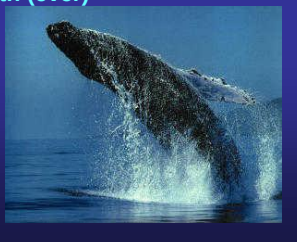
Bio 125 lecture #22 (4/13/17)

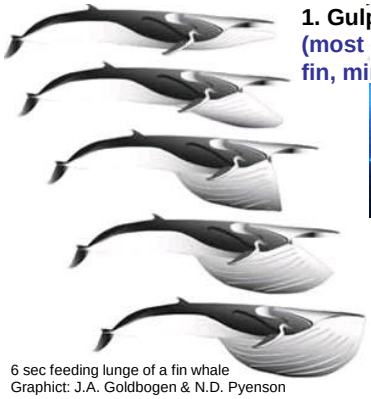
I. Class Mammalia, Order Cetacea (con't)
   A. Suborder Mysticeti (baleen whales)
      1. Characteristics (did last class)
      2. Feeding behaviors
   B. Suborder Odontoceti (toothed whales)
II. Marine Mammal Biology & Behavior
   A. Diving
   B. Thermoregulation
   C. Echolocation

Baleen Whales – Suborder Mysticeti

Largest animals on Earth (ever)



Mysticeti (Baleen Whale) Feeding Modes



1. Gulpers
(most common-blue, fin, minke, humpback, + 5)

6 sec feeding lunge of a fin whale
Graphict: J.A. Goldbogen & N.D. Pyenson

2. Strainer/Skimmer (fine baleen)

Right Whale

Atlantic Bowhead

3. Bottom feeder (Grey Whale)

Suborder Odontoceti - Toothed Whales

Teeth catch & hold fish, squid (but swallow whole)

Types of Odonoceti (Toothed Whales):

1. Sperm whale

- Deep divers
- Large spermaceti organ
- Matriarchial (female) societies
- Largest of the odontocetes
- Temperate waters

Ambergris

Photo: Chris Johnson - Courtesy of the Museum and Art Gallery of the Northern Territory

Types of Toothed Whales:

2. Narwhals & beluga (Monodontidae)

- Flexible head
- Cold arctic waters

Types of Toothed Whales:

3. Orca (Delphinidae!)

Types of Toothed Whales

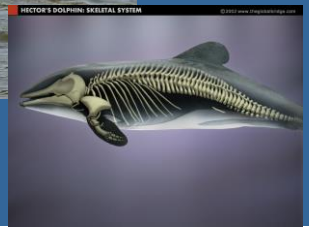
3. Dolphins (Delphinidae) & 4. Porpoises (Phocoenidae)

- Teeth: Conical vs. Spade-shaped

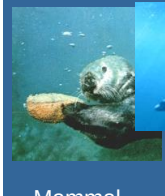
- Dorsal fin: curved vs. triangular

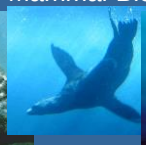
- Head: 'beak' (usually) vs. blunt
- Behavior: highly social, playful vs. less social (small pods)

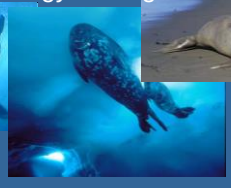
Marine Mammal Biology



Marine Mammal Biology: Diving







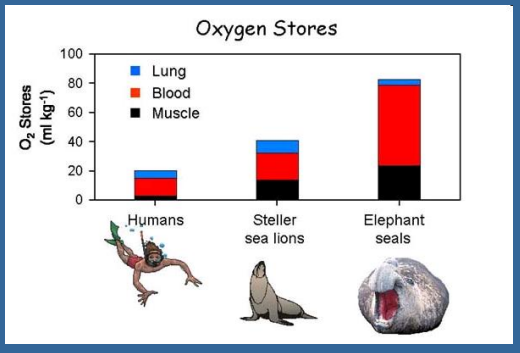
Mammal	Max. Time	Max. Depth
Sea otters	4-5 min.	180 ft
Most Pinnipeds	30 min.	820 ft
Pinniped Exceptions		
Weddell Seal	1:13	1900 ft
N. Elephant seal	2 hr	5000 ft

