

Learning A–Z

Level **Z**

Multi-level

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5

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Refer to the Focus Question on page 2 of this title to guide discussion and support additional learning connected to the text.

**Blue Whales: Giant Mammals** allows students to learn about the largest animals on Earth. From their anatomy to their offspring, blue whales have many interesting things for students to learn about. Photographs, maps, and diagrams support the text. Part of the Giants of the Animal World series, this book is also available for levels H and R.

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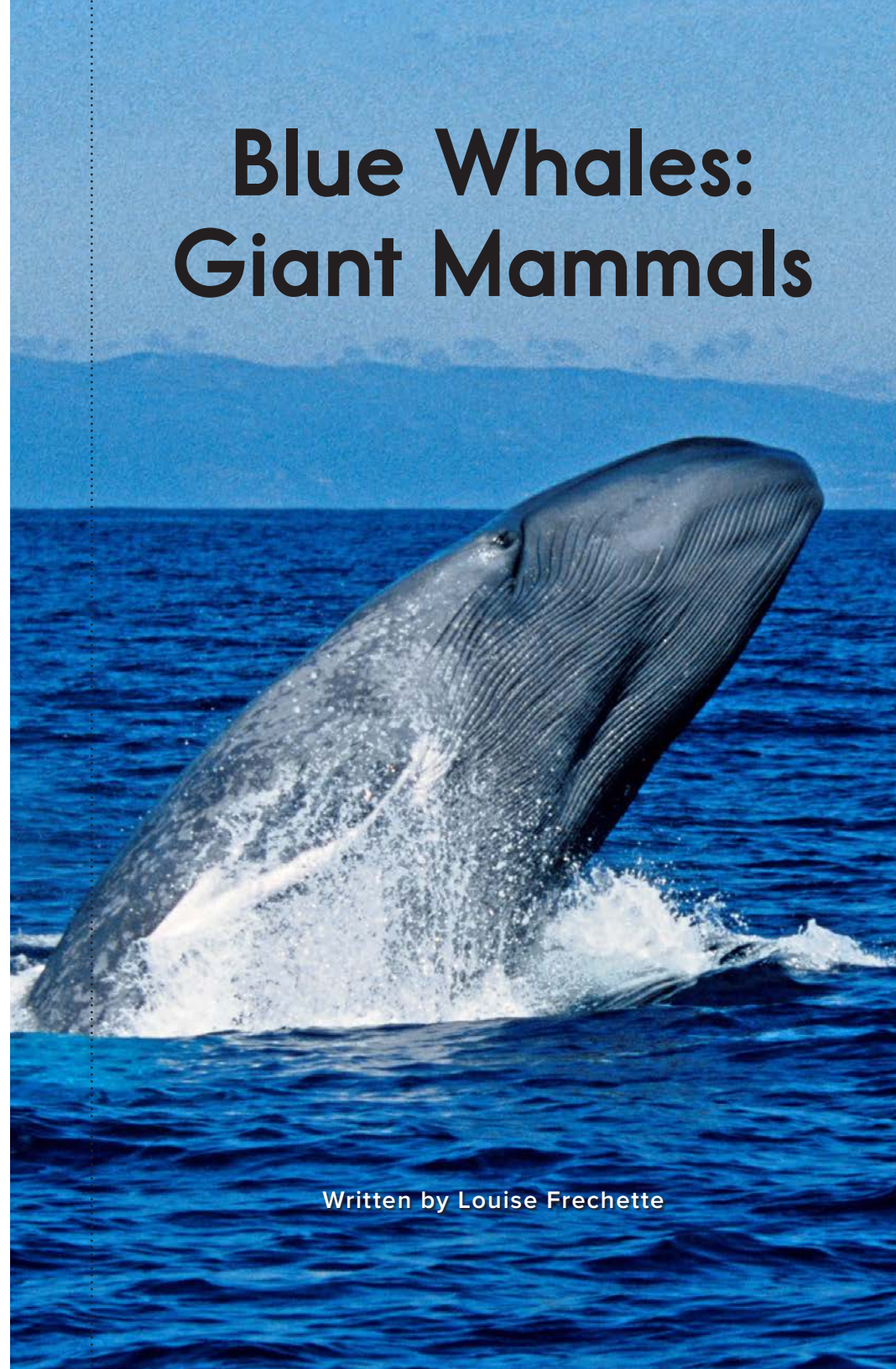
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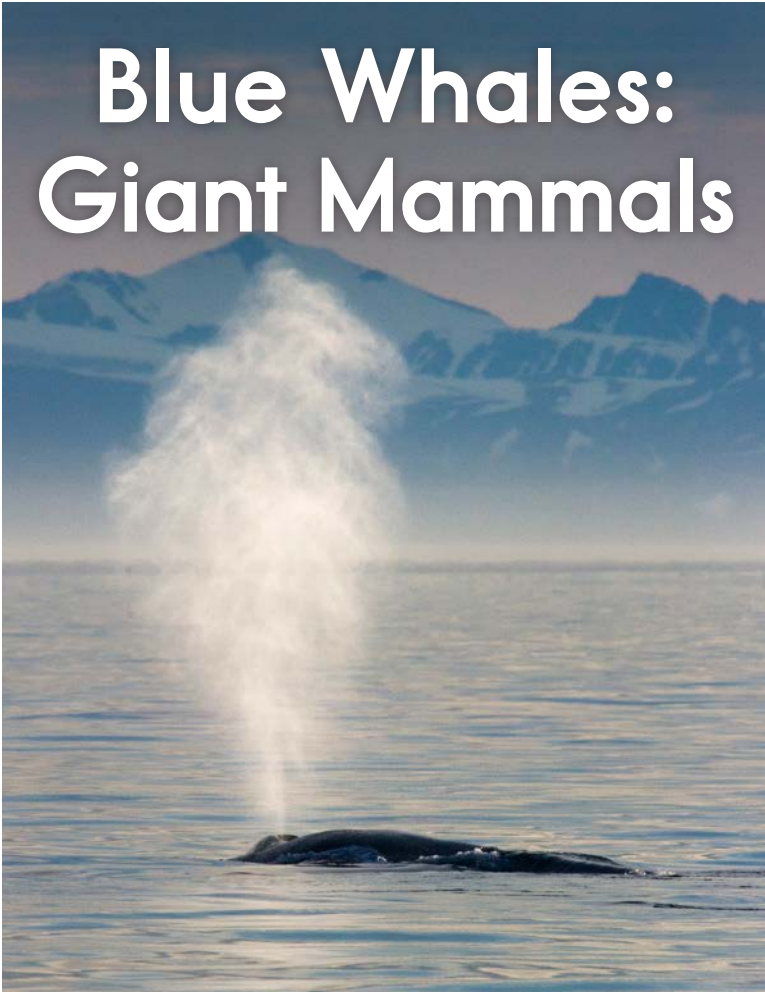
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# Blue Whales: Giant Mammals



