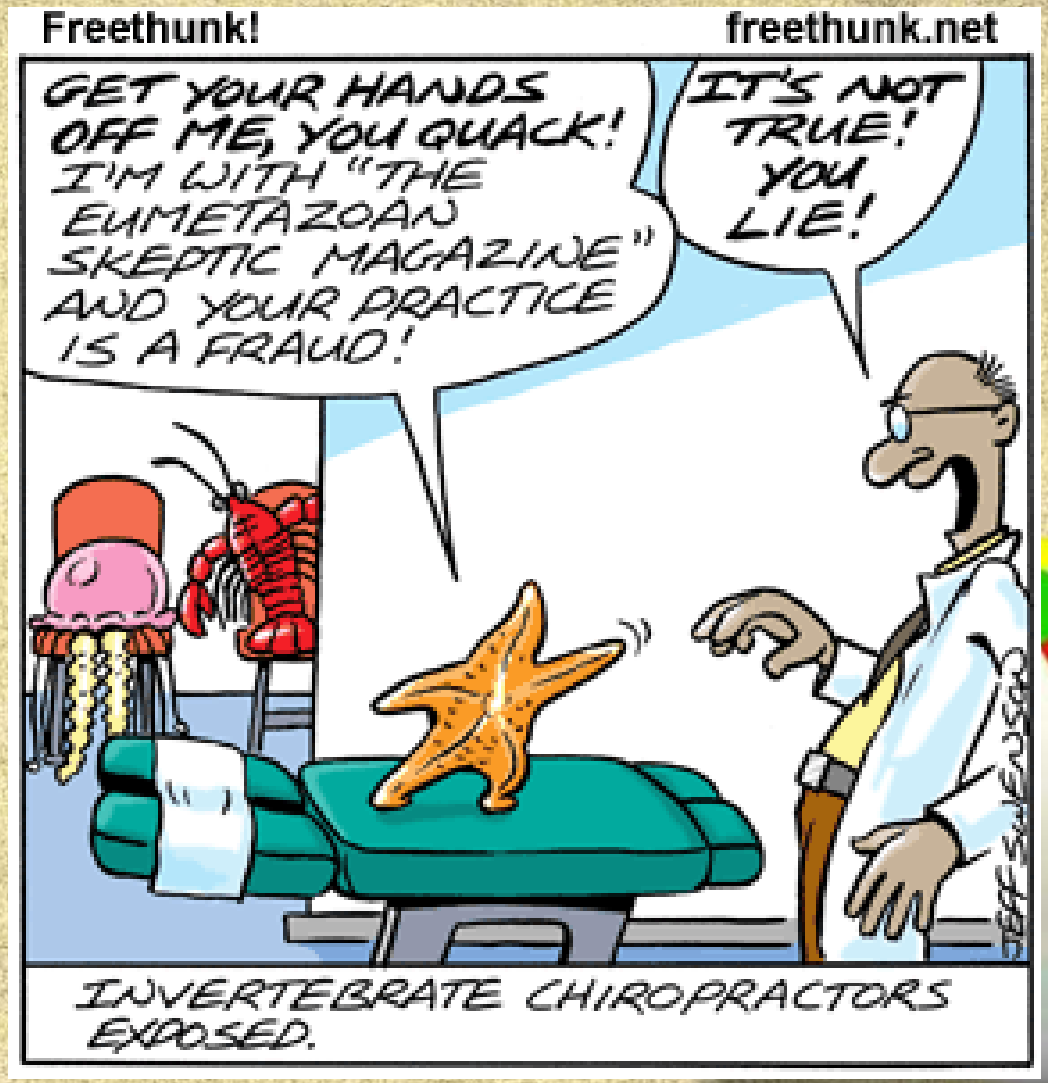
INVERTEBRATES

KRAUZ/MALAZZO/BORDI

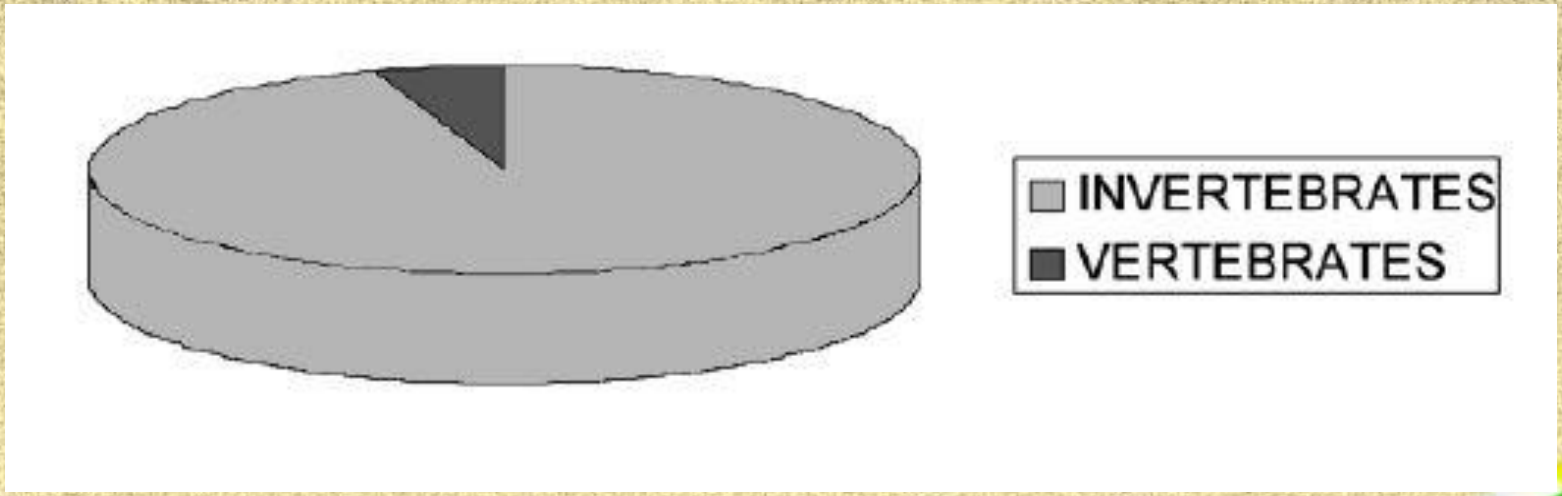


INVERTEBRATES

- ORGANISMS WITHOUT A BACKBONE

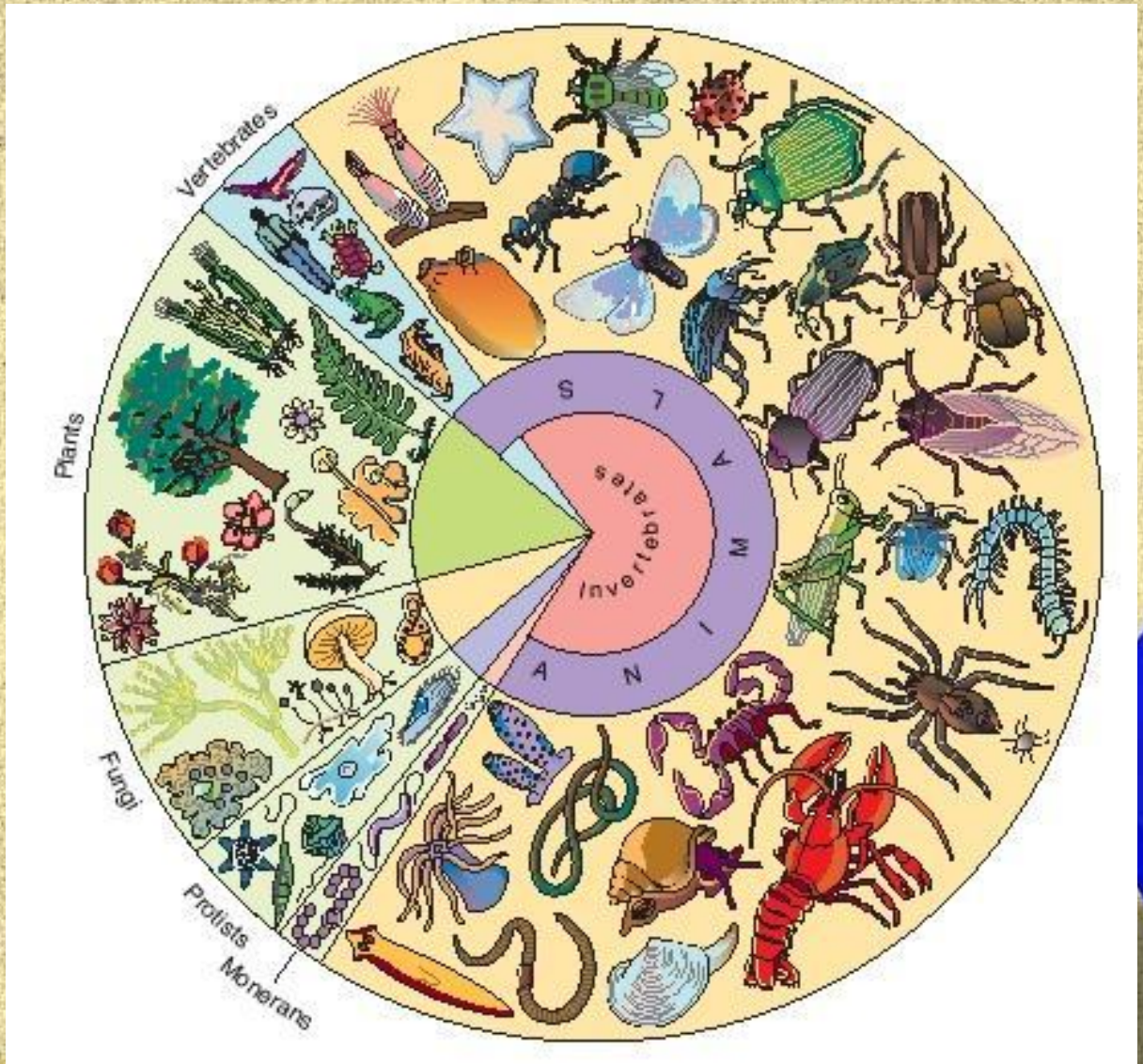


INVERTEBRATES



- 97 - 98 % OF ALL ANIMALS ARE INVERTEBRATES

INVERTEBRATES



INVERTEBRATES

- INVERTEBRATES ARE THE MOST DIVERSE GROUP OF LIVING THINGS ON THE PLANET!!!!

