

SBC Earth Day Celebration!
 Thursday April 20th on West Campus lawn in front
 of Luria Library from 10:00 am to 2:00 pm

30 local environmental groups will be here to
 share the exciting and creative ways they are
 helping to build a sustainable world.

We are especially pleased to welcome Santa
 Barbara's Mayor Helene Schneider who will give
 remarks at 12:30.

Come support and become part of our
 environmental community!

**NOTE: Bio125 will begin at 1:00 on Thursday
 so we may all hear the Mayor's remarks.**

MARCH FOR SCIENCE

SANTA BARBARA
 4.22.17 • 11AM-2PM
 DE LA GUERRA PLAZA

A celebration of our passion for science and a call to
 support and safeguard the scientific community



11AM-12PM SPEAKERS
 Dr. Karl Hutterer
 Dr. Denise Knapp
 Dr. Raeanne Napoleon
 Mayor Helene Schneider
 Dr. Debora Iglesias-Rodriguez

Marchforsciencesb@gmail.com @marchforsciencesb March for Science-Santa Barbara

Bio125 Lecture 23 (4/18/17)

Phylum Chordata, Subphylum Vertebrata – Cartilagenous Fishes

A. Fish & evolution

B. Infraphylum Agnatha

1. Characteristics

2. Classes

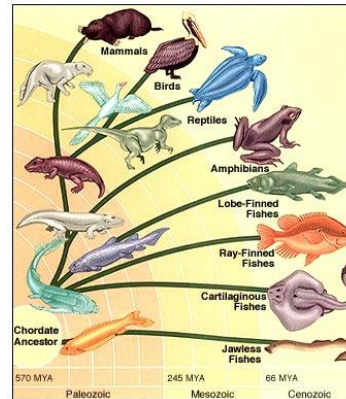
- a. Hagfish
- b. Lampreys

C. Class Chondrichthyes

1. Characteristics

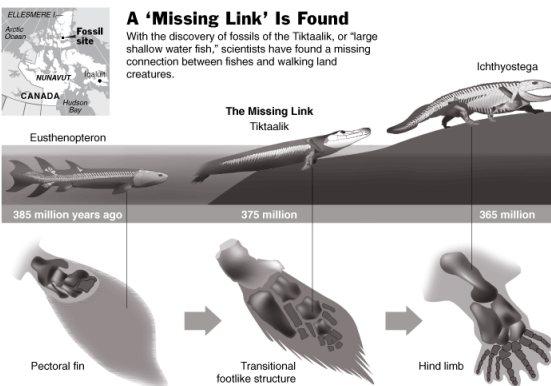
2. Sharks

- a. Body plan
- b. Respiration
- c. Buoyancy
- d. Osmoregulation
- e. Sensory System
- f. Feeding
- g. Reproduction



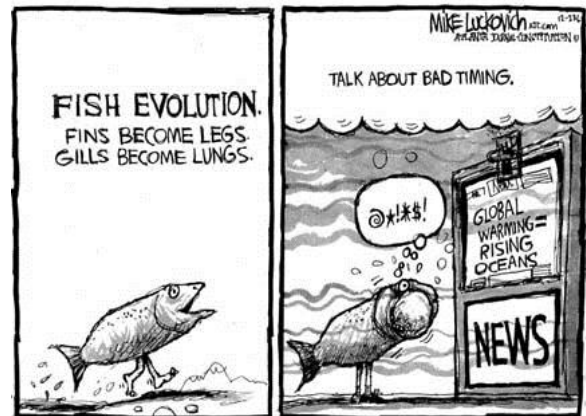
**Fish:
 1st vertebrates!**

- Major ecological impact
- 50% of vertebrates on Earth are fish
- \$, food

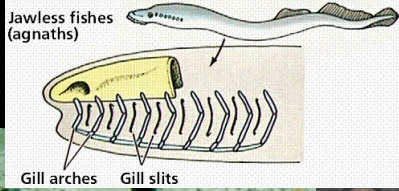


Sources: "Book of Life," edited by Stephen Jay Gould; Nature

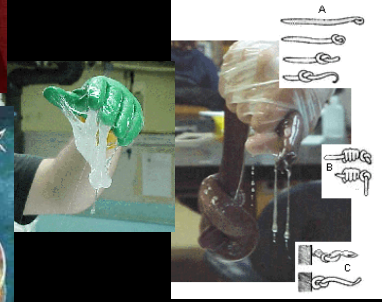
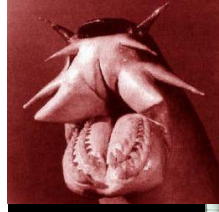
The New York Times; Illustrations by Graham Roberts



Phylum Chordata, InfraPhylum Agnatha
Jawless Fishes



Phylum Chordata
 InfraPhylum Agnatha
 Class Myxini - **Hagfish**



<http://www.youtube.com/watch?v=RrPvMMkQkk0>

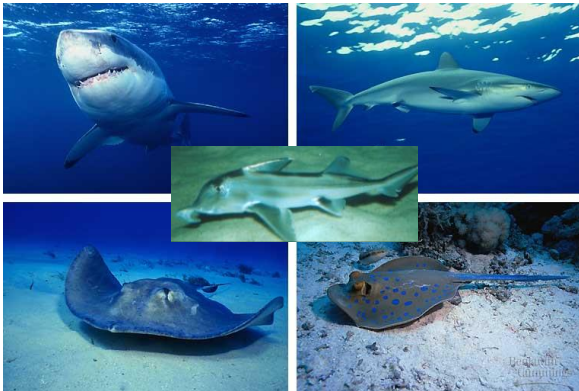
Phylum Chordata, InfraPhylum Agnatha
 Class Myxini - **Hagfish**
Hagfish leather! Ooh la la!