Marine Mammal Biology: Diving



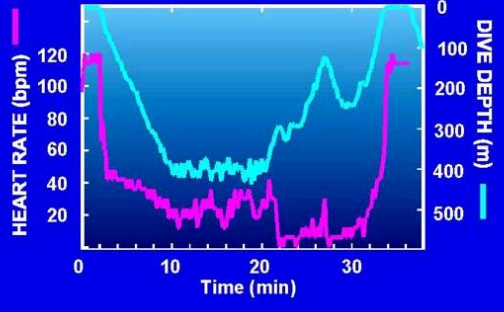
Mammal	Max. Time	Max. Depth
Baleen Whales	3-4 min.	300 ft
Toothed Whales		
Dolphins	3-8 min.	990 ft
Sperm Whales	1 hr	8250 ft
Cuvier's	85 min	9874 ft

Marine Mammal Diving Adaptations



Russ Andrews, AK Sealife Ctr

Marine Mammal Diving Adaptations
- Reduced heart rate (elephant seal)



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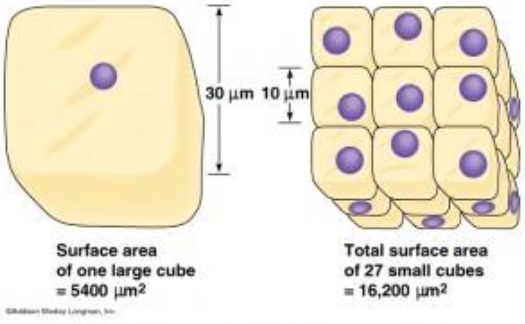
Heat Retention Adaptations

Decreased Surface Area to Volume Ratio



Heat Retention Adaptations

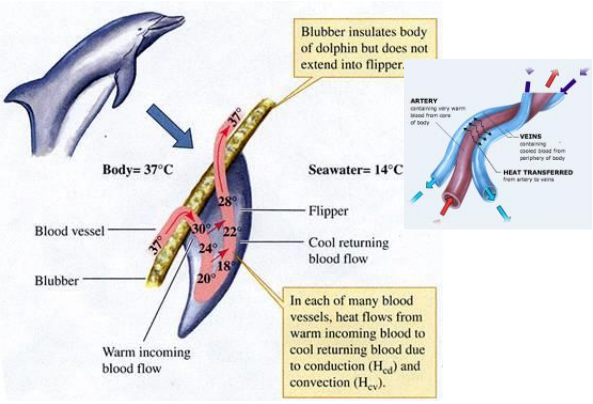
Blubber

Heat Retention Adaptations

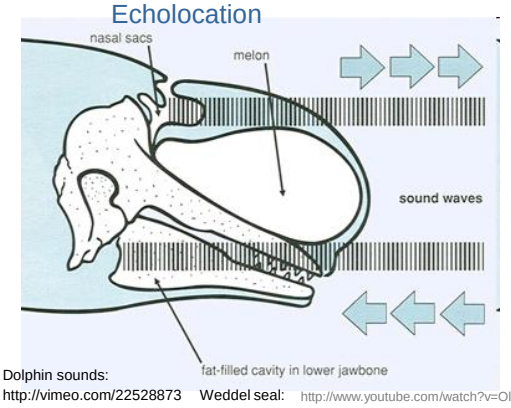
Fur: otters & pinnipeds




Heat Retention Adaptations **Counter-current**



Marine Mammal Diving Adaptations
Echolocation



Dolphin sounds: http://vimeo.com/22528873 Weddel seal: http://www.youtube.com/watch?v=OIrcbKIW4Tw

Lecture #22 (4/13/17): Marine Mammal Biology

1. Describe how feeding occurs in each of the following groups of Order Cetacea, Suborder Mysticeti and provide examples of species within each group, the type of prey they focus on, and any special physical adaptations they have to feed on these: Gulpers, Skimmers, Bottom feeders.
2. List 6 characteristics of Order Cetacea, Suborder Odontoceti.
3. Describe 2 ways that Family Delphinidae (dolphins, orca) differ from Family Phocoenidae (porpoises).

Lecture #22 (4/13/17): Marine Mammal Biology

4. Provide an example of a marine mammal in each category: shortest dives, shallowest dives, longest dives, deepest dives.
5. Why do toothed whales need to be able to dive deeper than baleen whales?
6. List & briefly describe 7 adaptations of marine mammals that allow them to dive deep and stay down long.
7. Describe 4 different thermoregulation adaptations in marine mammals.
8. Which marine mammal lacks blubber? How does it stay warm without it?

Lecture #22 (4/13/17): Marine Mammal Biology

9. Echolocation is a sensory system based upon which sense?
10. Which groups of marine mammals use echolocation?
11. Compare why marine mammals use low vs high frequency sounds in echolocation.
12. Describe the location and general make-up of the melon in toothed whales.
13. Describe the biology of echolocation, noting how sounds are produced, directed outward, and received.