Flying fish (Exocoetus volitans) are actually superb gliders, not flyers. To escape predators, the fish, which are about 18 cm long, aim toward the surface of the water and beat their powerful tails back and forth. When they break the surface, they continue to beat their tails, which increases their forward speed up to about 55 km/h. By spreading their side-fins, they are able to glide up from and over the surface for distances as great as 200 m!

Darwin and Lamarck both developed ideas about the inheritance of characteristics. Although Darwin read Lamarck's work and learned from his ideas, Darwin eventually proposed an alternative hypothesis that gave a different explanation for the mechanism that resulted in change. Read the following quotations from the writings of Lamarck and Darwin:

1.) Rewrite each quotation in your own words

"The environment exercises a great influence over the activities of animals, and as a result of this influence the increased and sustained use or disuse of any organ are causes of modification of the organization and shape of animals and give rise to the anomalies observed in the progress of the complexity of animal organization."

—Jean-Baptiste Lamarck in Philosophie zoologique, 1809

_____

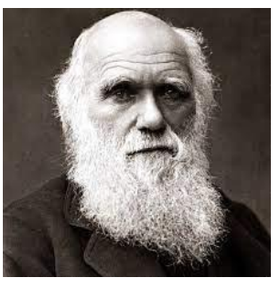
_____

_____

_____

_____

_____



"… natural selection, or the survival of the fittest, does not necessarily include progressive development—it only takes advantage of such variations as arise and are beneficial to each creature under its complex relations of life. And it may be asked what advantage, as far as we can see, would it be to an … intestinal worm … to be highly organised. If it were no advantage, these forms would be left, by natural selection, unimproved or but little improved, and might remain for indefinite ages in their present lowly condition."

—Charles Darwin in On the Origin of Species, 1859

_____

_____

_____

_____

_____

_____

2.) How does Lamarck's idea of "use or disuse" differ from Darwin's idea, which was later called "descent with modification"?

_____

_____

_____

_____

_____

Analysis

3.) Flying fish use large pectoral fins to glide in air.

(a) Explain how Lamarck might account for the origin of the large pectoral fins and the ability to glide.

_____

_____

_____

_____

_____

_____

(b) Explain how Darwin might account for the origin of the large pectoral fins and the ability to glide.

_____

_____

_____

_____

_____

_____

4.) Lamarck suggested that organisms arise spontaneously and then become increasingly more complex. Why is this idea not supported by the theory of natural selection? (Hint: You might want to consider an organism such as a snake, which evolved from a population of animals that had legs.)

_____

_____

_____

_____

_____

_____