Phylum Chordata
 InfraPhylum Agnatha:
Lampreys

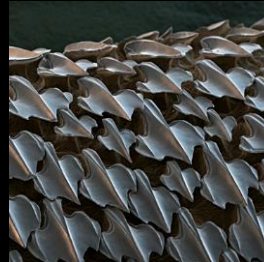


Phylum Chordata, Class Chondrichthyes



Phylum Chordata, Class Chondrichthyes

Placoid scales



Phylum Chordata, Class Chondrichthyes

whale shark
>50ft/15 m



Dwarf Lanternshark
7.5 in/19 cm

Spined Pygmy Shark (Squaliolus laticaudus)
©Heike Zidowitz

Wobegong



Phylum Chordata, Class Chondrichthyes
Variation in caudal fin (tail)

thresher shark



mako shark



Phylum Chordata, Class Chondrichthyes
Variation in habitat

6-gill shark:
Deep

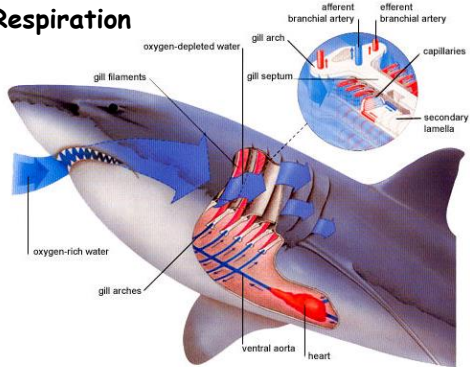


bull shark:
mangroves, freshwater



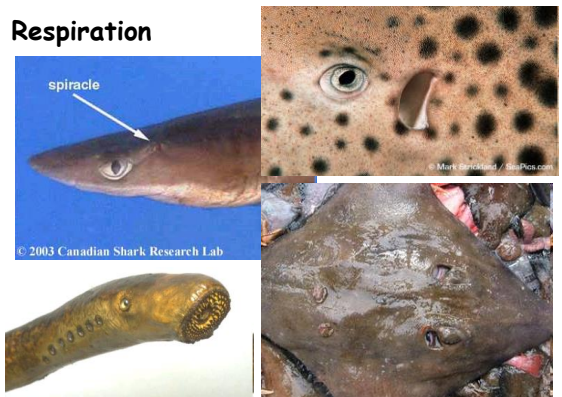
Phylum Chordata, Class Chondrichthyes

Respiration



Phylum Chordata, Class Chondrichthyes

Respiration





Phylum Chordata, Class Chondrichthyes

Sensory System

Nictitating membrane

Ampullae of Lorenzini

Phylum Chordata, Class Chondrichthyes

Filter feeders:

whale shark

basking shark

T. Campbell: SOS Foundation

Phylum Chordata, Class Chondrichthyes

Predators

Great white shark

Phylum Chordata, Class Chondrichthyes

sawfish

<http://news.sciencemag.org/sciencenow/2012/03/the-sawfishs-versatile-hunting-1.html?ref=tp>

Hey cutie!

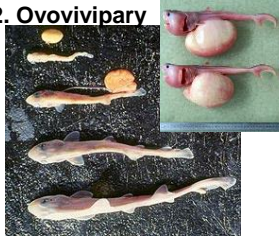
Elasmobranch Reproduction:

3 modes

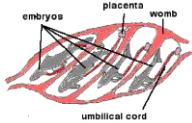
1. Ovipary



2. Ovovivipary



3. Vivipary



5. Describe placoid scales and list a benefit of having them.
6. Describe 4 ways that sharks regulate buoyancy.
7. List 3 ways that sharks/rays osmoregulate.
8. Describe the following senses in Class Chondrichthyes: smell, sight, lateral line, electrosense.
9. What is the largest shark and how does it feed?

1. How are we evolutionarily related to fish?
2. List 7 characteristics of Infra-phylum Agnatha.
3. Describe hagfish & lamprey anatomy & feeding.
4. List 4 characteristics of Class Chondrichthyes.

10. What are the 3 different methods of reproduction used by Chondrichthyes? Which is most common?

11. What are the 3 different methods of reproduction used by Chondrichthyes? Which is most common?

12. Define: placoid scales, spiracles, heterocercal tail, Ampullae of Lorenzini, ovoviviparity, oviparity, viviparity, claspers,