Written by Louise Frechette

# Blue Whales: Giant Mammals



**Above:** A blue whale can spray air and condensed water vapor up to 30 feet (9.1 m) in the air.

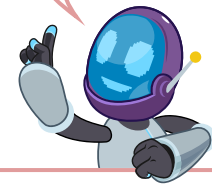
**Cover:** A blue whale leaps out of the water. This behavior is thought to be a method of communication.

**Page 3:** Blue whales have fifty to seventy throat grooves, which expand when they feed.

Written by Louise Frechette

## Focus Question

How does the blue whale's anatomy enable it to live in the ocean?



## Words to Know

baleen	gestation
buoyancy	keratin
cetaceans	krill
crustaceans	pectoral
flukes	plankton
frequencies	sonar

## Connections

### Writing

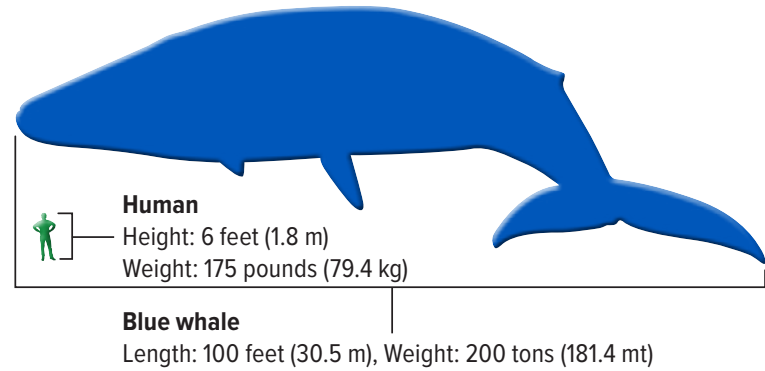
Using information from this book, write a persuasive essay answering the question: "Why are blue whales fascinating?"

### Science

Compare blue whales to humans. Use pictures of each to label the similarities and differences between these two mammals.



**How Big Is It?**



**Introduction**

A research vessel motors along the glassy surface of the Pacific Ocean off the coast of California. Onboard is a group of marine biologists continuously scanning the horizon for signs of Earth’s largest creature. Soon enough, they catch sight of what they are looking for—a towering water spout three stories high erupting from the ocean’s surface. Its source is *Balaenoptera musculus*—the majestic blue whale.

