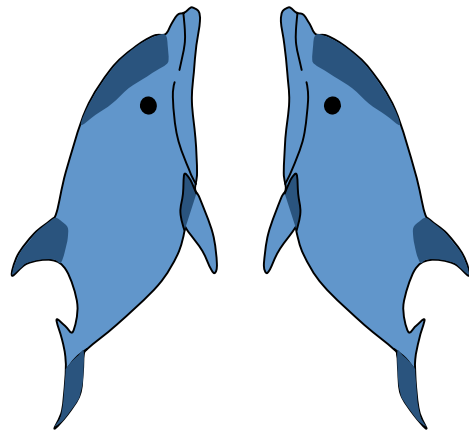


Family Delphinidae

A Dolphin Unit Study

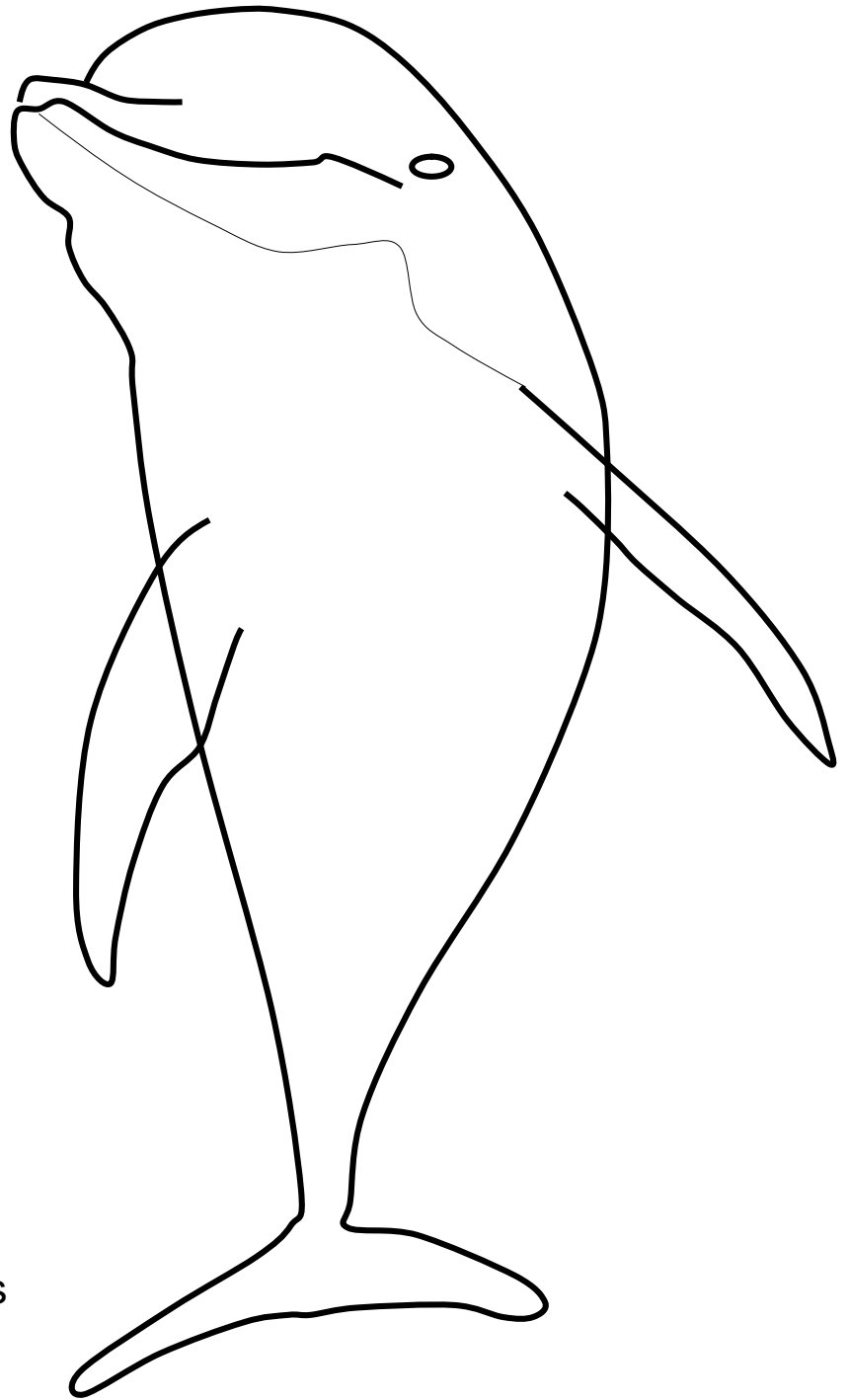


by

Gwen Nicodemus

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September 2005



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Note to Parents and Teachers

My intent for this workbook is for a homeschooling parent and/or guardian to be able to use it to teach his/her children about dolphins and for the children to become engaged and want to learn more. Most homeschooling parents have several children of different ages, so this is a difficult task. Consequently, some questions are “easy,” some are “difficult,” and some are designed to be “thinking” questions.

Most descriptions and text passages are targeted toward an upper grammar school level. Parents and/or teachers will need to read these sections to the younger students. The older students should be able to do this on their own.

The coloring pages are intended for everyone.

“Shareware” – This is a shareware unit study. If you like this unit study and use it, please remit payment to Gwen Nicodemus in one of the following ways:

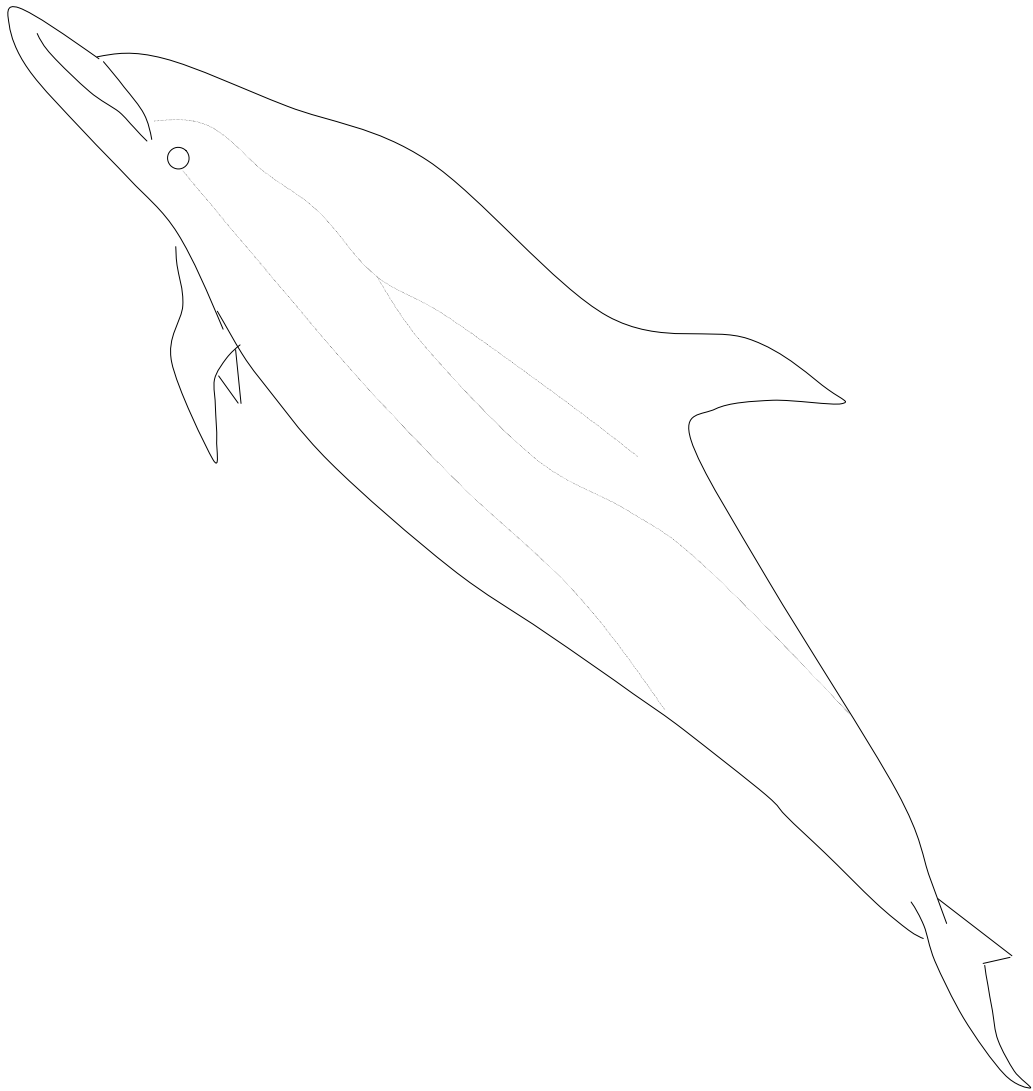
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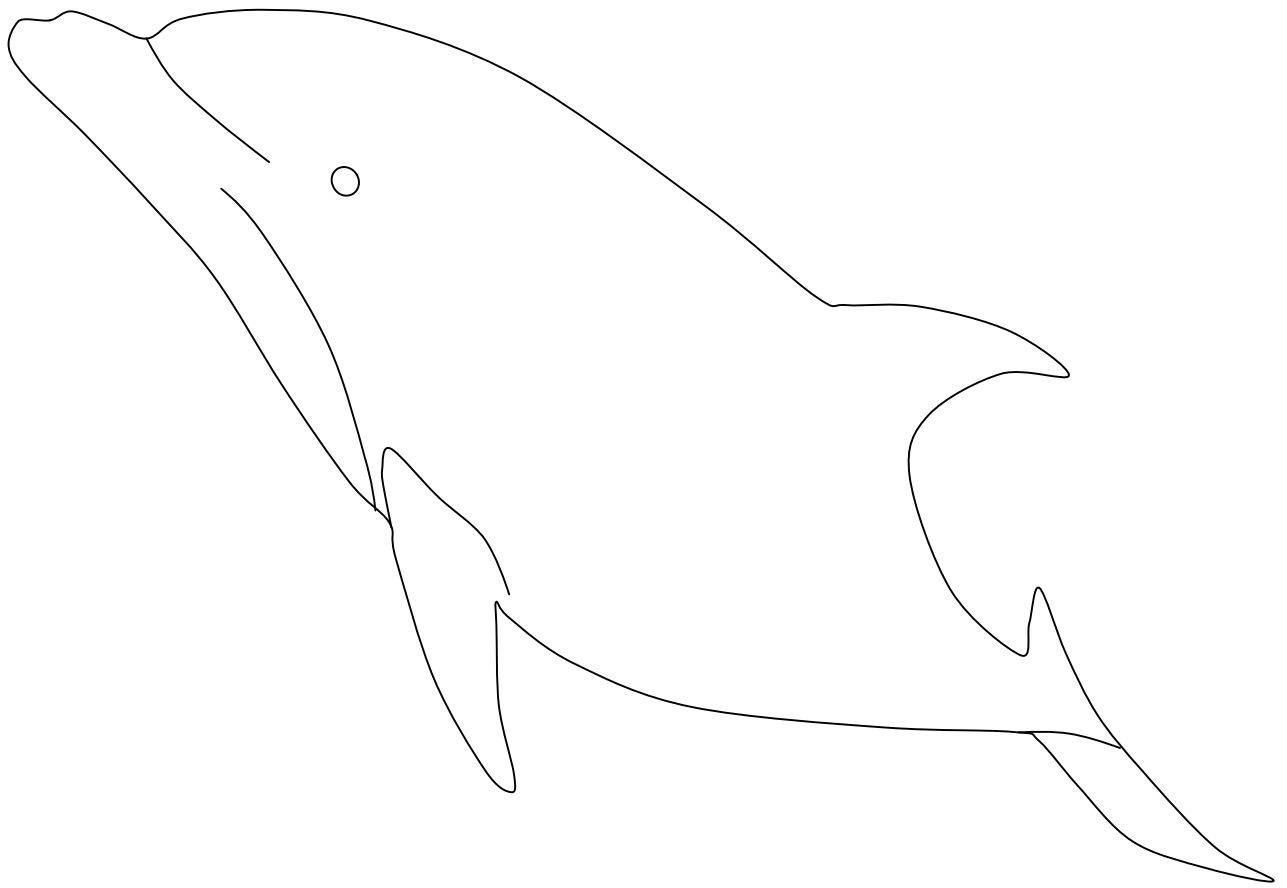
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What are a
Dolphins and
Why are They
so
Interesting?

General Science and
Philosophy



Dolphins

People have long been fascinated with dolphins. People usually like animals with big eyes, soft fur, and floppy ears. Dolphins have none of these things. Why are dolphins so interesting?

Why do you like dolphins?

What do you think other people like about dolphins?

What do you want to learn about dolphins?

Domain – Depending on the classification system used, there are either 2, 3, or 5 domains. Carl Woese's 1990 system has three domains:

Archaea – Organisms usually composed of only a single cell

Eubacteria – Bacteria

Eukaryota – Organisms with complex cells including animals and plants

Kingdom – Depending on the classification system used, there are either 3, 5, or 6 kingdoms. Carl Woese's 1990 classification system has four kingdoms:

Animalia – animals

Fungi – Fungi have plant and animal properties

Plantae – Plants

Protista – Organisms that are not plants, animals, or fungi are put into the kingdom called Protista.

Phylum – There are currently 35 Phyla in the Animalia Kingdom. Humans and dolphins are part of the phylum called Chordata. Members of the phylum Chordata have a hollow neural tube on their dorsal area at some point in their lives. The phylum Chordata is further broken down into three subphyla: Urochordata (nerve cords are lost in adulthood), Cephalochordata (have no vertebrae), and Vertebrata. Humans and dolphins are part of the subphyla Vertebrata. Vertebrata have backbones and spinal columns.

Class – Dolphins and humans are members of the class Mammalia. Members of this class are warm blooded animals that have four-chambered hearts, give birth to live young, have hair at some point in their lives, and have mammary glands to provide milk for their young.

Order – Dolphins are members of the order Cetacea (mammals fully adapted to marine life). Humans are members of the order of Primates (apes).

Family – Dolphins are members of the family Delphinidae. This family is also known as "toothed whales." Humans are members of the family Homindae (animals whose DNA is 97% similar to humans, can understand a language, and have a simple culture).

Genus – Genus is a special category because it becomes part of a species identification. Humans are members of the genus *Homo* and dolphins can be members of 17 different genera. Bottlenose dolphins are members of the genus *Tursiops*.

Species – The traditional definition of a species is a group of animals that are similar enough that they can have babies with each other and the babies are fertile and can have babies. This definition does not work for the animals that reproduce asexually. A species is identified by its genus and species, so humans are called *Homo sapiens* and bottlenose dolphins are called *Tursiops truncatus*.

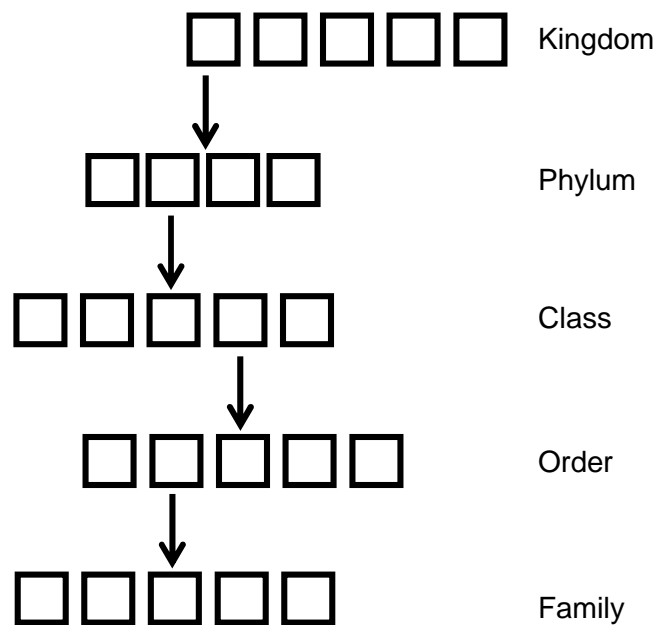
What is a Dolphin?

To understand exactly what a dolphin is you must first understand the scientific classification system.

Scientists divide animals into different groups. This science, or process, of grouping is called taxonomy. To divide up living things, scientists use Kingdoms, Phyla, Classes, Orders, Families, Genera, and Species.

All dolphins are part of the order called Cetacea. Cetaceans are animals in the class called Mammalia that have adapted to life in the water. There are different families of dolphins, and other types of animals, in the order Cetacea. River dolphins are in a different family than ocean dolphins. This workbook only discusses oceanic dolphins which are part of the family called Delphinidae.

The bottlenose dolphin (which is the most familiar dolphin because of television shows) is more closely related to the orca (the killer whale) than it is to river dolphins that live in fresh water.



Scientific Classifications

The official name of a species is its genus name followed by the species name. This is how scientists refer to a species. Humans are *Homo sapiens*. Bottlenose dolphins are *Tursiops truncatus*. The names are written in *italics* because the words are Latin, a foreign language, and whenever you use a foreign word in English text, you are supposed to put the text in italics. (If you are not typing, but handwriting, then put the foreign words belong in quotes).

Taxonomy	Humans	Bottlenose Dolphin	Lions	Palm Tree
Kingdom	Animalia	Animalia	Animalia	Plantae
Phylum	Chordata	Chordata	Chordata	Magnoliophyta
Subphylum	Vertabrata	Vertabrata	Vertabrata	
Class	Mammalia	Mammalia	Mammalia	Liliopsida
Order	Primates	Cetacea	Carnivora	Arecales
Suborder		Odontoceti		
Super Family	Hominoidea			
Family	Homindae	Delphinidae	Felidae	Areceaceae
Subfamily	Homininae			
Tribe	Hominini			
Genus	Homo	Tursiops	Panthera	
Species	H. sapiens	T. truncatus	P. leo	

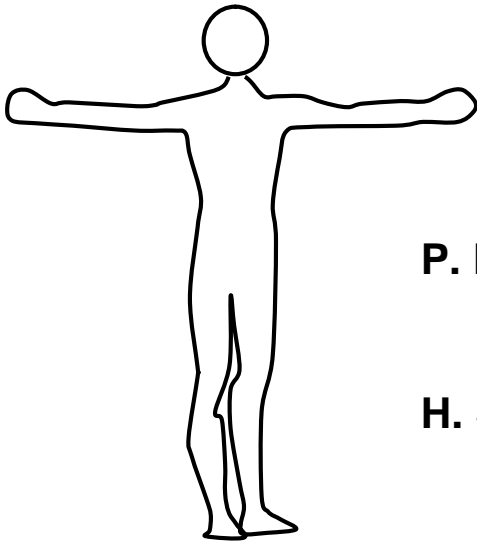
What is the genus name for a lion?

What order are lions in?

What order are humans in?

What is a Dolphin?

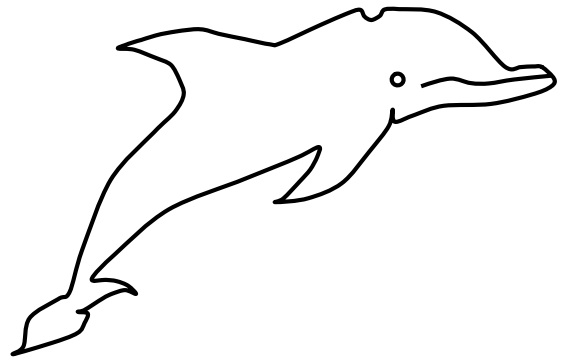
Match the picture to the name or family.



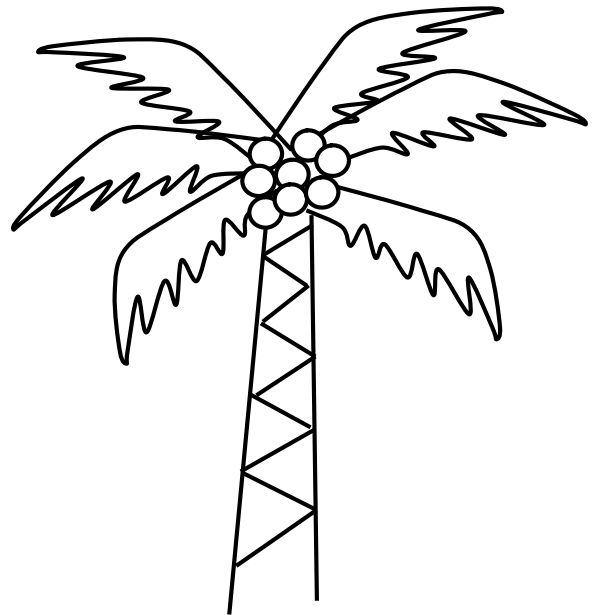
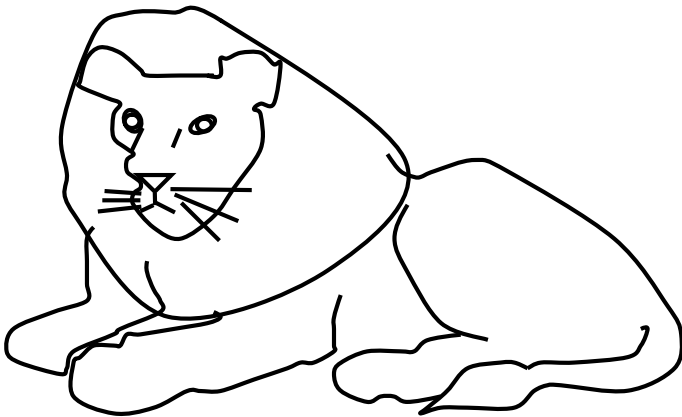
P. Leo

H. Sapiens

T. Truncatus



Arecaeae



35 Species of Dolphins

Genus: Stenella

Atlantic Spotted Dolphin
Stenella frontalis
Clymene Dolphin
Stenella clymene
Pantropical Spotted Dolphin
Stenella attenuata
Spinner Dolphin
Stenella longirostris
Striped Dolphin
Stenella coeruleoalba

Genus: Steno

Rough-toothed Dolphin
Steno bredanensis

Genus: Tursiops

Bottlenose Dolphin
Tursiops truncatus

Genus: Cephalorhynchus

Chilean Dolphin
Cephalorhynchus eutropia
Commerson's Dolphin
Cephalorhynchus commersonii
Heaviside's Dolphin
Cephalorhynchus heavisidii
Hector's Dolphin
Cephalorhynchus hectori

Genus: Grampus

Risso's Dolphin
Grampus griseus

Genus: Lagenodelphis

Atlantic White-sided Dolphin
Lagenorhynchus acutus
Dusky Dolphin
Lagenorhynchus obscurus
Hourglass Dolphin
Lagenorhynchus cruciger
Pacific White-sided Dolphin
Lagenorhynchus obliquidens
Peale's Dolphin
Lagenorhynchus australis
White-beaked Dolphin
Lagenorhynchus albirostris

Genus: Lagenodelphis

Fraser's Dolphin
Lagenodelphis hosei

Genus: Orcaella

Irrawaddy Dolphin
Orcaella brevirostris
Australian Snubfin Dolphin
Orcaella heinsohni

Genus: Peponocephala

Melon-headed Whale
Peponocephala electra

Genus: Orcinus

Orca (Killer Whale)
Orcinus orca

Genus: Feresa

Pygmy Killer Whale
Feresa attenuata

Genus: Pseudorca

False Killer Whale
Pseudorca crassidens

Genus: Globicephala

Long-finned Pilot Whale
Globicephala melas
Short-finned Pilot Whale
Globicephala macrorhynchus

Genus: Delphinus

Long-beaked Common Dolphin
Delphinus capensis
Short-beaked Common Dolphin
Delphinus delphis

Genus: Lissodelphis

Northern Rightwhale Dolphin
Lissodelphis borealis
Southern Rightwhale Dolphin
Lissodelphis peronii