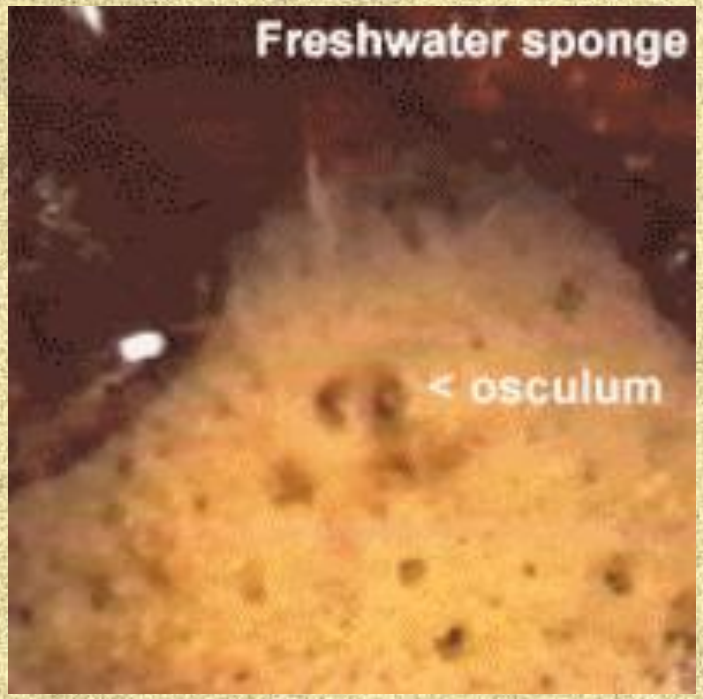
SPONGES (*PORIFERA*)

- PORIFERA LITERALLY MEANS "PORE BEARERS"

SPONGES (*PORIFERA*)

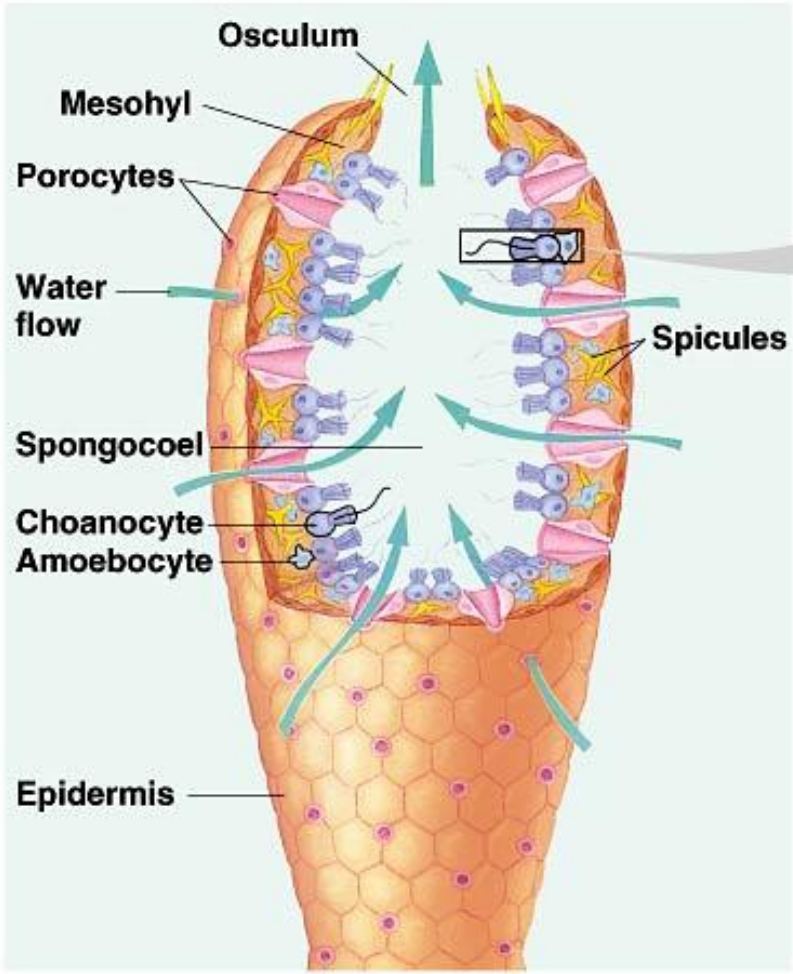
- ALMOST ALL SPONGES ARE MARINE AND ARE SESSILE

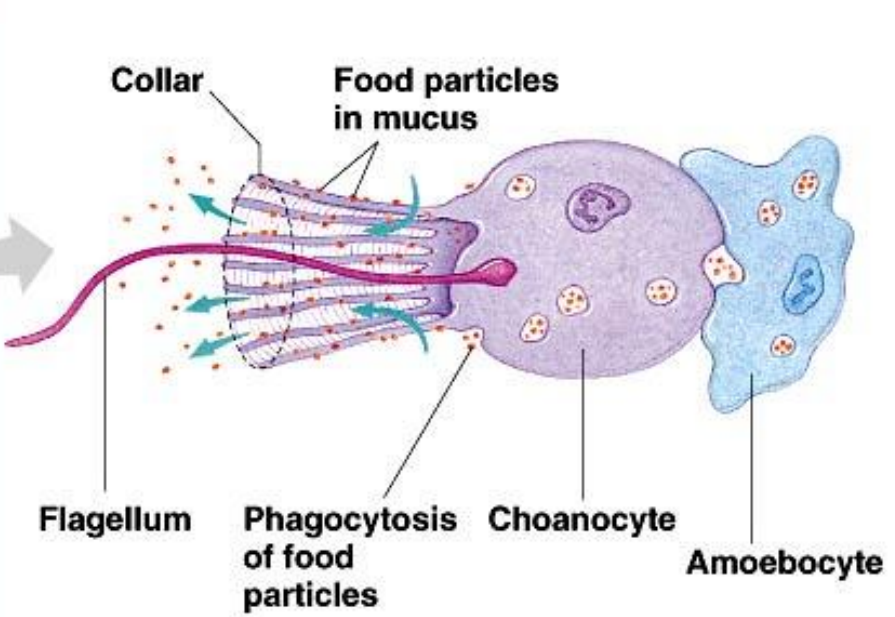
SPONGES (*PORIFERA*)



- NO TRUE TISSUES OR ORGANS
- THEY ARE SUSPENSION, OR FILTER, FEEDERS

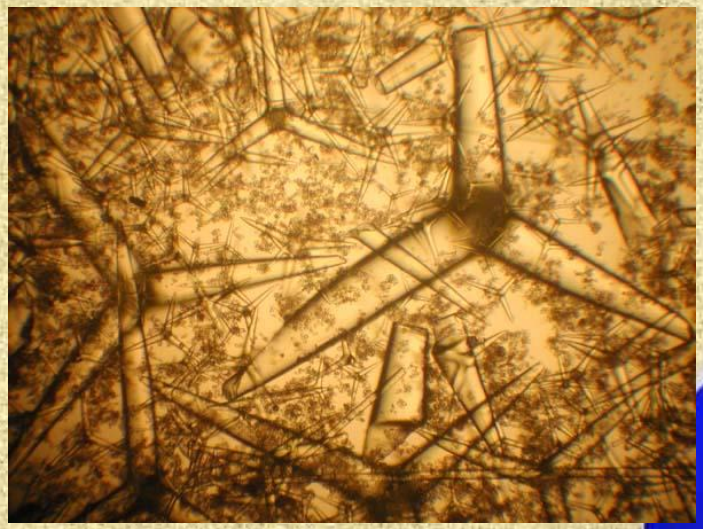
SPONGES (*PORIFERA*)

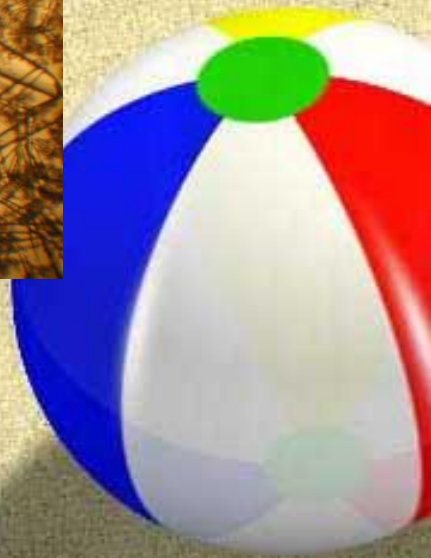




SPONGES (*PORIFERA*)

- SPICULES ACT LIKE A SKELETON, PROVIDING STRUCTURAL SUPPORT AND PROTECTION FROM PREDATORS



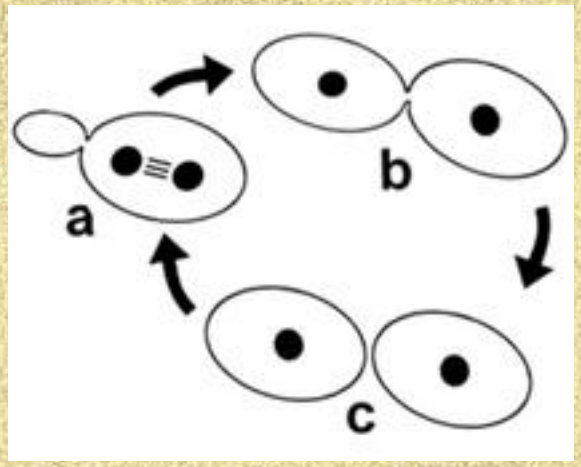


SPONGES (*PORIFERA*)

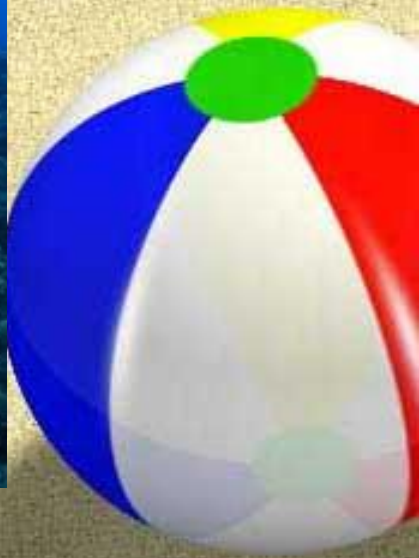
- REPRODUCE ASEXUALLY BY BUDDING
- REPRODUCE SEXUALLY BY SPAWNING

SPONGES (*PORIFERA*)

- BUDDING



- SPAWNING



ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- PHYLUM CNIDARIA INCLUDES THE SEA ANEMONES, JELLIES (JELLYFISHES), AND CORALS

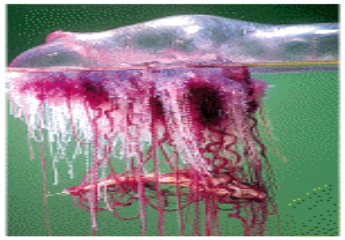
Cnidarian diversity

© CABISCO/Phototake

b. Sea anemone, *Apitasia*

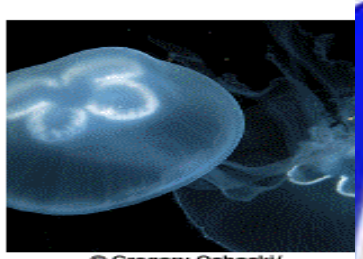
© Ron Taylor/Bruce Coleman

c. Cup coral, *Tubastrea*



© Runk/Schoenberger/ Grant Heilman Photography

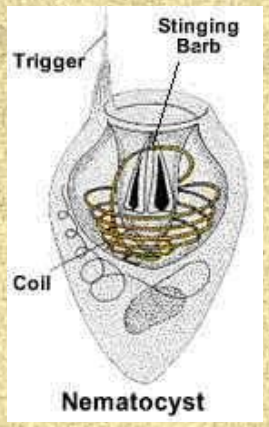
d. Portuguese man-of-war, *Physalia*

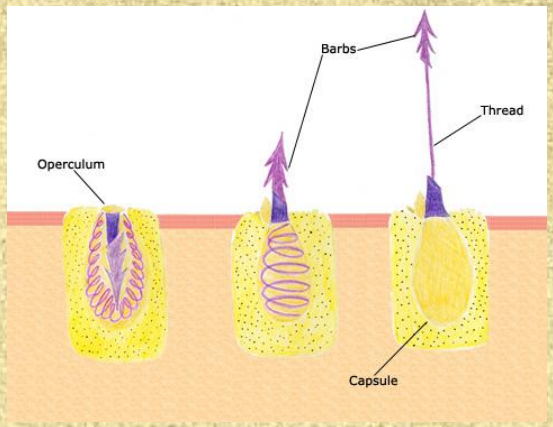


© Gregory Ochocki/ Photo Researchers, Inc.

e. Jellyfish, *Aurelia*

ANEMONES, JELLIES, CORALS (*CNIDARIA*)

