

# Marine Biology

## Worksheet III

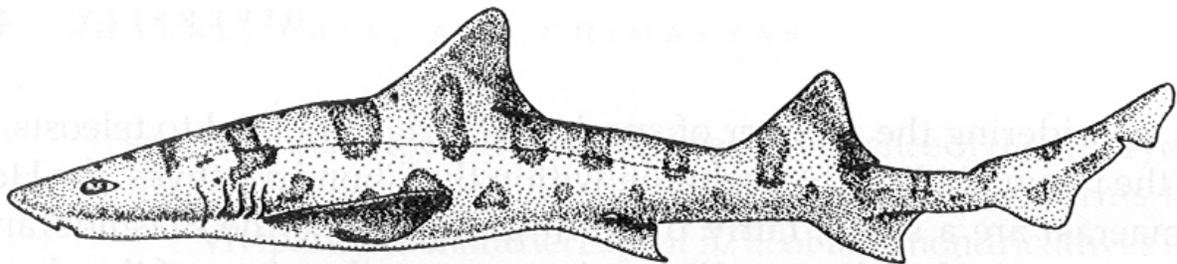
Fish, Reptiles, Birds, and Mammals

1. What are the four chordate characteristics?
  - A.
  - B.
  - C.
  - D.
2. How are vertebrates distinguished from tunicates and lancelets?
3. Define the following terms:
  - a. Spiracle
  - b. Heterocercal tail
  - c. Clasper
  - d. Placoid scales
  - e. Lateral line system
  - f. Ampullary organs of Lorenzini
  - g. Demersal
  - h. Spiral valve
  - i. Rectal gland
  - j. Rostrum
  - k. Nictitating membrane
  - l. Cloaca
  - m. Oviparous
  - m. Ovoviviparous
  - n. Viviparous
  - o. Homocercal tail

4. What are the three major groups of marine fishes?
5. How are hagfishes and lampreys distinguished from:
  - A. Each other
  - B. Other groups of fishes
6. How do sharks prevent osmotic loss of water in a marine environment?

7. Label the following on the shark drawing:

- |                  |                        |
|------------------|------------------------|
| A. Rostrum       | F. Dorsal fin          |
| B. Spiracle      | G. Caudal fin          |
| C. Pectoral fins | H. External gill slits |
| D. Pelvic fins   | I. Heterocercal tail   |
| E. Anal fin      |                        |

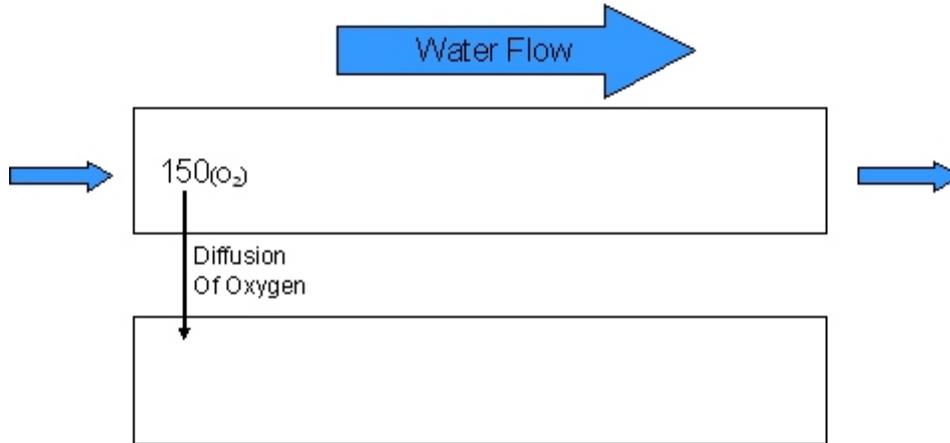


Smooth dogfish (leopard shark)

8. What is the largest shark and what does it eat?
9. Describe the difference between the lateral line system and the ampullae of Lorenzini in sharks.

