**Whales** are a widely distributed and diverse group of fully [aquatic](https://en.wikipedia.org/wiki/Aquatic_ecosystem) [placental](https://en.wikipedia.org/wiki/Placental_mammal) [marine mammals](https://en.wikipedia.org/wiki/Marine_mammal). They are an informal grouping within the infraorder [Cetacea](https://en.wikipedia.org/wiki/Cetacea), usually excluding [dolphins](https://en.wikipedia.org/wiki/Dolphin) and [porpoises](https://en.wikipedia.org/wiki/Porpoise). Whales, dolphins and porpoises belong to the order [Cetartiodactyla](https://en.wikipedia.org/wiki/Cetartiodactyla) with [even-toed ungulates](https://en.wikipedia.org/wiki/Even-toed_ungulate) and their closest living relatives are the [hippopotamuses](https://en.wikipedia.org/wiki/Hippopotamus), having diverged about 40 million years ago. The two parvorders of whales, [baleen whales](https://en.wikipedia.org/wiki/Baleen_whale) (Mysticeti) and [toothed whales](https://en.wikipedia.org/wiki/Toothed_whale) (Odontoceti), are thought to have split apart around 34 million years ago. The whales comprise eight [extant](https://en.wikipedia.org/wiki/Neontology) [families](https://en.wikipedia.org/wiki/Family_(biology)): [Balaenopteridae](https://en.wikipedia.org/wiki/Balaenopteridae) (the rorquals), [Balaenidae](https://en.wikipedia.org/wiki/Balaenidae) (right whales), [Cetotheriidae](https://en.wikipedia.org/wiki/Cetotheriidae) (the pygmy right whale), [Eschrichtiidae](https://en.wikipedia.org/wiki/Eschrichtiidae) (the grey whale), [Monodontidae](https://en.wikipedia.org/wiki/Monodontidae) (belugas and narwhals), [Physeteridae](https://en.wikipedia.org/wiki/Physeteridae) (the sperm whale), [Kogiidae](https://en.wikipedia.org/wiki/Kogiidae) (the dwarf and pygmy sperm whale), and [Ziphiidae](https://en.wikipedia.org/wiki/Ziphiidae)(the beaked whales).

Whales are creatures of the open ocean; they feed, mate, give birth, suckle and raise their young at sea. So extreme is their adaptation to life underwater that they are unable to survive on land. Whales range in size from the 2.6 metres (8.5 ft) and 135 kilograms (298 lb) [dwarf sperm whale](https://en.wikipedia.org/wiki/Dwarf_sperm_whale) to the 29.9 metres (98 ft) and 190 metric tons (210 short tons) [blue whale](https://en.wikipedia.org/wiki/Blue_whale), which is the largest creature that has ever lived. The [sperm whale](https://en.wikipedia.org/wiki/Sperm_whale) is the largest toothed predator on earth. Several species exhibit [sexual dimorphism](https://en.wikipedia.org/wiki/Sexual_dimorphism), in that the females are larger than males. Baleen whales have no teeth; instead they have plates of baleen, a fringe-like structure used to expel water while retaining the [krill](https://en.wikipedia.org/wiki/Krill)and [plankton](https://en.wikipedia.org/wiki/Plankton) which they feed on. They use their throat pleats to expand the mouth to take in huge gulps of water. Balaenids have heads that can make up 40% of their body mass to take in water. Toothed whales, on the other hand, have conical teeth adapted to catching fish or [squid](https://en.wikipedia.org/wiki/Squid). Baleen whales have a well developed sense of "smell", whereas toothed whales have well-developed hearing − their hearing, that is adapted for both air and water, is so well developed that some can survive even if they are blind. Some species, such as sperm whales, are well adapted for diving to great depths to catch squid and other favoured prey.

Whales have evolved from land-living mammals. As such whales must breathe air regularly, although they can remain submerged under water for long periods of time. Some species such as the [sperm whale](https://en.wikipedia.org/wiki/Sperm_whale) are able to stay submerged for as much as 90 minutes.[[1]](https://en.wikipedia.org/wiki/Whale#cite_note-1) They have [blowholes](https://en.wikipedia.org/wiki/Blowhole_(anatomy)) (modified nostrils) located on top of their heads, through which air is taken in and expelled. They are [warm-blooded](https://en.wikipedia.org/wiki/Endotherm), and have a layer of fat, or [blubber](https://en.wikipedia.org/wiki/Blubber), under the skin. With streamlined [fusiform](https://en.wiktionary.org/wiki/fusiform) bodies and two limbs that are modified into flippers, whales can travel at up to 20 [knots](https://en.wikipedia.org/wiki/Knot_(unit)), though they are not as flexible or agile as [seals](https://en.wikipedia.org/wiki/Pinniped). Whales produce a great variety of vocalizations, notably the extended songs of the [humpback whale](https://en.wikipedia.org/wiki/Humpback_whale). Although whales are widespread, most species prefer the colder waters of the Northern and Southern Hemispheres, and migrate to the equator to give birth. Species such as humpbacks and blue whales are capable of travelling thousands of miles without feeding. Males typically mate with multiple females every year, but females only mate every two to three years. Calves are typically born in the spring and summer months and females bear all the responsibility for raising them. Mothers of some species fast and nurse their young for one to two years.