Blue whales live in all of the world’s oceans, with one of the largest populations inhabiting the waters of the northeastern Pacific Ocean. An estimated 2,800 blue whales travel annually between Alaska and Costa Rica, a country in Central America, in search of temperate waters and food. Scientists attempt to locate the blue whales to learn more about the behavior and migration habits of these giant mammals.

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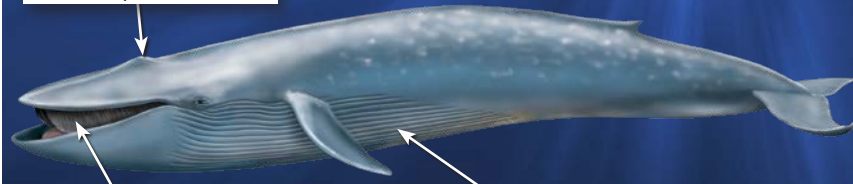
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## What Makes a Blue Whale a Mammal?

A blue whale breathes air through blowholes on the top of its head.



A blue whale has baleen—hairlike structures inside its upper jaw.

A blue whale has a layer of fat, called *blubber*, that helps keep it warm.

### All mammals

- breathe air
- are warm-blooded
- have hair on their bodies at some stage in their development
- produce milk to feed their babies

### Blue Whale Anatomy

The blue whale is the largest known animal to ever inhabit Earth. Even the most gargantuan of the dinosaurs was no match for a blue whale. Just one of these enormous sea creatures is the equivalent of four brontosaurus! A typical adult blue whale weighs in at 200 tons (181.4 mt) and is approximately 100 feet (30.5 m) long. Its tongue weighs as much as an elephant. Its heart is so large that a person could crawl through its main blood vessels!

A creature as colossal as the blue whale could never live on land because the force of gravity would cause the animal's body to collapse on itself. Water, on the other hand, provides **buoyancy**, which works against gravity and helps support the animal. The only way the blue whale can be so gigantic and still survive is by living in the sea.

Blue whales may be humongous, yet they still move with ease and grace through their watery habitat. They typically cruise at 5 miles per hour (8 kmph), although they can travel at speeds of up to 20 miles per hour (32 kmph).

A blue whale's graceful torso is long, with a flexible spine and elongated **pectoral** fins for maneuvering through the fluctuating ocean waters. On its tail is a pair of enormous **flukes**, or lobe-like structures. When a whale dives, its flukes rise from the ocean and create a circular "flukeprint" on the water's surface.



Whale watchers look for flukeprints on the water's surface to locate whales.

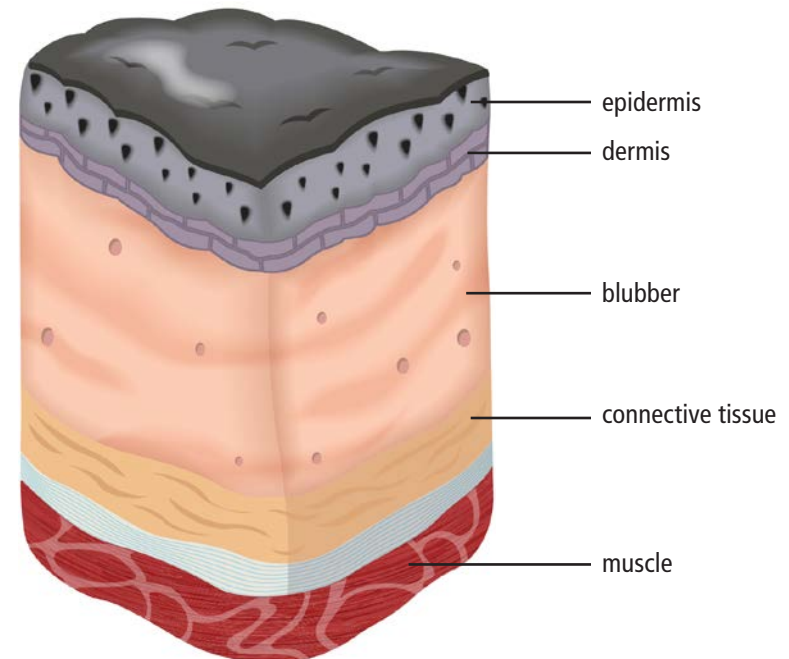


The two blowholes on a blue whale's head are like human nostrils.

