

Animal Behavior

Science Grade-Level Expectations

This instructional task addresses content related to the following science grade-level expectations:

LS-H-F3 Explain how selected organisms respond to a variety of stimuli (GLE 35)

LS-H-F4 Explain how behavior affects the survival of species (GLE 36)

Contents

Teachers may choose to use or modify this tool as part of an instructional lesson or as a formative or summative assessment.

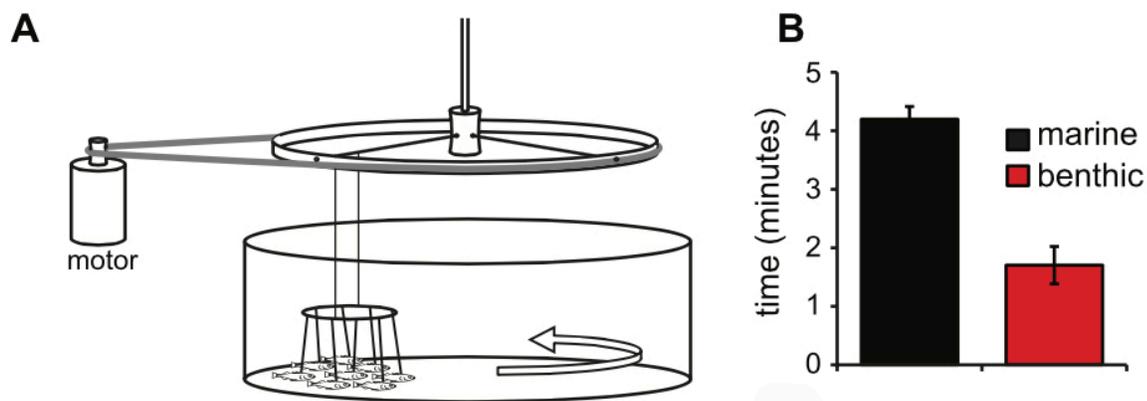
	Objectives
Task	<ul style="list-style-type: none"> · Evaluate models to determine the primary function of animal behavior · Cite evidence to support a conclusion · Evaluate and describe survival behavior
Sample Exemplar Student Response	

Task – Part A

Scientists from the Howard Hughes Medical Institute studied the schooling behavior of stickleback fish to determine how the fish would respond to an artificial fish school model. The diagram below shows the mechanism used to study the schooling behavior of the fish.

Sticklebacks from two different environments were used:

- Open water marine habitat
 - ❖ Comprised of the sunlit top layer of the ocean where life is usually scarce
- Freshwater benthic habitat
 - ❖ Lowest level of a body of water most often found in lakes where sediment can be stirred up by movement
 - ❖ Habitat for small crustaceans, insect larvae, and submerged plants
 - ❖ In freshwater, contains the most thriving habitats near the shoreline



Describe the survival benefits of schooling for fish. Then explain how the discrepancy of time of schooling behaviors between the two groups of fish could reflect survival behavior in each of the two habitats?

Diagram used under the Creative Commons Attribution License:

Wark AR, Greenwood AK, Taylor EM, Yoshida K, Peichel CL (2011) Heritable Differences in Schooling Behavior among Threespine Stickleback Populations Revealed by a Novel Assay. PLoS ONE 6(3): e18316. doi:10.1371/journal.pone.0018316

<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0018316>

Task – Part B

Animal Behavior Data Collection

Animal Observed: The male leader of a lion pride

Length of Observation Time: 8 hours

Description of Environmental Factors: Africa Savanna (grasslands)

Behavior	Record of Occurrences								
	By the hour								
	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	
Running							X		
Walking/Patrolling			X	X	X	X			X
Smelling					X	X			
Stalking									
Hiding					X				
Drinking Water						X			
Roaring					X				
Calling				X		X			
Chasing Prey							X		
Hunting in Groups									
Feeding							X	X	
Confronting an Opponent									
Attacking/Fighting							X		
Laying and Watching			X						
Sleeping	X	X							

Analyze the data to identify survival behaviors displayed by the lion. Describe the survival behaviors displayed and explain how each is a response to the environmental factors around the animal.

Sample Exemplar Student Response

Part A

Schooling offers greater protections against predators. It especially benefits smaller, younger, and weaker fish in the group, making it less likely that predators will spot and target those fish. Schooling also provides for group hunting, which increases the probability of finding food or prey. It also allows the targeting of larger food sources due to the strength in numbers. Locating and selecting a mate is easier when animals live in groups. The chance for reproduction increases when fish school.

Open Water Marine Habitat

Fish in the open marine environment encounter fewer obstacles, making it easier for fish to stay in groups. Food is more difficult to find, so the fish tended to school for longer periods of time and at greater distances to increase the likelihood of obtaining food for survival.

Freshwater Benthic Habitat

The shorter schooling time in the benthic zone is a survival behavior. Fish in the benthic freshwater environment are more likely to encounter underwater vegetation, cloudy water, and obstacles, so it is more difficult for the fish to remain in large groups for long periods of time.

Part B

Patrolling is an essential survival behavior in a wild environment. It allows the animal to spot danger and intrusions on their territory. Without patrolling behavior, the possibility that an animal will encounter surprise attacks from other animals hiding in the high grasses increases. The male lion observed was seen walking and patrolling during 5 of the 8 hours he was observed. This was the most frequent behavior in this male lion.

Smelling is a survival behavior in that it allows the animal to detect enemies or prey in the vast grassland environment. Once prey is detected, the lion may stalk it before attacking. This is an important behavior for procuring food.

Chasing prey, attacking, fighting, and feeding are survival behaviors. Attacking and fighting enables lions to overcome enemies and to obtain food. Chasing prey and feeding are survival behaviors because carnivores must successfully hunt, chase down prey and attack to kill in order to obtain food to live. Because of the large grassland land territories in their environment, lions often stalk and chase prey for long periods of time.

Roaring is a defensive survival behavior because it is used to chase off enemies and warn the pride. It can be heard from long distances in this environment because there is little vegetation to muffle the sound.