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Bloom Steve

[10 Amazing Facts about Dolphins](#)

The intelligence of the sea

1. The first cetacean was Pakicetus, which lived 55 million years ago. It was a shore animal with well-developed four limbs. The first dolphins (and toothed whales) are considered the Squalodontidae, which lived 33 to 15 MA years ago. They were 3 m (10 ft) long and had large teeth. There are 32 dolphin species. The smallest living dolphin is a porpoise, vaquita (*Phocaena sinus*) from the Sea of Cortez: up to 1.5 m (5 ft) in length and 50 kg (110 pounds) in weight. The largest dolphin is orca: males can be 8 m (27 ft) long and weigh 6 tonnes.

2. Dolphins live in bands, which can be large in the case of the pelagic species (up to 1,000 individuals, the record being of 8,696 dolphins in a group), while coastal dolphins live in small groups. Females stay in the center, to be protected against sharks and killer whales. In all species there are solitary individuals. In orca groups, individuals form very strong bonds, more powerful than in other species. The dominant males keep a harem of 3-4 fertile females, with which they will live to the end of their lives, raising together more generations of young orcas. These large families comprise young individuals, males and females, mixed with adults. Coastal dolphins hunt isolated and have a more varied menu of bottom or close to bottom animals, including fish, crustaceans and mollusks. The pelagic dolphins hunt in teams that communicate through sounds. When the dolphins detect using their sonar a shoal of fish, they will swim in circles increasingly tighter around it, forcing the fish to gather compactly and raise to the surface. The more dolphins, the easier to herd the shoal it will be. If the fish is forced into the upper layer of the water, from where there is no escape, dolphins plump for prey, swallowing whole fishes. Some individuals guarding for signaling the appearance of sharks or orcas. Tuna shoals can follow the dolphins to eat from their catch. Because of this, tuna fishing boats put in danger also the dolphins. Sometimes groups of two different dolphin species (but which do not compete for the same food, like a fish eating one and a squid eating one) can unite to defend themselves against sharks. Dolphins defend against sharks with blows applied with the rostrum into their abdomen. Frigate birds too accompany the dolphins to take advantage of their sonar. Fish eating species of dolphins have 80-150 sharp, curved teeth and longer rostrum (snout); squid eating species have few teeth and short rostrum. Porpoises have broader teeth. Orcas attack other dolphins, penguins and seals. In groups they can attack, kill and devour partially a blue whale, the largest of all. Orcas consume 45 kg (100 pounds) of food daily, and inside the stomach of an individual, there were 13 porpoises and 14 seals. Some dolphins hunt on the shores, others in the open sea. Porpoises form small groups of 2-4 individuals, but open sea dolphins use to form groups of over 1,000 or more individuals. The highest diversity of dolphins is found in the upwell food rich areas. Usually, their colors and patterns are good camouflages.

3. To display superiority, a dolphin snaps its teeth and blows the water with the tail. Males are polygamous and the female is fecundated by several males during the breeding season. In the case of large species, sexual maturity is reached at the age of 10, but mating occurs first time by the age of 15. The nuptial parade includes acrobatic breaching. Breaching can also be a method for more rapid advancing, as air has a lower resistance compared to water. Some dolphins can execute 7 consecutive breaches. The underwater mating lasts for 15-20 seconds. Both female and male genitalia have inner position in repose. Dolphins are known to mate for relaxation, not just for breeding. Males in most species have no role in taking care of the young. The gestation last 10-12 months (depending on species) and the newborn is 0.7-1.1 m (2.3-3.6 ft) long. A "midwife" helps at the birth and protect the newborn. The new mother and offspring are protected by the whole group against sharks. The offspring is born tail first so that it will not