Once relentlessly hunted for their products, whales are now protected by international law. The [North Atlantic right whales](https://en.wikipedia.org/wiki/North_Atlantic_right_whale) nearly became extinct in the twentieth century, with a population low of 450, and the [North Pacific grey whale population](https://en.wikipedia.org/wiki/Gray_whale#North_Pacific) is ranked [Critically Endangered](https://en.wikipedia.org/wiki/Critically_Endangered) by the [IUCN](https://en.wikipedia.org/wiki/International_Union_for_Conservation_of_Nature). Besides whaling, they also face threats from bycatch and marine pollution. The meat, blubber and [baleen](https://en.wikipedia.org/wiki/Baleen) of whales have traditionally been used by indigenous peoples of the Arctic. Whales have been depicted in various cultures worldwide, notably by the Inuit and the coastal peoples of Vietnam and Ghana, who sometimes hold whale funerals. Whales occasionally feature in literature and film, as in the great white whale of [Herman Melville](https://en.wikipedia.org/wiki/Herman_Melville)'s [*Moby Dick*](https://en.wikipedia.org/wiki/Moby_Dick). Small whales, such as [belugas](https://en.wikipedia.org/wiki/Beluga_whale), are sometimes kept in captivity and trained to perform tricks, but breeding success has been poor and the animals often die within a few months of capture. [Whale watching](https://en.wikipedia.org/wiki/Whale_watching) has become a form of tourism around the world.

1. ETIMOLOGY AND DEFINITION

The word "whale" comes from the [Old English](https://en.wikipedia.org/wiki/Old_English) *whæl*, from [Proto-Germanic](https://en.wikipedia.org/wiki/Proto-Germanic) *\*hwalaz*, from [Proto Indo European](https://en.wikipedia.org/wiki/Proto_Indo_European) *\*(s)kwal-o-*, meaning "large sea fish". The Proto-Germanic *\*hwalaz* is also the source of [Old Saxon](https://en.wikipedia.org/wiki/Old_Saxon) *hwal*, [Old Norse](https://en.wikipedia.org/wiki/Old_Norse) *hvalr*, *hvalfiskr*, [Swedish](https://en.wikipedia.org/wiki/Swedish_language) *val*, [Middle Dutch](https://en.wikipedia.org/wiki/Middle_Dutch) *wal*, *walvisc*, [Dutch](https://en.wikipedia.org/wiki/Dutch_language) *walvis*, [Old High German](https://en.wikipedia.org/wiki/Old_High_German) *wal*, and [German](https://en.wikipedia.org/wiki/German_language) *Wal*.[[2]](https://en.wikipedia.org/wiki/Whale#cite_note-2) The obsolete "whalefish" has a similar derivation, indicating a time when whales were thought to be fish.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] Other archaic English forms include *wal, wale, whal, whalle, whaille, wheal*, etc.[[3]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTESkeat1898-3)

The term "whale" is sometimes used interchangeably with [dolphins](https://en.wikipedia.org/wiki/Dolphin) and [porpoises](https://en.wikipedia.org/wiki/Porpoise), acting as a synonym for [Cetacea](https://en.wikipedia.org/wiki/Cetacea). Six species of dolphins have the word "whale" in their name, collectively known as blackfish: the [killer whale](https://en.wikipedia.org/wiki/Killer_whale), the [melon-headed whale](https://en.wikipedia.org/wiki/Melon-headed_whale), the [pygmy killer whale](https://en.wikipedia.org/wiki/Pygmy_killer_whale), the [false killer whale](https://en.wikipedia.org/wiki/False_killer_whale), and the two species of [pilot whales](https://en.wikipedia.org/wiki/Pilot_whale), all of which are classified under the family [Delphinidae](https://en.wikipedia.org/wiki/Delphinidae) (oceanic dolphins).[[4]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTELeatherwood_et_al.1991pp.&nbsp;33%E2%80%9365-4) Each species has a different reason for it, for example, the killer whale was named "Ballena asesina" by Spanish sailors, which translates directly to "whale assassin" or "whale killer", but is more often translated to "killer whale".[[5]](https://en.wikipedia.org/wiki/Whale#cite_note-5)