Genus: Sotalia

Tucuxi
Sotalia fluviatilis

Genus: Sousa

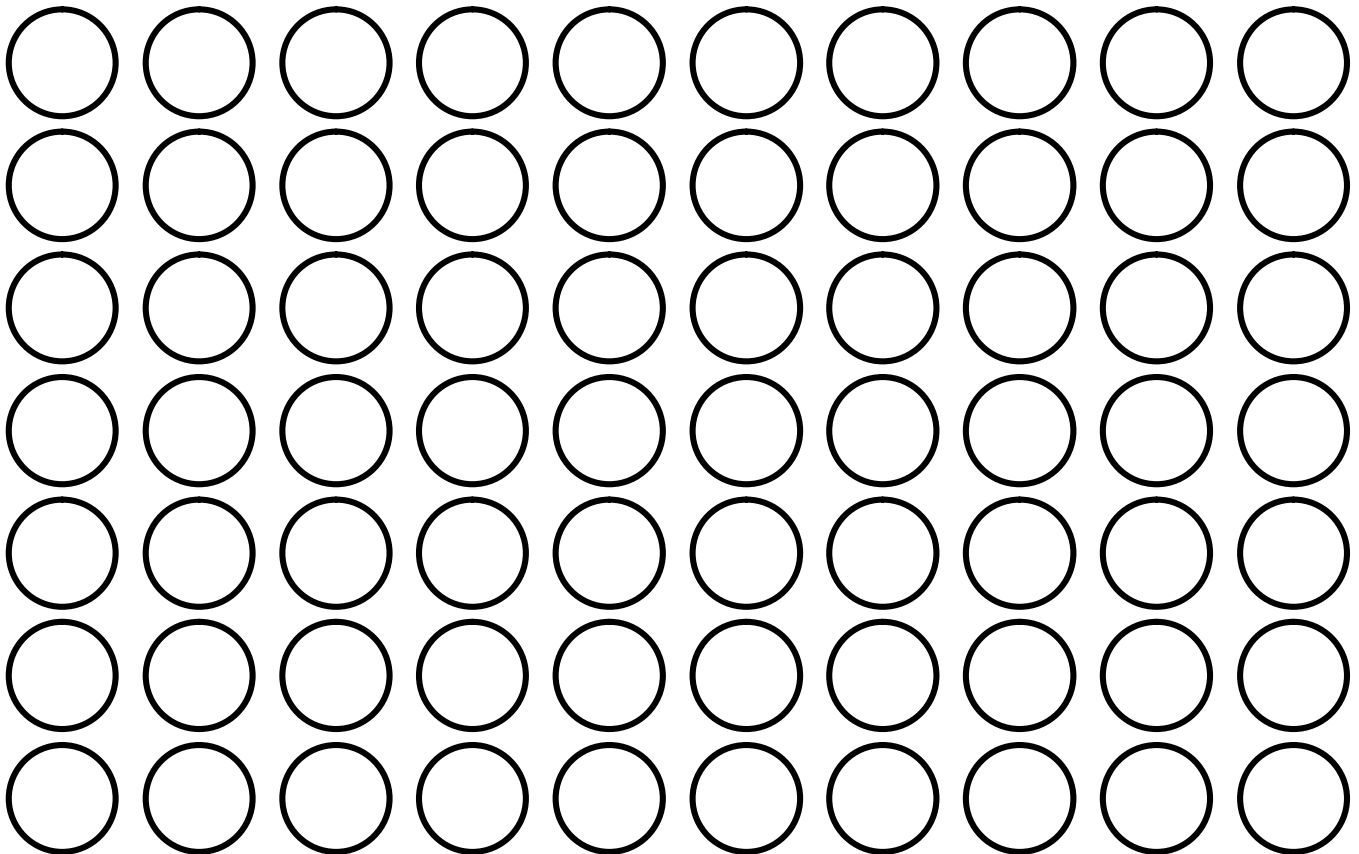
Pacific Humpback Dolphin
Sousa chinensis
Indian Humpback Dolphin
Sousa plumbea
Atlantic Humpback Dolphin
Sousa teuszii

35 Species of Dolphins

Color 35 of the circles red. That is how many species of dolphins there are.

Color 17 of the circles blue. That is how many genera of dolphins there are.

How many circles are below?



Scientific Classifications

What is the genus name for the Orca, also known as the killer whale?

What is the species name for Hector's dolphin? How would scientists refer to Hector's dolphin?

What is the family name for the bottlenose dolphin?

Which is a smaller group of animals? A phylum or an order?

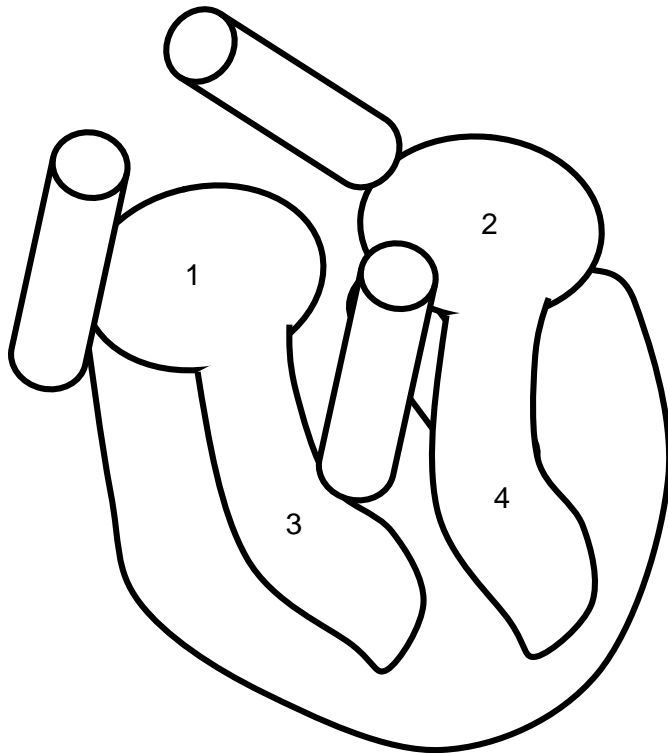
What is the genus name for the Spinner dolphin?

What is the family name for the Spinner dolphin?

Which genus has the most number of species?

What is a Dolphin?

Dolphins are **mammals**. Mammals are animals that belong to the class called Mammalia. This means that the females have mammary glands that make milk to nurse the young, they have hair or fur at some point in their lives, are warm blooded, have a four-chambered heart, have a brain with a special part called a neocortex¹, and have a brain that regulates the circulatory system. Mammals also have skin that is made up of three layers and they have three bones in each ear.



This is a simplified picture of a four-chambered heart.

Count the four chambers. Each chamber has a place for blood to go in and a place for blood to go out. The chambers are surrounded by a strong muscle.

Color each chamber a different color.

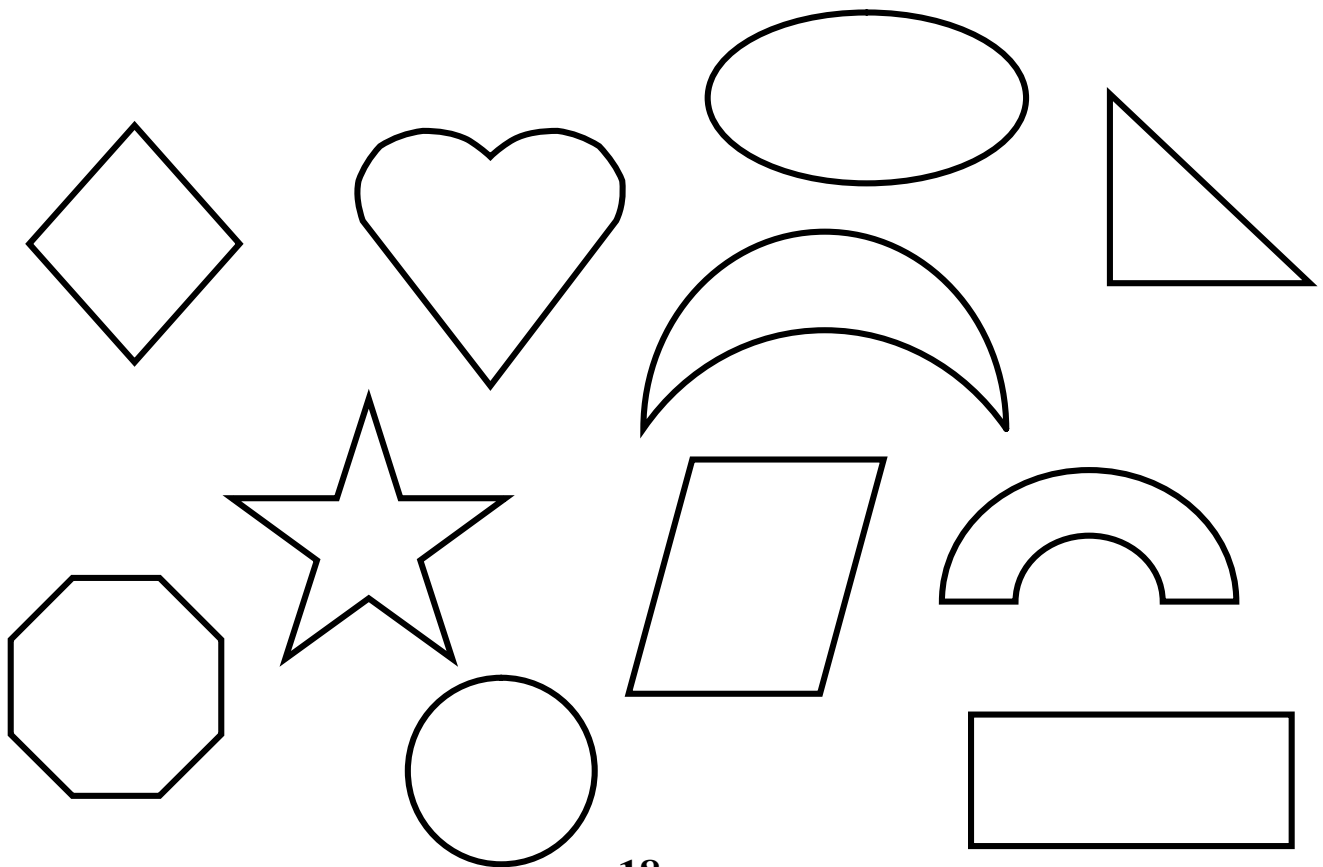
¹The neocortex is the part of the brain thought responsible for intelligence.

What is a Dolphin?

Dolphins are also Cetaceans. Cetaceans are an order of mammals adapted to aquatic life. Their body is spindle-shaped, their forelimbs are modified into flippers, and their tiny hind limbs are hidden in their body and are not useful. Dolphins have tails with horizontal flukes (tail fins), are nearly hairless, and are insulated with a thick layer of blubber.

Spindle-shaped means that the shape is thickest in the middle and is tapered down (not as thick) on both sides.

What are the shapes below? Which of the below shapes are spindle-shaped? How many shapes are there? Color the spindle shapes Orange and the non-spindle shapes green.



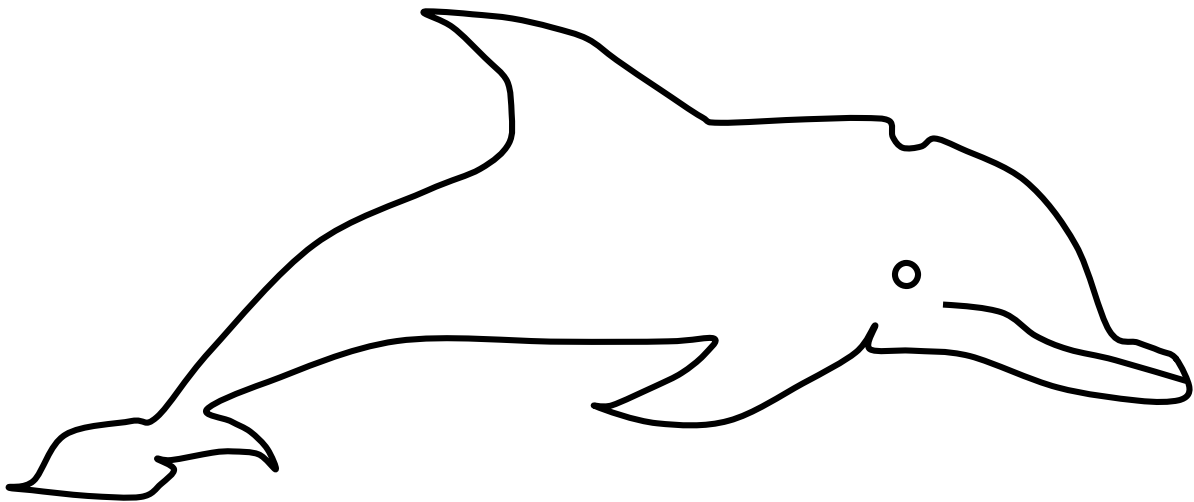
Do Dolphins have Hair?

Now, you might be wondering at this point about hair. According to the definition of a mammal, mammals have hair at some point in their lives. However, according to the definition of a Cetaceans, Cetaceans have very little hair.

Have you ever seen hair on a dolphin? _____

Do you have hair? _____

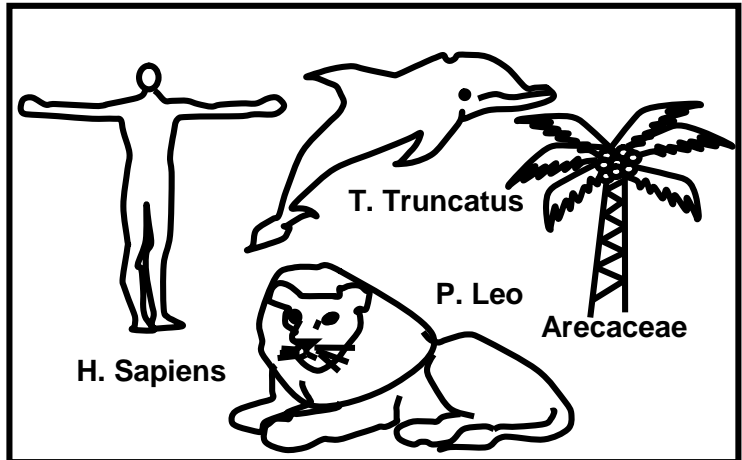
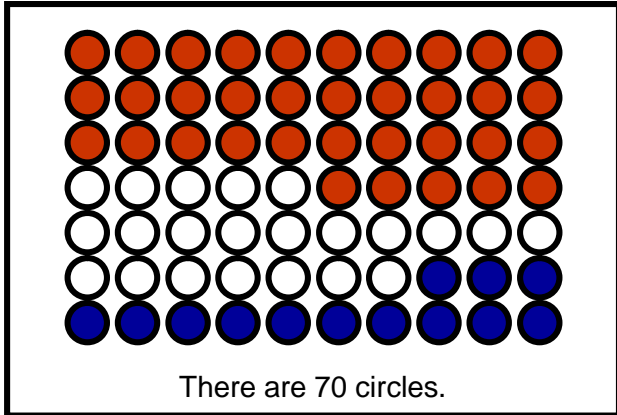
The mystery resolves itself this way. When dolphins are born, they have tiny hairs on their rostrum (mouth). As they age, the hairs disappear.



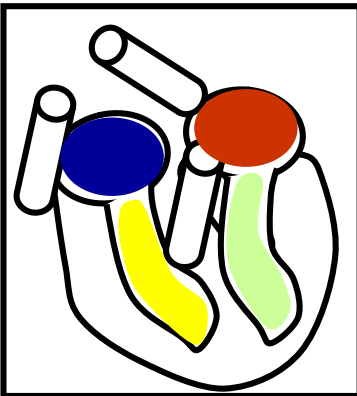
This dolphin is an adult. When it was a baby it had a little bit of hair on its rostrum, its mouth. Draw the hair on this dolphin how it might have appeared when it was a baby.

What is the genus name for a lion? *Panthera*
 What order are lions in? *Carnivora*
 What order are humans in? *Primates*

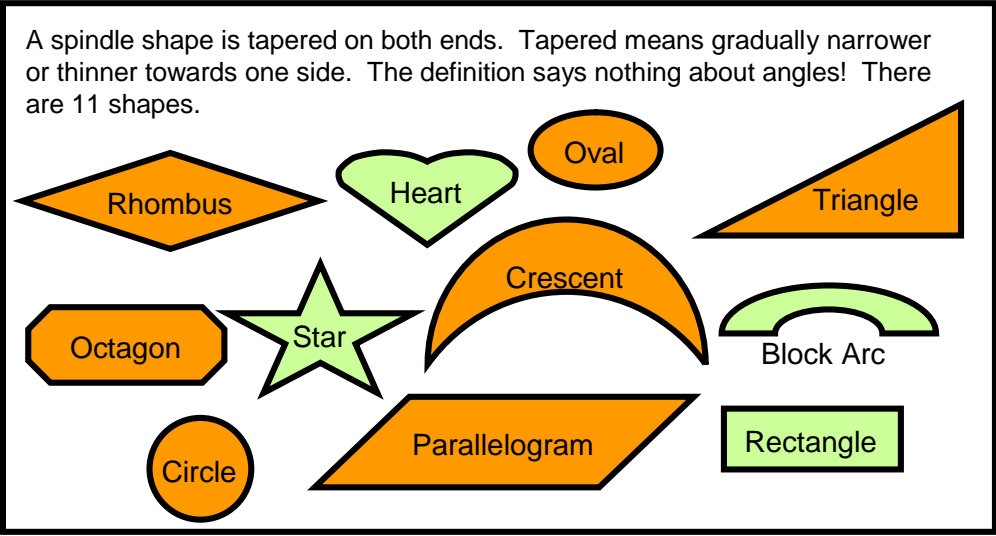
Answers



What is the genus name for the Orca, also known as the killer whale? *Orcinus*
 What is the species name for Hector's dolphin? *Hectori*
 How would scientists refer to Hector's dolphin? *Cephalorhynchus hectori*
 What is the family name for the bottlenose dolphin? *Delphinidae*
 Which is a smaller group of animals? A phylum or an order? **Order**
 What is the genus name for the Spinner dolphin? *Stenella*
 What is the family name for the Spinner dolphin? *Delphinidae*
 Which genus has the most number of species? *Lagenodelphis* has 6 member species.
***Stenella* is the next closest with 5 member species.**



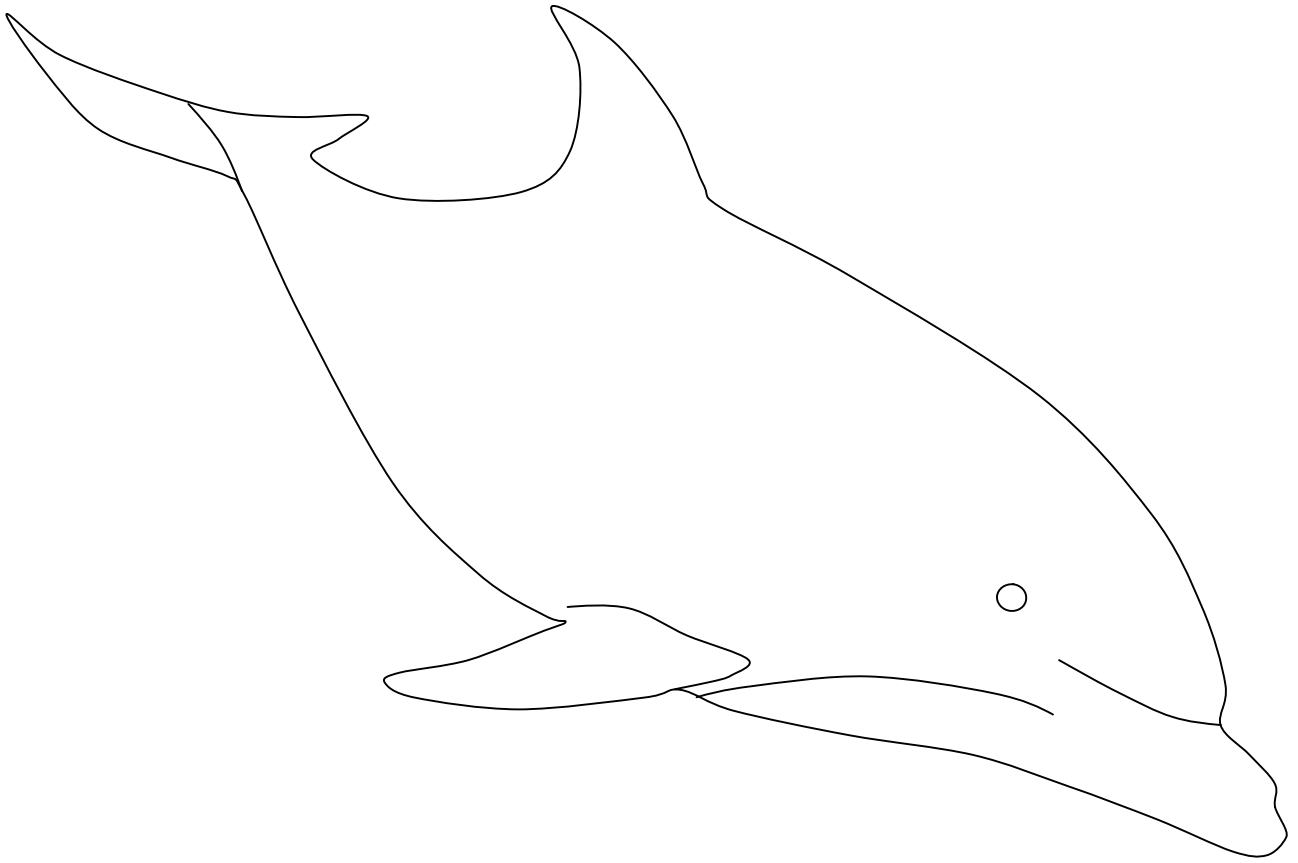
Dolphins sometimes have hair on their mouths when they are born.



A dolphin is a spindle shaped mammal that lives in the ocean, gives birth to live young, has a four chambered heart, breathes air, and is warm blooded.

Dolphin Anatomy

Biology



Blowholes and Lungs

Dolphins are mammals and as such they breathe air; however, unlike people, dolphins cannot breathe air through their mouths. Dolphins breathe air through a blowhole on the top of their head. (We have two nostrils on the front of our face. Dolphins have one blowhole on the top of their head.)

Why do you think dolphins cannot breathe through their mouths?

The blowhole is connected to the dolphin's lungs. The blowhole is opened and closed by a strong muscle. A dolphin can empty and refill its lungs in less than a fifth of a second. Air can leave the dolphins blowhole at speeds of over 100 miles per hour.

How fast have you ever been driven in a car? The fastest speed limit on the Interstates in the United States is 75 miles per hour. How much faster can a dolphin release air from its lungs than you can legally travel in a car in the United States?