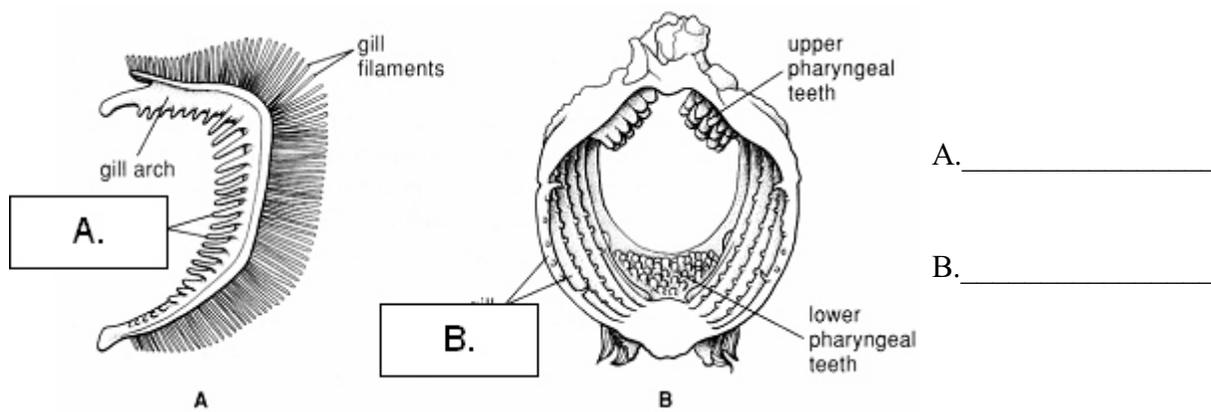
10. Complete the following diagram and explain why the countercurrent system increases the efficiency of oxygen from the water to the blood in fish gills.

### Countercurrent Flow of Water and Blood in the Gills



11. Define the following terms:
- A. Demersal
  - B. Cryptic coloration
  - C. Countershading
  - D. Anadromous fish
12. Give an example of:
- A. A fish with chromatophores
  - B. A fast swimming fish
  - C. A filter feeding fish
  - D. A herbivorous fish
  - E. An anadromous fish

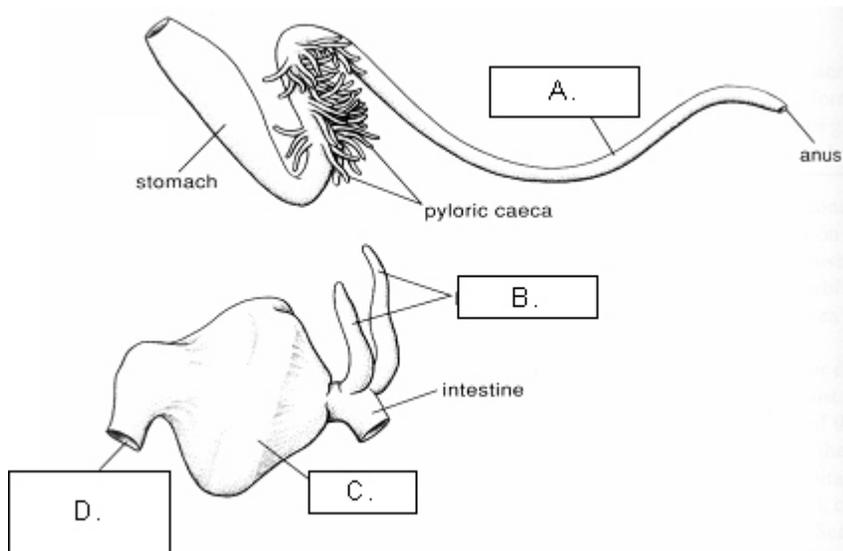
13. What do A and B represent on the diagram below