The term "Great Whales" covers those currently regulated by the [International Whaling Commission](https://en.wikipedia.org/wiki/International_Whaling_Commission):[[6]](https://en.wikipedia.org/wiki/Whale#cite_note-iwcjuris-6) the Odontoceti family Physeteridae (sperm whales); and the Mysticeti families Balaenidae (right and bowhead whales), Eschrichtiidae (grey whales), and some of the Balaenopteridae (Minke, Bryde's, Sei, Blue and Fin; not Eden's and Omura's whales).[[7]](https://en.wikipedia.org/wiki/Whale#cite_note-iwcgreat-7)

1. TAXONOMY AND EVOLUTION

### Phylogeny

The whales are part of the largely terrestrial mammalian [clade](https://en.wikipedia.org/wiki/Clade) Laurasiatheria. Whales [do not form a clade or order](https://en.wikipedia.org/wiki/Paraphyletic); the infraorder Cetacea includes [dolphins](https://en.wikipedia.org/wiki/Dolphins) and [porpoises](https://en.wikipedia.org/wiki/Porpoises), which are not considered whales.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)]The [phylogenetic tree](https://en.wikipedia.org/wiki/Phylogenetic_tree) shows the relationships of whales and other mammals, with whale groups[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia:Citation_needed)] marked in green.

Cetaceans are divided into two parvorders: the largest parvorder, [Mysticeti](https://en.wikipedia.org/wiki/Mysticeti) (baleen whales), is characterized by the presence of baleen, a sieve-like structure in the upper jaw made of [keratin](https://en.wikipedia.org/wiki/Keratin), which it uses to filter [plankton](https://en.wikipedia.org/wiki/Plankton), among others, from the water; [Odontocetes](https://en.wikipedia.org/wiki/Odontoceti) (toothed whales) are characterized by bearing sharp teeth for hunting, as opposed to their counterparts' baleen.[[8]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEKlinowska_et_al.1991ap.&nbsp;4-8)

Cetaceans and [artiodactyls](https://en.wikipedia.org/wiki/Artiodactyl) now are classified under the order [Cetartiodactyla](https://en.wikipedia.org/wiki/Cetartiodactyla), often still referred to as Artiodactyla, which includes both whales and [hippopotamuses](https://en.wikipedia.org/wiki/Hippopotamus). The hippopotamus and pygmy hippopotamus are the whale's closest terrestrial living relatives.[[9]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEGatesy1997-9)

### Mystycetes

*See also: [Mysticeti](https://en.wikipedia.org/wiki/Mysticeti)*

Mysticetes are also known as baleen whales. They have a pair of [blowholes](https://en.wikipedia.org/wiki/Blowhole_(anatomy)) side-by-side and lack teeth; instead they have [baleen plates](https://en.wikipedia.org/wiki/Baleen_plates) which form a sieve-like structure in the upper jaw made of keratin, which they use to filter [plankton](https://en.wikipedia.org/wiki/Plankton) from the water. Some whales, such as the humpback, reside in the polar regions where they feed on a reliable source of schooling fish and [krill](https://en.wikipedia.org/wiki/Krill).[[10]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJohnson_et_al.1984%5Bhttpsponwrnoaagovmfr464mfr4647pdf_''Megaptera_novaeangliae''%5D-10) These animals rely on their well-developed flippers and tail fin to propel themselves through the water; they swim by moving their fore-flippers and [tail fin](https://en.wikipedia.org/wiki/Caudal_fin) up and down. Whale ribs loosely articulate with their [thoracic vertebrae](https://en.wikipedia.org/wiki/Thoracic_vertebrae) at the [proximal](https://en.wikipedia.org/wiki/Proximal) end, but do not form a rigid rib cage. This adaptation allows the chest to compress during deep dives as the pressure increases.[[11]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTECozzi_et_al.2009-11) Mysticetes consist of four families: [rorquals (balaenopterids)](https://en.wikipedia.org/wiki/Balaenopteridae), [cetotheriids](https://en.wikipedia.org/wiki/Cetotheriidae), [right whales (balaenids)](https://en.wikipedia.org/wiki/Balaenidae), and [grey whales (eschrichtiids)](https://en.wikipedia.org/wiki/Eschrichtiidae).

