Mostly suspension feeders, filtering food from their gills

Bivalves move with their muscular foot when they stick it outside the shell

Ciliated siphons bring water in and out for eating and breathing at the same time

Scallops flap their shell almost like a bird flying

Adductor muscles are how bivalves hunker down and stay put when they can't move

Bivalves are almost all suspension feeders

BUT

Bathymodiolus mussels found at deep-sea cold seeps and whale falls can harvest energy from chemosynthesis

Symbiotic bacteria in their gills use hydrogen sulfide and/or methane for chemical fuel

Class Gastropoda

The most diversity

Diversity of feeding strategies from herbivores to detritus feeders to active predators

Class Gastropoda (prosobranchia) - Pteropods

Pteropod = "wing foot"

These marine snails are also called sea butterflies

Some have lost their shells

All marine, all active predators*

→ Except vampire squids

Besides nautilus, all have a reduced or lost shell

Part of the foot formed into a **funnel/siphon** in a cephalopods that allows the animal to rapidly expel water from its mantle and jet away

Cephalopods have the highest mobility of all molluscs

Cephalopods are active hunters due to their fast moving, fast grabbing feeding tentacles

Tentacles are different from arms

- Octopuses have 8 arms
- Squids have 8 arms and 2 tentacles
- Cuttlefish have 8 arms and 2 tentacles
- Nautiluses have a MESS of tentacles

Cephalopods use **chromatophores** to change color

Phylum Arthropoda

Arthropods Have a Cuticle

More legs than insects

Less developed trachea

More struggles with dehydration

Order Isopoda(in Class Malacostraca)

Marine isopods can get MUCH larger
→ Ex. Deap sea giant isopod

Many isopods are parasites

Subclass Pentastomida

Worm-like parasites

Hard to believe they belong with other crustaceans

Subclass Branchiura

Another crustacean parasite

Branchiurids are also called “fish lice”

Subclass Thecostraca

Another surprising crustacean → barnacles

Crocodiles are fearsome predators due in no small part to their impressive bite force

Birds

Evolutionary History of Birds

As we have already learned, birds are a group of dinosaurs that survived to today

They have massivey diversified since then

How do we know birds descended from dinosaurs?

Archaeopteryx is a famous fossil that helped solidify the connection

It is not a direct ancestor of modern birds, but it does represent what the intermediate forms between dinosaurs and birds would have looked like

Archaeopteryx

Dinosaur traits
- Bony tail
- Teeth
- Abdominal ribs
- Clawed fingers

Bird traits
- Similar skull shape
- Feathers*

*There were also dinosaurs that had feathers but these don't preserve well in fossils, so it took a while for scientists to recognize many "scaly" species probably had feathers

Endothermy in Birds

Reptiles, like all the animals before them we've covered, ar exothermic ("cold-blooded")

Birds need to be endothermic to keep up with intense metabolic demands for flight

Many dinosaurs weres endothermic as well to be speedy predators.
Including the velociraptors that are only a few spets away from modern birds

Mammalia

Mammals descended from a group of dinosaurs called **therapsids**

These dinos were different from other lineages due to their upright walking posture

That upright walking posture allows for more speed, but less stability

Cerebellum helps with coordination and balance

The cerebrum also hugely expanded to keep up with the fast pace of mammal life

Mammals didn’t really expand much until the dinosaurs went extinct

Mammals have to go to the dentist because we are **diphyodont** and lose our teeth permanently after the second set

Additional Mammal Projections

Antlers
- Sex difference: Antlers are only found on males
- Shed every year

Horns
- No sex difference
- Removal is damaging to animals

Live Birth
- Not quite a shared feature
  - **Monotremes** lay eggs

Marsupials

The long period of time it takes for marsupials to develop in the pouch makes them vulnerable, so in most parts of the world, placental mammals outcompeted them

Marsupials are abundant in Australia but the only marsupial in the US is the possum

From Dinosaurs to Mammals

Mammals are endothermic compared to other groups

Scents can ward off other members of the same species to mark territory

No pheromones have yet been identified in humans
    We don't primarily rely on scent to navigate our surroundings

Skunks: Weaponized Scent Glands

Unlike other mammals, the fur of skunks doesn't help them camouflage
    It's instead **aposematic coloration** warning predators to stay away

Sebaceous Glands

Sebum is an oily mixture produced from glands located in our hair follicles

Sebu keeps our skin protected from drying out and makes hair glossy

Sebaceous glands are also what becomes infected and inflamed when a pimple develops

This is why acne can ONLY happen where you have hair on your body

Evolution of Marine Mammals

Mammals evolved from land vertebrates, so marine mammals represent lineages that went BACK into the water

"Marine mammals" itself is a **polyphyletic** term since several different lineages returned to the water

All have lungs and are limited to breathing air, unlike fish