A. \_\_\_\_\_

B. \_\_\_\_\_

14. Name structures A - D and list their functions:



**Structure**

**Function**

A. \_\_\_\_\_

\_\_\_\_\_

B. \_\_\_\_\_

\_\_\_\_\_

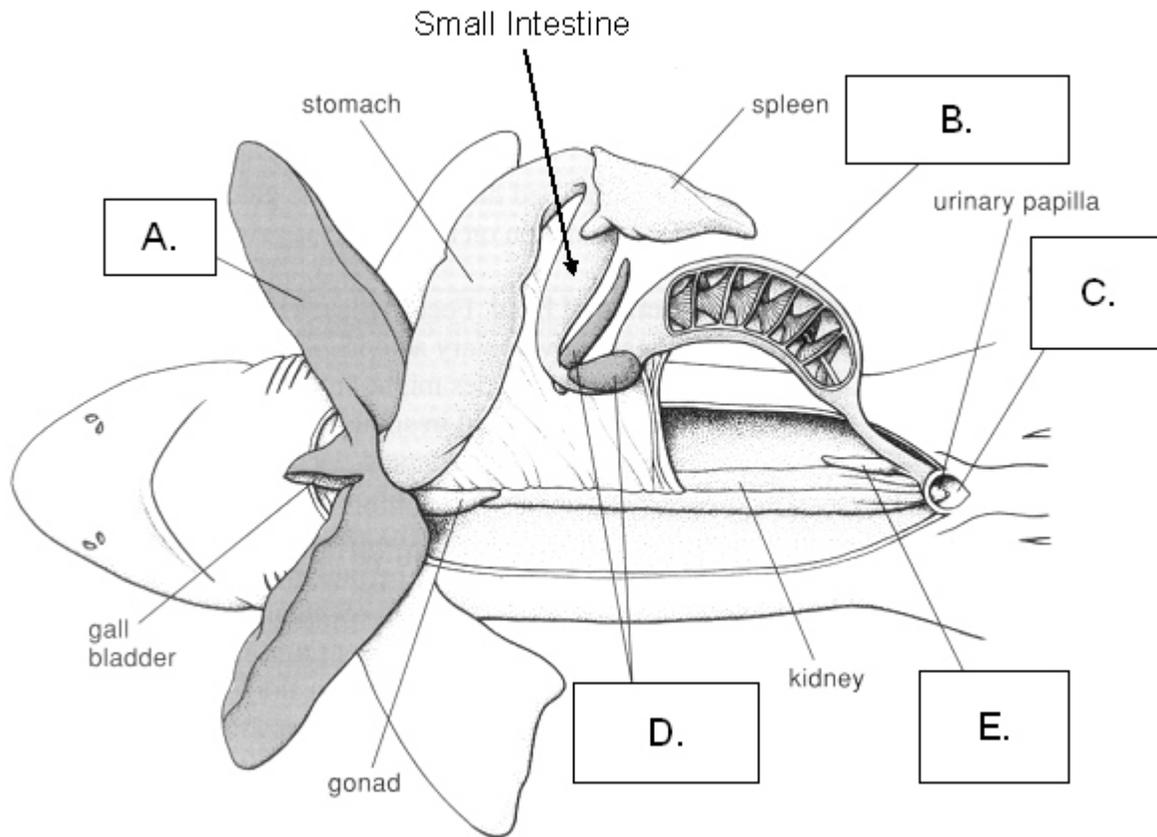
C. \_\_\_\_\_

\_\_\_\_\_

D. \_\_\_\_\_

\_\_\_\_\_

15. Name structures A - E and list their functions:



Structure	Function
A. _____	_____
B. _____	_____
C. _____	_____
D. _____	_____
E. _____	_____

16. Define the following terms:
- A. Artery
  - B. Vein
  - C. Capillary
  - D. Amniotic egg
  - E. Internal fertilization
17. All species of sea turtles endangered. What are 5 things that have led to the decline of sea turtle populations?
18. Where is the marine iguana found and what does it eat?
19. Metabolism of proteins results in the production of nitrogenous wastes. What are the primary nitrogenous waste produced in:
- A. Fishes
  - B. Birds
  - C. Reptiles
  - D. Mammals
20. Distinguish between:
- A. Aerial piracy and aerial pursuit
  - B. Plunge diving and surface diving

21. Matching:

- |                            |                               |
|----------------------------|-------------------------------|
| _____ a. Skates and Rays   | 1. Agnatha                    |
| _____ b. Hollow bones      | 2. Aves                       |
| _____ c. Tuna              | 3. Chordate without vertebrae |
| _____ d. Tunicate          | 4. Chondrichthyes             |
| _____ e. Lamprey           | 5. Mammalia                   |
| _____ f. Gray whale        | 6. Osteichthyes               |
| _____ g. Amphioxus         | 7. Reptilia                   |
| _____ h. Hagfish           |                               |
| _____ i. Sea turtle        |                               |
| _____ j. Penguin           |                               |
| _____ k. Heterocercal tail |                               |
| _____ l. Swim bladder      |                               |
| _____ m. Uropygial gland   |                               |
| _____ n. Operculum         |                               |