Colors

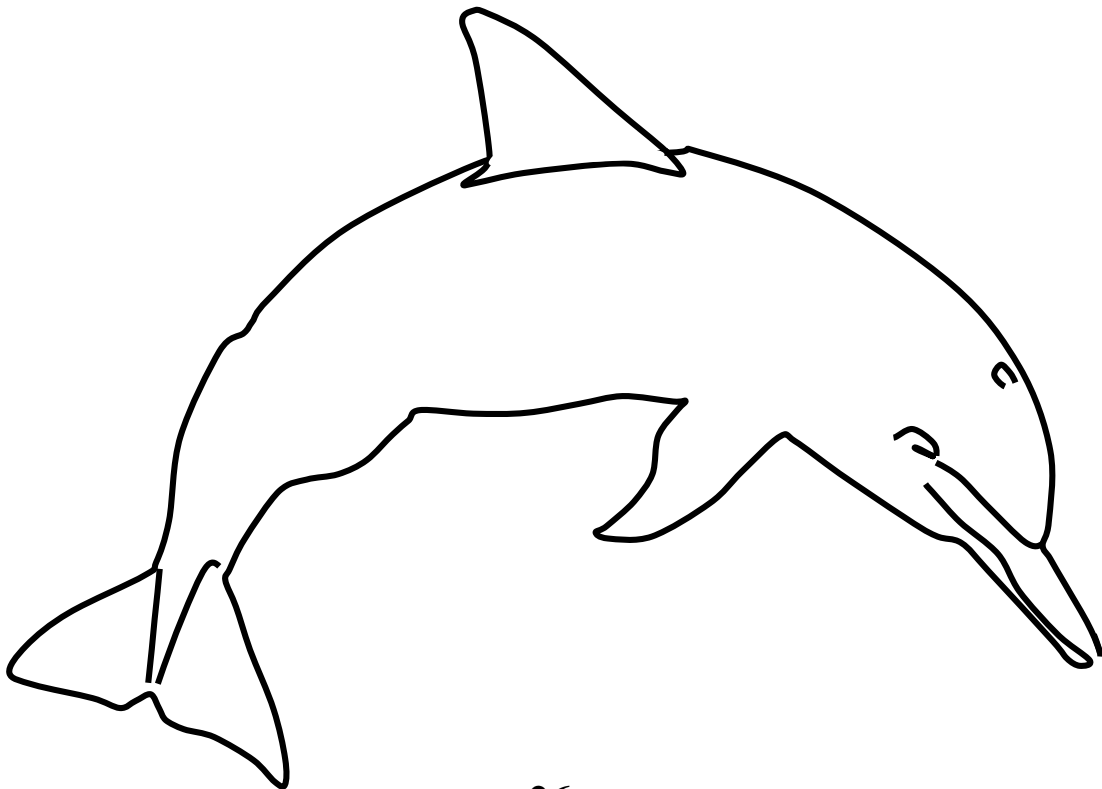
Dolphins are light colored on their bellies and darker colored on their backs. Why?

Imagine you are in the ocean under water looking up at a dolphin. A light colored dolphin can blend in with the water you see.

Now, imagine you are in the air looking down at the ocean. A dark colored dolphin can blend in better with the water.

The dark and light coloring is referred to as countershading.

Countershade color the dolphin below.



Eyes

Dolphins can see above the water and below the water. Humans can only really focus above the water and have to use goggles to see under the water. Next time you are in a swimming pool, open your eyes under water and look at something. Can you see well? Bring goggles and try looking at something under water then. Can you see better?

Salt-water dolphins have four major differences in their eyes as compared to humans.

Firstly, they have a special elastic lenses on their eyes that expand and contract. These lenses allow the dolphin to focus above and below the water. Strong muscles around the eye change the shape of that lens when needed.

Secondly, they have a special glands that produces a jellylike mucus that helps protect their eyes from the salt water.

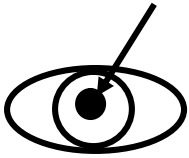
Thirdly, the eye of a dolphin has 7,000 times as many rod cells as a human eye which enables the dolphin to gather more light and allows the dolphin to see in deep water.

Finally, dolphins have pupils shaped like horseshoes instead of circles like humans. When dolphin pupils constrict, the pupils go from a horseshoe shape to two thin lines. This makes focusing automatic.

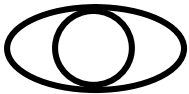


Eyes

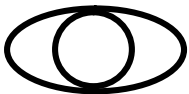
Humans



Humans have pupils shaped like circles. Go into the bathroom and turn out all of the lights. Light a flashlight. Look at your pupil in the mirror. How big is it? This condition is called a “dilated” pupil. Now, turn on all of the lights and look at your pupil in the mirror. This condition is called a constricted pupil. Your pupils are used to control the amount of light that enters your eye.

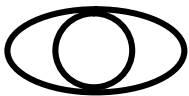


Now, draw your pupil when it is constricted and there is a lot of light around you.

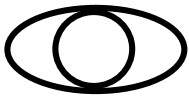


Finally, draw your pupil how it appears when it is dark.

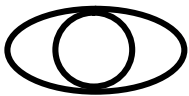
Dolphins



Draw a dolphin's pupil on this eye.



Draw what you think the dolphin's pupil would look like when it is exposed to a lot of light.



Draw what you think the dolphin's pupil would look like when there is little light around.

Fins, Flippers, Flukes and Thermoregulation

Mammals are warm-blooded animals. We call an animal “warm-blooded” when its body is in charge of maintaining the right body temperature. Unless it is really cold, really hot, or the animal is sick, the animal will maintain the same body temperature.

We call animals “cold-blooded” when their activity level and temperature is based on the local environment. Snakes are cold-blooded animals. When it is hot, snakes have higher body temperatures and they are active. When it is cold, snakes hibernate and go to sleep. Cold-blooded animals have similar body temperatures to the local environment.

Are you warm blooded or cold blooded?

How is your temperature measured?

What is the temperature of a cat or a dog?

Fins, Flippers, Flukes and Thermoregulation

Humans and other land animals lose some of their body heat when they breathe since some heat leaves with the air they exhale. Humans and other animals generate heat in their bodies with their basic metabolism; just living makes heat.

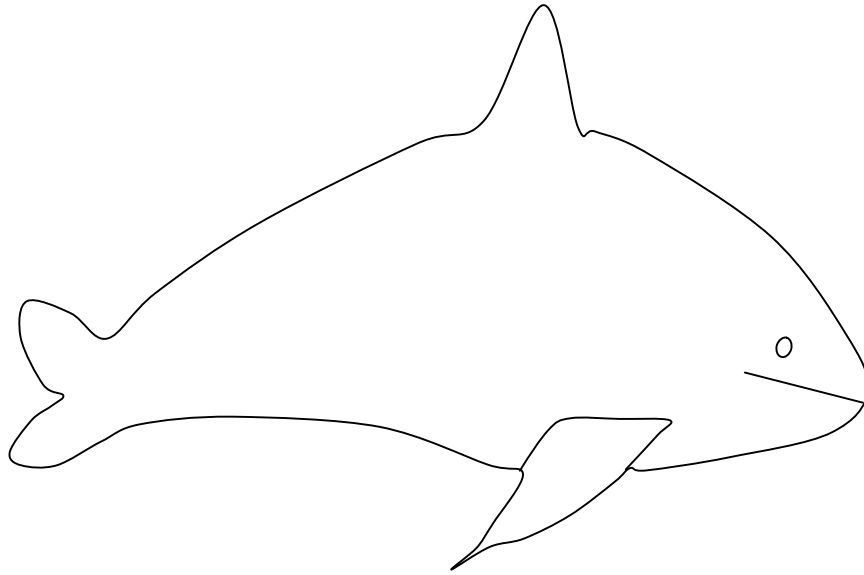
Dolphins are warm-blooded animals. Dolphins need to regulate their body temperature to keep it the same all the time. A bottlenose dolphin's normal temperature is 98.4°F in its center. A dolphin's skin temperature is cooler than the temperature inside its body.

Since dolphins do not breathe as often as land animals, they do not lose as much heat by breathing.

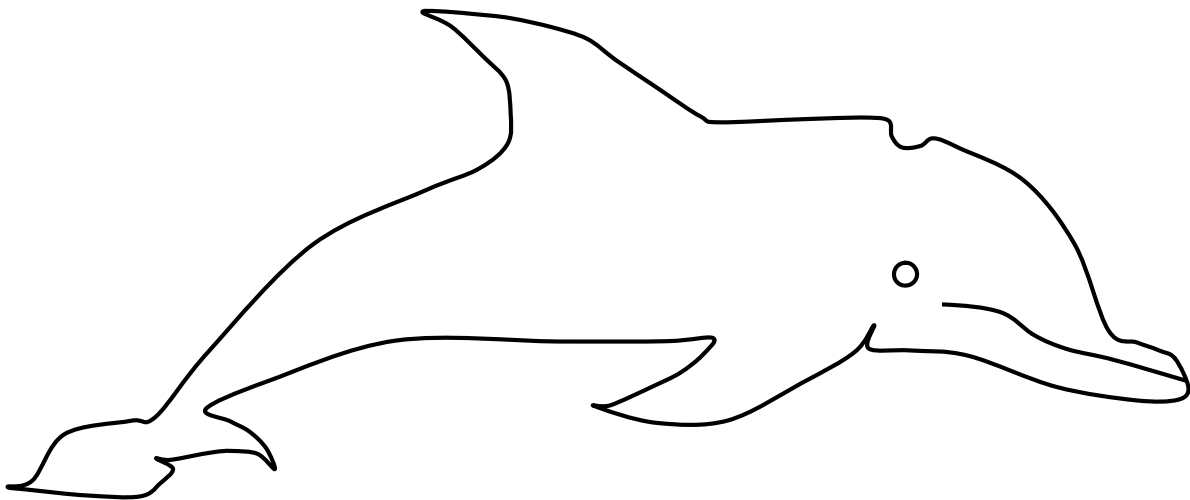
Dolphins lose heat a little bit through breathing, but most of their heat is lost through their flippers, fins, and tail flukes. There is not blubber in dolphin flippers, fins, and flukes; however, the fins, flukes, flippers do have arteries and veins running through them. Since the blood running through the veins is not protected by blubber, the heat in the blood is lost to the water.

Water is 25 times more efficient at carrying away heat than air is.

Harbor Porpoise

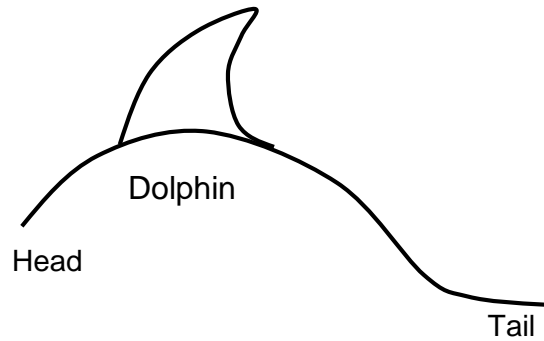
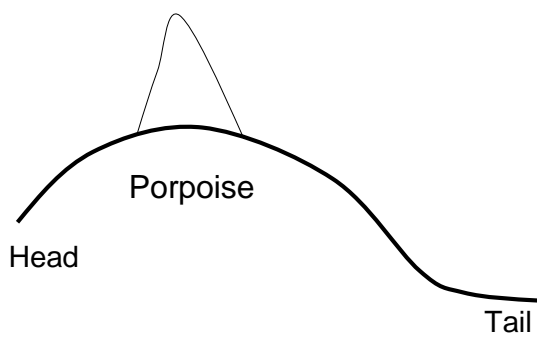


Dolphin

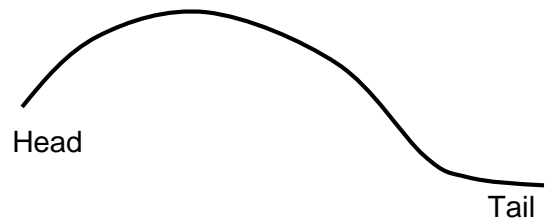
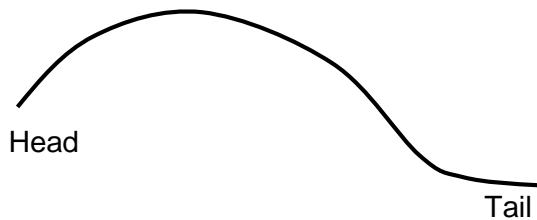


Dorsal Fins

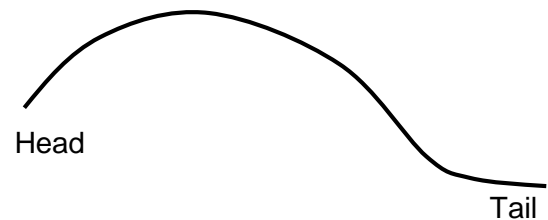
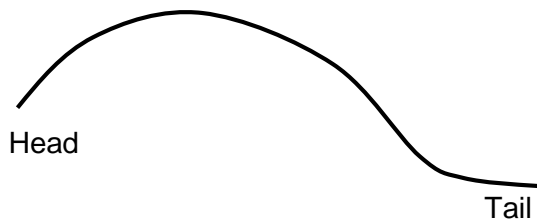
Dolphins have a fin on their back called the dorsal fin. Unlike fish, a dolphin's dorsal fin does not have bones in it. The dorsal fin helps the dolphin maintain its balance. Dolphin dorsal fins are sort of like human fingerprints in that we have not yet seen two that are identical. Dolphin dorsal fins are usually not a perfect triangle and point towards their tail flukes. A porpoise's dorsal fin is usually triangular.



Practice drawing a dolphin's dorsal fin.



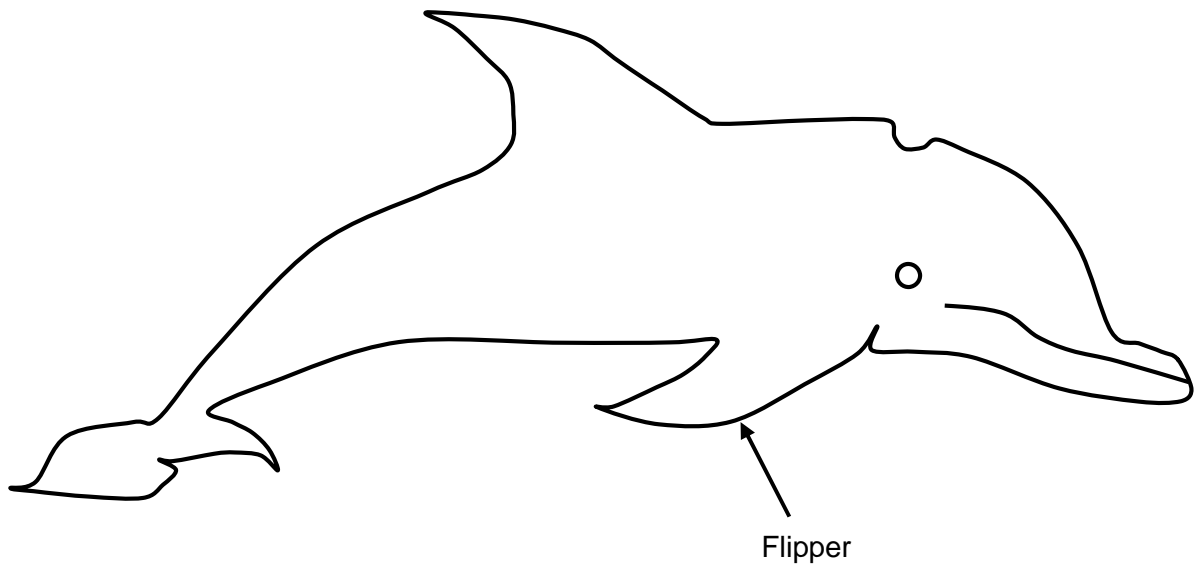
A porpoise's dorsal fin is usually more triangular than a dolphins.
Practice drawing a porpoise's dorsal fin.



Flippers

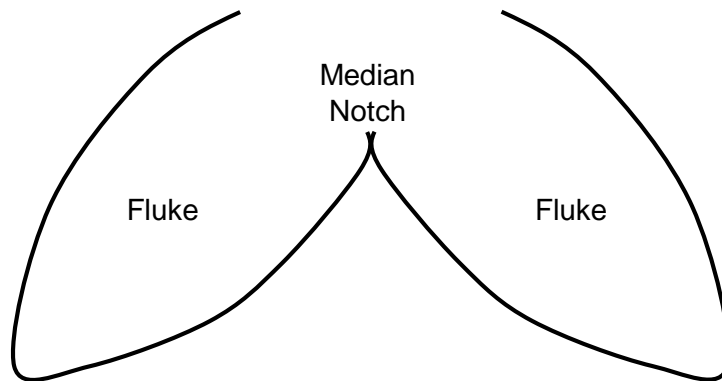
A dolphin has a flipper on each side of its body. The flippers are also called “pectoral fins.” The dolphin’s flippers are like your arms.

Dolphins use their flippers to steer through the water.



Tail Flukes

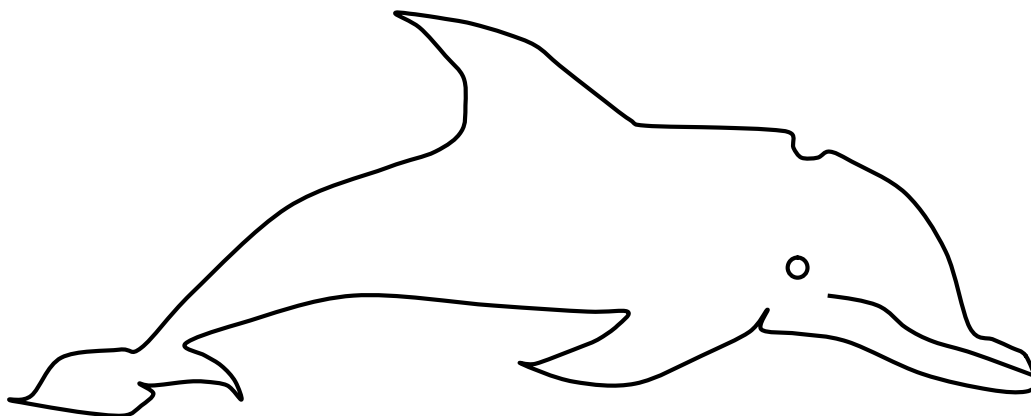
A dolphin has tail flukes at the end of its body. The median notch is in the center of the tail flukes. Dolphins' tails move up and down to swim. Fish, including sharks, have tails that move from side to side.



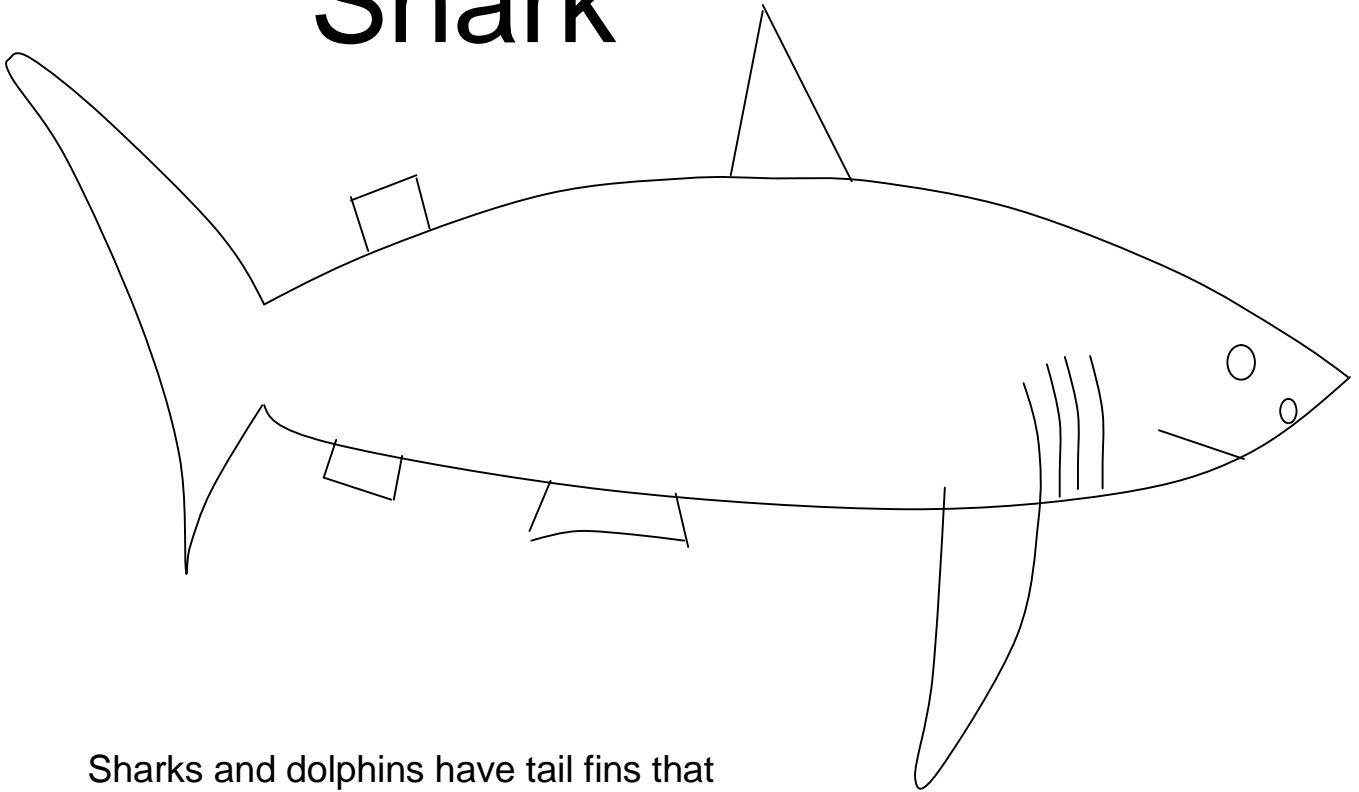
Have you ever seen a picture of a mythical mermaid? Notice how the mermaid's tail seems like its really two legs glued together?

A dolphin's tail is not fused legs! A dolphin's tail is part of its spinal column. Unlike fish, dolphins move their tails up and down.

Where are this dolphin's tail flukes?

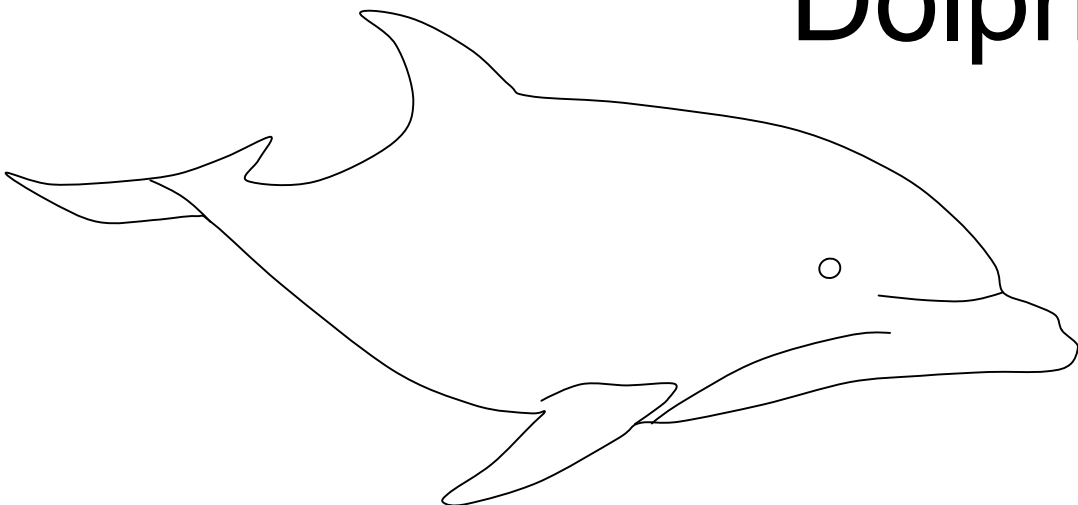


Shark



Sharks and dolphins have tail fins that point in different directions. This is because the shark's tail goes from side to side while the dolphin's tail goes up and down.

Dolphin



Skin

Layers

Mammals have three layers of skin. Since dolphins are part of the class of animals called Mammalia, they also have three layers of skin.

The first layer, the layer that you can touch, is called the **epidermis**. This is the layer that you can touch. Some people say that dolphin skin feels like a wet inner tube. Some species of dolphins shed their epidermal layer of skin every 2 to 4 hours. This is probably to keep them clean, smooth, and free of parasites.

The epidermal layer of skin on a dolphin is ten times thicker than any land animal; however, the skin on a dolphin is very sensitive and can break easily. Dolphins can even be sunburned if they get stranded!

