



All About Dolphins

Lesson Plan

Summary

This presentation will give students some general information about dolphins which can then lead into a discussion about captivity, if desired. Once students have an understanding of dolphins and how they live, they can understand the captivity better.

Tip: Think about how you will INSPIRE your students and consider what you want them to take away from today's lesson plan.

Presentation Slides

Current Dolphin and Porpoise Species

Slides 1 - 6

- Currently, there are 44 known species of dolphins and 7 species of porpoises
- These numbers can change as new species are discovered
- Just as new species of fish are constantly being discovered, there may be more species that have yet to be discovered as the ocean is a vast area that has not been completely explored
- Most are oceanic but there are four freshwater species in Asia and South America
- The killer "whale" is actually a dolphin due to the presence of teeth and it is the largest dolphin
- The smallest dolphin is the critically endangered Hector's dolphin, found off the coast of New Zealand
- The current population of Hector's dolphins is thought to be about 55 individuals
- While they have natural predators, a bigger problem for the Hector's dolphins is getting caught in gill nets and drowning

- The largest dolphin is the killer whale or orca, males can grow up to 26 feet in length while the smallest dolphin is the Hector's dolphin which can grow up to 5 feet, 3 inches in length
- Lifespan varies by species, from 20-80+ years, a killer whale known as "Granny" was thought to live over 100 years
- Population sizes vary with species, the most endangered dolphin is the Maui's dolphin with a population estimated at about 55 individuals
- The most endangered porpoise is the Vaquita, with a current population estimated at only about 10-15 individuals
- Slides 6 and 7 show (left to right): Risso's dolphin, Common dolphin and the Pink river dolphin

Dolphins as Mammals

Slides 8 - 12

- Comparing Dolphins to Fish
- Dolphins extract oxygen from the air and have lungs while fish extract oxygen from water and have gills
- Dolphins evolved from land animals and their backbone allows them to move their tails up and down while fish evolved from aquatic animals and their backbones allow them to move their tails side to side
- Dolphins are warm blooded and have blubber to help maintain their body temperature while fish are cold-blooded with little body fat
- Dolphins give birth to live young, one baby every 1-6 years while fish lay eggs, some species laying hundreds of eggs at a time
- Dolphins feed their young milk and provide care for up to 6 years while most fish lay eggs, leaving them to fend for themselves
- Characteristics of Mammals include: warm blooded with a four chambered heart, giving birth to LIVE young, feeding offspring milk, and having fur/hair

Do Dolphins Have Hair?

Slides 13 - 17

- Dolphins are born with a small amount of hair on their lower jaw
- After about two weeks, those hairs fall out

- Hair would be a disadvantage because dolphins need the ability to swim fast to catch their prey and escape predators
- Hair causes drag in the water which would slow a dolphin down
- In most mammals, the hair/fur is needed to help the animal stay warm, however, dolphins have a thick layer of blubber to keep them warm and the hair/fur is not needed
- Evolution chooses desirable traits and reduces or eliminates unneeded traits so, over time, hair has been close to eliminated in dolphins

Ontogeny Provides Evidence of Phylogeny

Slides 18 - 20

- Embryonic development provides evidence of the evolution history of a species
- Ontogeny is the growth and development of an organism while phylogeny is the evolutionary history of a species
- Cetaceans (whales/dolphins) are thought to have originated about 50 million years ago
- Scientists believe that their relatives were a group of hooved animals called Artiodactyls which looked similar to small deer
- The fossil evidence shows that cetaceans went from being land dwellers, through an amphibious stage before completely returning to life in the water
- Evidence of their land origins can be seen in their embryonic development
- Dolphin embryos have some hair as they develop, it is present on their upper jaw when they are born but drops off after a few weeks
- Amazon river dolphins (Boto) keep their hair and use it as a sensory organ to find prey in murky, river water
- More embryonic evidence can be seen in the early stages of development when dolphin embryos show the beginnings of hind limbs which later disappears
- The closest living relatives to cetaceans are thought to be hippos

How do Dolphins Breathe?

Slides 21 - 24

- Since dolphins are mammals, they must breathe air
- Their nostrils have migrated to the top of their heads over time
- They blowholes are surrounded by strong muscles, giving them the ability to open and close
- Dolphins are conscious breathers, meaning they must think to breathe

- A dolphin must open its blowhole at the surface and bring air in, then close it tightly before descending into the water or it will get water in its lungs
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How do Dolphins Sleep?