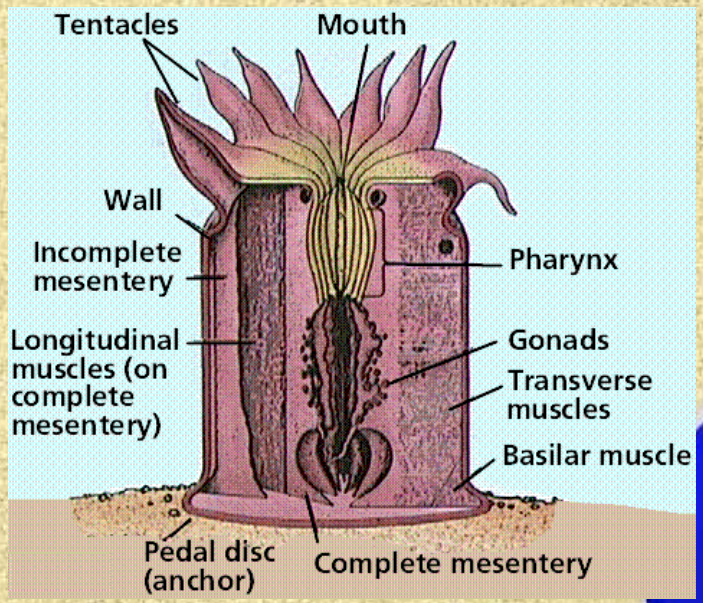


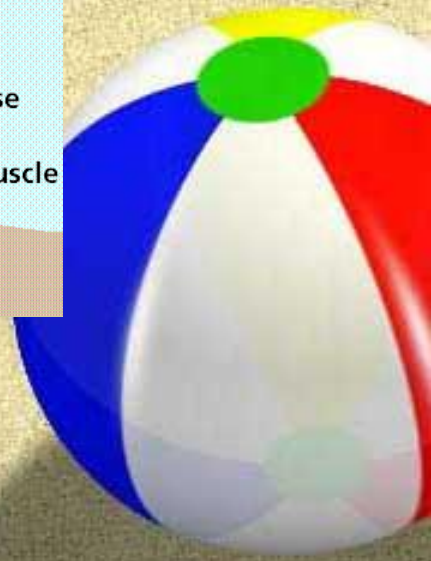


- CALLED CNIDARIANS BECAUSE THEY POSSESS CNIDOCYTES (NEMATOCYSTS), OR STINGING CELLS

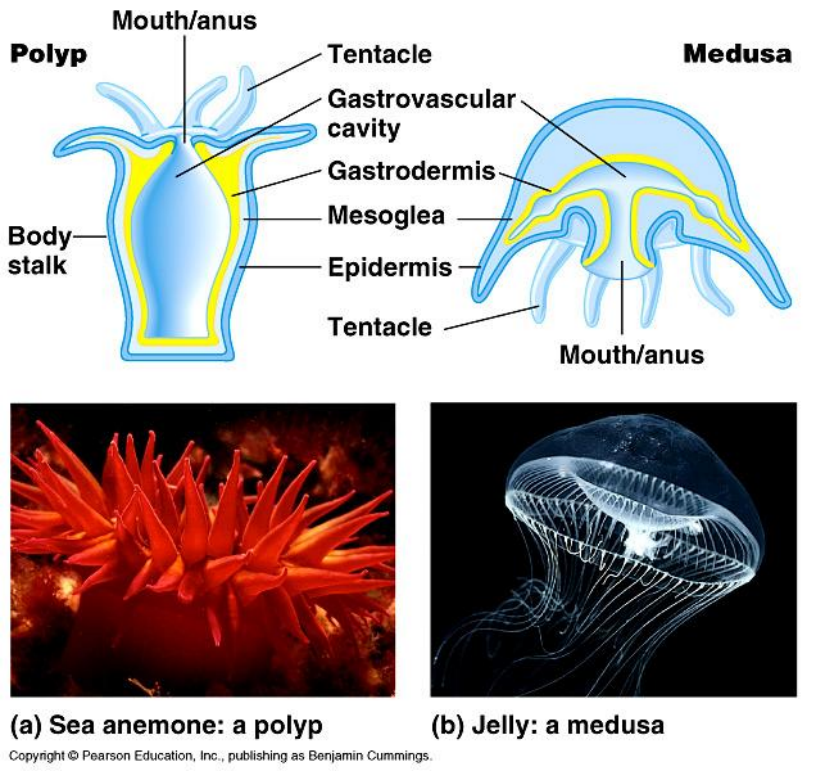
ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- THEY POSSESS BOTH AN ORAL AND ABORAL SURFACE.





ANEMONES, JELLIES, CORALS (*CNIDARIA*)

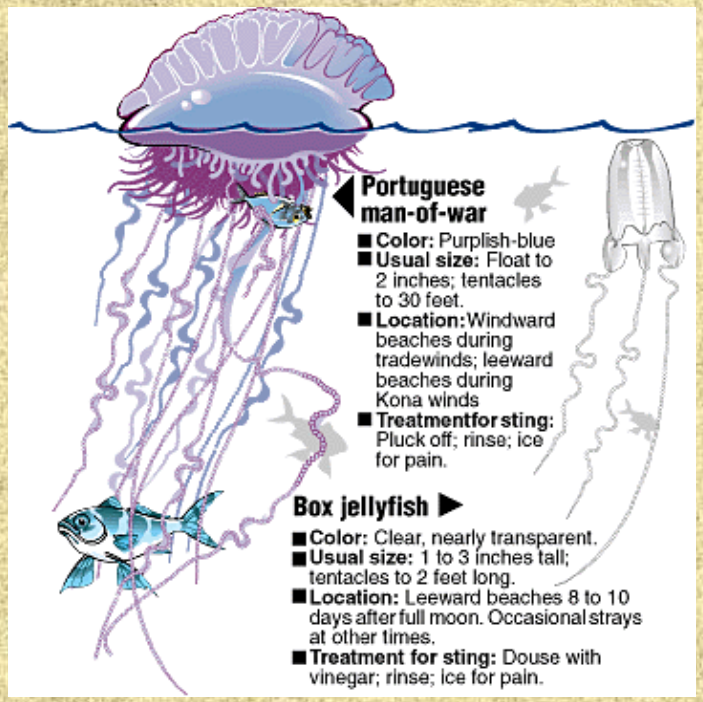


- EXIST AS EITHER POLYP OR MEDUSA

ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- CNIDARIANS ARE CARNIVORES

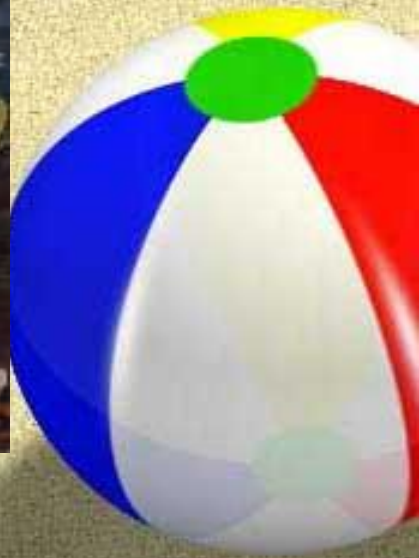
ANEMONES, JELLIES, CORALS (*CNIDARIA*)



- THE PORTUGUESE MAN-OF-WAR CAN GROW TENTACLES OVER 150 FT LONG, AND CONTAINS LETHAL TOXIN.

ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- SEA ANEMONES EXIST IN MANY DIFFERENT COLORS

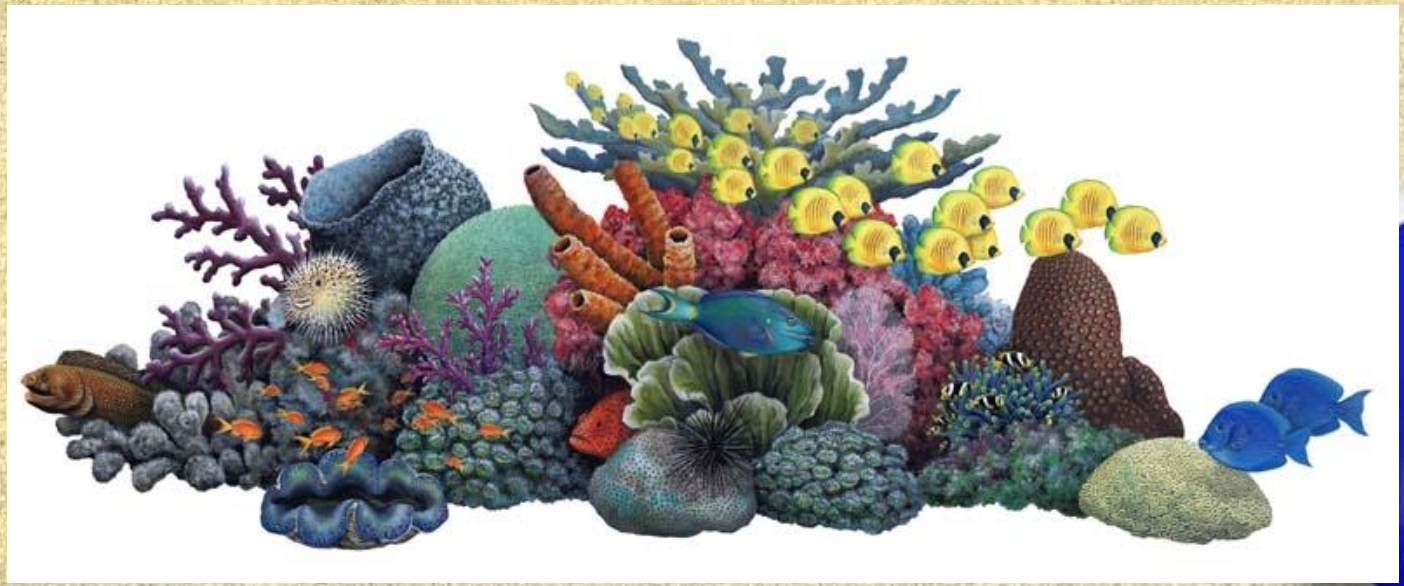


ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- CORALS BUILD "STONY" SKELETONS MADE OF CALCIUM CARBONATE

ANEMONES, JELLIES, CORALS (*CNIDARIA*)

- CORALS GIVE RISE TO CORAL REEFS, THE MOST DIVERSE ECOSYSTEMS ON EARTH!!



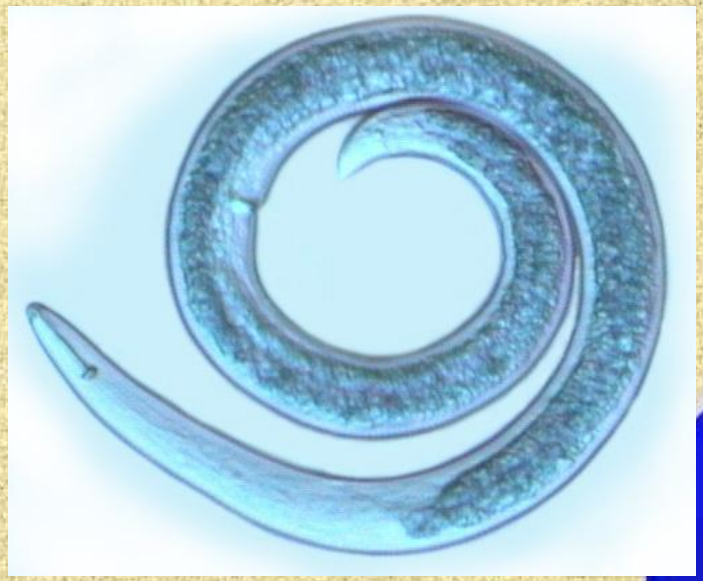
WORMS (*PLATYHELMINTHES*)

WORMS (*PLATYHELMINTHES*)

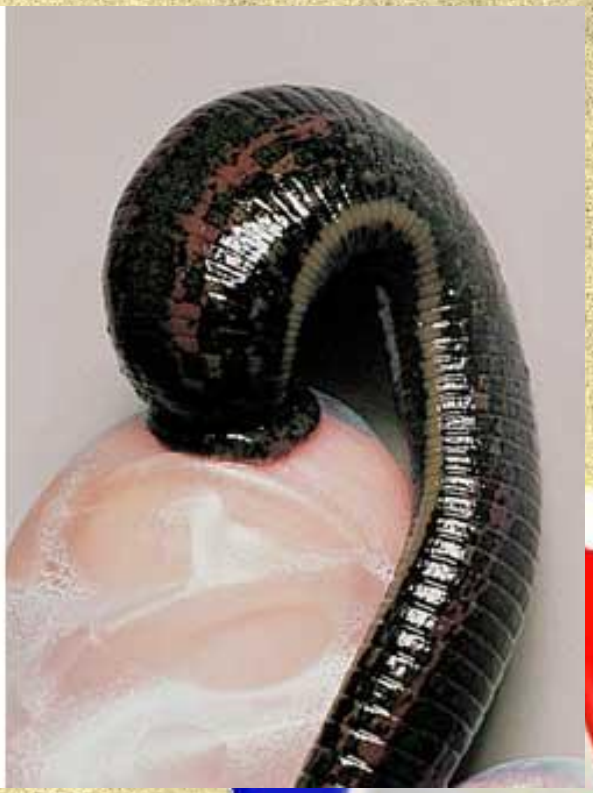
- PLATYHELMINTHES ARE THE FLAT WORMS; FLAT BODIED.