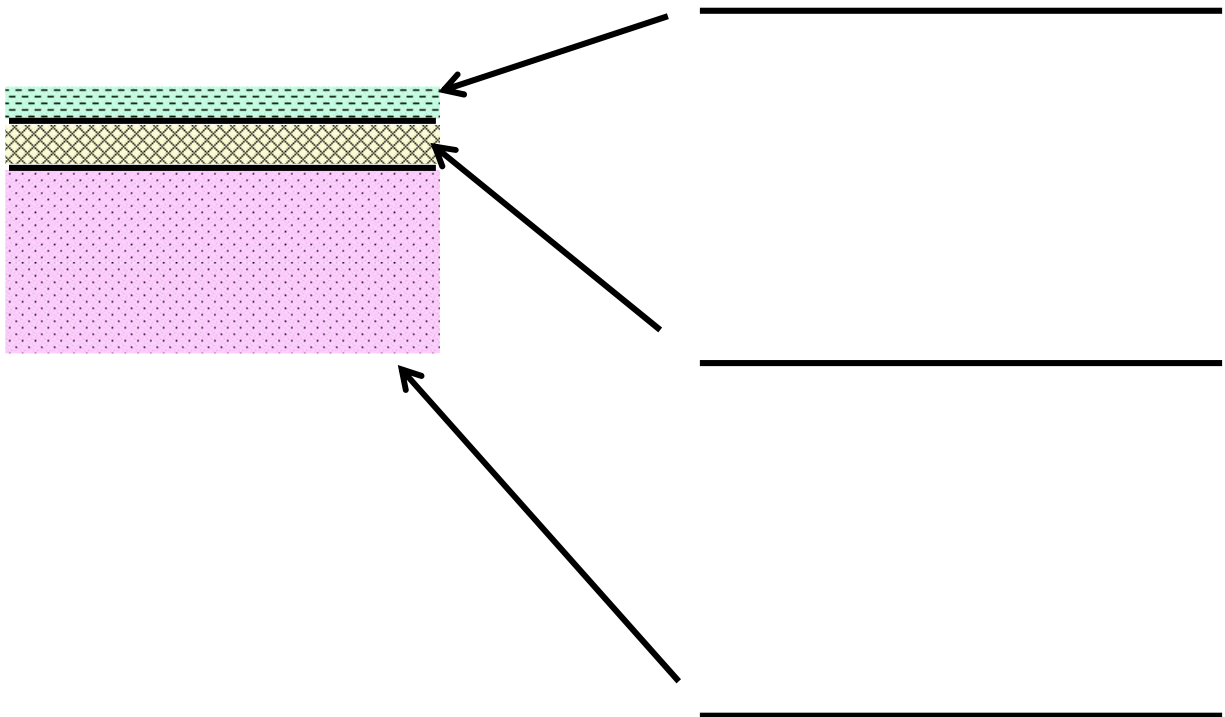
The middle layer of skin is called the **dermis**.

The bottom layer of skin is called the **hypodermis**. For dolphins this third layer is thick blubber that can be from $\frac{3}{4}$ of an inch to $1\frac{1}{4}$ inches thick. A bottlenose dolphin's body fat generally accounts for about 20% of its body weight.

The blubber layer on a dolphin is as thick as the line on the left is long and can be as thick as the line on the right.

Skin

Label the layers of skin.



Skin

How thick do you think your epidermis is? _____

How many layers of skin do you have? _____

How many layers of skin does a dog have? _____

What objects can you find around your house that are about the same length as a dolphin's blubber layer?

What can you use to measure the objects in your house?

Micro Dermal Ridges

Dolphins have tiny ridges on the surface of their skin. These ridges trap water. This makes it easier for dolphins to swim.

Use the space below to draw what you think the micro dermal ridges on a dolphin's skin look like.

Food and Stomach

What Do Dolphins Eat?

Dolphins are carnivores. A carnivore only eats meat, and in the case of dolphins, only fish. Omnivores eat both meat and vegetables. Herbivores only eat plants.

Are humans carnivores, omnivores, or herbivores?

What other animals, besides dolphins, are carnivores?

Name some animals that are herbivores and only eat plants.

Do Dolphins Chew?

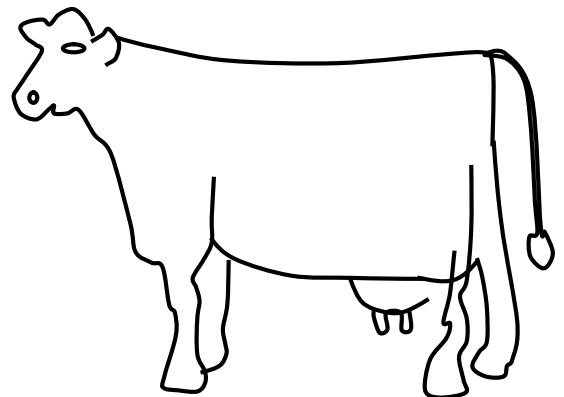
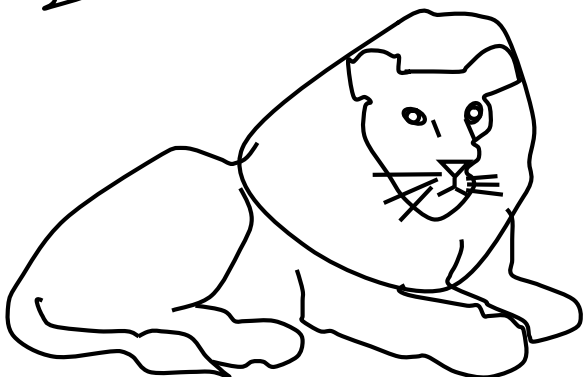
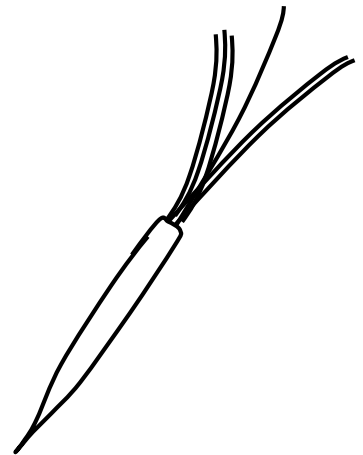
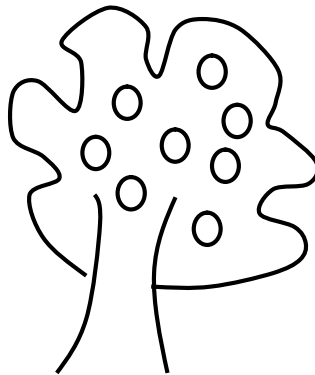
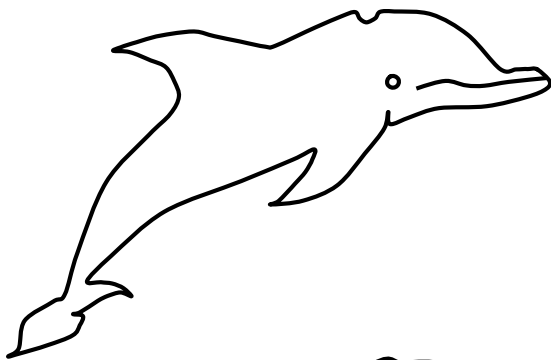
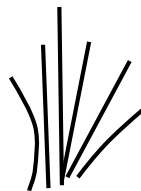
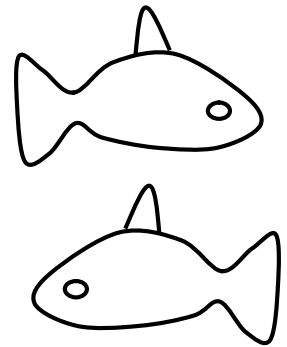
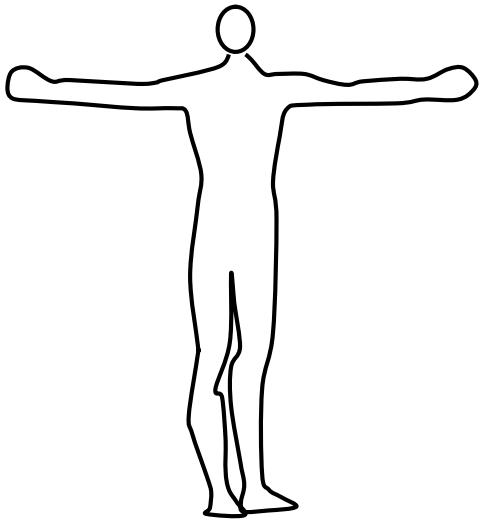
Have you ever watched a dolphin eat? Did you notice how they swallow their fish whole and do not chew them? The dolphin's teeth are designed to grab the fish and hold onto them. The dolphin's mouth does not have saliva. Then the dolphins swallow the food and put it into their first stomach.

Do you chew your food? _____

Can you think of other animals that do not chew their food?

Food and Stomach

Match the animals to their food. Some animals might eat more than one type of food. An animal could also be food for another animal! Some animals may eat more than one type of food.



Food and Stomach

How Much Do Dolphins Eat?

Dolphins eat a lot of food. Some dolphins eat about 15 pounds of fish a day. Some dolphins eat a third of their weight in fish a day. An adult orca (killer whale) can eat up to 400 herring a day.

How much is 15 pounds? Do you have a gallon of milk or juice in your refrigerator? Two gallons of milk or juice weigh about 16 pounds, just one pound more than 15. What other things can you find around your house that weigh about 15 pounds?

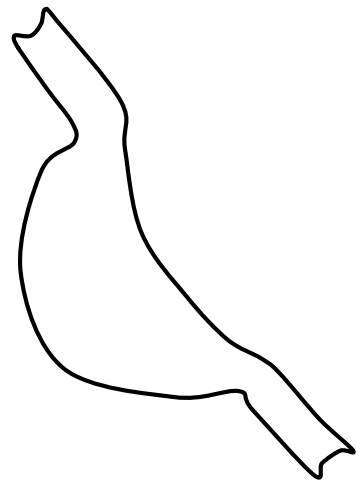
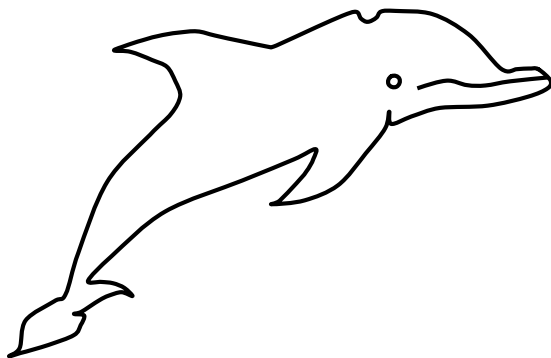
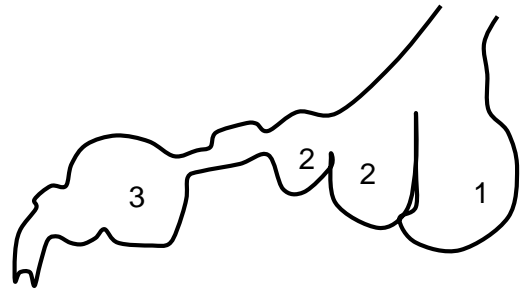
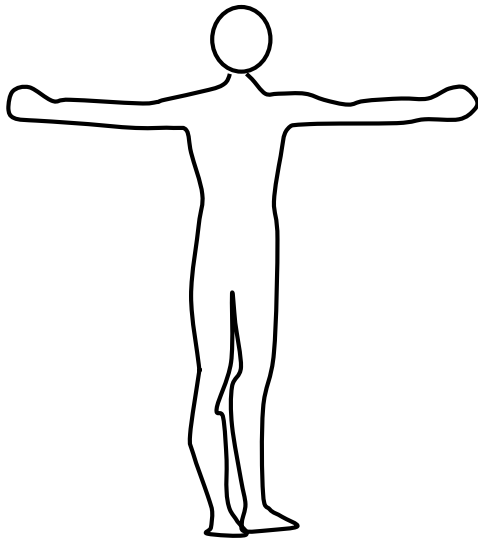
What tool do you use to find out how much something weighs?

How much do you weigh?

Food and Stomach

Humans have one stomach. Dolphins have three stomachs. The first stomach is like a “storage tank,” and the dolphin puts its food in there until the “real” stomach decides it needs it. That 2nd stomach does most of the breakdown of the food. Remember, dolphins don’t chew their food, so there are whole fish in the 2nd stomach. The 3rd stomach breaks down the food more and sends it along its way in the small intestine when it is needed.

Match the animal on the left to its stomach on the right.



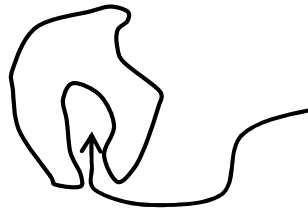
Teeth

Dolphins have more teeth than people. Some dolphins have as few as 80 teeth and others have as many as 250.

How many teeth do you have? _____

Baby humans are born without teeth and then grow teeth. Young children usually have 20 teeth. As the baby set of teeth falls out, children grow an adult set of teeth that they use the rest of their lives. Adult humans have 28-32 teeth.

Dolphins only have baby teeth. Each year, however, a new layer of enamel is formed on the inside of the tooth. One of the ways a dolphin's age can be determined is by counting the rings on their teeth.

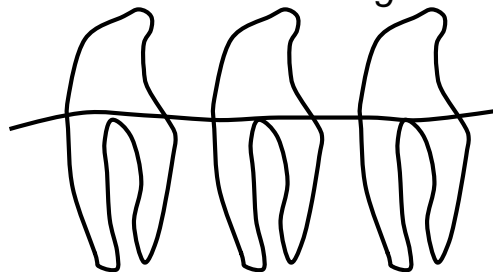
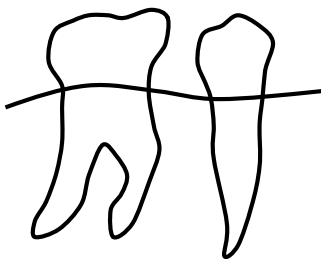


The enamel fills in on the inside of the tooth.

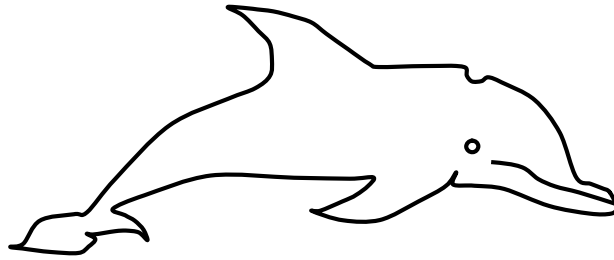
Besides dolphins, there's another type of living thing that we determine how old it is by counting rings. What type of living thing is it?

At the front of a dolphin's mouth a few teeth are missing. This is so the dolphin can latch onto his mother when it's a baby to nurse without hurting the mother.

Humans have different types of teeth. Dolphins have teeth that are all the same. *Which teeth below belong to a human? Which belong to a dolphin?*

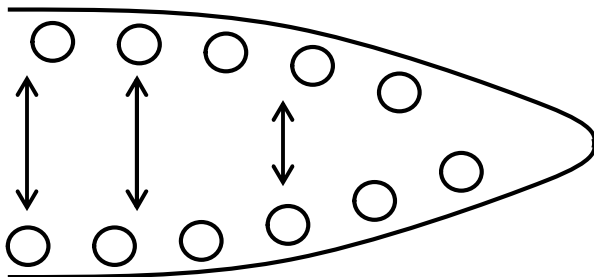


Teeth



Look in a mirror. How is your mouth shaped? Find a blank piece of paper and stick it in your mouth and bite down. Pull the paper out and look at the shape your bite made. Draw your mouth's shape below.

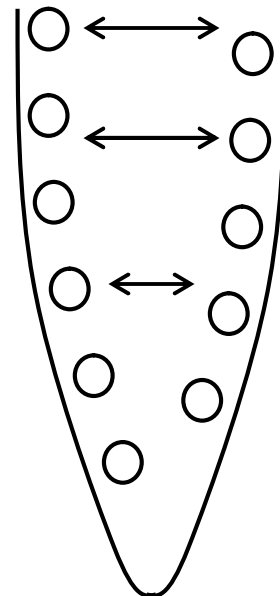
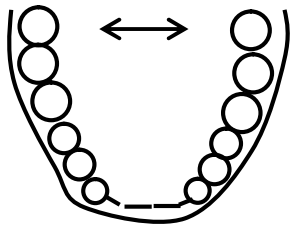
Dolphins have mouths that are shaped very differently than humans. The shape made when they bit is much different than yours. A dolphin's bite shape looks like the picture below.



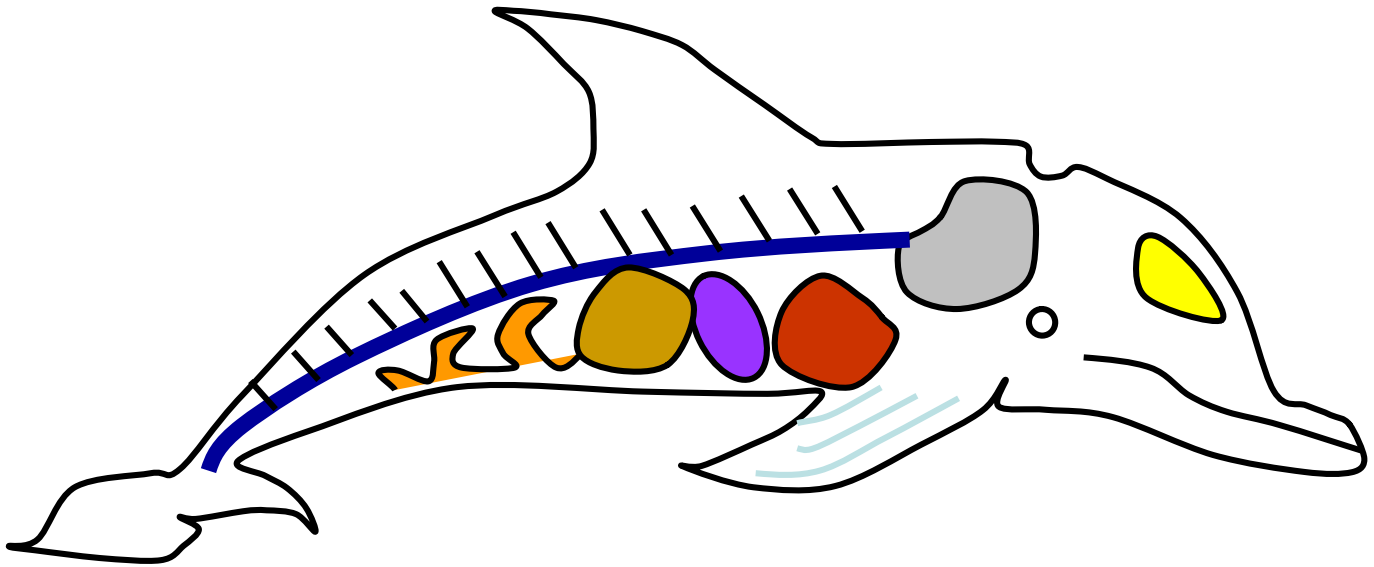
The shape of the dolphin's mouth is different; it is shaped more like a V and your mouth is shaped like a fat U.

Teeth

Look at your bite mark again. Your teeth probably line up in a straight line. Look at the dolphin's bite mark. One side of the mouth has its teeth offset by half a tooth! Scientists think that offset is related to the dolphin's ability to echolocate.



The Insides



Melon

Heart

Liver

Intestines

Brain

Spinal Cord

Stomach

Bones

Voluntary Breathing

How long can you hold your breath? What tool can be used to accurately measure how long you can hold your breath? Try holding your breath and get someone to time the seconds. Was it under 60 seconds? If you wanted to hold your breath for 120 seconds, do you think you could? What happens if you try?

After holding your breath for awhile, your body forces you to breath. Breathing, for humans, is called an involuntary action. We cannot stop our breathing for very long. We breath when we are asleep. Humans do not control their breathing. We do not need to think about breathing to breathe.

Dolphins, on the other hand, are voluntary breathers. Dolphins can hold their breath under water and they know to breath only when above water. Dolphins never fully go to sleep and they wake up every so often to breath. Some dolphins can go two minutes between breaths and some dolphins can go 15 minutes.

If you touch something hot, you automatically move your hand away. Is that a voluntary or involuntary action?

Is walking a voluntary or involuntary action?

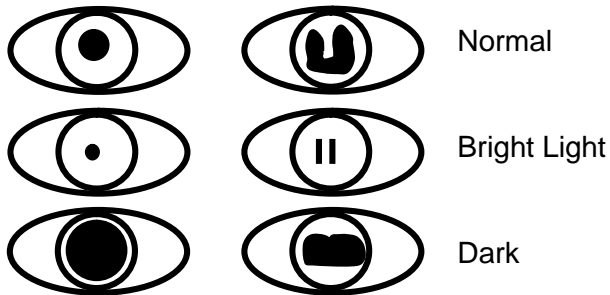
Answers

Why do you think dolphins cannot breathe through their mouth? **Not being able to breathe through their mouth is helpful for a dolphin. Firstly, they can eat without getting water in their lungs, and since dolphins usually eat under the water, that is a good thing. A cool side effect of this is that dolphins do not have a gag reflex.**

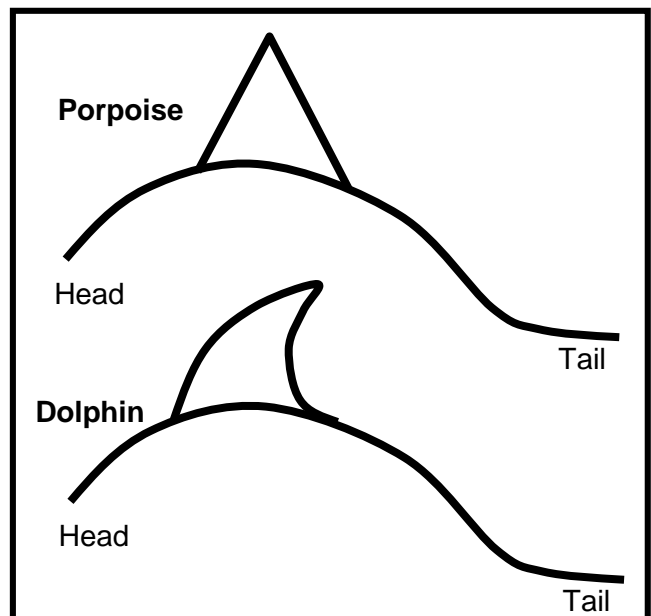
How fast have you ever been driven in a car? The fastest speed limit on the Interstates in the United States is 75 miles per hour. How much faster can a dolphin release air from its lungs than you can legally travel in a car in the United States?

100 miles per hour – 75 miles per hour = 25 miles per hour

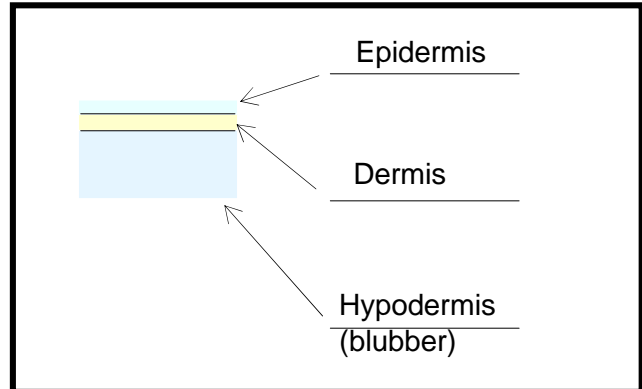
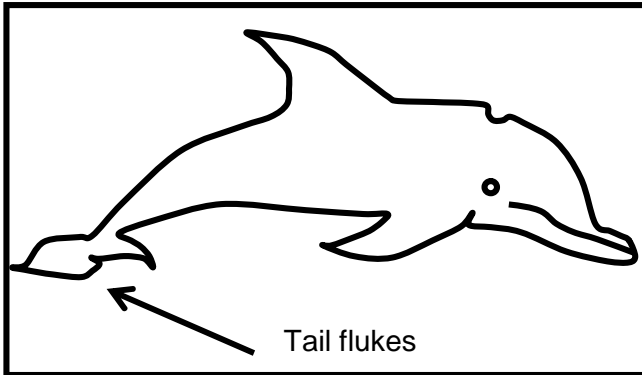
Humans Dolphins



The pupil gathers light. When it is dark, the pupil needs to be bigger to gather light. When it is bright, the pupil gets smaller so it doesn't gather too much light. Dolphins have U-shaped pupils normally. Since dolphins have eyes on opposite sides of their heads, the eyes do not work like ours. Humans must use two eyes to achieve depth perception. Dolphins use parallel slits in their pupils to achieve depth perception.