Slides 25 - 27

- The fact that dolphins are conscious breathers means that they cannot sleep as humans do, they must remain awake enough to breathe
- Dolphins almost must constantly be aware of possible dangers
- The problem is solved by shutting down half of the brain at a time
- While one half of the brain is “sleeping”, the other half is still awake and able to breathe and keep an eye out for danger
- “Sleeping” dolphins are usually seen in small groups, swimming very slowly
- Dolphin breath can be seen as the dolphin exhales upon reaching the surface
- Dolphins ONLY breathe through their blowholes
- Eating and breathing are kept entirely separate so that a dolphin can eat underwater and not get water in its lungs
- A dolphin’s esophagus is completely separated from the trachea, thus keeping breathing and eating completely separated

Dolphins vs. Whales

Slides 28 - 33

- “Whales” is a broad description of all cetaceans
- Cetaceans are divided into baleen whales and toothed whales
- The toothed whales are the dolphins which is why it can be said that all dolphins are whales but not all whales are dolphins
- The differences between baleen whales and dolphins are:
- dolphins have teeth while the teeth of baleen whales has been replaced by baleen
- Baleen is made of keratin, just like our fingernails and it hangs down from the roof of the whale’s mouth, acting like a filter when the whale feeds

- The whale engulfs a huge amount of water then uses its tongue to push the water out, trapping many small fish or invertebrates which the whale then licks off of the baleen
- All dolphins are carnivores, feeding on various species of fish, squid, crustaceans and other invertebrates
- All dolphins have teeth but their teeth are NOT used for chewing, they are used for grasping their prey which is swallowed whole
- Teeth may be used to break food into smaller pieces
- The number of teeth ranges from 4-6 in Risso's dolphins to 240 in spinner dolphins
- Dolphins have a single blowhole while baleen whales have a double blow hole
- Size: dolphins tend to be much smaller than baleen whales
- Behavior: dolphins are usually in social groups called "pods" while baleen whales are usually alone in may temporarily join in small feeding groups but do not stay together

Dolphin Pods

Slides 34 - 38

- "Pod" is the name for the social groupings of dolphins, there are several different types of pods
- Pod size varies depending on species, can be from just a few individuals up to about 30
- Sometimes, several pods may join together to form "super pods", large groups of dolphins
- Super pods can include hundreds or even thousands of individuals
- Super pods usually form in areas of high food availability
- Dolphin pods are fluid, with some movement between them at different life stages
- Male dolphins will not mate with relatives, in smaller pods they will leave the pod to mate and then return to their family pod
- The only exception is male killer whales will stay with their mother's pod for their entire lives while female killer whales may split from their mother's pod to form their own pod
- Nursery pods are groups of females with calves along with other females who serve as babysitters for the mothers, and may include elderly dolphins who are taken care of in nursery pods
- Juvenile pods are dolphins who are old enough to leave the nursery pod but not yet sexually mature
- Once mature, females will often return to their mothers pods but males may form their own pods
- Male pods are mature males who stay together

- Advantages of forming pods include cooperative hunting which can be more successful than hunting alone, protection from predators and the ability to find a mate easily

Dolphin Behaviors

Slides 39 - 43

- The biggest advantage or, perhaps, byproduct of pod life, is socialization
- Dolphins are extremely social and have been known to exhibit empathetic, cooperative and altruistic behaviors
- Dolphin mothers carrying their dead offspring has been documented in different species which many interpret as a sign of grief, pod members seem to grieve as well
- Dolphins work cooperatively to hunt
- There are many examples of dolphins helping members of different species, including humans
- Humans report being protected from sharks and saved from drowning by dolphins

Behaviors that May Indicate Intelligence

Slides 44 - 47

- It is difficult to measure intelligence in other species but dolphins exhibit many behaviors which seem to indicate intelligence
- Some measurements commonly used by scientists include communication, cooperation, problem-solving, the ability to learn by observation, cultural transmission as well as self-awareness
- Dolphins have been shown to have names, each dolphin has a unique “signature whistle” and they greet each other using that signature whistle
- Dolphins communicate using a series of clicks and whistles
- Self-awareness is measured by the ability to pass the mirror test which dolphins do, they recognize themselves as individuals
- The mirror test <https://www.youtube.com/watch?v=VR4-fvjyMtY>
- Dolphin brain anatomy also indicates intelligence with a large brain size to body size ratio and a complex cerebral cortex

Dolphin/Human Relationships

Slides 51 - 54

This information may be used to lead to discussions and lessons about dolphin captivity and, for older students, for discussions and lessons on humans hunting dolphins and dolphins being caught as by-catch by the fishing industry. A good question for discussion is, how do dolphins treat humans and how do humans treat dolphins?

- In the ocean, there are many accounts of dolphins helping humans, such as protecting humans from sharks and helping save humans from drowning
- As seen in the video, there are even dolphins who work cooperatively with humans to fish
- Humans capture and keep dolphins in captivity for our “entertainment”
- There are no records of dolphins in the wild attacking humans
- In captivity, there are many accounts of aggressive behavior in dolphins
- While in captivity, Killer whales have killed humans and some bottlenose dolphins have bitten humans
- Humans also kill and consume dolphins in some parts of the world, such as Taiji, Japan
- Dolphins are caught in fishing nets and drown
- These topics can be further discussed in lessons on the pros and cons of dolphin captivity and on the dolphin hunts in Taiji

Extra Information, as students may ask about what’s the difference between a dolphin and a porpoise.

Differences Between Dolphins and Porpoises

- Dolphins are larger than porpoises
- Many dolphin species have an elongated beak
- Porpoise bodies tend to be chunkier with smaller heads, lacking a beak
- Dolphins have a falcate, or hooked, dorsal fin while porpoises have a small, triangular dorsal fin
- Dolphin teeth are cone-shaped while porpoises have spade-shaped teeth