WORMS (NEMATODES)

- NEMATODES ARE THE ROUND WORMS; TUBULAR BODIES.



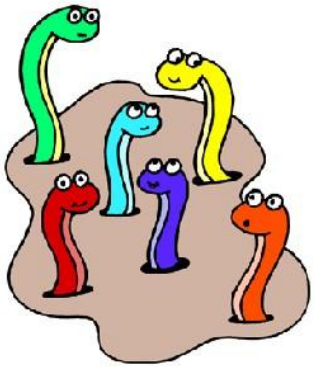
WORMS (*ANNELIDS*)

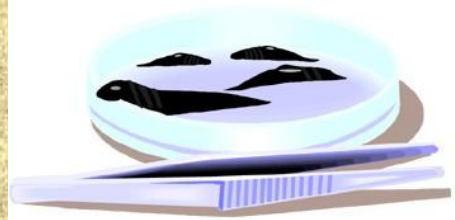


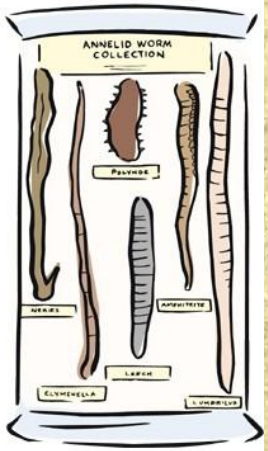
WORMS (*ANNELIDS*)

Annelids

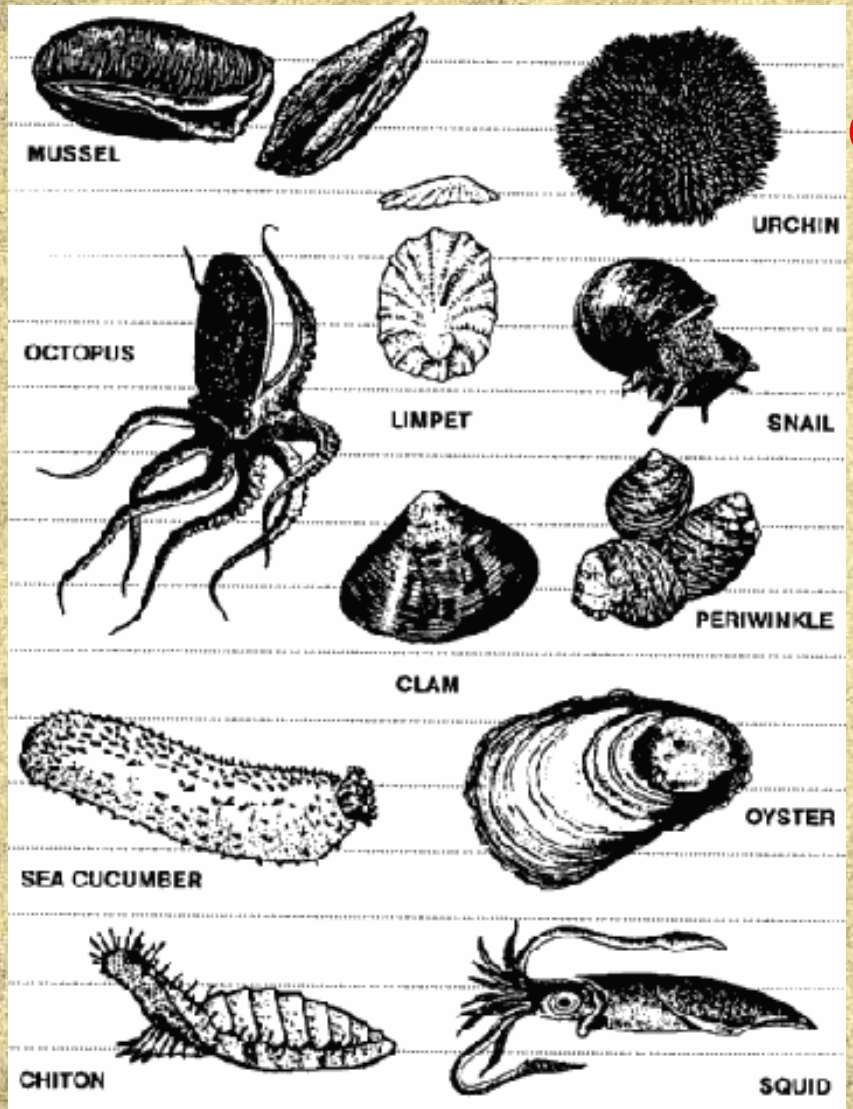
Annelids, such as like worms and leeches. have bodies that are divided into segments.





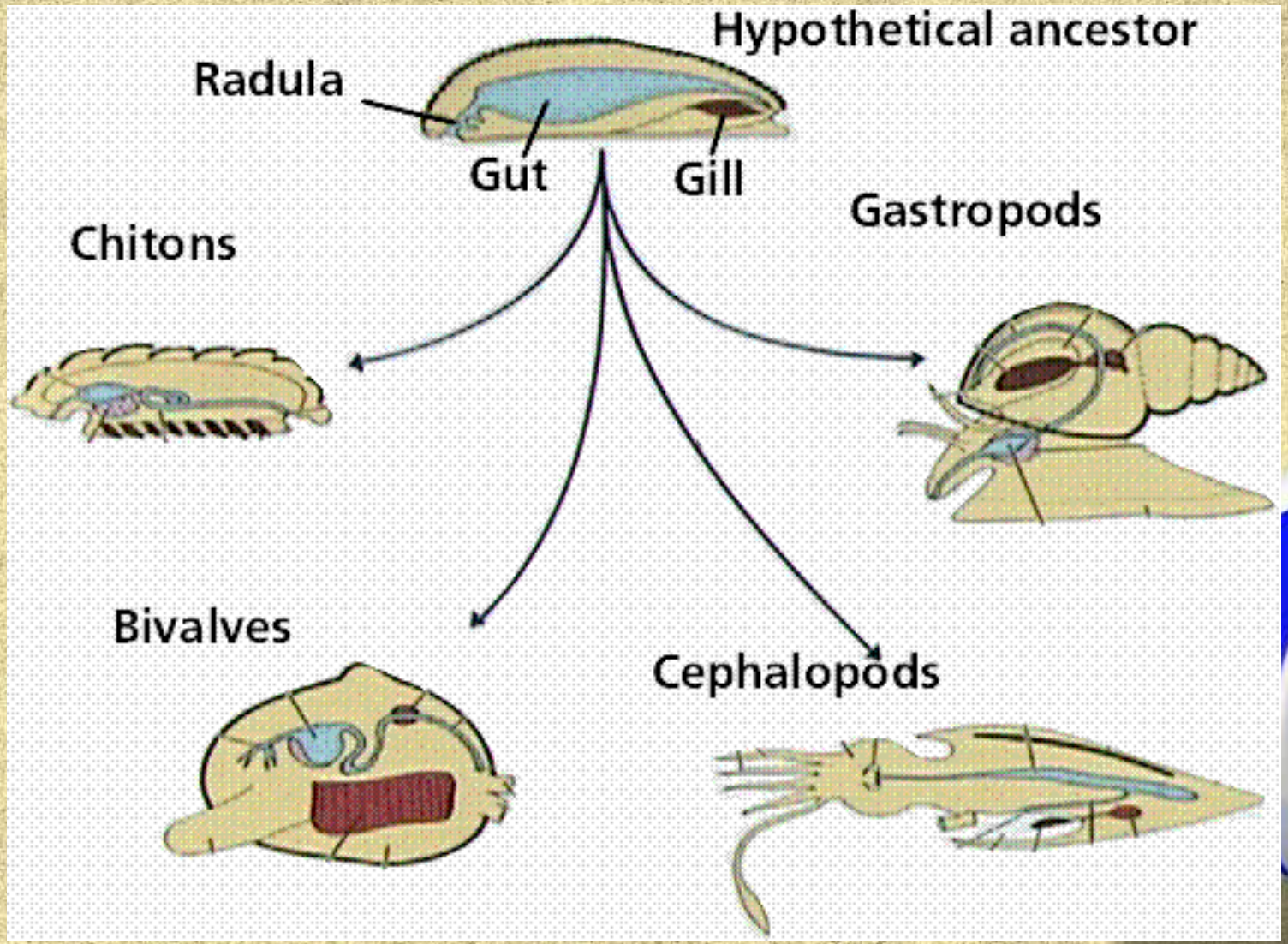


MOLLUSKS (*MOLLUSCA*)



- PHYLUM MOLLSUCA INCLUDES THE GASTROPODS (SNAILS), BIVALVES (CLAMS), AND CEPHALOPODS (OCTOPUSES AND SQUIDS)

MOLLUSKS (*MOLLUSCA*)

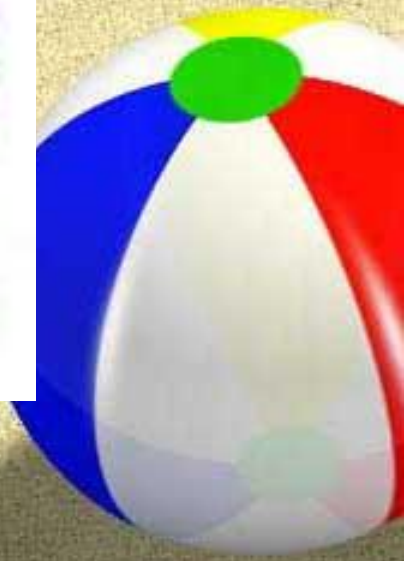


MOLLUSKS (*MOLLUSCA*)

- ARE SOFT BODIED WITH A CALCIUM CARBONATE OR CHITIN SHELL FOR PROTECTION.

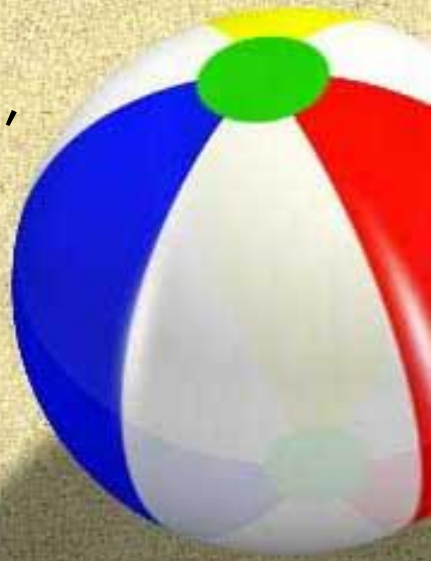
MOLLUSKS (*MOLLUSCA*)

- THEY OBTAIN OXYGEN THROUGH A PAIR OF GILLS
- THEY HAVE SEPARATE SEXES!!



SNAILS (***GASTROPODS***)

- THE LARGEST GROUP OF MOLLUSKS, WITH ABOUT 90,000 SPECIES!!