Answers



Are you warm blooded or cold blooded? **Humans are warm blooded.**

How is your temperature measured? **Most humans have an oral body temperature of 97.6 °F to 99.6 °F.**

What is the temperature of a cat or a dog? **A cat's normal temperature is 100.4°F and 102.5°F. A dog's temperature should be between 101°F and 102°F.**

How thick do you think your epidermis is? The human epidermal layer is 0.5 to 1.0 mm thick. Skin cells are regenerated every two weeks. Skin cells are created at the bottom of the dermal layer, where blood is available, and they migrate upwards. An adult's weight is 15-20% from skin.

How many layers of skin do you have? Three. Mammals all have three layers of skin.

How many layers of skin does a dog have? Three. Mammals all have three layers of skin.

What objects can you find around your house that are about the same length as a dolphin's blubber layer? Some books are about the same thickness. Anything 0.5 to 1.5 inches is in the ballpark. A cell phone is about that thick. A thin wallet, and a pack of purse size tissues are about this thickness.

What can you use to measure the objects in your house? A ruler

Measure time with a clock or a stopwatch.

Answers

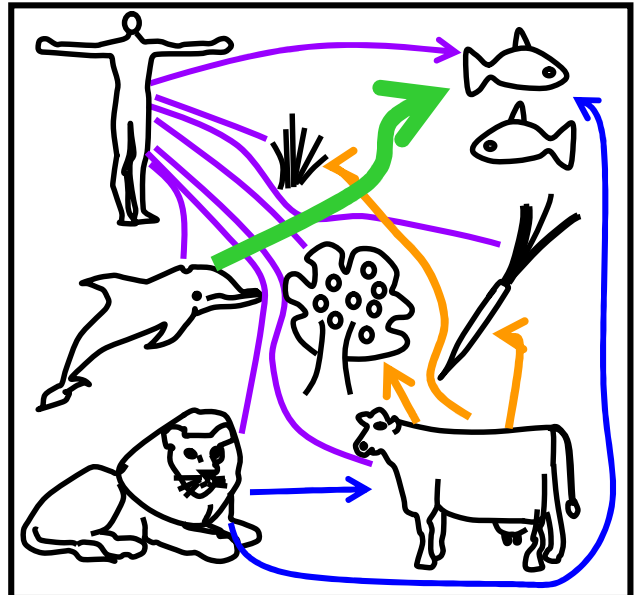
Are humans carnivores, omnivores, or herbivores? **Omnivores. Humans can eat meats or vegetables.**

What other animals, besides dolphins, are carnivores? **Lions, cats**

Name some animals that are herbivores and only eat plants. **Cows, deer**

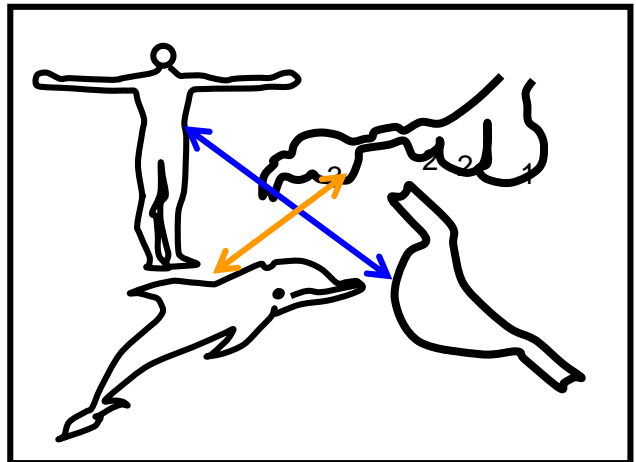
Do you chew your food? **Yes!**

Can you think of other animals that do not chew their food? **Porpoises, Snakes, Others**



What other things can you find around your house that weigh about 15 pounds? **A 1 year old baby can be about 15 pounds. Two bags of small dog or cat food can be about 15 pounds.**

What tool do you use to find out how much something weighs? **A scale**



How many teeth do you have? **Adult humans can have 32 teeth, but many people have their last 4 teeth pulled and only have 28, and some people never have those last four teeth grow in.**

Besides dolphins, there's another type of living thing that we determine how old it is by counting rings. What type of living thing is it? **Trees!**

Humans have different shaped teeth.



Dolphins teeth are all the same and evenly spaced.

If you touch something hot, you automatically move your hand away. Is that a voluntary or involuntary action?

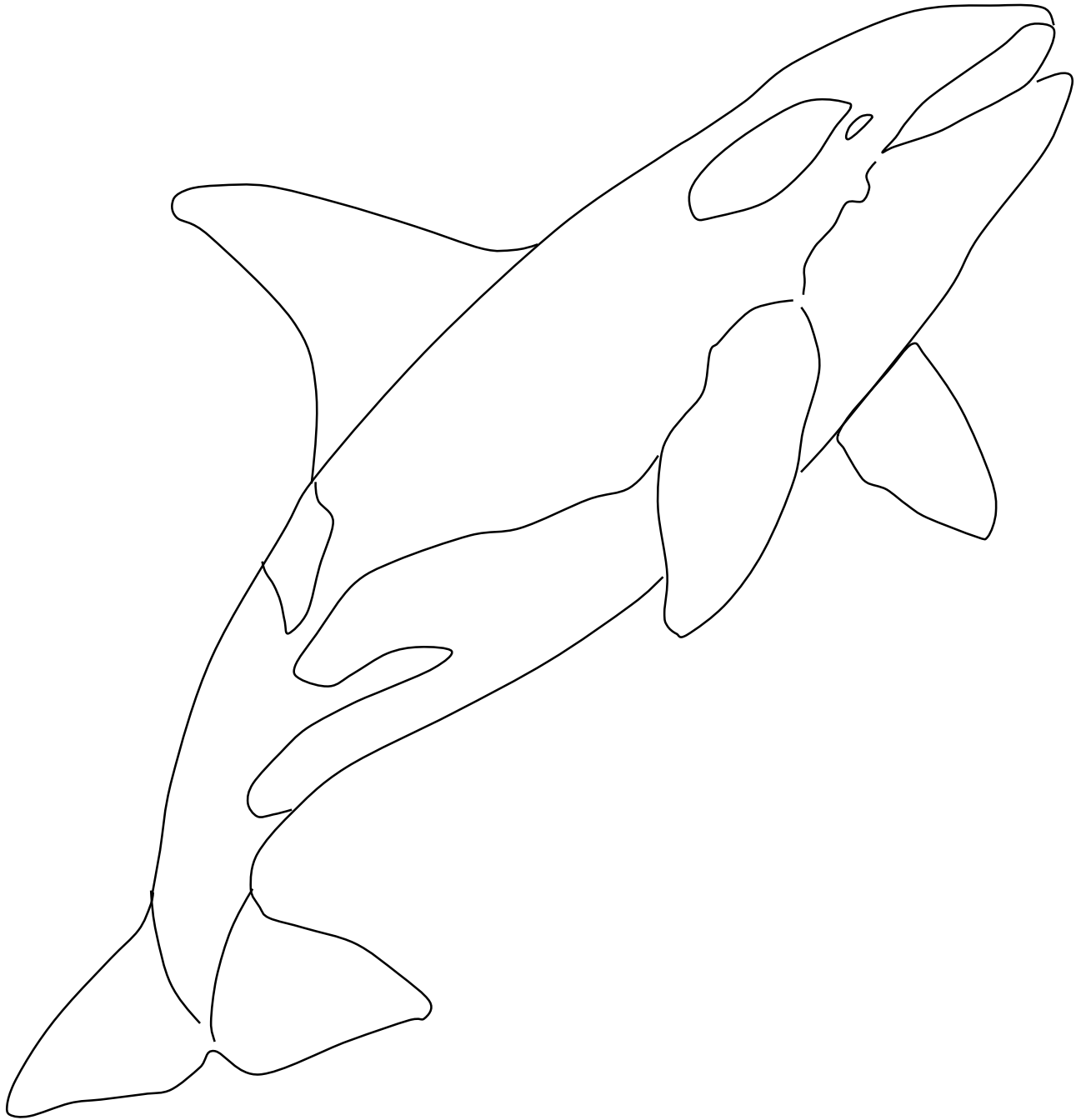
Involuntary

Is walking a voluntary or involuntary action?

Voluntary

Reproduction

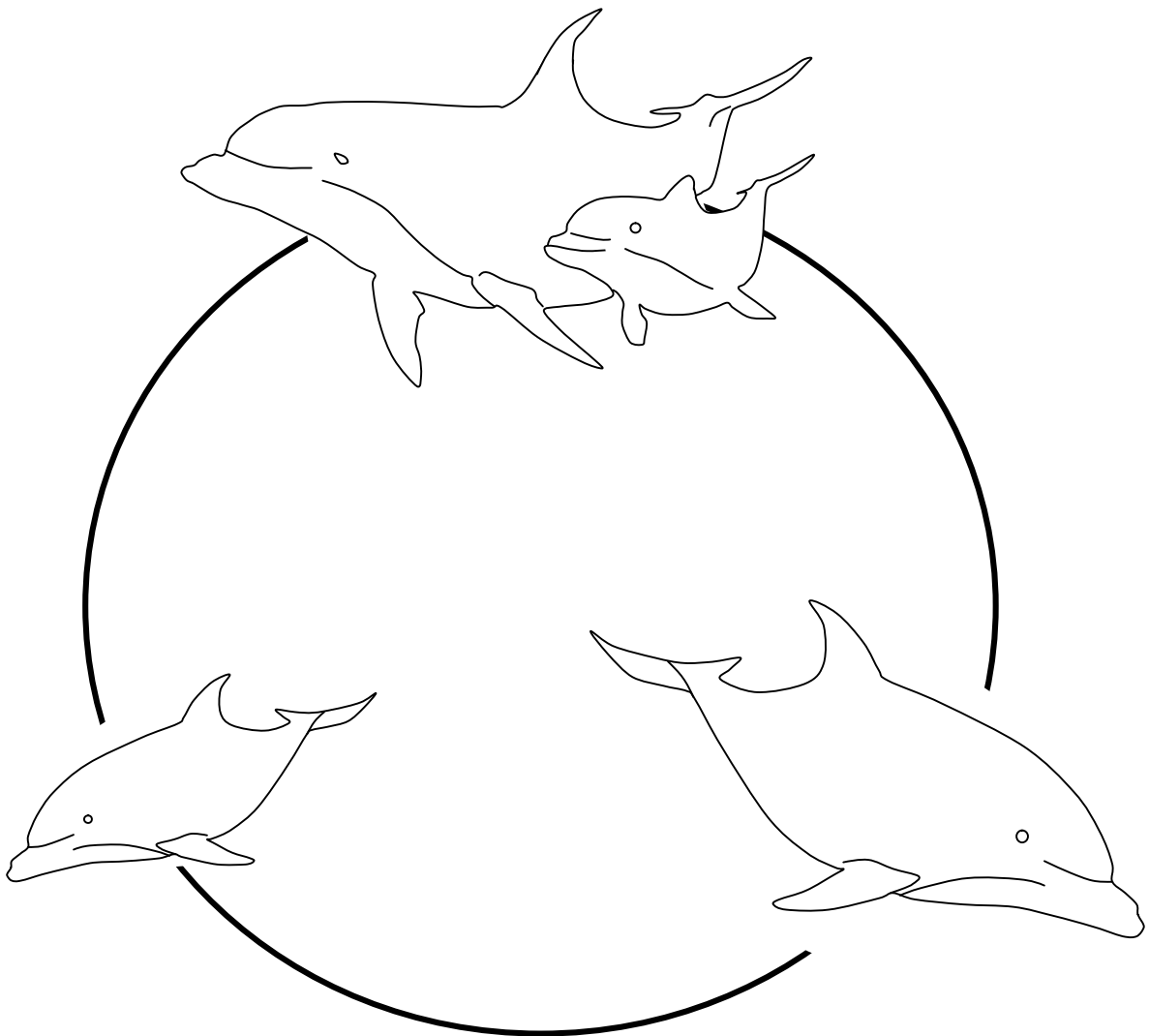
Biology



The Dolphin's Life Cycle

Dolphins have similar life cycles to humans.

After dolphins are born, they stay under their mother's care and nurse. Some dolphins will nurse for several years. Female dolphins remain around their mothers. When they are weaned they help to raise the next baby, their sibling, until they are old enough to have their own babies.



Gestation

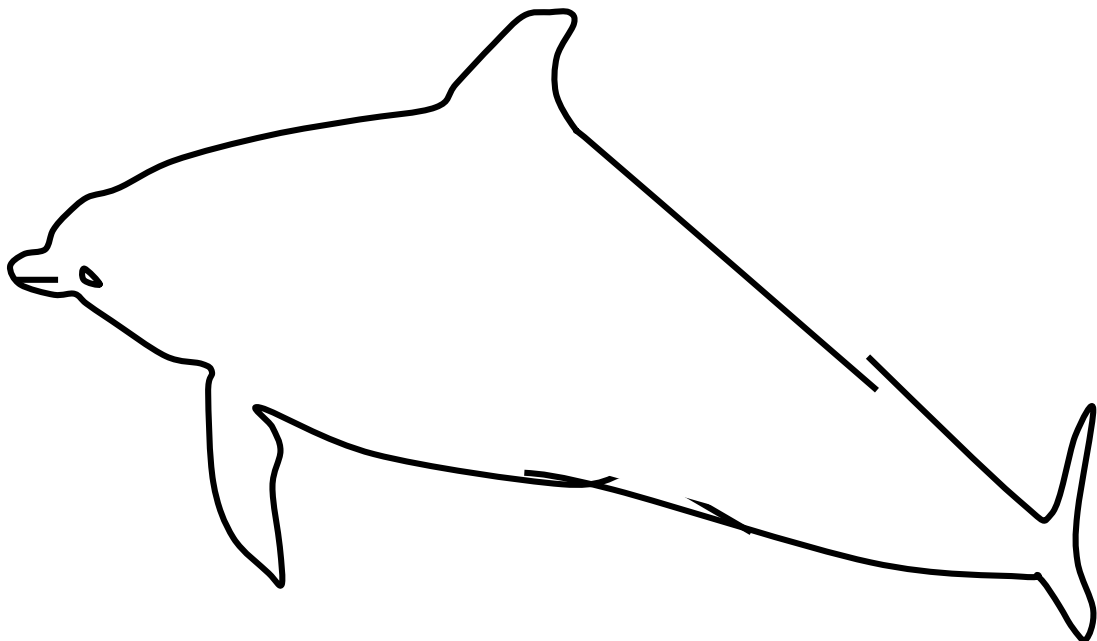
Gestation is the time a baby is inside the mother. Gestation starts with “fertilization,” when the egg and the sperm join, to the time when the baby is born. Dolphin females only conceive every two to three years, but they will continue to conceive all their lives as long as they are healthy.

Different animals have different lengths of gestation time.

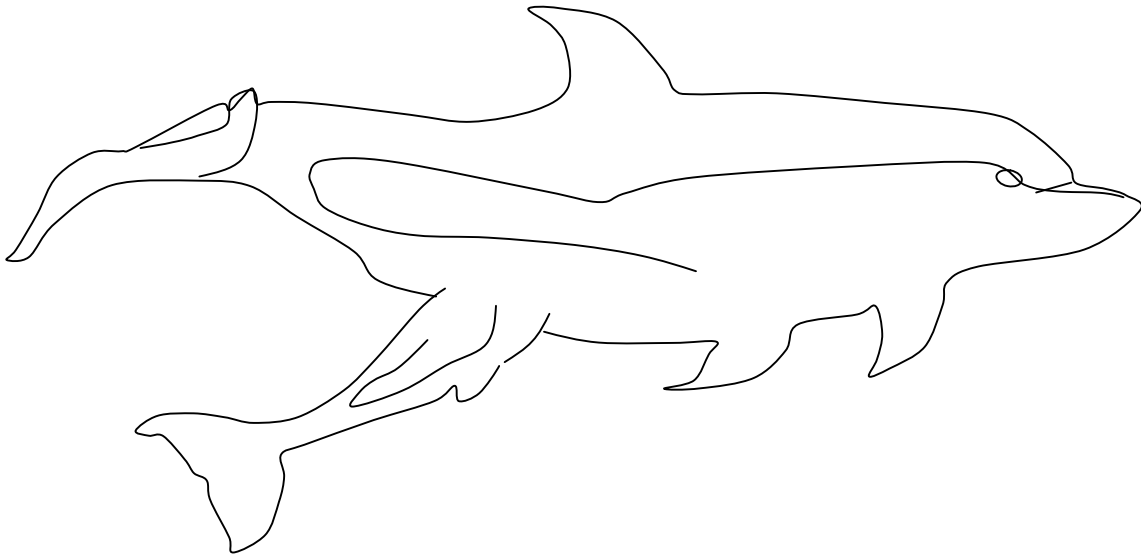
The length of gestation is different for different species of dolphins, but the average is about ten months.

How long is gestation for humans?

How long is gestation for elephants?



Birth

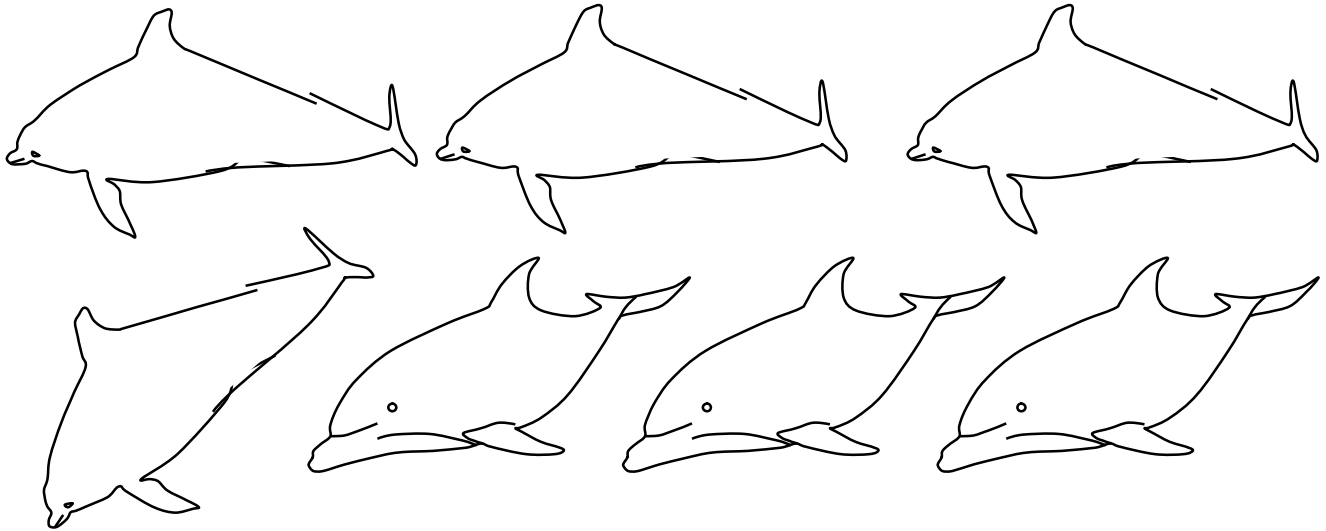


Most mammals are born head first, because the babies need to get oxygen right away. Cetaceans are a little different. Cetacean babies are born under water. They are born tail first, and as soon as the baby is born, the mother nudges the baby up to the surface for his first breath of air. The baby is born knowing how to breath once it gets to the surface.

The dorsal fin on the babies is flopped over to the side when first born. This makes it easier for the baby to be born.

Ask your parents how you were born. Were you born naturally, or did the doctor's have to perform surgery on your mother to get you out? Were you born head first, feet first, or bottom first? What about your sisters and brothers if you have any?

Having Calves



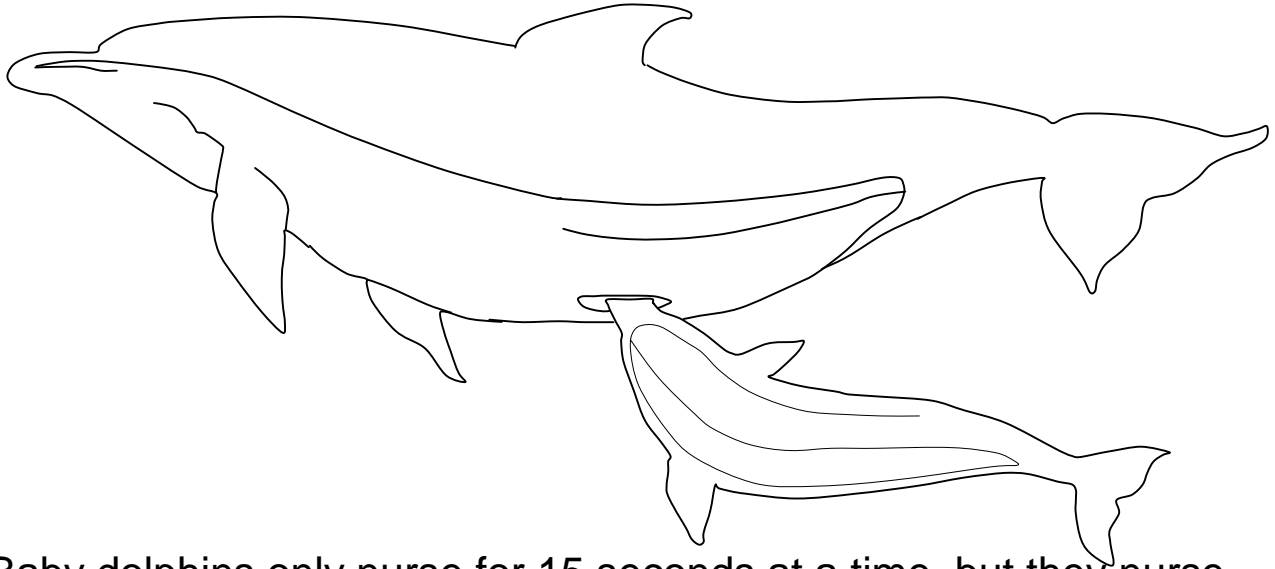
One small pod consists of 4 pregnant dolphins and 3 “auntie” dolphins. Dolphins give birth to 1 baby at a time.

After the pregnant dolphins give birth, how many calves will there be in the pod?

After the pregnant dolphins give birth, how many members of the nursery pod will there be?

If $\frac{3}{4}$ (75%) of calves survive to adulthood, how many of these baby dolphins will grow up to be adults?