drawn by taking the first breath in the water. The mother pushes the calf to the water's surface. The nipples are found in two ventral grooves lateral to the genital groove. They have a muscle that retracts them or ejects the milk. In two months, the young doubles its weight. The calf suckles 3.4 liters of milk daily. The offspring do not have lips, they cannot suckle, they hit with their rostrum the nipple area and the milk is ejected into their mouth. Offspring can be suckled for 19 months, but it starts eating solid food months before weaning. 4. Smaller dolphins reach 35-40 km (22-25 mi) per hour but the orca or killer whale, which is in fact the world's largest dolphin, reaches 50 km (31 mi) per hour, which is a lot in the water. Due to their speeds, they can execute jumps outside the water which can be 5-6 m (16-20 ft) high and 11 m (36 ft) long in the case of the bottlenosed dolphin, the most common dolphin species. The secret of the dolphin speed is not only connected to its hydrodynamic shape, but also to the structure of its skin, which presents an elasticity that decreases friction between its body and water. The epiderm is elastic, while the derma is sinuous, with papillae and grooves forming transversal folds which at high speeds deform themselves, absorbing turbulence. Through the decrease of the resistance, a more rapid advance is achieved for the same muscle power and energy waste. The upper layer of the skin grinds with an unusually high speed (even 12 times per day) and the oil produced by the cells forms a film covering the whole body, helping the advance in the water. Because of this, the most rapid cetacean is the Dall's porpoise that can reach 50 km (30 mi) per hour and maintain it on large distances. But the bubbler is also extremely elastic, similar to rubber. The acceleration achieved by the elastic return of the bubbler, which is compressed and stretched with every fluke beat, can save 20 % of the energy wasted during the period of continuous swimming. This can be possible because half of the bubbler's volume is represented by a complex collagen web, wrapping the dolphin's body. Dolphins need the isolating bubbler as even in the tropics, water temperature is lower than animal's temperature. The dorsal and pectoral fins have the role of stabilizers and rudders. Inside the dolphin skin, there are numerous tactile receptors which inform the brain about the "whirls" in the surrounding water, which transmit signals to the elastic cells that modify their shape so that they prevent and impede whirls' formation that would slow down the dolphin. But dolphins are also excellent divers. They can dive down to 300 m (1000 ft) with ease but their ability goes down to 900 m (3,000 ft). (Beaked whales, cetaceans related to the true dolphins, can dive to 1,900 m (6,300 ft)). Their lungs, muscle and blood present adaptations that enable them to retain much more oxygen from one breath than the human being does. Still, dolphins do not use to dive too deep and no more than one minute, and inspiration can take just 0.5 seconds. Bottlenose dolphins stay in apnea up to 8 minutes. Between two respirations, a dolphin's heartbeat slows down to the half, blood vessels from the muscle contract decreasing significantly the oxygen consumed by muscles, ensuring this way a reserve for the brain, which cannot miss it. A common dolphin has about 10 liters of blood, twice the amount possessed by a human. Other complex adaptations enable the dolphins to return to the surface from a deep dive without the need of taking decompression pauses, as people do for avoiding sudden nitrogen embolia that would cause death. 5. The high intelligence of the dolphins is regarded as a reaction to the complex marine environment. The dolphin's brain has 2 kg (4.4 pounds), more than a human brain (which has about 1.5 kg or 3.3 pounds) and displays the same complicated grooves pattern. A dolphin weighing 120 kg (280 pounds) has a 1.7 kg (4 pounds) brain. Archaeological data show they have been having these big brains for millions of years. But there are differences between a dolphin and a human brain: in the case of the dolphin, the auditory areas are more developed than in humans (due to their complicated ultrasound sonar used for mapping the environment). The cortex is relatively less developed than in humans and the neuron's density is lower than in terrestrial mammals. The brain development of the dolphins is attributed to their displacement in all directions (forward, backward, up and down, left-right), the aquatic and aerial life, the speed of movement (enriching the organism in information), developed space orientation, group life and collective hunt (which require a complex

