BIODIVERSITY I AND II: MYXINI, MYOPTERYGII, CHONDRICHTHYES, AND PRIMITIVE ACTINOPTERYGII

This is the first of a series of labs exploring fish biodiversity. Below is a classification of the fishes covered in today's lab. You are responsible for learning the bold-faced names. Yes, it looks like a lot, just be thankful we are not making you memorize families!

CLASSIFICATION

Phylum **Chordata**
- Infraphylum **Myxini**
  - Order **Myxiniformes** (hagfishes)
- Infraphylum **Myopterygii**
  - Superclass **Cephalaspidimorphi**
    - Order **Petromyzontiformes** (lampreys)
  - Superclass **Gnathostomata**
    - Class Elasmobranchiomorphi
      - Subclass **Chondrichthyes**
        - Infraclass **Elasmobranchii** (sharks, rays)
          - Superorder **Selachiomorpha** (sharks)
            - Order **Orectolobiformes** (nurse sharks)
            - Order **Carcharhiniformes** (smooth dogfish, requiem sharks)
            - Order **Squaliformes** (dogfish sharks)
          - Superorder **Batiomorpha** (rays)
            - Order **Rhinobatiformes** (guitar fishes)
            - Order **Rajiiformes** (skates)
            - Order **Dasyatiformes** (stingrays, roundrays, butterfly rays)
            - Order **Myliobatiformes** (devil rays, manta rays)
        - Infraclass **Holocephali**
          - Order **Chimaeriformes** (ratfishes)
    - Class Teleostomi
      - Subclass **Actinopterygii** (ray-finned fishes)
        - Infraclass Cladistia
          - Order **Polypteriformes** (bichirs, reedfishes)
        - Infraclass Actinopteri
          - Series **Chondrostei**
            - Order **Acipenseriformes** (sturgeons, paddlefishes)
              - Family **Acipenseridae** (sturgeons)
              - Family **Polyodontidae** (paddlefishes)
          - Series **Neopterygii**
            - Division Ginglymodi
              - Order **Semionotiformes** (gars, garpikes)
            - Division Halecostomi
              - Subdivision Halecomorphi
                - Order **Amiiformes** (bowfin)

During this lab, you will examine representatives from the orders listed in the above classification. For each order, you should make sketches of representative fishes, labeling any characters/anatomy/structures that *you* feel will be helpful in identifying the fishes on a test. The more notes you take, the more material you will have to study for the exam. Your lecture notes may prove useful in identifying important characters for some of the fishes, though you should not rely solely on your notes as interpretation through observation is an important skill in science.

The questions below should be answered in your lab notebook. Before answering the questions, you should examine and make notes on the orders referred to in the questions. It would be best to take it one group at a time, i.e., Myxini & Myopterygii, Chondrichthyes, Actinopterygii.

NOTE: You may take pictures of the specimens if you so choose to aid you in studying. These, however, *should not* augment your sketches and notes.

MYXINI & MYOPTERYGII

1. Look at the representatives for Myxiniformes (hagfish) and Petromyzontiformes (lamprey). How are myxiniform and petromyzontiform fishes similar? How are they different? Answer these questions based on *your* observations, not your notes.

CHONDRICHTHYES

2. Look at specimens from each selachiomorph (sharks) order. What characters might you use to differentiate the orders? (HINT: Look at fins, mouth areas, and fin placement. These are a start. There are other characters that will help you as well.)

3. Look at specimens from each batiomorph (rays) order. What characters might you use to differentiate the orders? (HINT: Look at fin shape, fin placement, and presence of spines. These are a start, there are other characters that will help you as well.)

4. Look at the representative for the Holocephali (chimearas). What characters might you use to differentiate the Holocephali from the Elasmobranchii?

ACTINOPTERYGII

5. What type of scales do these polypteriform (bichirs, reedfish) fishes have? What other order(s) have this type of scale?

6. Compare and contrast the caudal fins of the two acipenseriform families, i.e., the polyodontid (paddlefish) and the acipenserid (sturgeon). Based upon the rest of the fish, hypothesize why the differences in caudal fins exist.

7. What characters could you use to unite the two families of acipenseriforms?
   What type of do amiiform fishes have? What does this suggest of their phylogenetic position relative to the other actinopterygian fishes from today's lab?

8. How are the neopterygiian fishes similar? How do they differ?

9. What characters could you use to differentiate the polypteriform fishes from the other bony fishes in this lab (if you look at your classification, they are in separate infraclasses)?

10. What characters could you use to differentiate the Chondrostei from the Neopterygii?