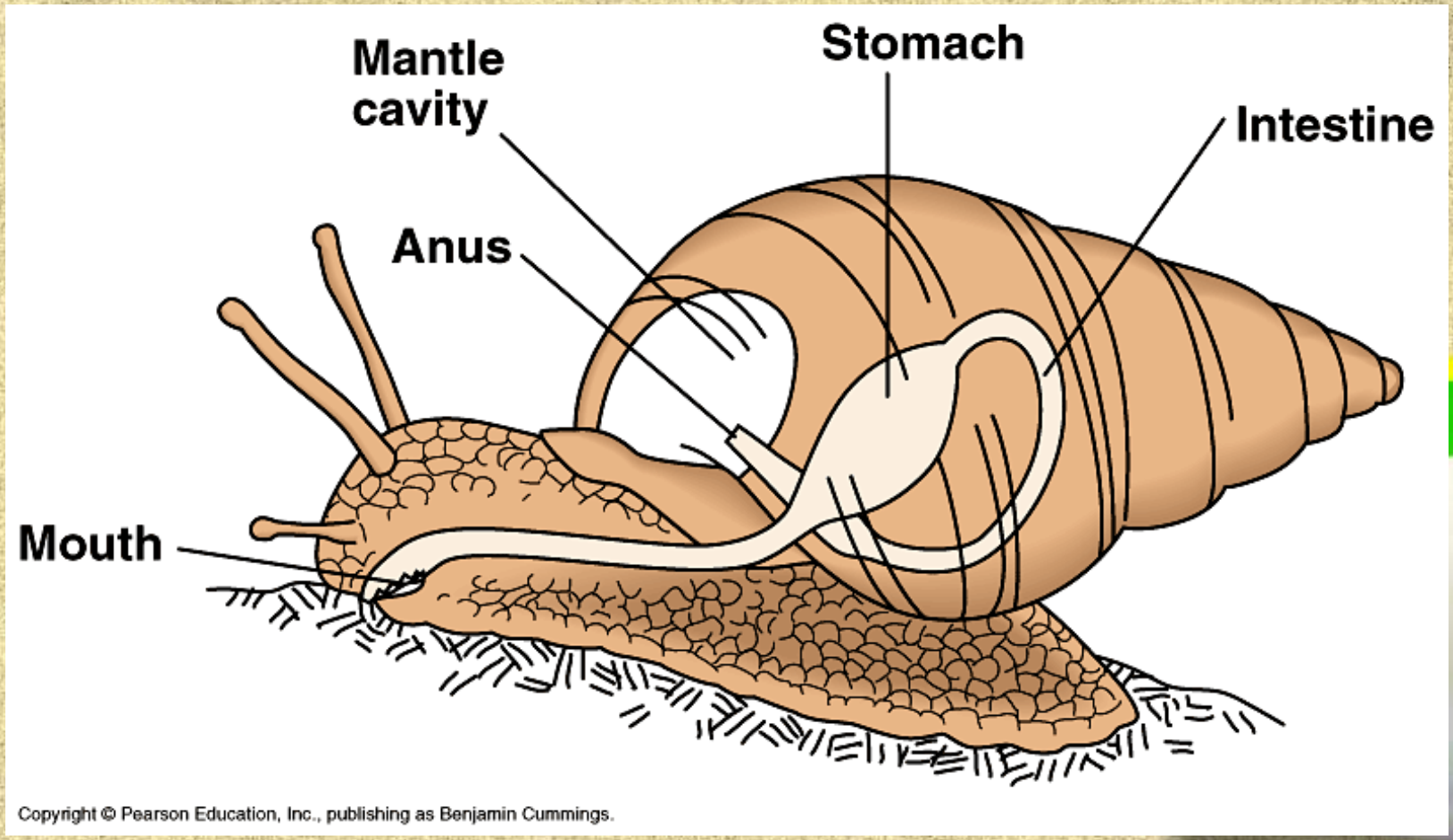


SNAILS (***GASTROPODS***)

- GASTROPOD LITERALLY MEANS "STOMACH-FOOTED"

"I'm afraid Sidney has foot and mouth disease, Mrs Snoddy - and for a gastropod that's about as bad as it gets

SNAILS (***GASTROPODS***)



SNAILS (***GASTROPODS***)

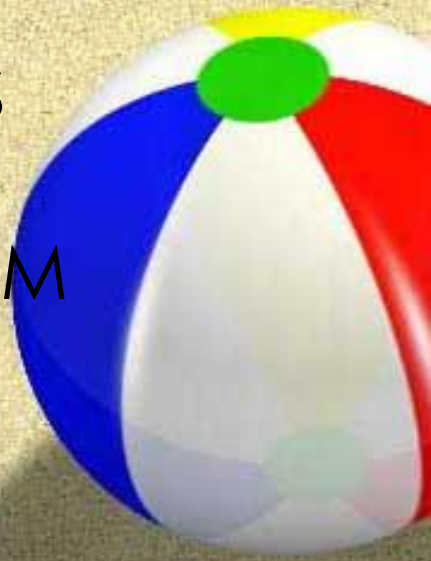
- SOME ARE HERMAPHRODITES, WITH BOTH MALE AND FEMALES GONADS.

SNAILS (***GASTROPODS***)

- SNAILS FERTILIZE BY THE EXCHANGE OF SPERM.

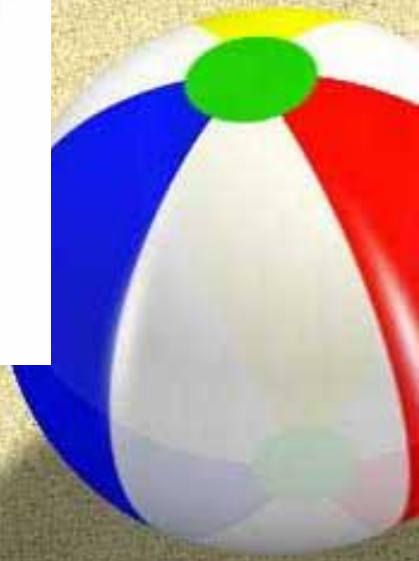
SNAILS (***GASTROPODS***)

- SOME SPAWN, BUT MOST COPULATE…THE MALE HAS A LONG FLEXIBLE PENIS WHICH IS USED TO TRANSFER SPERM

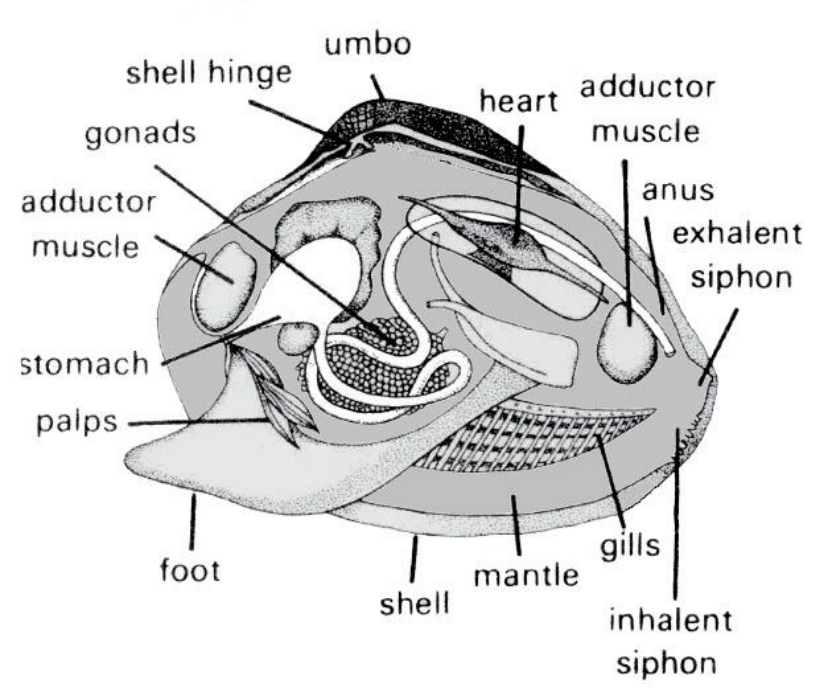


CLAMS (***BIVALVES***)

- THIS CLASS INCLUDES ORGANISMS WITH TWO SHELLS LIKE CLAMS, OYSTERS, MUSSELS, SCALLOPS ETC.



CLAMS (***BIVALVES***)



- BIVALVE LITERALLY MEANS "TWO-VALVES", OR SIPHONS WHERE WATER PASSES THROUGH.

CLAMS (***BIVALVES***)

- BIVALVES ARE FILTER FEEDERS!!

CLAMS (***BIVALVES***)

CLAMS (***BIVALVES***)

- THE LARGEST BIVALVE, THE GIANT CLAM, CAN GROW TO OVER 3 FT!!

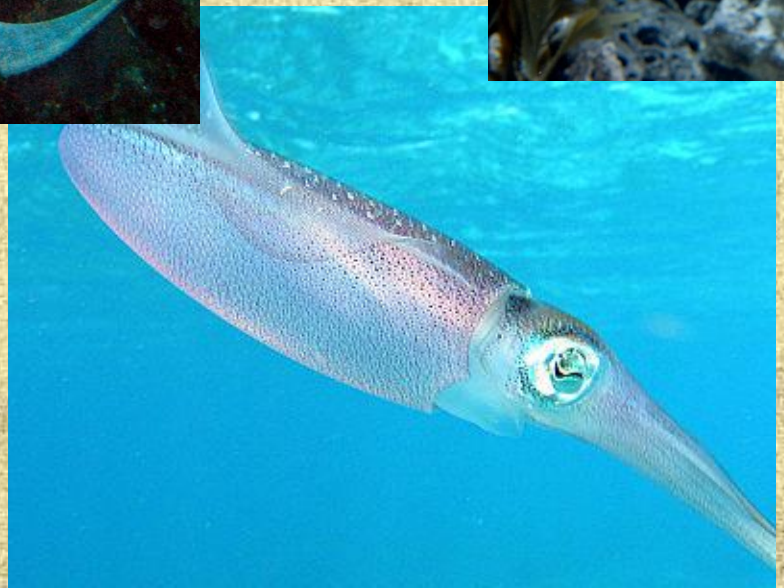
CLAMS (***BIVALVES***)

- PEARLS FORM WHEN CALCIUM CARBONATE IS RELEASED TO COAT/COVER IRRITATING PARTICLES.

OCTOPUSES + SQUIDS (***CEPHALOPODS***)

- CEPHALOPOD LITERALLY MEANS "HEAD-FOOTED"; INCLUDES THE OCTOPUSES, SQUIDS, AND CUTTLEFISH.

OCTOPUSES + SQUIDS (***CEPHALOPODS***)



OCTOPUSES + SQUIDS (***CEPHALOPODS***)

- HIGHLY COMPLEX NERVOUS SYSTEMS

- REDUCED, OR LOST, SHELL!!

OCTOPUSES + SQUIDS (***CEPHALOPODS***)

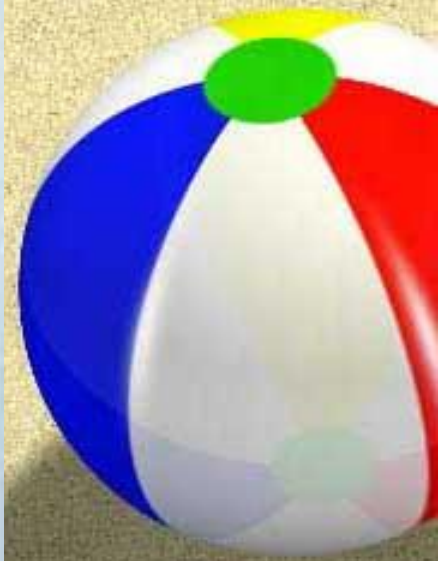
- TENTACLES HAVE SUCKERS TO CAPTURE AND HOLD PREY!!