behavior and communication system about food, its nature, size, distance), protein rich food and long parenting of the offspring. The QE (encephalization coefficient) (volume of the brain versus body surface) is about 2. In lower mammals (like mice) this value falls under 1; in humans is 7.4, in chimpanzee 2.5, in primitive river dolphins 1.5 while large dolphins display a value of 5.6, explaining their developed mental and imprinting abilities. The most developed area are auditory nuclei of the mid brain, the motor nuclei of the fore brain and the motor learning nuclei of the cerebellum. Their visual areas are less developed than in people's case, while olfactory areas are completely absent (in humans, they are greatly reduced, but existent). But their cortex, the brain part of mental and cognitive processes, has the same size like in humans and its surface is even more complicated and grooved than in humans. Anyhow, their intelligence and the way they perceive the world are different from ours; their world is a more acoustic one. And even if dolphins can execute complicated movements, they require a long time to distinguish a circle from a square, an easy task for a mouse or a pigeon. 6. These cetaceans are famous for their sonar, so that they can make acoustic mental "images" of the environment. This way they can detect in murky waters fish shoals located hundreds of meters away. The sonar employs sounds from 250 Hz to 220 kHz. Sounds under 20 kHz can be heard by humans, like clicks, the others are ultrasounds. The basal frequency is emitted by nasal orifice and reflected by the melon (the swollen fatty tissue from forehead) localizing remote objects, while high frequencies locate close objects. The echoes are captured not only by the ears, but also by the fatty sinuses of the lower jaw and carried to the auditory bulla. Based on the time period of echo interception, dolphins determine at each distance food, objects or predators are located. Dolphins perceive sounds in "stereo" (localizing the precise direction of the sound's origin). Humans cannot do this, as for us sounds in the water reach our ears propagated through the skull's bones almost at the same time. This does not happen with dolphins, as their inner ears are included in a foam like tissue, so that they do not receive the skull's vibrations, so that the two ears do not receive at the same time the sounds. When the sonar is impaired by parasites (like the *Nasitrema*, a parasite trematode worm, affecting the brain and inner ear, so that the animal cannot avoid obstacles), toxins eliminated by microorganisms during red tides or electromagnetic interferences, the dolphins can strand. In the case of pilot whale (a large dolphin), if the dominant individual strands, the other members of the group will follow it. Dolphins are devoid of olfaction. The eye lens is very adaptable, so that they can see well also in the water (up to 10 m (33 ft) if the water is clear) and in the air. Species with rostrum (long snout) have excellent binocular sight (they see tridimensionally), assessing precisely distances. Some dolphins can execute high breaches to spy the decks of the ships. The touch sense is extremely fine. 7. Dolphins can communicate, transmitting and receiving much more complex information than other animals. Some are inaudible ultrasounds, other sounds can be heard by humans, too. In captivity, the variety of the sounds can grow and they even try to imitate the sounds of the human speech. The male emits calls during breeding season or at the appearance of a danger. Females emit calls to accustom the offspring with their voice. Attitudes have their meaning. The head pulled out of the water with the vertical body means a floating object has been observed. These marine mammals touch one another with their rostrum, or hug one another with the pectorals, a type of behavior that has the role to increase cohesion in the group. 8. When sleeping, dolphins are moving, because at intervals of one minute, they raise to the surface, even if they can stand 8 minutes in apnea. 9. A 6,000 years old dolphin carving was found in the Roddoy Cave, Norway. 8. There were cases of dolphins which defended shipwrecked people swimming in the water from shark attacks till rescue ships appeared. And real cases of people saved from drowning by dolphins are known; this behavior is mentioned in many tales, from ancient Greek and Roman stories to the legends of the Polynesians and Maori of the New Zealand. Sometimes they carried people more than 20 mi (32 km) to the shore or protected them from shark attack. In other cases, dolphins guided fishermen lost in the mist or shipwrecked people found in boats to the shore. But dolphins do not save only people.

Sometimes their behavior can seem curious: in a Florida aquarium, dolphins helped a sick shark to breathe, by pushing it to the water surface: this way they killed the shark, even if this would have helped a sick dolphin (or a shipwrecked human). The friendly relationship in some cases between dolphins and fishermen is well-known: the dolphins urge the fish to the fishermen's nets and this eases their own hunting. The case of the "Pelorus Jack" is a famous one: between 1887 and 1912, a dolphin helped ships cross safely the Cook Strait, between the two main islands of the New Zealand, which are dangerous due to submarine rocks and currents. Dolphins have been used to detect sinked ships down to 300 m (1,000 ft) and make connection with divers at 180 m (600 ft), bringing drugs or tools. The dolphin makes that distance 7 times faster than a diver. It is curious that the dolphins never attack humans, even if just a fluke blow or bite would be enough. They can even attach to some humans. But their excessive hunting (like the infamous Japanese dolphin hunt), overfishing and massive development of the navigation deplete many populations.