The main difference between each family of mysticete is in their feeding adaptations and subsequent behaviour. Balaenopterids are the rorquals. These animals, along with the cetotheriids, rely on their throat pleats to gulp large amounts of water while feeding. The throat pleats extend from the mouth to the navel and allow the mouth to expand to a large volume for more efficient capture of the small animals they feed on. Balaenopterids consist of two genera and eight species.[[12]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEGoldbogen2010-12) Balaenids are the right whales. These animals have very large heads, which can make up as much as 40% of their body mass, and much of the head is the mouth. This allows them to take in large amounts of water into their mouths, letting them feed more effectively.[[13]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEFroias2012-13) Eschrichtiids have one living member: the grey whale. They are bottom feeders, mainly eating crustaceans and benthic invertebrates. They feed by turning on their sides and taking in water mixed with sediment, which is then expelled through the baleen, leaving their prey trapped inside. This is an efficient method of hunting, in which the whale has no major competitors.[[14]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJefferson_et_al.-14)

### Odontocetes

Odontocetes are known as toothed whales; they have teeth and only one blowhole. They rely on their well-developed sonar to find their way in the water. Toothed whales send out [ultrasonic](https://en.wikipedia.org/wiki/Ultrasound) clicks using the [melon](https://en.wikipedia.org/wiki/Melon_(cetacean)). Sound waves travel through the water. Upon striking an object in the water, the sound waves bounce back at the whale. These vibrations are received through fatty tissues in the jaw, which is then rerouted into the ear-bone and into the brain where the vibrations are interpreted.[[15]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJeanette_et_al.1990pp.&nbsp;203%E2%80%93427-15) All toothed whales are opportunistic, meaning they will eat anything they can fit in their throat because they are unable to chew. These animals rely on their well-developed flippers and tail fin to propel themselves through the water; they swim by moving their fore-flippers and [tail fin](https://en.wikipedia.org/wiki/Caudal_fin) up and down. Whale ribs loosely articulate with their [thoracic vertebrae](https://en.wikipedia.org/wiki/Thoracic_vertebrae) at the [proximal](https://en.wikipedia.org/wiki/Proximal) end, but they do not form a rigid rib cage. This adaptation allows the chest to compress during deep dives as opposed to resisting the force of water pressure.[[11]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTECozzi_et_al.2009-11) Excluding dolphins and porpoises, odontocetes consist of four families: [belugas and narwhals (monodontids)](https://en.wikipedia.org/wiki/Monodontidae), [sperm whales (physeterids)](https://en.wikipedia.org/wiki/Physeteridae), [dwarf and pygmy sperm whales (kogiids)](https://en.wikipedia.org/wiki/Kogiidae), and [beaked whales (ziphiids)](https://en.wikipedia.org/wiki/Ziphiidae). There are six species, sometimes referred to as "blackfish", that are dolphins commonly misconceived as whales: the [killer whale](https://en.wikipedia.org/wiki/Killer_whale), the [melon-headed whale](https://en.wikipedia.org/wiki/Melon-headed_whale), the [pygmy killer whale](https://en.wikipedia.org/wiki/Pygmy_killer_whale), the [false killer whale](https://en.wikipedia.org/wiki/False_killer_whale), and the two species of [pilot whales](https://en.wikipedia.org/wiki/Pilot_whale), all of which are classified under the family [Delphinidae](https://en.wikipedia.org/wiki/Delphinidae) (oceanic dolphins).[[4]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTELeatherwood_et_al.1991pp.&nbsp;33%E2%80%9365-4)

The differences between families of odontocetes include size, feeding adaptations and distribution. Monodontids consist of two species: the [beluga](https://en.wikipedia.org/wiki/Beluga_whale) and the [narwhal](https://en.wikipedia.org/wiki/Narwhal). They both reside in the frigid arctic and both have large amounts of blubber. Belugas, being white, hunt in large pods near the surface and around pack ice, their coloration acting as camouflage. Narwhals, being black, hunt in large pods in the aphotic zone, but their underbelly still remains white to remain camouflaged when something is looking directly up or down at them. They have no dorsal fin to prevent collision with pack ice.[[16]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJefferson2015a-16) Physeterids and Kogiids consist of [sperm whales](https://en.wikipedia.org/wiki/Sperm_whale). Sperm whales consist the largest and smallest odontocetes, and spend a large portion of their life hunting squid. *P. macrocephalus* spends most of its life in search of squid in the depths; these animals do not require any degree of light at all, in fact, blind sperm whales have been caught in perfect health. The behaviour of Kogiids remains largely unknown, but, due to their small lungs, they are thought to hunt in the [photic zone](https://en.wikipedia.org/wiki/Photic_zone).[[17]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJefferson2015b-17)Ziphiids consist of 22 species of [beaked whale](https://en.wikipedia.org/wiki/Beaked_whale). These vary from size, to coloration, to distribution, but they all share a similar hunting style. They use a suction technique, aided by a pair of grooves on the underside of their head, not unlike the throat pleats on the [rorquals](https://en.wikipedia.org/wiki/Rorqual), to feed.[[18]](https://en.wikipedia.org/wiki/Whale#cite_note-FOOTNOTEJefferson2015c-18)