

One potential problem is that opening the mouth to breathe detracts from the streamlining of these fishes and tends to slow them down. Some species of tuna have specialized grooves in their tongue. It is thought that these grooves help to channel water through the mouth and out the gill slits, thereby reducing water resistance.

7. Which of the sentences below best expresses the essential information in the highlighted sentence in the passage? Incorrect answer choices change the meaning in important ways or leave out essential information.
- These fishes often have a problem opening their mouths while swimming.
 - The streamlining of these fishes prevents them from slowing down.
 - The streamlining of these fishes tends to slow down their breathing.
 - Opening the mouth to breathe can reduce the speed of these fishes.
8. The word "channel" in the passage is closest in meaning to
- reduce
 - remove
 - direct
 - provide

There are adaptations that increase the amount of forward thrust as well as those that reduce drag. Again, these fishes are the envy of engineers. Their high, narrow tails with swept-back tips are almost perfectly adapted to provide propulsion with the least possible effort. Perhaps most important of all to these and other fast swimmers is their ability to sense and make use of swirls and eddies (circular currents) in the water. They can glide past eddies that would slow them down and then gain extra thrust by "pushing off" the eddies. Scientists and engineers are beginning to study this ability of fishes in the hope of designing more efficient propulsion systems for ships.

9. According to the passage, one of the adaptations of fast-swimming fishes that might be used to improve the performance of ships is these fishes' ability to
- swim directly through eddies
 - make efficient use of water currents
 - cover great distances without stopping
 - gain speed by forcing water past their gills

The muscles of these fishes and the mechanism that maintains a warm body temperature are also highly efficient. A bluefin tuna in water of 7°C (45°F) can maintain a core temperature of over 25°C (77°F). This warm body temperature may help not only the muscles to work better, but also the brain and the eyes. The billfishes have gone one step further. They have evolved special "heaters" of modified muscle tissue that warm the eyes and brain, maintaining peak performance of these critical organs.

10. According to paragraph 9, which of the following is true of bluefin tunas?
- Their eyes and brain are more efficient than those of any other fish.
 - Their body temperature can change greatly depending on the water temperature.
 - They can swim in waters that are much colder than their own bodies.
 - They have special muscle tissue that warms their eyes and brain.

Again, supersonic jets have similar features.

(1) Because they are always swimming, tunas simply have to open their mouths and water is forced in and over their gills. (2) Accordingly, they have lost most of the muscles that other fishes use to suck in water and push it past the gills. (3) In fact, tunas must swim to breathe. (4) They must also keep swimming to keep from sinking, since most have largely or completely lost the swim bladder, the gas-filled sac that helps most other fish remain buoyant.

11. **Directions:** Look at the part of the passage that is displayed above. The numbers (1), (2), (3), and (4) indicate where the following sentence could be added.

Consequently, tunas do not need to suck in water.

Where would the sentence best fit?

- Choice 1
- Choice 2
- Choice 3
- Choice 4

12. **Directions:** Complete the table below by indicating which features of fishes are associated in the passage with reducing water resistance and which are associated with increasing thrust. **This question is worth 3 points.**

Reducing Water Resistance	Increasing Thrust
•	•
•	•
•	

Answer Choices

- 1. The absence of scales from most of the body
- 2. The ability to take advantage of eddies
- 3. The ability to feed and reproduce while swimming
- 4. Eyes that do not protrude
- 5. Fins that are stiff, narrow, and smooth
- 6. The habit of swimming with the mouth open
- 7. A high, narrow tail with swept-back tips