Blue whales have lungs and breathe air just like humans, but on a much larger scale. Whale lungs can hold more than 1,000 gallons (3,785.4 L) of air, while adult human lungs hold only about 1.3 gallons (5 L). A whale rises to the surface and exhales through the pair of blowholes at the top of its head, spraying air and condensed water vapor 30 feet (9.1 m) into the air. Then it quickly inhales, filling its massive lungs with air in under two seconds. The blowholes connect to the whale's lungs through its trachea. A blue whale cannot breathe through its mouth.

A whale takes several breaths before its descent into the ocean depths. A flap covers its blowholes when the whale dives. Blue whales typically remain underwater for twenty to thirty minutes. Classified as shallow divers, they rarely go deeper than 700 feet (213.4 m). In comparison, the sperm whale can reach depths more than four times greater.

Even the shallowest of tropical waters can get cool, but that doesn't present a problem for blue whales. Like all **cetaceans**, these whales have a thick layer of fatty tissue called *blubber* just beneath their skin that serves to insulate them from cold temperatures. Since blubber is not as dense as water, it provides buoyancy and makes it easier for blue whales to float and swim.



Blubber provides insulation and helps whales maintain food reserves.

Female whales build up extra layers of blubber before giving birth so they won't have to leave their newborn calves to search for food. The surplus energy stored in their blubber tides them over until they can get food.



Krill are the main staple of a blue whale's diet. Krill often swarm near the water's surface.

### Diet and Feeding

When blue whales dive, they are searching for their favorite meal—tiny shrimplike **crustaceans** called **krill**. While it may seem strange that the largest animal in the world feeds on one of the smallest, it does so for good reason. Blue whales are huge, but their throats are actually quite narrow. A blue whale's esophagus is only inches wide, making it impossible to swallow anything big. In addition, blue whales lack teeth and must swallow their food whole.

Scientists divide whales into two groups. Some, like sperm whales, have teeth and are classified in the suborder *Odontoceti*, while others, like blue whales, have **baleen**, which places them in the suborder *Mysticeti*. Instead of teeth, blue whales have hundreds of plates of baleen lining their upper jaw.

Baleen consists of **keratin**—the same substance found in human hair and fingernails. It's fringed on the end, making it seem as though a mustache is growing inside the whale's mouth.

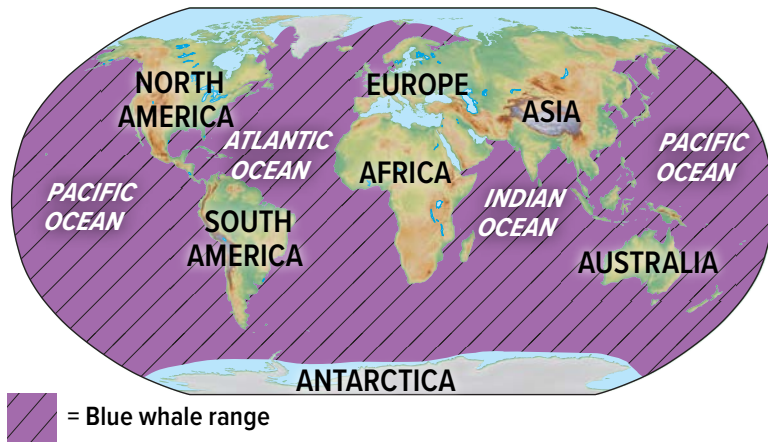
The baleen in a whale's mouth functions as a strainer. When feeding, a blue whale takes an enormous gulp of seawater teeming with krill. Its throat expands to accommodate thousands of gallons of seawater. Next, it closes its mouth and uses its massive tongue to push the water through the baleen and out into the sea. Since krill cannot pass through the baleen, they remain in the whale's mouth and are eventually swallowed whole.

A blue whale eats about forty million krill each day. Blue whales make multiple dives into a swarm of krill while feeding. A whale must consume huge quantities since it burns up to 3 million calories (300,000 kcal) per day.



A blue whale has up to eight hundred baleen plates in its mouth.

## Where Blue Whales Live



### Whale Range and Habitats

Blue whales can be found gliding through the depths of every ocean on our planet. While some species of whales travel in groups called *pods*, blue whales typically travel alone or in pairs. They migrate from higher to lower latitudes during the winter months in search of krill.

A popular location for Pacific blue whales is the Costa Rica Dome, off the southern coast of Central America. Water currents there force frigid air to the surface during summer months, resulting in large amounts of **plankton** and krill.

### Wowser!

The grooves on a blue whale's throat expand to help it gulp up to 17,000 gallons (64,352 L) of water at a time.