OCTOPUSES + SQUIDS (***CEPHALOPODS***)

- WATER ENTERS THROUGH THE GILLS AND IS FORCED OUT THROUGH A SIPHON/FUNNEL
- MOVEMENT IS ACCOMPLISHED BY FORCING THE WATER OUT THE FUNNEL AT HIGH SPEED; THIS IS A FORM OF AQUATIC JET PROPULSION!!

OCTOPUSES + SQUIDS (***CEPHALOPODS***)

- ALL CEPHALOPDS UTILIZE INTERNAL FERTILIZATION, MALE TRANSFERS A PACKET OF SPERM TO FEMALE.



OCTOPUSES (***CEPHALOPODS***)

- HAVE EIGHT LONG ARMS
- NO SHELL!!
- ARE DEMERSAL

OCTOPUSES (***CEPHALOPODS***)

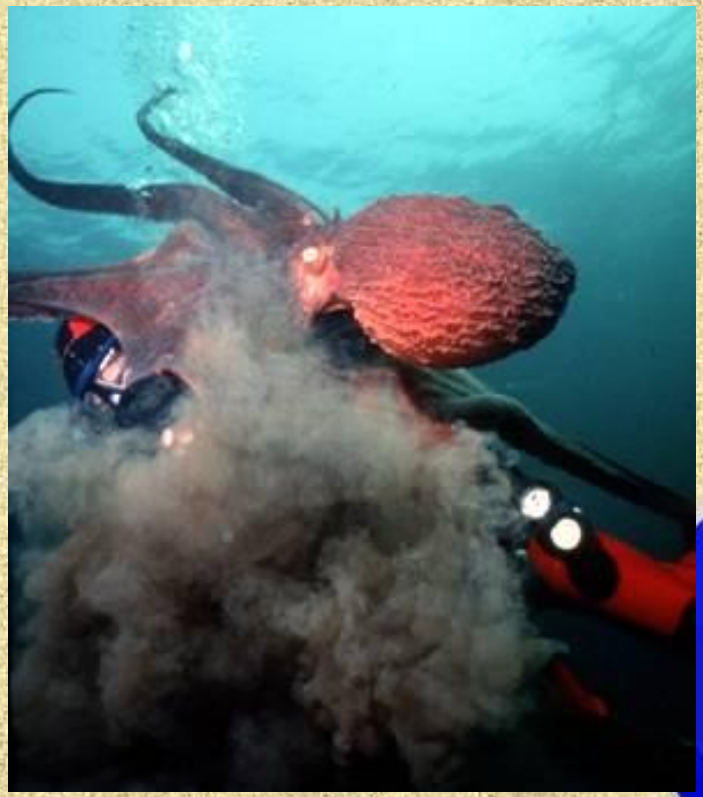
- LACK OF SHELL ALLOWS OCTOPUS TO SQUEEZE THROUGH EXTREMELY TIGHT SPACE!!

OCTOPUSES (***CEPHALOPODS***)

- RANGE IN SIZE FROM 2 INCHES (DWARF OCTOPUS) TO 30 FT (GIANT PACIFIC OCTOPUS)

OCTOPUSES (***CEPHALOPODS***)

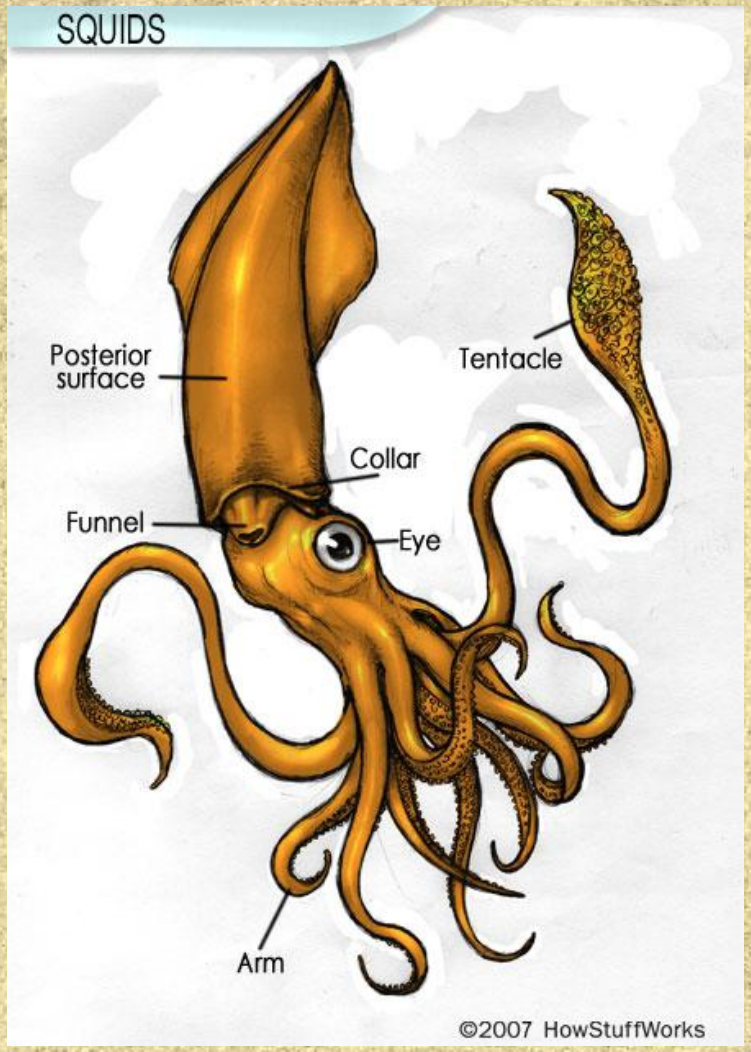
- THEIR DIET CONSISTS MAINLY OF SHRIMPS, CRABS AND LOBSTERS
- CAN DISTRACT PREDATORS BY SHOOTING INK!



OCTOPUSES (***CEPHALOPODS***)

- STAY AWAY!!!!!!!!!!!

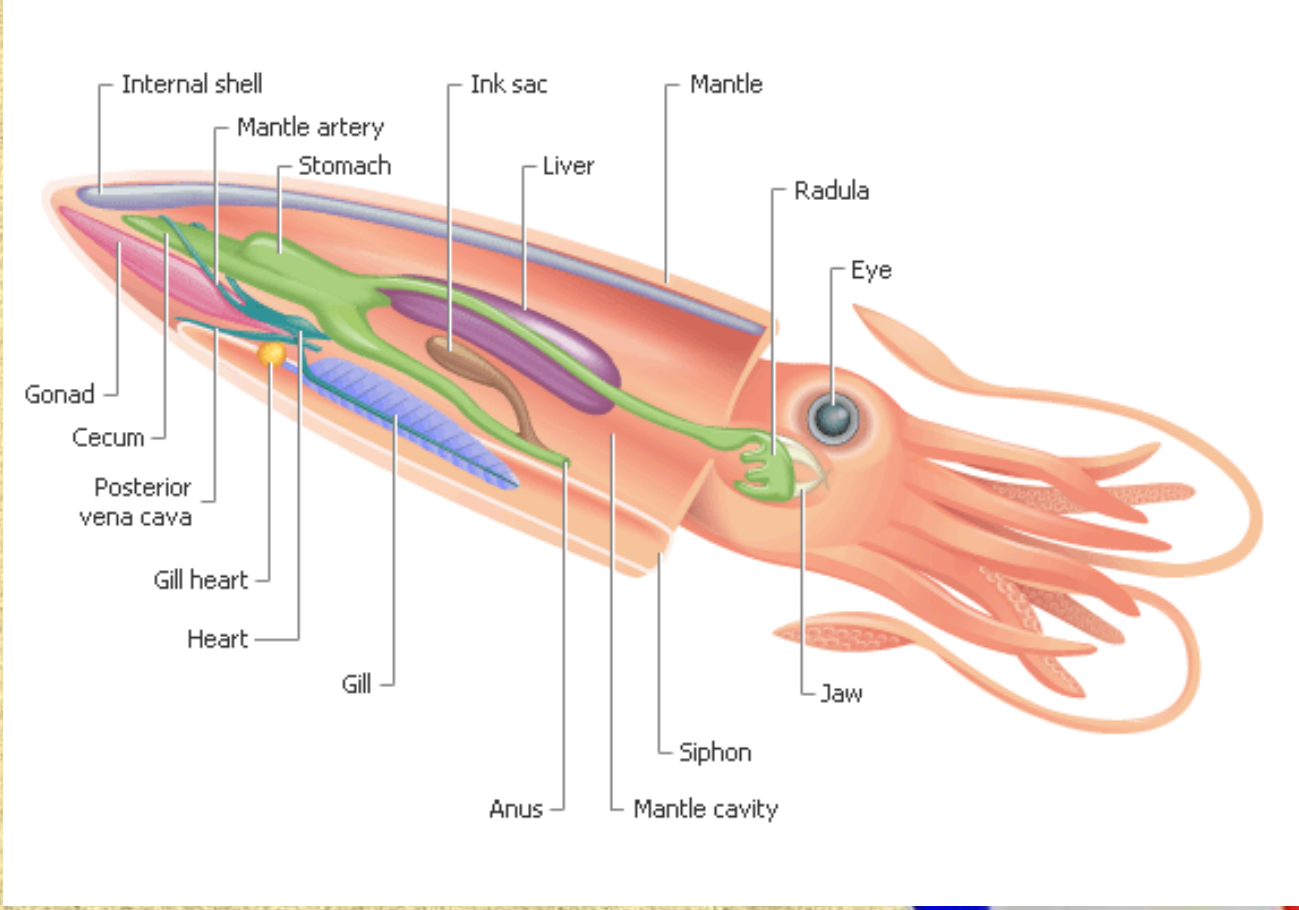
SQUIDS (***CEPHALOPODS***)



- BETTER SWIMMERS THAN OCTOPUSES
- 10 ARMS!!!
- 2 OF THE ARMS ARE LONGER WITH SUCKERS ONLY AT ENDS!

SQUIDS (***CEPHALOPODS***)

- HAVE A REDUCED INTERNAL SHELL CALLED THE PEN HIDDEN IN THEIR MANTLE.



SQUIDS (***CEPHALOPODS***)

- SIMILAR DIET TO OCTOPUSES
- ESCAPE PREDATORS VIA INK SAC AND QUICK SWIMMING (JET PROPULSION)

SQUIDS (***CEPHALOPODS***)

- RANGE IN SIZE FROM A FEW CENTIMETERS TO THE LARGEST INVERTEBRATE, THE GIANT SQUID (66 FT)

SQUIDS (***CEPHALOPODS***)

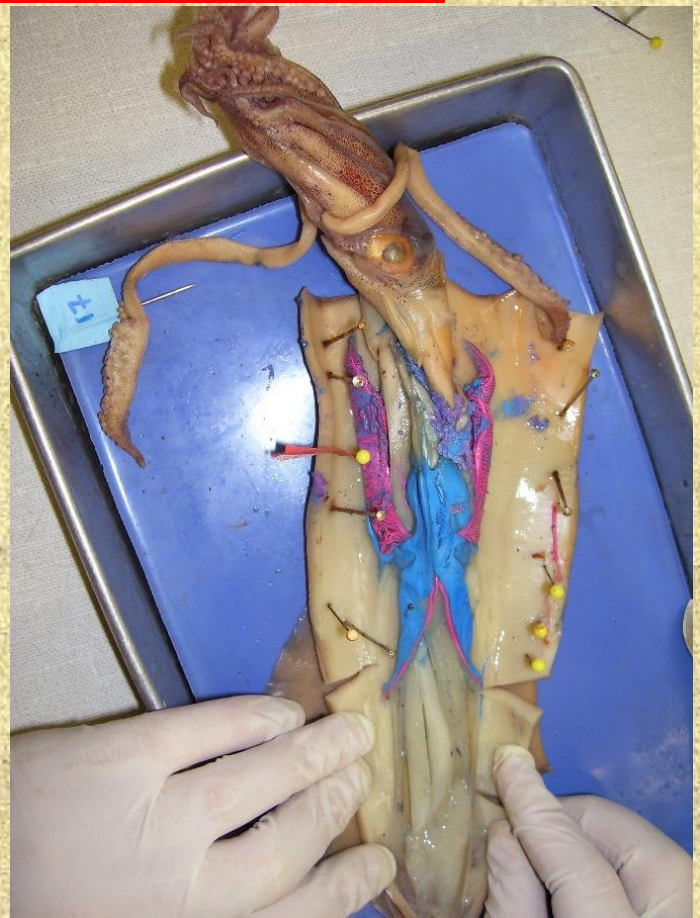
- GIANT SQUID

SQUIDS (***CEPHALOPODS***)

