

Marine Biology

6th period

Molluscs, Arthropods,
Crustaceans

Molluscs: General information

- soft body protected by a calcium carbonate shell
- unsegmented, bilateral body
- ventral muscular **foot** usually used in locomotion
- **radula** = a ribbon of small teeth used in rasping food from surfaces

Molluscs: Gastropods

- Snails
- largest and most common
- use their radula to scrape algae from rocks or are deposit feeders or are carivores or grazers of seaweed
- **sea slugs** = lost the shell altogether but use noxious chemicals or undischarged nematocysts as defense and to kill prey

Molluscs: Bivalves

- clams, mussels, oysters
- body is enclosed in a two-valved shell
- no head and no radula
- **siphons** = allow clams to feed and obtain oxygen when buried in sediment
- **byssal thread** = threads that allow mussels to attach themselves to rocks

Molluscs: Cephalopods

- octopuses, cuttlefishes, squids, giant squids
- predators specialized for locomotion
- reduction or loss of shell
- all are marine
- arms have suckers designed to capture prey
- their **funnel** can be moved around allowing for locomotion in any direction

- <http://video.google.com/videoplay?docid=3738248642864400317&ei=-gl5Sau3IYvCrQKZmOy3BQ&q=giant+squids>
- <http://www.spike.com/video/giant-squid-caught/2808253>
- <http://video.google.com/videoplay?docid=3738248642864400317&ei=TM15SYnRCYjoigKI8rywBQ&q=giant+squid&hl=en>
- http://video.google.com/videoplay?docid=-1985440224489260073&ei=fc15SbbfGpLQjwK7_fT2Dw&q=giant+squid&hl=en

Molluscs: Other

A. chitons

- all marine
- eight overlapping shell plates

B. tusk shells or scaphopods

- elongated shell, which is tapered like an elephant tusk
- live in sandy or muddy bottoms

C. monoplacophorans

- thought to be extinct when “living fossils” were discovered in 1952
- mostly from deep waters
- may be the “missing link” to other groups of invertebrates

Molluscs: Digestion, Nervous System and Reproduction

- Digestion system is specific to diet
- Snails have the simplest “brains” = **ganglia**
- Octopuses are very intelligent and display colors coordinating with mood and behavior
- Usually separate sexes, though some **hermaphrodites**

- <http://video.google.com/videosearch?q=octopuses+changing+color&hl=en&emb=0#>

Arthropods: General information

- Barnacles, shrimp, lobster, and crab
- Segmented body, bilateral symmetry
- Jointed appendages
- **Exoskeleton** = chitinous external skeleton which must **molt** in order for the organisms to grow

Arthropods: Small Crustaceans

- Copepods = simplest
- Barnacles = filter feeders
- Beach Hoppers = “whale lice”
- Isopods = “fish lice”
- Krill = food source of whales
- **Carapace** = armor-like body covering







Arthropods: Shrimps, Lobsters and Crabs

- Decapods = 10 legs
- **Carapace** is well developed covering the **ccephalothorax**
- **Abdomen** is the part we eat
- Mostly scavengers

Arthropods: Horseshoe Crabs

- Widely represented in fossil record
- 4 remaining species are “living fossils”
- Horseshoe-shaped **carapace**
- 5 pairs of legs

Arthropods: Sea Spiders

- Superficially resemble land spiders
- Most common in cold waters

Arthropods: Marine Insects

- 3 pairs of legs
- Most live at water's edge
- Some inhabit seaweed on shoreline
- scavengers

Arthropods: Digestion, Nervous System and Reproduction

- Most are filter feeders
- **Maxillipeds** = bottom dwellers' appendages closest to mouth for food sorting
- **Compound eyes** = bundle of light-sensitive units
- Complex body language
- Mostly separate sexes, though some **hermaphrodites**

- <http://dsc.discovery.com/videos/deadliest-catch/>

Echinoderms: General Information

- Sea stars, sea urchins, sea cucumbers
- Radial symmetry → **pentamerous**
- no head
- **Oral** surface has mouth and **aboral** does not
- Endoskeleton
- **Tube feet** = muscular extensions that end in a sucker

Echinoderms: Sea Stars

- Starfish
- 5 to 50 arms
- Move slowly
- **Pedicellariae** =
minute pincer-like
organs that cover the
aboral side
- Most are predators

- http://www.oceanfootage.com/video_clips/HH01_032

Echinoderms: Brittle Stars

- 5 long, flexible arms
- No suckers on tube feet
- Most eat particulate/organic matter

Echinoderms: Sea Urchins

- Endoskeleton forms test with moveable spines
- Grazers
- Come in a variety of shapes, sizes and colors
- Include sand dollars

Echinoderms: Sea Cucumbers

- Worm-like
- No spines and no obvious radial symmetry
- Deposit feeders
- Defense mechanisms

Echinoderms: Crinoids

- feather stars and sea lilies
- suspension feeders
- upside-down brittle star body plan
- 5 to 200 arms

Echinoderms: Digestion, Nervous System and Reproduction

- relatively simple
- most sea stars are carnivorous and extend their stomachs out of their mouths
- no brain, similar nervous systems to cnidarians
- mostly separate sexes that release gametes into the water
- **regeneration** = the ability to grow lost or damaged body parts is highly developed

Chordates: General information

- Sometime during development, all chordates must have:
 - Dorsal nerve cord
 - Gill slits
 - Notochord
- **Protochordates** = invertebrate chordates

Chordates: Tunicates

- Sea squirts
- No notochord or dorsal nerve cord in adulthood
- Filter feeders

- [http://www.oceanfootage.com/video_clips/
CW02_030](http://www.oceanfootage.com/video_clips/CW02_030)

Chordates: Lancelets

- Contain dorsal nerve cord, gill slits and notochord but no backbone
- Look like fish

- <http://video.google.com/videosearch?q=chordates&hl=en&emb=0&aq=f#>