



**Sharks - Electroreception**

Of all the animals on Earth and in the oceans, sharks have the most acutely developed electroreception abilities. This sensory perception enables them to detect and interpret the electric field that is emitted by animals as well as by the Earth itself. It is used to hunt prey that may be concealed from vision and even as a gravitational device and stabiliser.

The electroreception ability is enabled by the ampullae of Lorenzini. These are modified sensory organs situated on the snout or nose of the shark and can number from a few hundred (for the more placid sharks) to well over 1000 for active hunters and killers. The ampullae of Lorenzini are made up of a large pore, filled with a jelly-like substance. Gelatinous secretions are stored in cylindrical canals, which are attached to these bulbous pores. Minute sensory cells line the walls of each pore. These sense even faint electrical impulses from the environment around the shark and transmit the message

to the sensory nerve at the base of each pore. This nerve sends messages directly to the brain to inform the shark of gravitational electro-sensations or those of nearby prey. So acute is this sensory ability that they can detect a change in voltage of 10 millionths of a volt. The ampullae of Lorenzini are also able to detect changes in water pressure and temperature, although this is to a far lesser degree.

The electroreception ability present in sharks is a significant survival tool as it allows them to seek out and find prey that is hidden behind rocks, or even under sand, just from sensing the natural electrical signals emitted by all animals. The prey is unable to control this emission of impulse, regardless of how motionless it remains. When an animal or person is injured, they emit erratic electrical impulses, attracting the shark.

(Taken from <http://www.sharks.org.za/electroreception.html>)

**EXERCISES**

**1 True or false?**

- a. Sharks are lacking in electroreception.  T  F
- b. Sharks use the ampullae of Lorenzini to detect electric fields.  T  F
- c. Sharks cannot find prey if it is hidden behind rocks.  T  F
- d. Animals can stop the emission of electrical impulses if they want to.  T  F

**2 Complete.**

Among ..... on Earth, sharks have ..... the most ..... electroreception ability. A ..... shark can ..... prey hidden behind ..... and under sand. The more animals sense ..... the more they emit ..... electrical impulses, that can be ..... detected by sharks. This ability is ..... by the ampullae of Lorenzini, a ..... organ situated on the ..... of the shark. The number of ampullae of Lorenzini can ..... from a few hundred to over 1000. This ability is so ..... that sharks can detect a change in ..... of 10 millionths of a volt.

*rocks • sensory • animals • enabled • killer • developed • acute • voltage • erratic • vary • sharp • easily • detect • danger • snout*

**3 Match questions and answers.**

QUESTIONS		ANSWERS	
A	What happens to the human electrical emission in a dangerous situation?	1	Sharks are predators, meaning that they need to find prey to survive. Using their electroreception ability they can even find prey hidden behind rocks and under sand.
B	How do sharks use their electroreception ability?	2	Sharks' sensory organs, used to detect electric fields. These organs are situated on the snouts or noses of sharks, and are variable in number.
C	What are the ampullae of Lorenzini?	3	The human body emits erratic electrical impulses when in danger and these impulses are sensed by sharks.
A .....		B .....	
		C .....	