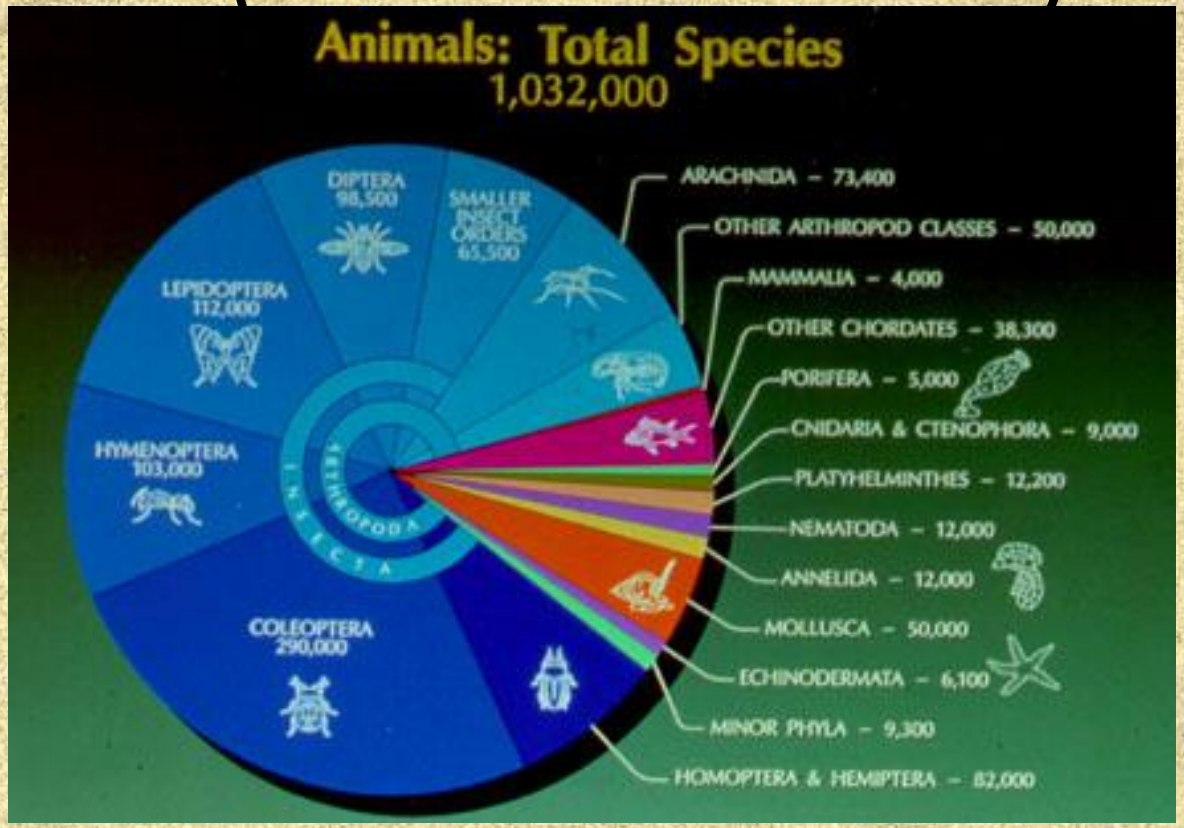
- GIANT SQUID

CEPHALOPODS

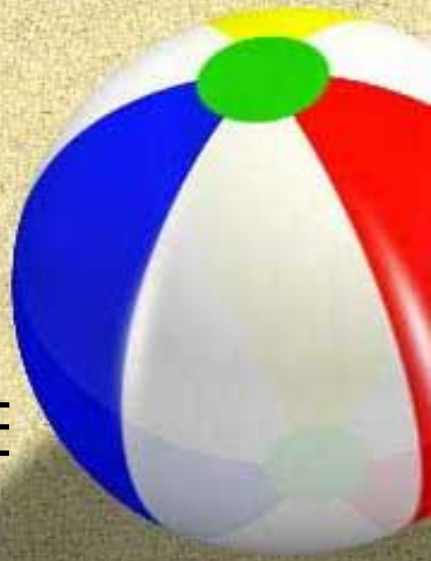
- SQUID DISSECTION



LOBSTERS, CRABS, SHRIMPS (*ARTHROPODS*)



- 3 OUT OF 4 ANIMALS ON EARTH ARE ARTHROPODS

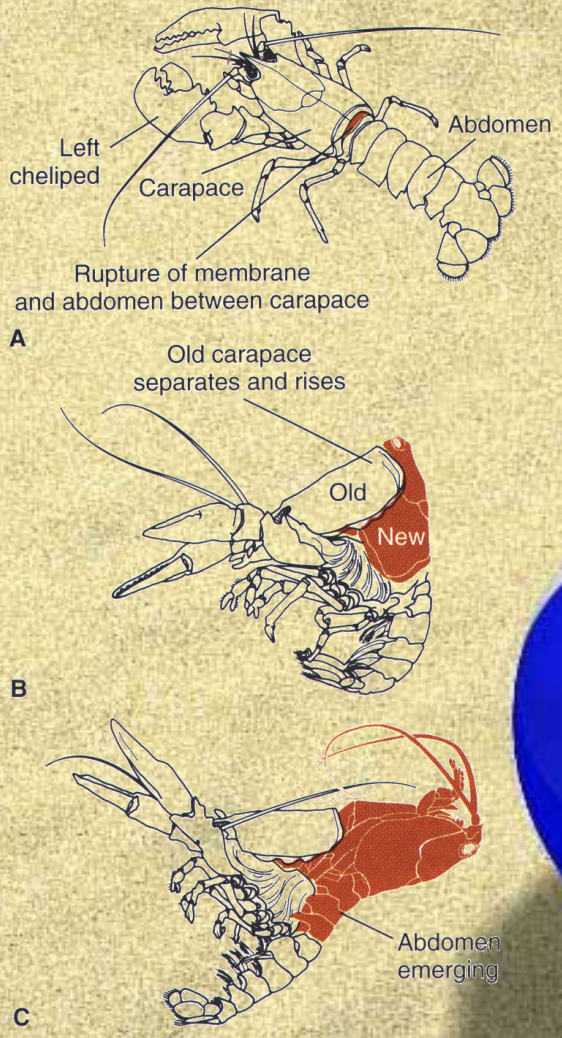


LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

- ARTHROPOD LITERALLY MEANS "JOINTED FOOT"
- HAVE BENDABLE APPENDAGES

LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

- ALL ARTHROPODS HAVE AN EXOSKELETON
- MUST MOLT TO GROW

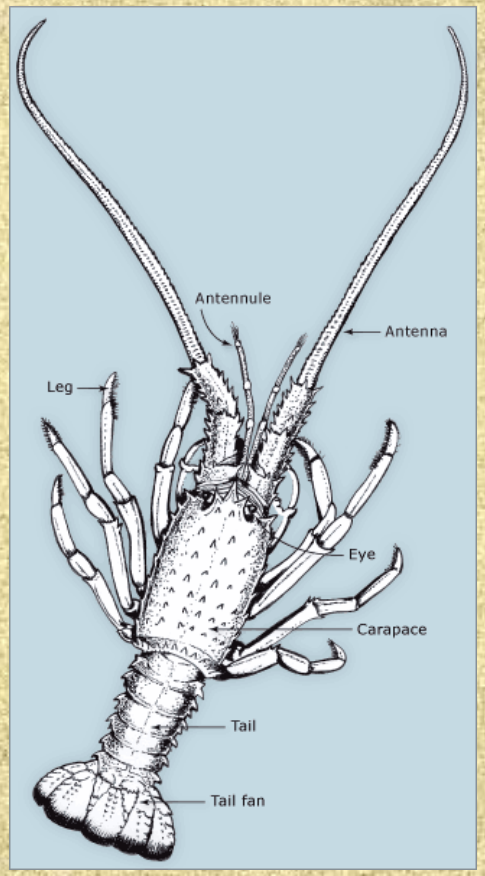


LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

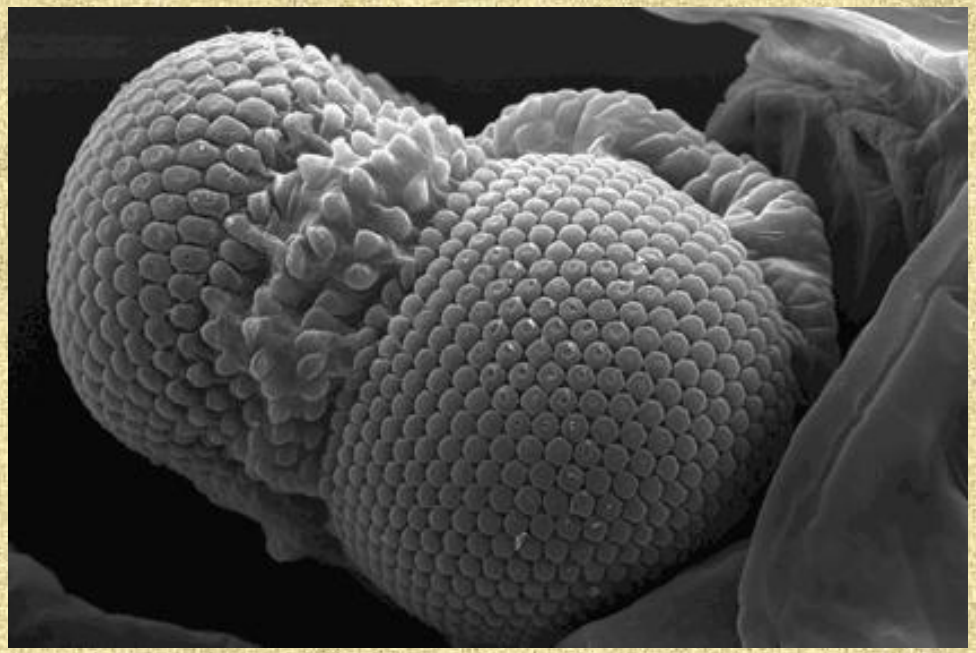
- LARGEST GROUP OF MARINE ARTHROPODS ARE THE CRUSTACEANS

LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

- HAVE GILLS
- HAVE TWO ANTENNAE FOR SENSING ENVIRONMENT

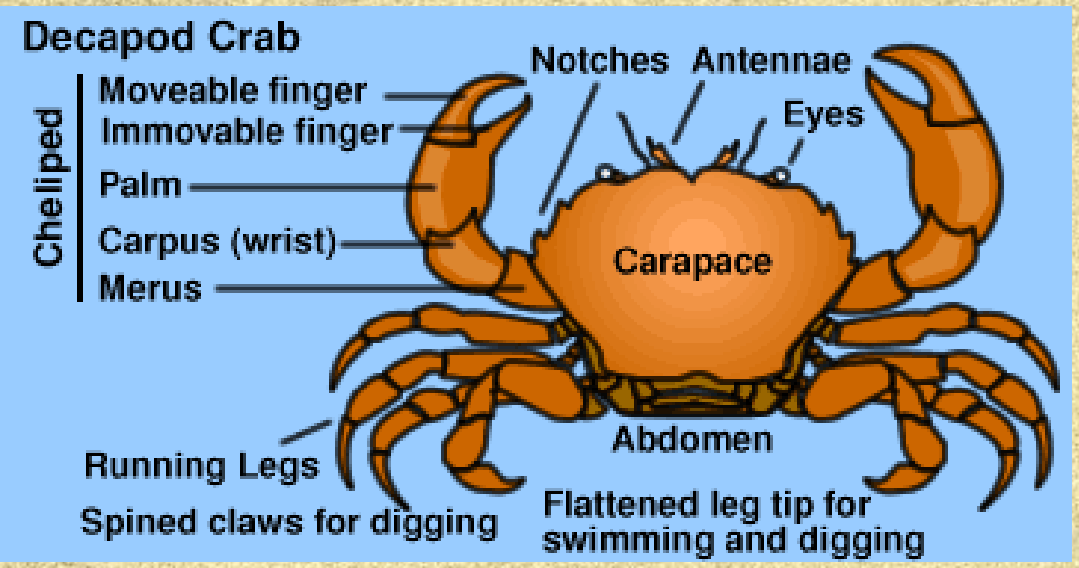


LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

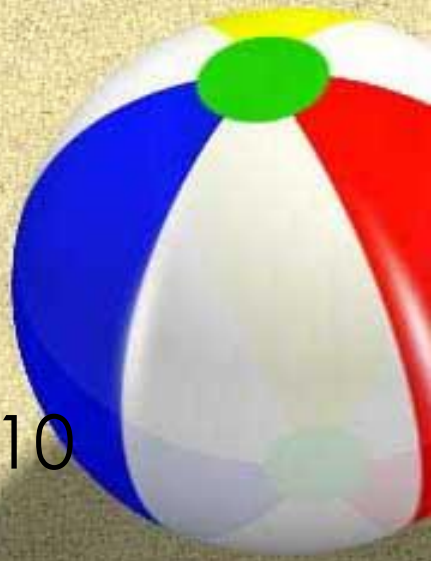


- MOST HAVE COMPOUND EYES WITH THOUSANDS OF LIGHT RECEPTORS

LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

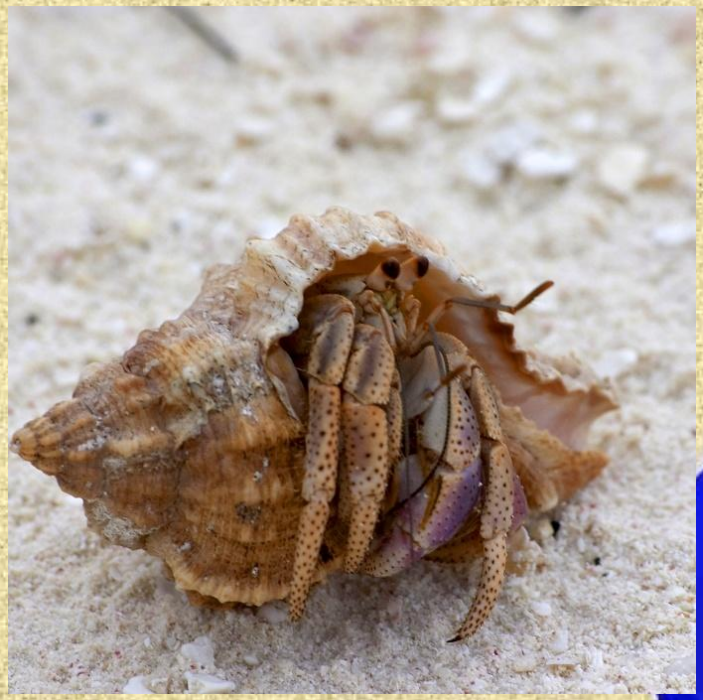


- LOBSTERS, CRABS, AND SHRIMPS ARE DECAPODS (10 LEGS)



LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

- HERMIT CRABS ARE NOT TRUE CRABS; USE AN EMPTY SHELL, USUALLY LEFT OVER FROM A GASTROPOD



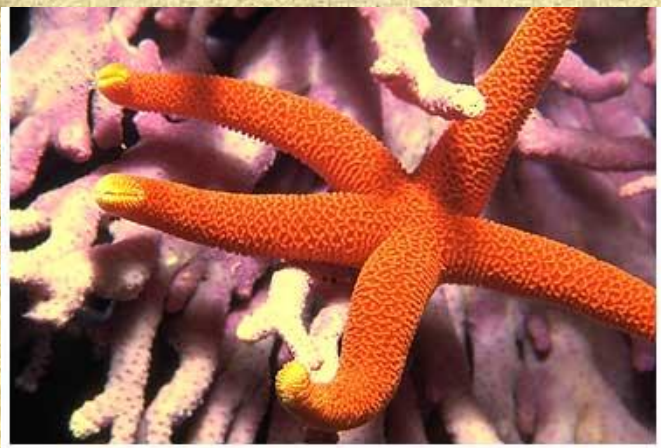
LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

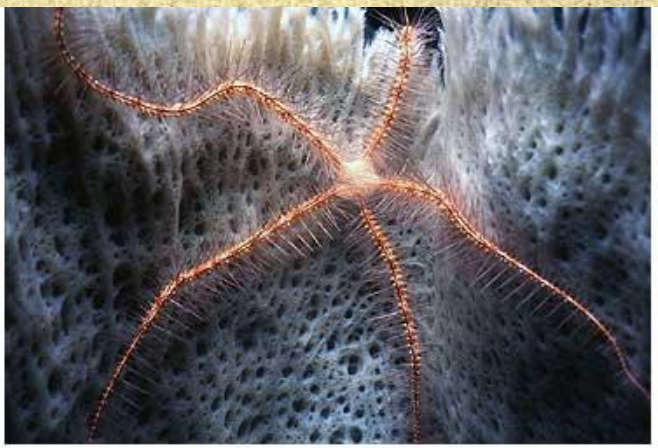
- HORSESHOE CRABS ARE NOT TRUE CRABS, MORE CLOSELY RELATED TO SPIDERS
- PART OF THE CLASS <u>MEROSTOMATA</u>

LOBSTERS, CRABS, SHRIMPS (*ARTHOPODS*)

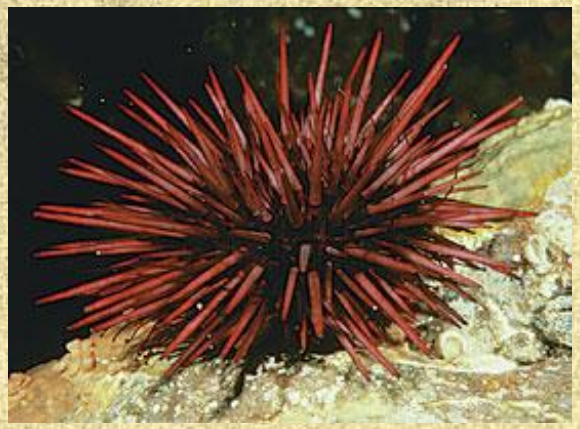
- HORSESHOE CRAB BLOOD IS BLUE (DUE TO COPPER)
- USEFUL AS A DETECTOR OF CONTAMINANTS IN MEDICATION

SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

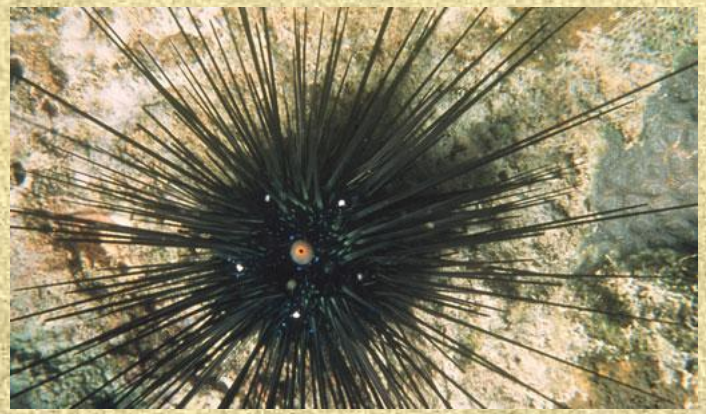




SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

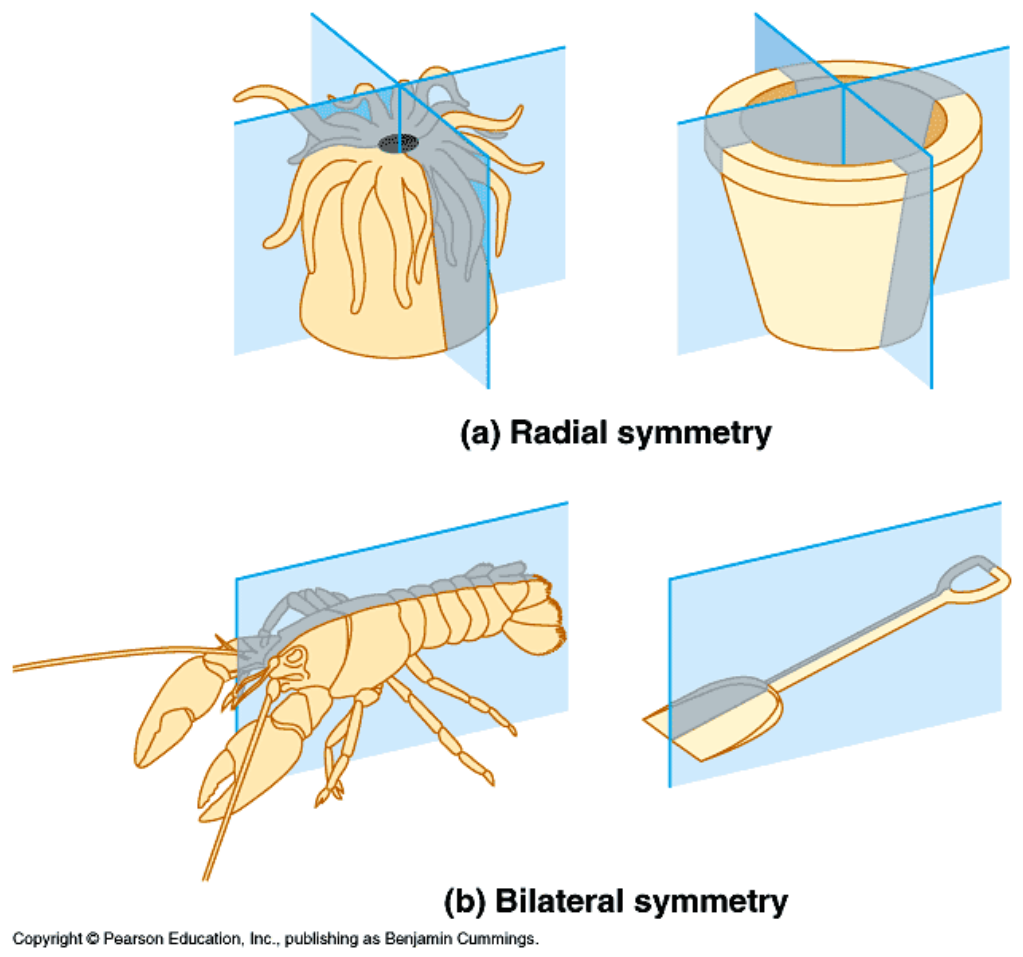


- ECHINODERM LITERALLY MEANS "SPINY-SKINNED"



SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

- MOST EXHIBIT RADIAL SYMMETRY AS ADULTS



SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

- LACK A HEAD; NO ANTERIOR OR POSTERIOR END. NO DORSAL OR VENTRAL SIDE.

SEA STARS, SEA URCHINS, SEA CUCUMBERS (*ECHINODERMS*)

- REGENERATION, GROWING BACK LOST BODY PARTS, IS COMMON AMONGST ALL ECHINODERMS

INVERTEBRATES

- NO BACKBONE
- INCLUDE PORIFERA, CNIDARIA, MOLLUSKS (GASTROPODS, BIVALVES, CEPHALOPODS), ARTHROPODS, AND ECHINODERMS

INVERTEBRATES

- THE END!!