Nursing



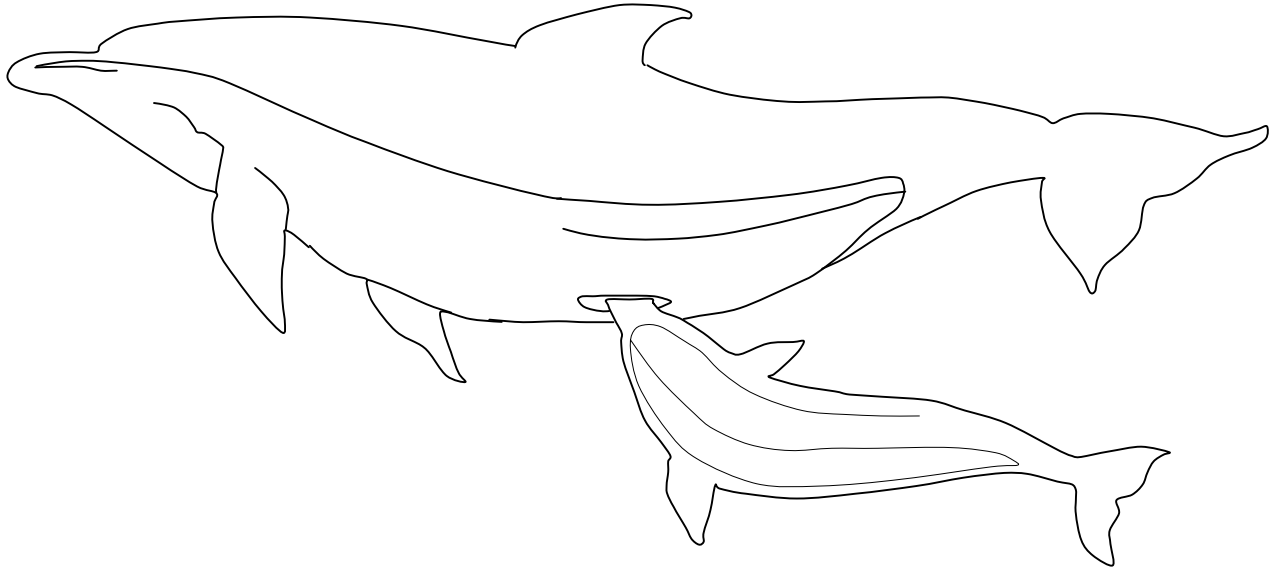
Baby dolphins only nurse for 15 seconds at a time, but they nurse about every 15 minutes. Their tongues latch onto their mother's nipples. The mother's nipples are located inside her mammary slit. The mother squirts the milk into the baby's mouth. The milk is rich in protein and fat and this helps the baby grow fast.

Dolphins live exclusively on their mother's milk for at least the first six months of their life. Then, they start to catch fish and slowly need their mother's milk less. Some dolphins won't fully wean until they reach adulthood themselves, but most wean after about two years.

Why do you think dolphins only nurse for 15 seconds at a time?

Why do you think dolphins must nurse so often?

Nursing

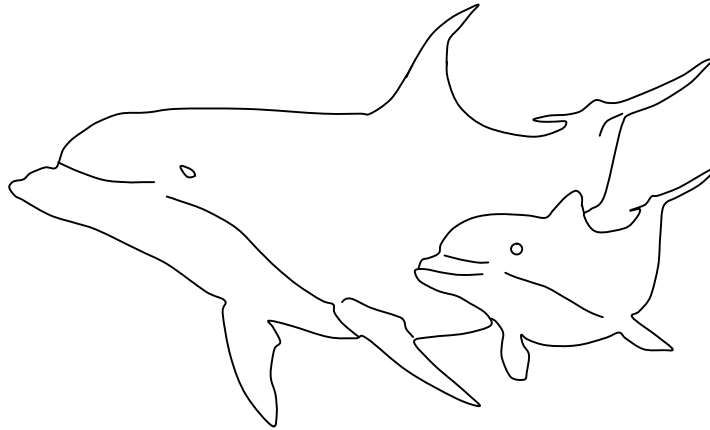


Baby dolphins nurse about every 15 minutes. There are 60 minutes in an hour. How many times per hour does a baby dolphin nurse?

There are 24 hours in a day. How many times a day does a baby dolphin nurse?

If each nursing takes 15 seconds, and there are 60 seconds in a minute, how many minutes a day does a baby dolphin spend nursing?

Sleeping



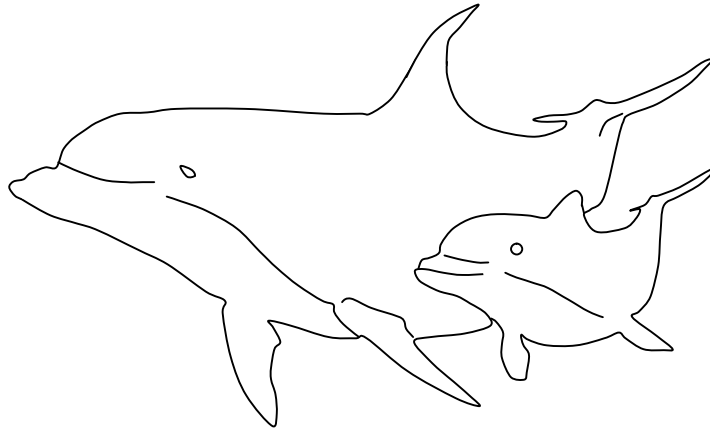
When human babies are born, they sleep a lot. Sometimes human babies sleep 20 hours a day. Human mothers try to sleep a lot too after a baby is born.

Dolphins are the opposite. Dolphin babies do not sleep at all for their first month of life, and the mother has to stay awake with the baby to take care of the baby. Some scientists think the reason they don't sleep is so the babies can learn a lot quickly so they don't get eaten by sharks or hurt by other things.

Eventually, dolphins do sleep; however, only half of the dolphin's brain sleeps at a time. Remember how the dolphins are voluntary breathers? Dolphins can only sleep for short periods and then they breathe. Half of the dolphin's brain is awake when sleeping too, to keep a look out for sharks.

Female dolphins sleep just at the surface of the water. Male dolphins stay close to the surface and come up for breaths when they need them.

Learning Names



After a dolphin is born its mother repeatedly tells the baby its name. This way, the baby can learn which dolphin is its mother. The dolphin doesn't say to the baby "My name is Rose," because dolphins do not talk like people do. Dolphins talk with sounds, not words, and scientists call their names "signature whistles." The mother dolphin repeats a series of sounds to the baby. Those sounds are the mother's name.

After the baby has been around for awhile, it will make up its own name and then everyone will learn how to call the baby dolphin.

How did you learn your mother and/or father's name?

Did you learn your mother and father's name the same way a dolphin does?

If you could have named yourself, what name would be yours?

Dolphins Learn from their Mothers

Some animals rely solely on instinct. They do not learn anything from their parents. They are born with all the information they need to survive in the world. Fish are animals that rely solely on instinct.

Can you think of some other animals that live by instinct alone?

Do you live by instinct or do you learn things from your parents, teachers, friends, and family?

When you a human baby is born, is there anything it knows how to do right away without being taught?

Dolphins Learn from their Mothers

When a dolphin is born, it does not know much. After the dolphin is born, its mother nudges it towards the surface. The dolphin knows how to breathe without being taught. The dolphin also knows how to swim a little bit without being taught. Baby dolphins also know how to nurse to get their mother's milk.

Mothers must teach baby dolphins other things though, such as:

- How to communicate with the pod
- How to catch fish
- How to swim better and do leaps out of the water
- How to put a sponge in their beak to protect their skin when they are hunting for fish in reefs and on the bottom of the ocean
- How to avoid sharks
- How to hunt a lot of fish with the pod

What are some important things that your mother, father, relatives, friends, and teachers teach you?

Sleeping

When do you go to bed at night and when do you wake up in the morning? How much sleep do you get at night?

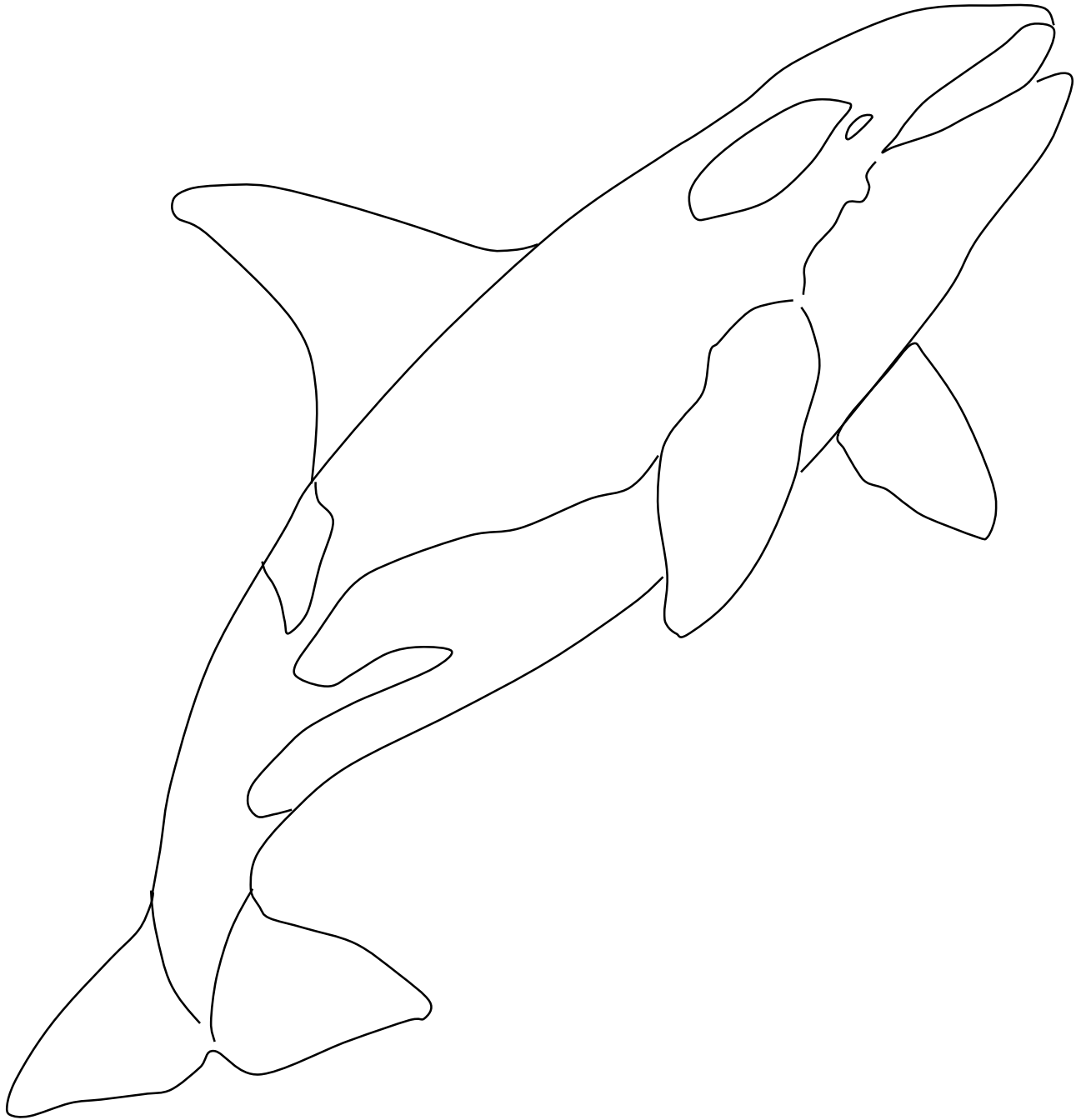
Do you take naps?

Add up your night time sleep and your daytime sleep. How many hours is that?

$$\begin{array}{ccccccc} \underline{\hspace{2cm}} & + & \underline{\hspace{2cm}} & = & \underline{\hspace{2cm}} \\ \text{Nighttime sleep} & & \text{Naps} & & \text{Total daily sleep} \end{array}$$

Ask your mother and/or father how much sleep they get every day. Who sleeps more, you or your parents?

Have you ever gone a whole day without sleeping. How do you feel when you do not have enough sleep?



Answers

How long is gestation for humans?

About 40 weeks

How long is gestation for elephants?

About 2 years

Ask your parents how you were born. Were you born naturally, or did the doctor's have to perform surgery on your mother to get you out? Were you born head first, feet first, or bottom first? What about your sisters and brothers if you have any? **Most people are born head first.**

Why do you think dolphins only nurse for 15 seconds at a time? **Dolphin calves must breathe more often than their mothers. Since they nurse underwater, they need to nurse for short periods so they can come up to the surface to breathe.**

Why do you think dolphins must nurse so often? **Since dolphins can only nurse for short periods of time, they must nurse often.**

After the pregnant dolphins give birth, how many calves will there be in the pod? **4**

After the pregnant dolphins give birth, how many members of the nursery pod will there be? **11**

If $\frac{3}{4}$ (75%) of calves survive to adulthood, how many of these baby dolphins will grow up to be adults? **3**

Can you think of some other animals that live by instinct alone? **Bees, ants, fish**

Do you live by instinct or do you learn things from your parents, teachers, friends, and family? **People learn most things and have few instincts.**

When you a human baby is born, is there anything it knows how to do right away without being taught? **Babies know how to suck so they can nurse.**

What are some important things that your mother, father, relatives, friends, and teachers teach you? **Your parents teach you how to eat, how to write, your letters, how to communicate with people, how to cross the street, how to drive a car, and many more things.**

Baby dolphins nurse about every 15 minutes. There are 60 minutes in an hour. How many times per hour does a baby dolphin nurse? **$60/15 = 4$ times an hour**

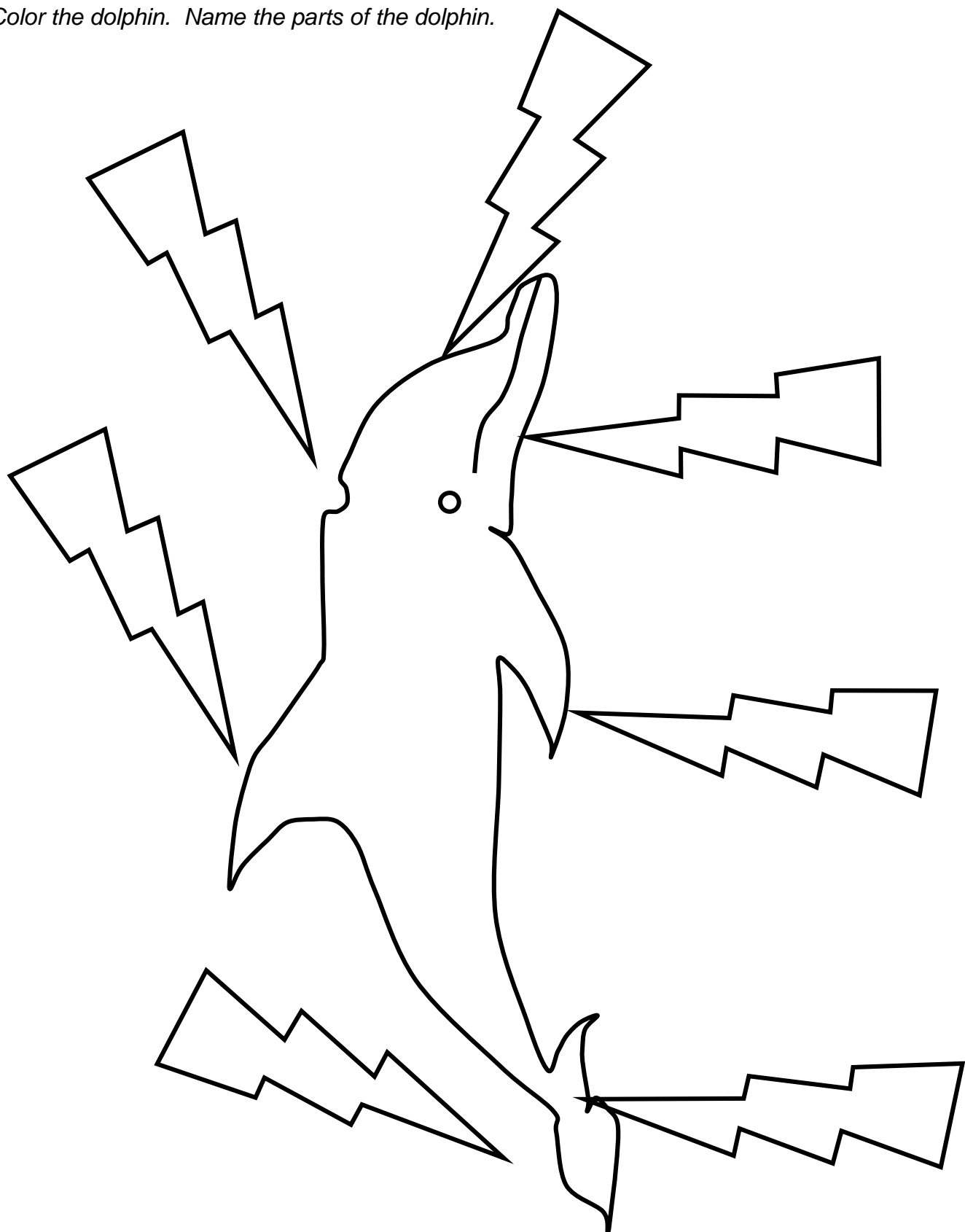
There are 24 hours in a day. How many times a day does a baby dolphin nurse? **$4 * 24 = 96$ times a day**

If each nursing takes 15 seconds, and there are 60 seconds in a minute, how many minutes a day does a baby dolphin spend nursing? **$96 * 15 / 60 = 24$ minutes**

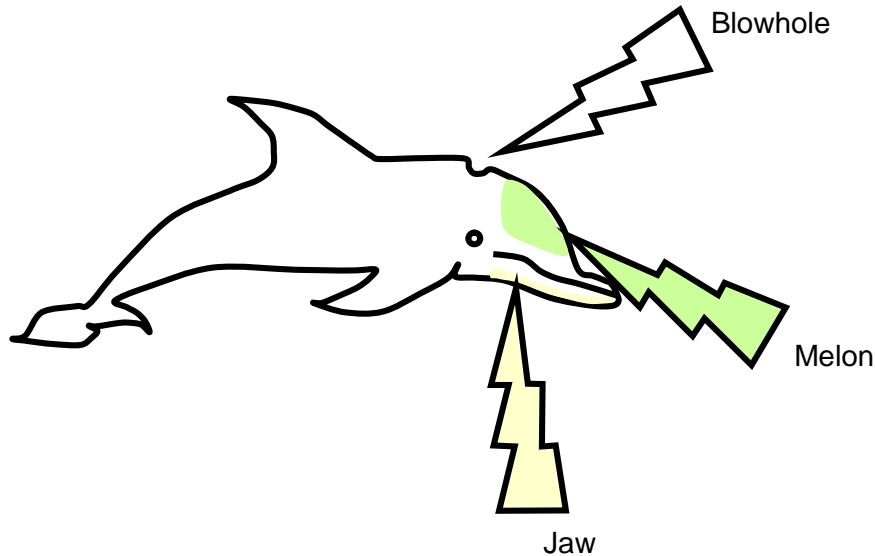
Echolocation, Sound Imaging, and SONAR

Physics

Color the dolphin. Name the parts of the dolphin.



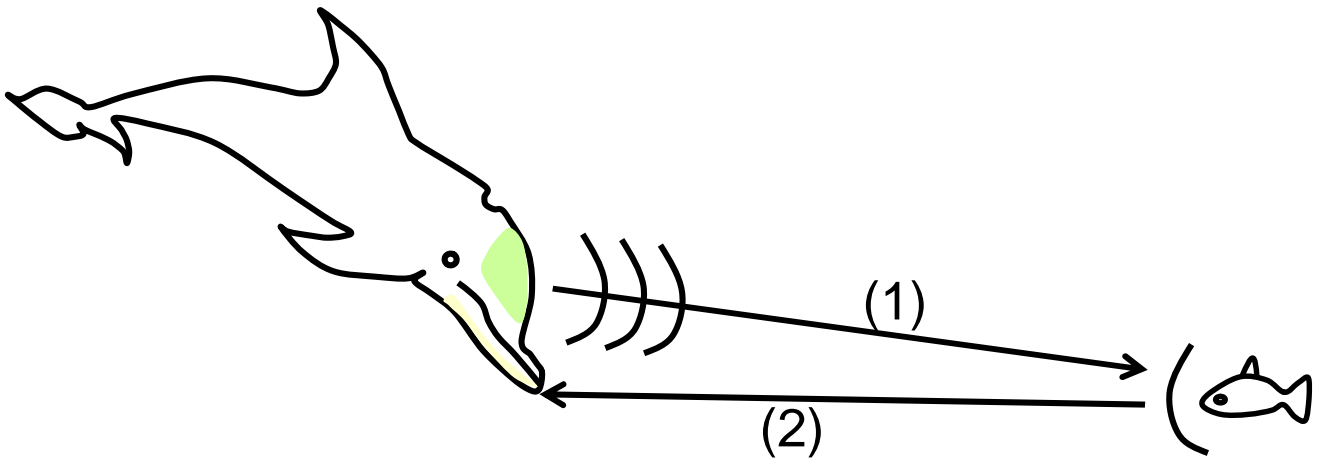
Melon, Jaw, and Echolocation



See the dolphin's blowhole in the picture above? It sort of looks like the blowhole is not on the dolphin's head but on its neck, but this is not the case. The blowhole is on the dolphin's head. The head looks further forward on the dolphin than it is because of the melon.

The melon is a part of the dolphin that deals with echolocation. The melon sends out the dolphin's echolocating signal and the dolphin is thought to receive the echolocating signal back in the lower part of his rostrum, or his jaw.

Melon, Jaw, and Echolocation



The dolphin sends out its echolocating signal, clicks, through its melon, which is close to its blowhole.

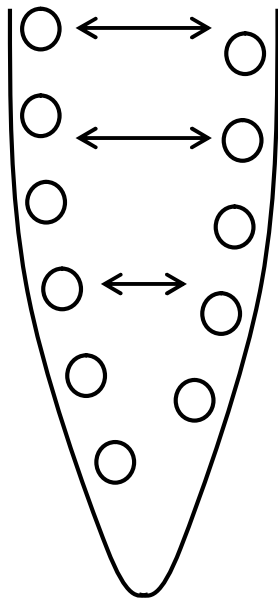
The sound bounces off of an object and the dolphin hears the return echo.

The dolphin picks up the sound in its jaw, which is connected to its ears, and then processes the noise.

The dolphin can determine how big the object is, its shape, its density, and how far away it is. For instance, a loud echo might indicate a large, close, or dense object. Dolphins can even find fish buried in the sand of the ocean of the ocean floor by using echolocation.

Melon, Jaw, and Echolocation

Look at the dolphin's bite mark again. One side of the mouth has its teeth offset by half a tooth! Each tooth is separated by the wavelength of the dolphin's click sound in water. The offset is exactly half that wavelength. Scientists think that offset is related to the dolphin's ability to echolocate. The teeth act like a TV antennae when they receive sound.



What do you think the offset teeth in the jaw has to do with echolocation? How can it help a dolphin to echolocate?

Passive and Active

Dolphins have both passive and active echolocation abilities.

Active echolocation occurs primarily when the dolphin is hungry and is searching for food. The dolphin transmits signals. The dolphin clicks and waits to hear the click return.

Passive echolocation is just listening to the cues around like waves hitting the shore, splashes, rain, and other noises.

Which sense, touch, eyesight, hearing, smelling, or tasting do you think echolocation is most like? Why?

Can Humans Echolocate

Dolphins have evolved to use echolocation. Humans have not. In fact, the only land mammal that has evolved echolocation is the bat. However, humans are one of the most adaptable creatures on the planet.

Some people, with a lot of practice and hard work, can learn to do a little echolocation; however, they will probably not be as accurate as a dolphin.

A man named Daniel Kish taught himself to echolocate by clicking his tongue. He is blind. He became so good at echolocating that he is able to ride a bike and can hike in the wilderness.

If your parents will let you, watch the movie called "Daredevil." It was made in 2003 and has Ben Affleck in it.

What ability does the Daredevil character share with dolphins?

Why do we hear about blind people echolocating and not sighted people?

Learn to Echolocate

Can you learn to echolocate? Probably. To practice, I suggest the following things:

1. Practice where there are not a lot of people around. People might look at you oddly if you are clicking your tongue constantly, and they will make more noise which could confuse you.
2. Wear a blindfold to practice echolocating.
3. Make learning to echolocate a game and practice with a friend.
4. How are you going to tell if it is working?