22. List 7 adaptations found in birds for flight

- |    |    |
|----|----|
| 1. | 6. |
| 2. | 7. |
| 3. |    |
| 4. |    |
| 5. |    |

23. Matching:

- |          |  |                             |
|----------|--|-----------------------------|
| a. _____ | Heat loss by direct contact  | 1. boundary layer           |
| b. _____ | Heat loss due to wind or water currents  | 2. conduction               |
| c. _____ | The still layer of air that surrounds any object                               | 3. convection               |
| d. _____ | What happens to the metabolic rate of a fish when the water temperature rises? | 4. day                      |
| e. _____ | Marine fish - Osmoregulation   | 5. decreases                |
| f. _____ | Maintain high urea values  | 6. ectothermic              |
| g. _____ | Marine invertebrates - Osmoregulation  | 7. endothermic              |
| h. _____ | Maintain high urea values  | 8. evaporation              |
| i. _____ | Animals which depend on the environment as their primary source of body heat   | 9. homeostasis              |
| j. _____ | What happens to the oxygen content of water as the water temperature rises?    | 10. increases               |
| k. _____ | Maintenance of a constant internal environment                                 | 11. hyperosmotic regulators |
| l. _____ | Organisms in which metabolism contributes significantly to body temperature    | 12. hyposmotic regulators   |
| m. _____ | A term used for animals with a fluctuating temperature                         | 13. osmotic conformers      |
|          |  | 14. poikilothermic          |
|          |  | 15. radiation               |
|          |  | 16. sharks and rays         |

24. What is long lining and what group of marine birds has this long lining impacted?

25. List 5 threats to marine birds.

26. What does the term *Biological Magnification* mean?

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27. Matching:

- |   |                           |
|---|---------------------------|
| _____ a. Flightless diving birds  | 1. Full - webbed swimmers |
| _____ b. Found in Galapagos. Eat algae  | 2. Gulls and terns        |
| _____ c. Heavy bones to reduce buoyancy   | 3. Jaegers and skuas      |
| _____ d. Venomous, carnivorous, ovoviviparous                                     | 4. Penguins               |
| _____ e. Gregarious, noisy birds  | 5. Puffins                |
| _____ f. Albatrosses, shearwaters, petrels  | 6. Salt water crocodile   |
| _____ g. Breed in tundra, arctic, and antarctic                                   | 7. Sea snakes             |
| _____ h. Feed by flying over surface of water with Lower bill cutting surface     | 8. Skimmers               |
| _____ i. Inhabit mangrove swamps and estuaries in Australis. Aggressive           | 9. Tubenoses              |
| _____ j. Reproduce on land. Feed on sea grasses and algae. Migrate long distances | 10. Marine Iguana         |
|   | 11. Sea Turtles           |
- 

28. What is the effect of high concentration of DDT in the tissues of bald eagles, brown pelicans, and ospreys? Why do these species of birds have such high concentrations of DDT in there tissues compared to a house sparrow?

29. List at least three differences between seals and sea lions.

**Seals**

**Sea lions**

30. Describe the difference between:

A. Feeding behavior of the gray whale and the humpback whale

B. Polygyny and Monogamy

C. Baleen whales and Toothed whales

D. Order Sirenia and Order Cetacea

31. What are two animals in Order Carnivora that are highly associated with the marine environment?

32. What are some adaptations found in marine mammals to reduce heat loss?

33. What are “The Bends” and what are some of the behaviors or adaptations in diving marine mammals to prevent “The Bends”?

34. What is *The Diving Reflex*?
35. Explain adaptations found in diving mammals, related to the words listed below, that enable them to stay under water for long periods of time.
- A. Blood cells (Be specific):
  - B. Hemoglobin:
  - C. Myoglobin:
  - D. The ribs of Odontoceti cetaceans:
  - E. The spleen of the Weddell Seal:
  - F. Oxygen exchange in the lungs:
36. Explain the process of echolocation in dolphins.
37. Describe the difference between the intestine of herbivores and carnivores.