## Those Big Baby Blues

Female blue whales give birth while wintering in warm waters. The **gestation** period lasts about one year. At birth, baby blue whales, called *calves*, weigh more than 5,000 pounds (2,268 kg) and measure approximately 25 feet (7.6 m) in length. Within minutes, a calf swims to the surface with its mother to take its first breath.



Blue whales give birth in warm waters since newborn calves do not have much insulating blubber.

A female whale gives birth to a calf every two or three years. A blue whale calf has strong bonds with its mother and stays close by for at least the first six months of its life. During that time, the calf consumes up to 100 gallons (378.5 L) of milk and gains over 200 pounds (90.7 kg) every day. After migrating to summer feeding grounds, the calf is eventually weaned and goes off alone to look for krill. A blue whale is considered mature by the time it's ten years old.

## Call of the Cetaceans

Not only are blue whales the largest animals in the world, but they are also the loudest. Their sounds, which are louder than a jet engine, can travel for miles through the water. Yet even though whale sounds are powerful, they are difficult for people to hear since they are produced at extremely low **frequencies**. The frequencies are too low for the human ear to detect without special equipment.

Some scientists think blue whale sounds, or songs, function as a type of **sonar** that allows the whales to navigate dark ocean waters. Other scientists think that these whales sing to communicate with each other about where they are and what they're doing.



When a blue whale leaps out of the water, the behavior is called *breaching*.

## Just How Loud Is a Blue Whale's Song?



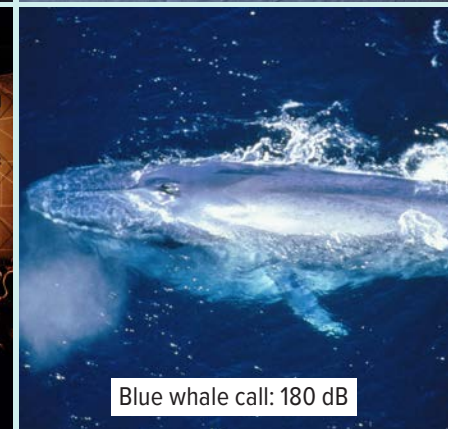
Conversation: 70 dB



Jet engine: 140 dB



Rock concert: 150 dB



Blue whale call: 180 dB

A decibel (dB) is a unit that measures the loudness or softness of a sound.

Researchers know that only male blue whales sing. They have also found that whales in one part of the world sing songs that are slightly different from songs sung by whales elsewhere. In calm seas, their songs can be detected by other blue whales up to 1,000 miles (1,600 km) away. The blue whales of the Indian Ocean have the most musical and versatile songs, producing four separate “notes” as they sing.

## Conclusion

Blue whales continue to fascinate researchers around the world. In the early to mid-twentieth century, so many blue whales were hunted that they were nearly driven to extinction. Blue whales also face other dangers, including collisions with ships in the open ocean. As an endangered species, these whales are protected under the International Whaling Commission. However, hunting bans remain hard to enforce, and the blue whale population has yet to fully recover.

Marine biologists and other scientists study migration movements and feeding patterns in order to better understand how these giants of the deep live and what they can teach us about life and survival in the ocean. By monitoring environmental and human-related threats, the goal of keeping blue whales safe from harm and helping their numbers rebound may still be achieved.



An estimated ten to twenty-five thousand blue whales live in the world's oceans. At one time, there were over three hundred thousand.

## Glossary

**baleen** (*n.*) page 9

a material in the mouth of certain whales that filters food from ocean water

**buoyancy** (*n.*) page 6

the ability or tendency to float

**cetaceans** (*n.*) page 8

ocean mammals, including whales, dolphins, and porpoises

**crustaceans** (*n.*) page 9

members of a group of mostly aquatic invertebrates, such as crabs, lobsters, and shrimp

**flukes** (*n.*) page 6

the two halves of a whale's tail

**frequencies** (*n.*) page 13

the rates of vibration of a sound wave

**gestation** (*n.*) page 12

the period when a baby develops inside its mother's body before being born; the development that occurs during this time

**keratin** (*n.*) page 10

a strong material produced by the bodies of some animals that makes up hair, hooves, claws, feathers, and fingernails

**krill** (*n.*) page 9

tiny crustaceans that live in oceans and are food for many other animals

**pectoral** (*adj.*) page 6

of, relating to, or located in or on the chest

**plankton** (*n.*) page 11

tiny plants and animals that live on or near the ocean's surface

**sonar** (*n.*) page 13

a system that sends high-frequency sound waves through water and registers the vibrations bounced back by an object