For Further Reading:

Blackshear, Jim. "Echolocation: A Useful Tool for the Blind Human."
<<http://hubel.sfasu.edu/courseinfo/SL02/echolocation.htm>>

World Access for the Blind, <<http://www.worldaccessfortheblind.org/Echolocation.htm>>

Is it Echolocation or SONAR?

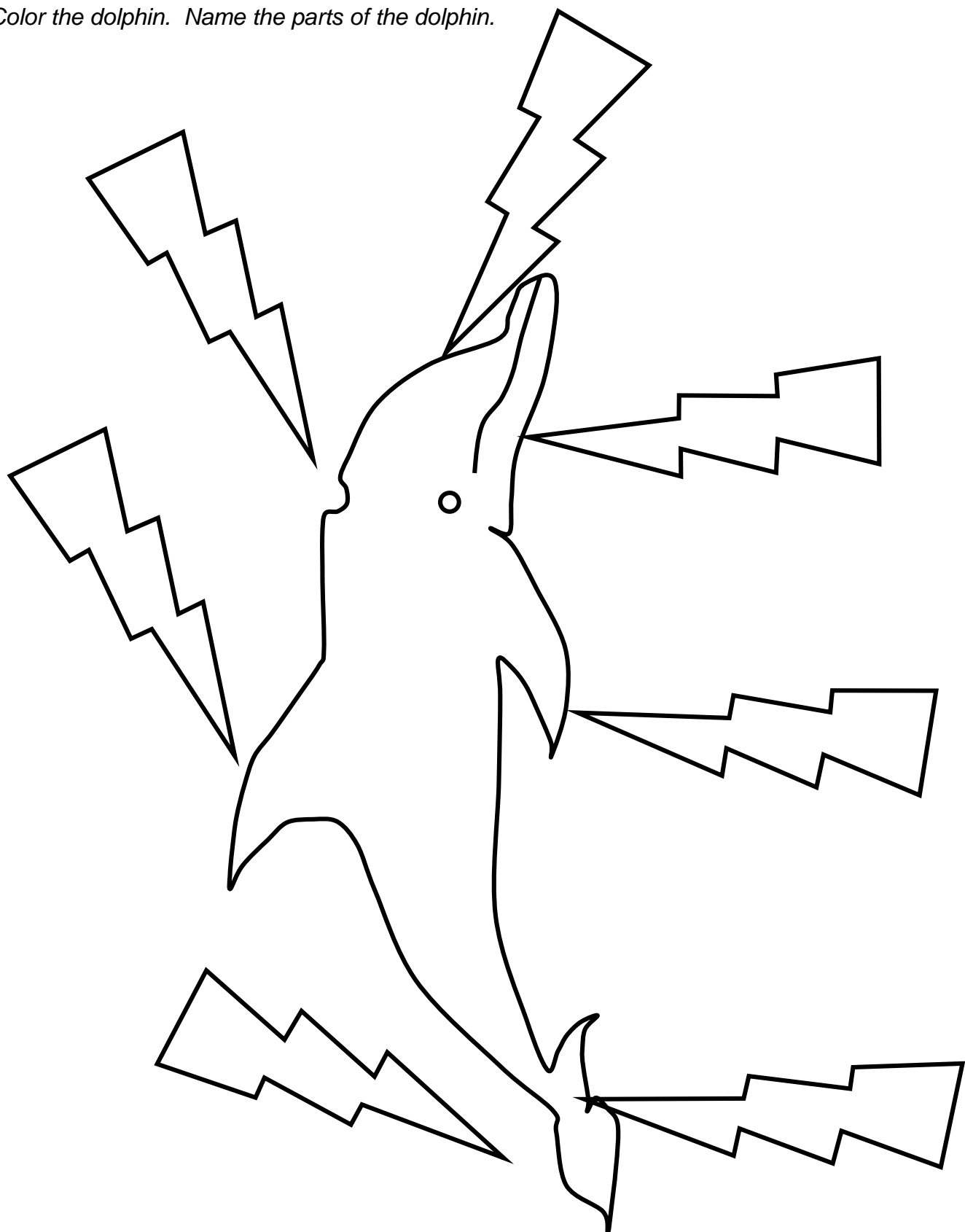
Echolocation is a natural ability of dolphins, whales, and bats.

SONAR is an acronym for Sound Navigation Ranging and it actually refers to equipment, hardware, and not people. SONAR was first developed by Lewis Nixon as a way of detecting icebergs. The military became interested in SONAR during World War I when submarines came on the scene.

How is SONAR using in the medical field?

What is "Sound Imaging?"

Color the dolphin. Name the parts of the dolphin.



Answers

What do you think the offset teeth in the jaw has to do with echolocation? How can it help a dolphin to echolocate? ***The offset teeth in a dolphin's mouth help the dolphin to determine direction. The teeth are equally spaced at one wavelength of their clicks in the water. One side of the mouth is offset exactly half a wavelength from the other side.***

How is the movie Daredevil and dolphins related? ***The daredevil was able to echolocate and his best time was in the rain when there were a lot of rain drops falling to help him draw mental pictures.***

Why do we hear about blind people echolocating and not sighted people? ***Blind people need another sense so are motivated to learn how to echolocate.***

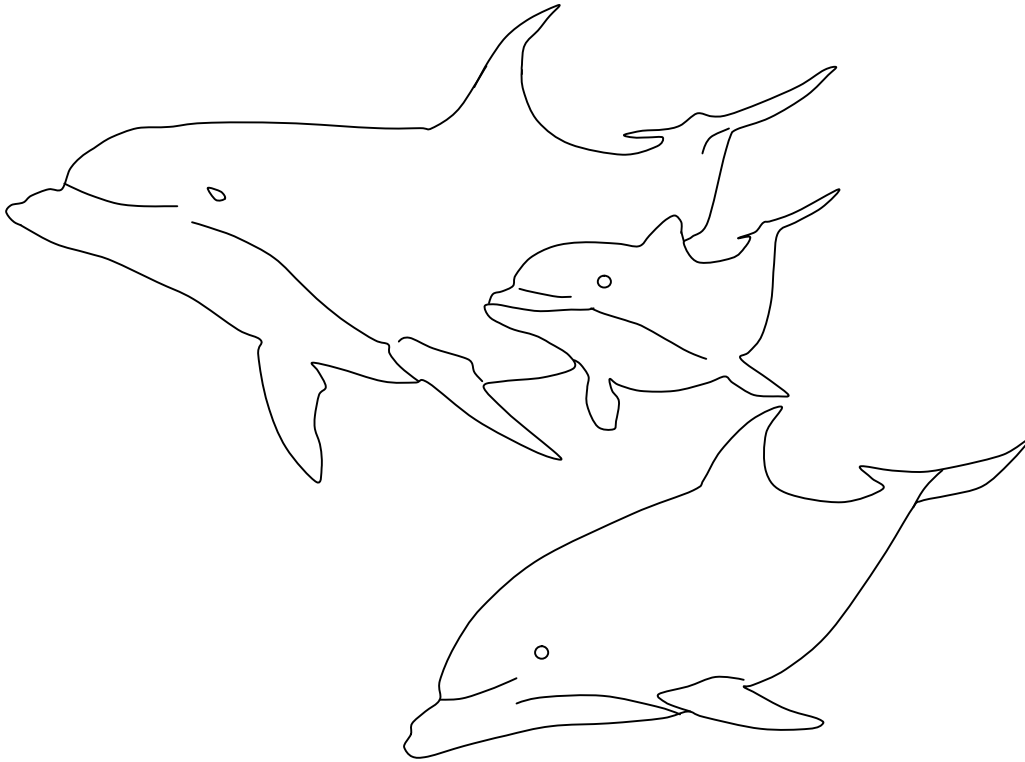
How is SONAR using in the medical field? In the medical field, SONAR is called "sound imaging." ***It's most common use is for ultrasounds, which is most frequently used to look at babies before they are born.***

What is "Sound Imaging?" ***SONAR in the medical field. Sound waves are used to create a picture.***

The Athletic, Social, and Intelligent Dolphin

Anthropology, Biology,
Philosophy, Physics

Dolphins Live in Pods



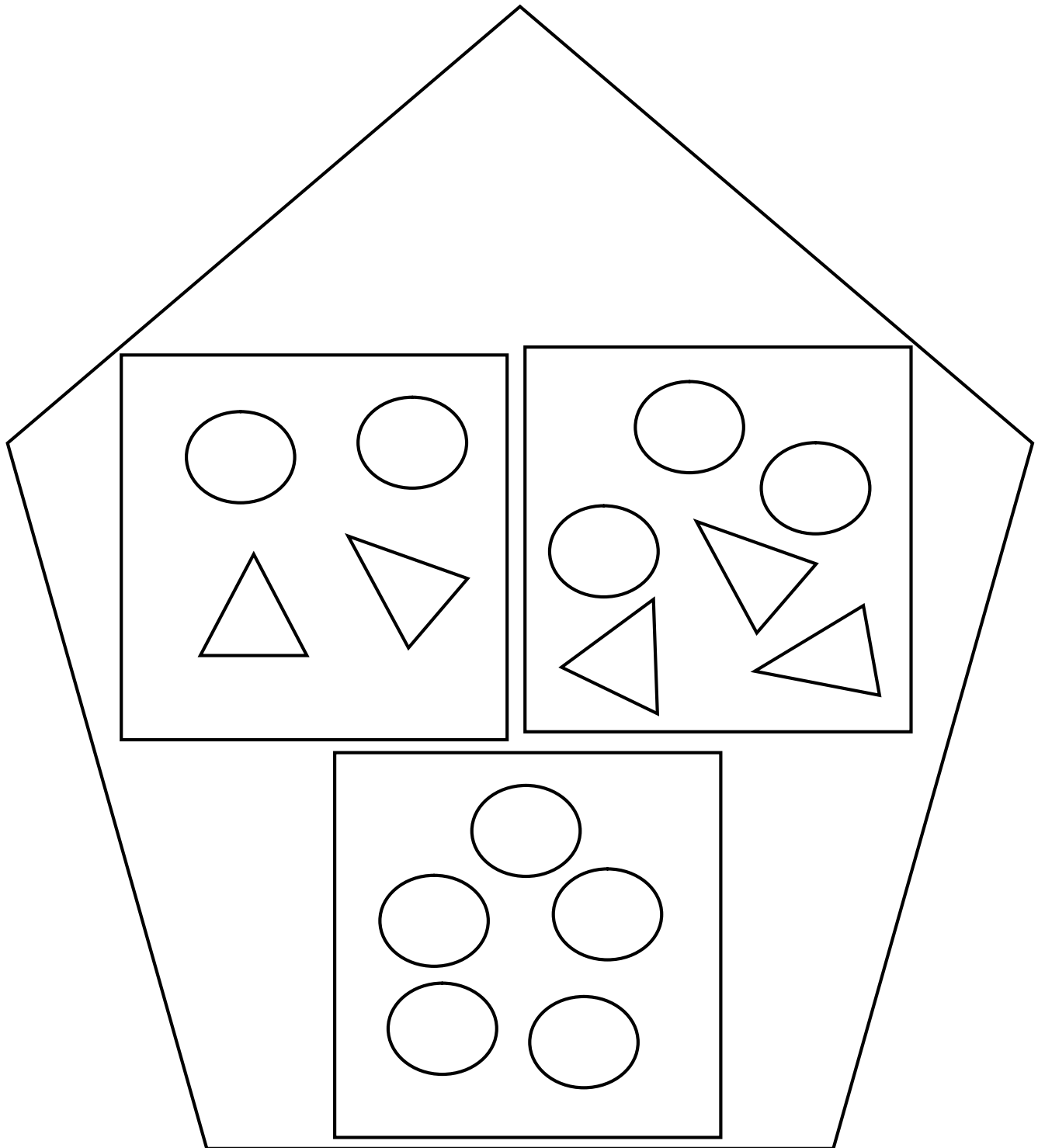
Dolphins live in pods. A pod is a group of dolphins. Pod members include mothers, their daughters, their younger sons, and their newborn babies. Sometimes uncles will be in the pod too.

Females usually stay with the same pod their whole life. Some of the males leave and go to other pods. Young females that do not have babies yet help their mothers with the newer babies.

Different species of dolphins have different sizes of pods.

Dolphins that live out in the ocean tend to have multiple pods together, called a subgroup or a school, and they hang out together. Large groups of dolphins are safer from predators, such as sharks, and out in the ocean there is enough food to support them. A school of dolphins could have as many as 2,000 dolphins in it.

Names of Dolphin Groups



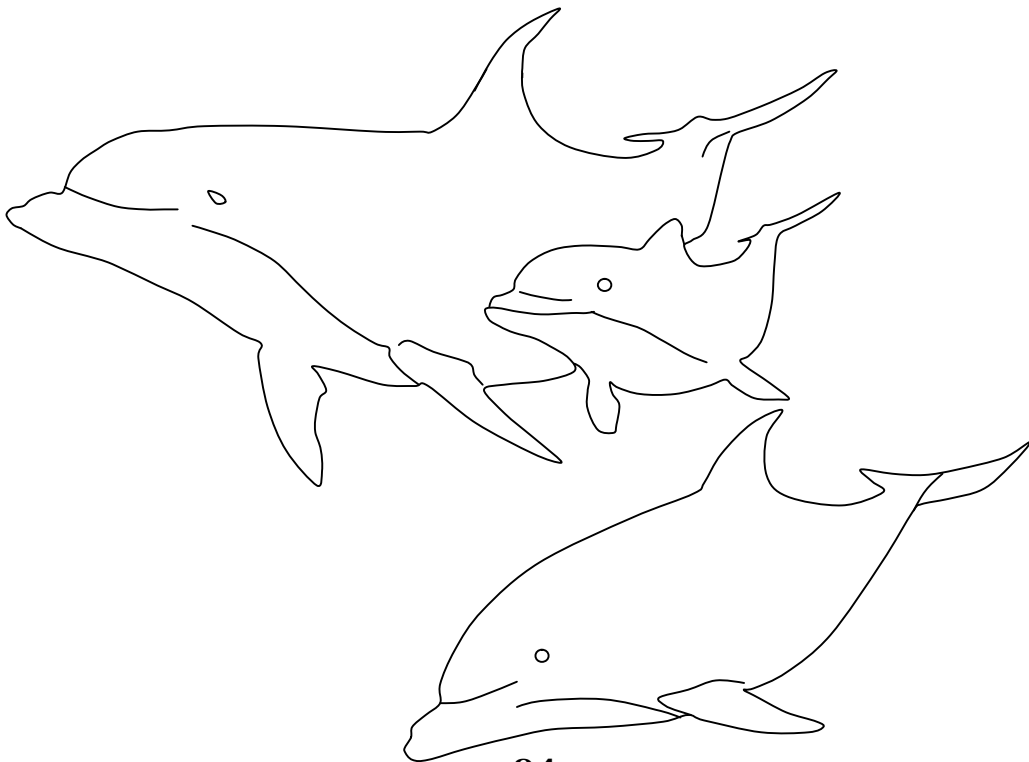
Names of Dolphin Groups

Color the family pods green. Family pods are stable units that have mothers, babies, and maybe some uncles and sons. These are represented by circles on the other page.

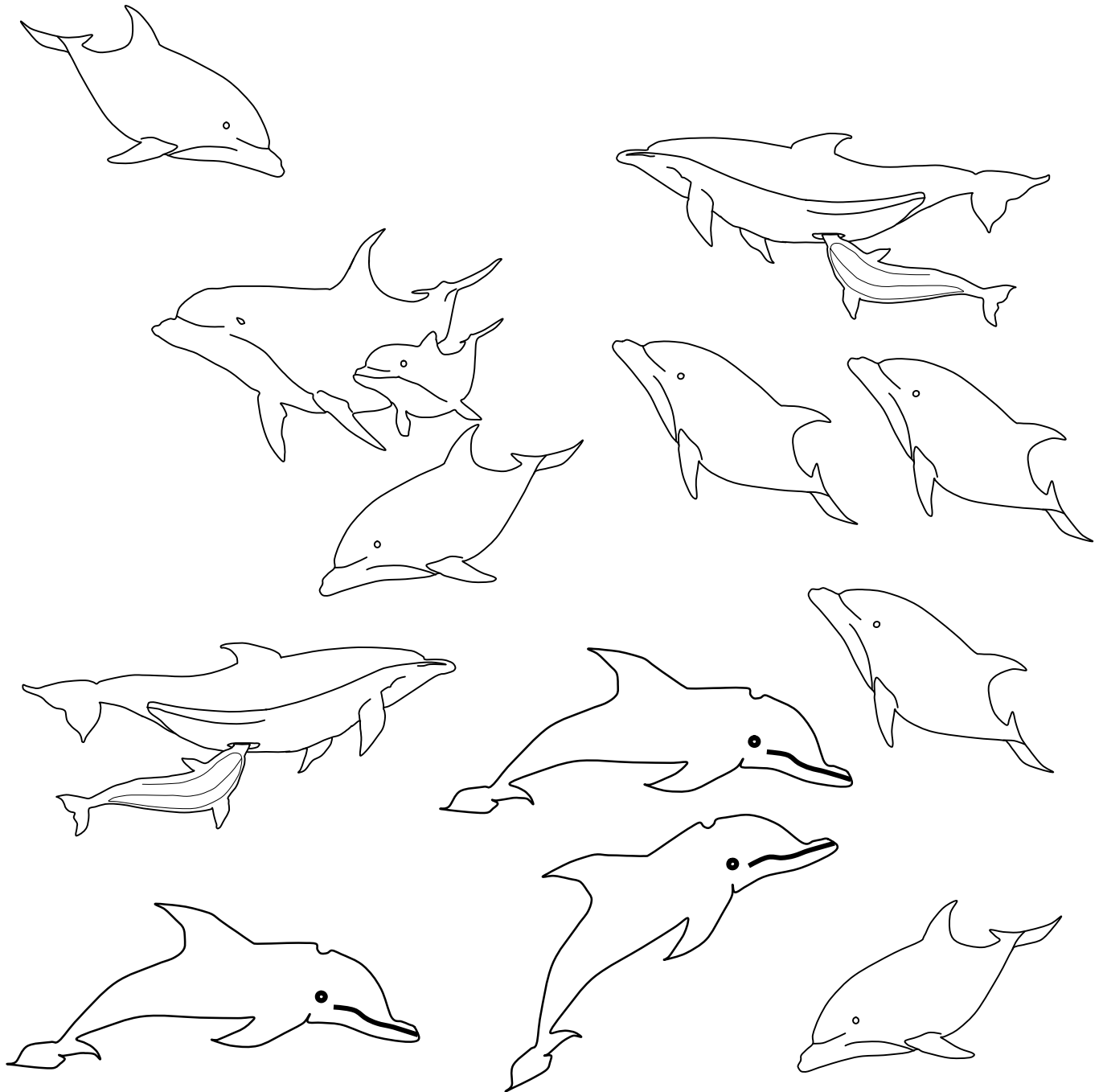
Color the nursery pods orange. Nursery pods just have mothers and their babies. These are represented by triangles on the other page.

Color the subgroups pink. Subgroups are smaller than a school. Subgroups go off and swim alone and then come back to the bigger school.

Color the school blue. The school is a large group of dolphins. A school of dolphins may contain different species of dolphins!



Count the Number of Dolphins in this Pod



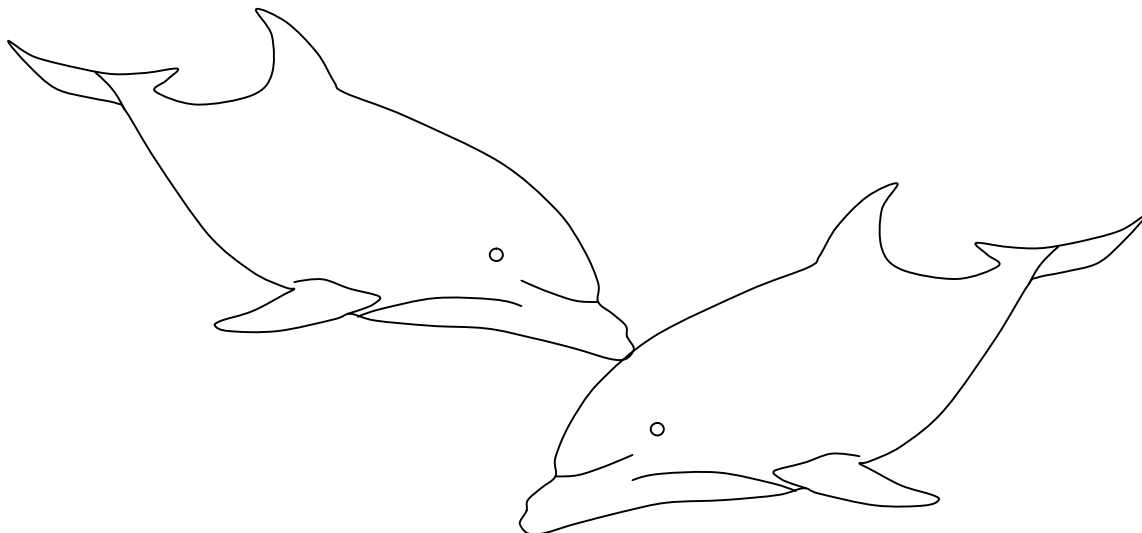
Touch is Very Important to Dolphins

Dolphins have very sensitive skin and they love to touch each other with their skin, flippers, fins, and tongues. A male often touches other dolphins with his penis. Dolphins sometimes copulate two or three times a day.

Captive dolphins like being stroked by their humans.

Mother dolphins are affectionate with their calves. Calves swim underneath or next to their mothers. Not only does this keep them close to their others, but it also makes swimming easier because they can ride the wake their mothers create in the water.

Dolphins like to touch fins, gently nip each other, and they keep track of the other members in their pod.



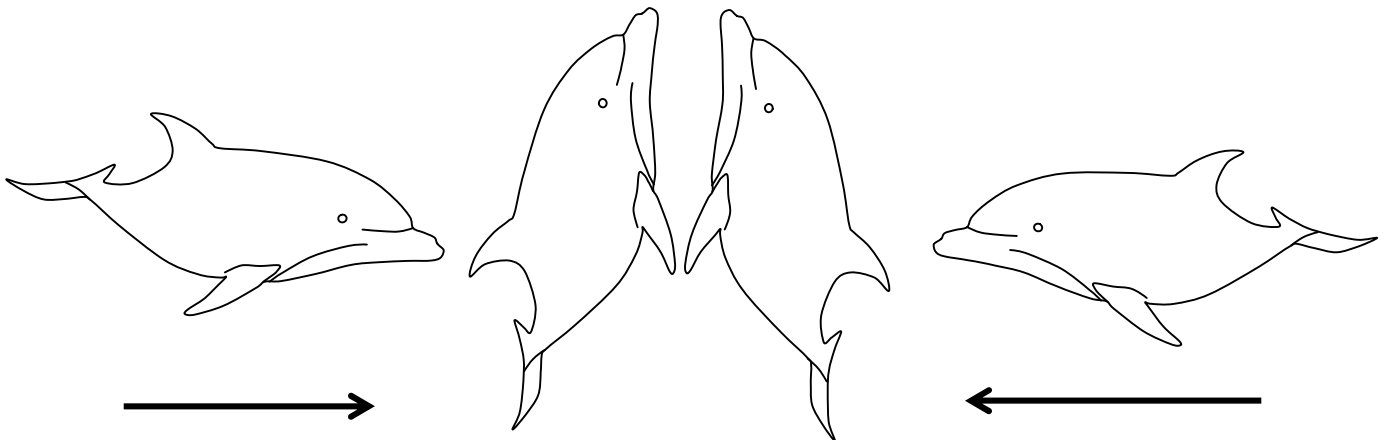
Play and Games are Important

Play and games are important to dolphins.

When calves play, the mothers and other pod members form a circle and the calves play inside it.

Dolphins love to play catch. They often play catch with their food (fish), but will also play catch with other objects they find.

Young male dolphins will often play “chicken.” The boys swim towards each other fast. When they get close, they jump out of the water, turn suddenly, and often touch fins. With another version of “chicken” the boys swim towards each other at high speeds and jump straight up out of the water when they get near each other. Sometimes they hit each other when they do this.



The Intelligent Dolphin

Many people think dolphins are intelligent, but what does that mean?

Describe what you think a smart person is like:

Intelligence is a topic that we can not accurately gauge for humans. Psychologists have tried to make tests, called I.Q. tests, to see how intelligent people are, but the tests are flawed. The tests only work for some people, not for all people.

So, if we cannot accurately define what intelligence is in a human, how is it that we think dolphins are smart? Here's some of the reasons:

- Dolphins have names.
- Dolphins learn from their mothers, other pod members, other dolphins, and from humans.
- Dolphins can learn human sign language.
- Dolphins can recognize themselves in a mirror.
- Dolphins have large brains when compared to their body size.
- Dolphin brains have a neocortex.
- Dolphins have a language which allows them to work in teams when hunting for fish.
- Dolphins are easily trained by humans.
- Dolphins use tools.

The Athletic Dolphin

Swimming

Dolphins are very good swimmers. In fact, they are so good, that scientists do not understand quite how they swim so well. So, they have done many studies.

One thing that helps dolphins swim fast are the microdermal ridges on their skin. These ridges are like little pockets that hold water. Water moves more easily through water than does anything else, so the water pockets on the dolphin's skin help it move more easily through the water. Wetsuits for humans were designed after dolphin skin.

Bottlenose dolphins can swim up to 40 miles per hour, which is five times faster than the fastest human swimmers.

Scientists created a concept called "Cost of Transport." This is how much energy is used to transport a given animal a given distance. The formula for this is:

Cost of Transport = Animal's Weight x Distance Traveled

Dolphins are more efficient swimmers than sharks. Scientists have decided that dolphins know some special dolphin swimming tricks that sharks do not know how to do.

The Athletic Dolphin Leaping

All dolphins swim fast and leap.

Different species of dolphins are known for leaping differently.

Spinner dolphins jump high out of the water and spin rapidly. Some scientists think this is to dislodge parasitic fish from their skin.

Some dolphins like to porpoise – move quickly in the water by jumping out of the water.

Some dolphins do “candle jumps.” A candle jump is jumping straight out of the water and then coming straight back in the water. Scientists aren’t sure why dolphins do this, but think it might be to help settle their tummies after eating a big meal.

The Athletic Dolphin Diving

All dolphins dive. Some species dive longer and further than others, but all dolphins dive. Some dolphins, such as the bottlenose dolphin, can dive 1,000 feet or more.

When humans dive, they have to worry about something called “the bends.” The air we breathe is composed of 90% Nitrogen. Normally, Nitrogen is an inert gas and it does not bother us. As humans dive in the water, and the pressure increases, the Nitrogen in the air dissolves in the bloodstream. This is fine. The problem comes into play when the person rises back up to the surface. If the person rises too fast, the dissolved Nitrogen gas in the blood starts to “boil” off because the diver can not exhale it fast enough. This is called “the bends” and can make people very sick.

Dolphins do not have this problem at all.

The Athletic Dolphin

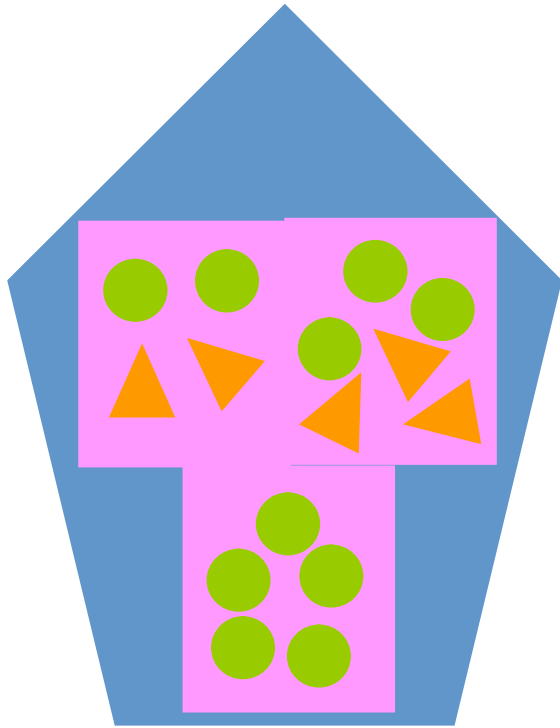
The Dive

The dolphin starts off its dive by taking a breath and then making a few powerful strokes with its tail. The dolphin then stops moving its tail, and since the dolphin is underwater, it does not breathe.

The dolphin descends rapidly. The dolphin's elastic lung cage shrinks and makes the dolphin able to sink even deeper. The dolphin's pulse diminishes.

When the dolphin is ready to go back up to the surface, it makes a few powerful strokes with its tail and increases its pulse. When the dolphin reaches about 250 feet from the surface, the dolphin's lung case expands again making the dolphin better able to float.

Answers

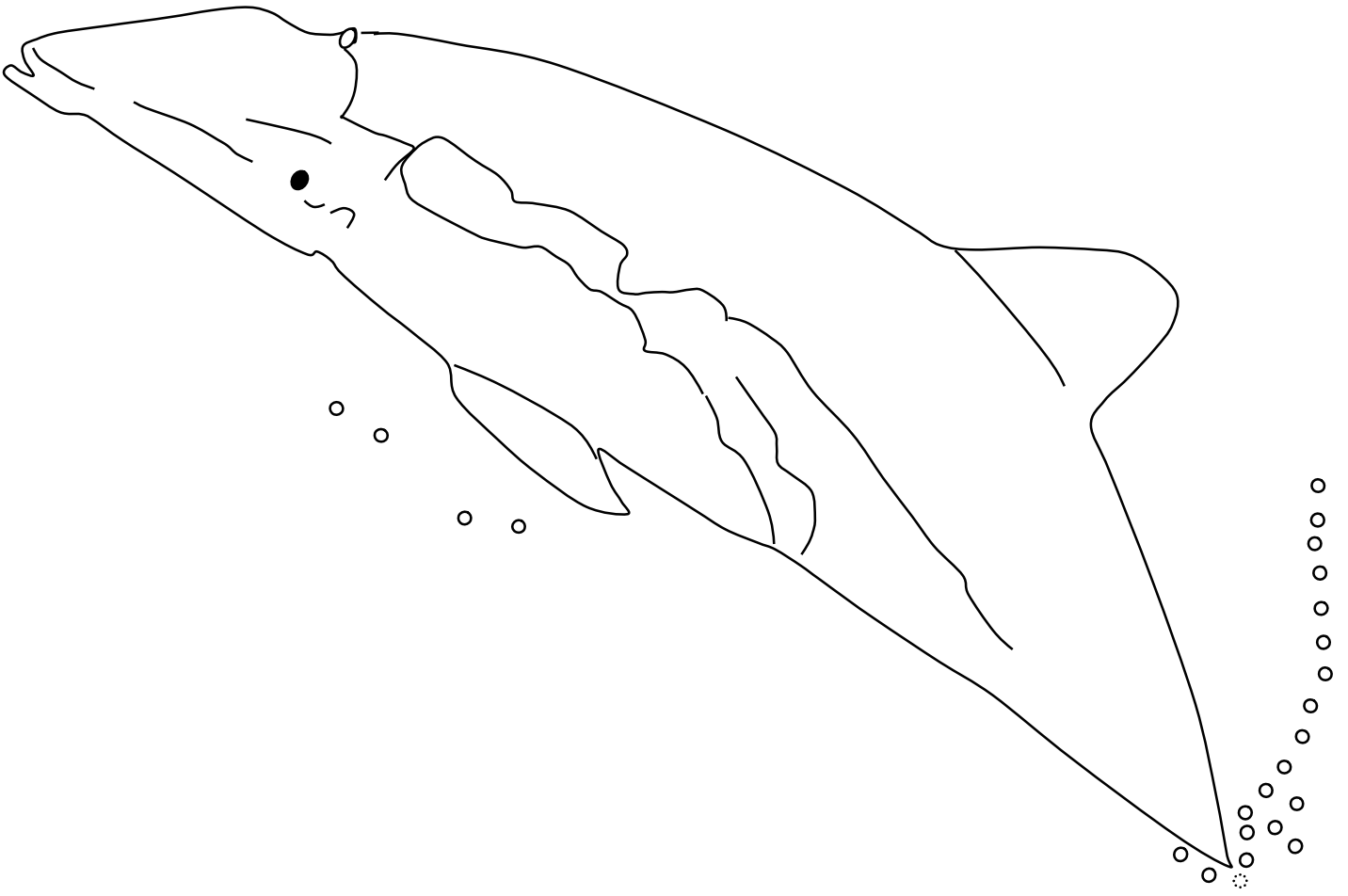


15

There are 15
dolphins on the
coloring page.

Compare the Species

Geography



Cephalorhynchus Eutropia

Chilean Dolphin

Habitat: This dolphin only lives off the coast of Chile in South America. This dolphin lives in shallow waters and does leave the ocean to enter estuaries and rivers.

Distinguishing Characteristic: This dolphin has rounded flippers and a beak that is not well defined. This dolphin is mostly gray in color. This dolphin is thick; its circumference can be $\frac{2}{3}$ of its length.

Teeth: 116-136

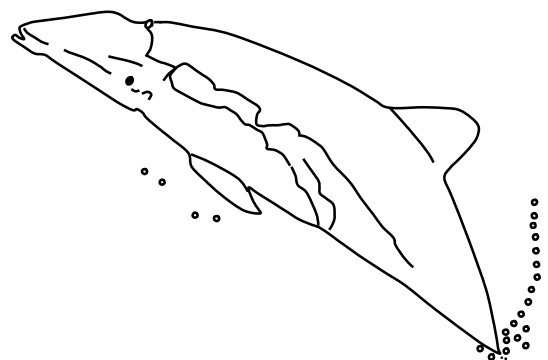
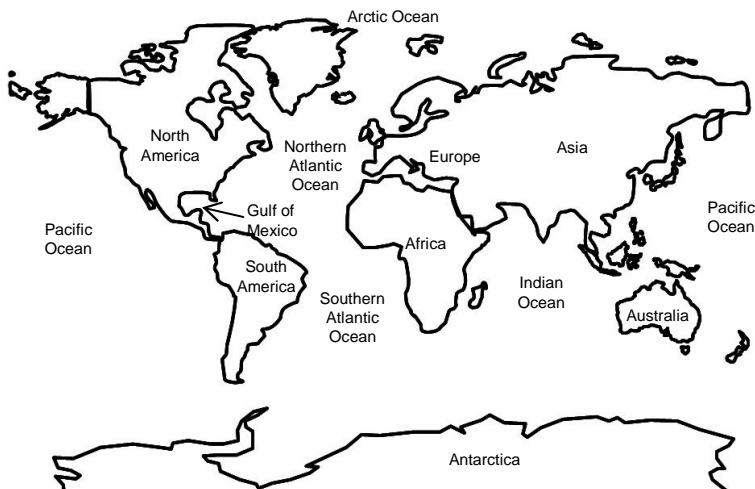
Diet: Fish, crustaceans

Length: Up to $5\frac{1}{2}$ feet

Weight: Up to 140 pounds

Pod Size: 2-10

Life Cycle: Estimated lifespan of 20 years.



Color the map with where this dolphin lives. **97**





Globicephala Melas

Long-Finned Pilot Whale

Habitat: The long-finned pilot whale prefers cooler waters to the short-finned pilot whale. Although this species can be found most anywhere, this species prefers the Northern Atlantic Ocean, around the coasts of Europe, and off the southern coasts of North America.

Distinguishing Characteristic: Pilot whales are either dark gray or black in color. The flippers on the long-finned pilot whale can be up to a quarter the length of the body. These dolphins are known for mass strandings.

Teeth: 32-52

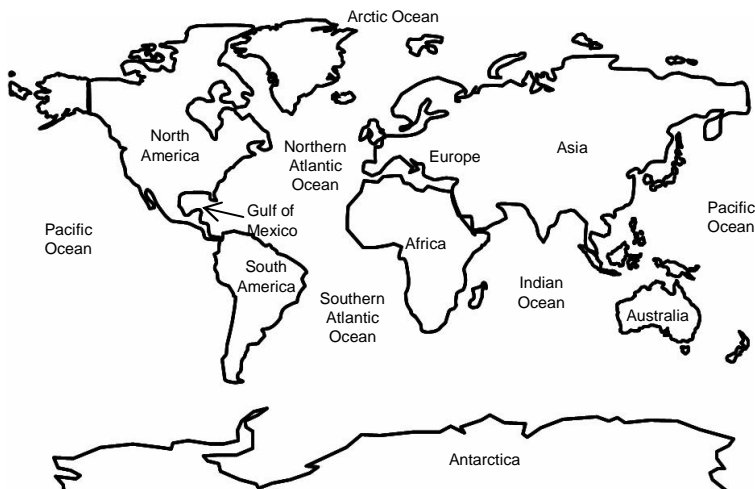
Diet: Squid

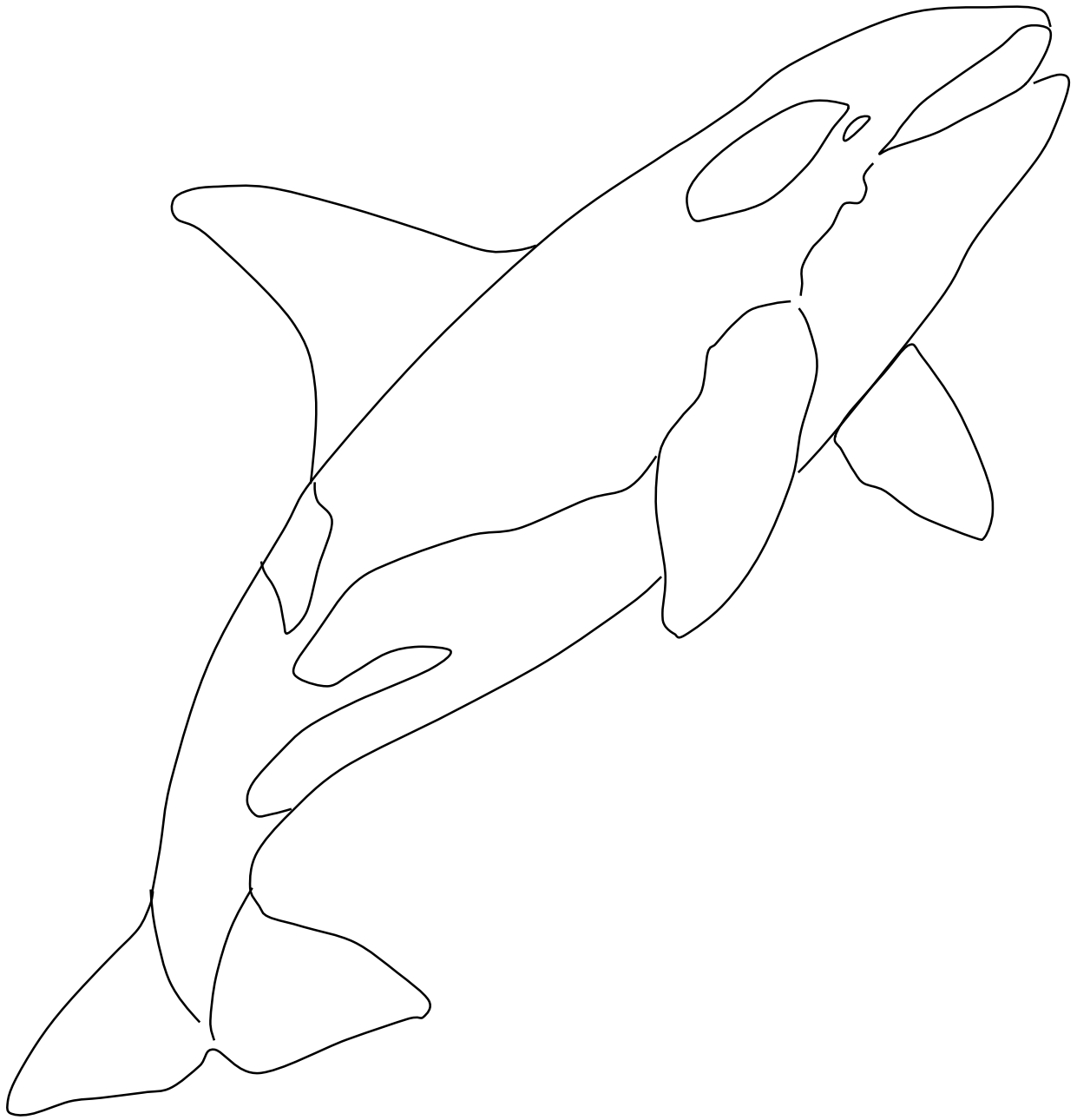
Length: Up to 23 feet long

Weight: Up to 6,600 pounds

Pod Size: 20-100; 1,000+

Life Cycle: Males can live to 45 years of age and females can live to 60 years of age.





Orcinus Orca

Orca (Killer Whale)

Habitat: Orcas can be found in all oceans, but is most common along the Pacific coast of the United States and Canada as far north as Alaska. They are also found on the coasts of the United States in the Atlantic Ocean and around the coasts of Europe. Orcas prefer colder waters like in the polar areas.

Distinguishing Characteristic: Orcas are the largest members of family Delphinidae. They are distinctly colored in black and white and do not have well-defined beaks. The orca is known for attacking and killing many marine animals, including young cetaceans of other species.

Teeth: 40-48

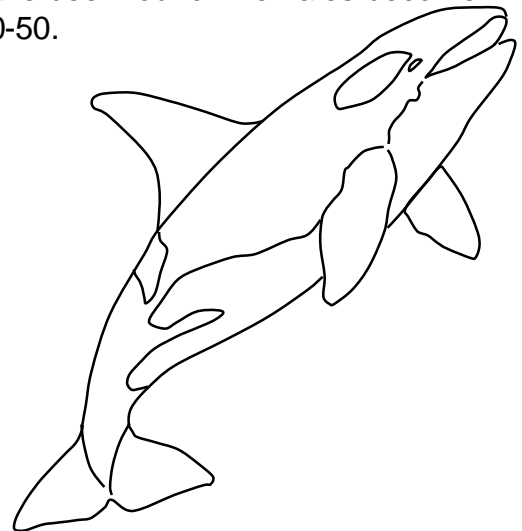
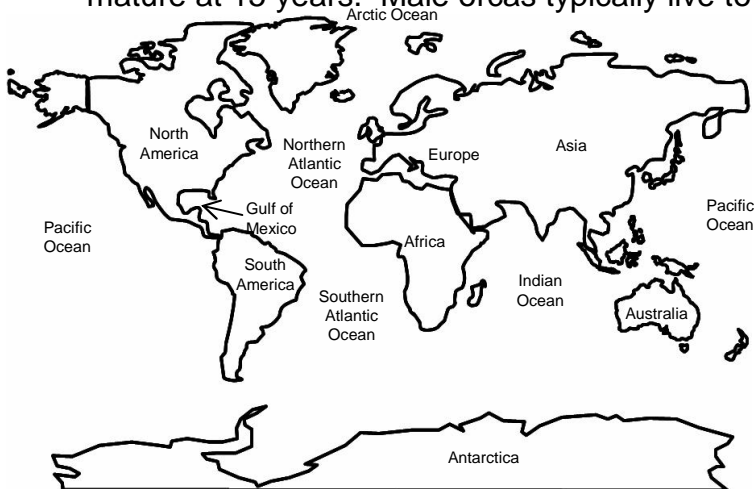
Diet: Fish, otters, blue whales, sea birds, sharks, marine turtles; an adult orca can eat 135 pounds of food a day.

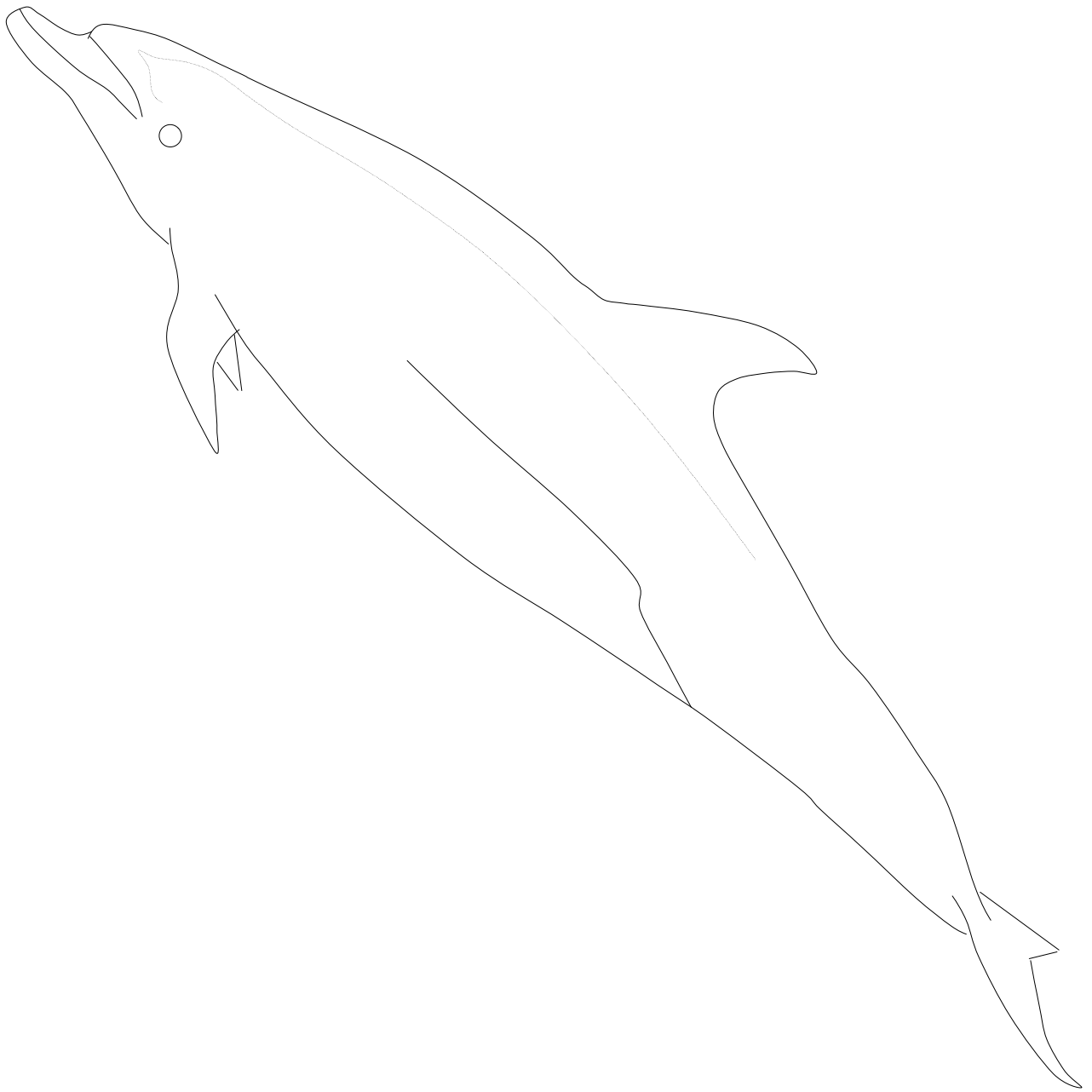
Length: The dorsal fin can be up to 6 feet tall for males and 3 feet tall for females. The dorsal fins on males is triangular and females tend to have a more normal dolphin shaped dorsal fin. Males can be up to 32 feet long.

Weight: Up to 16,500 pounds

Pod Size: 9 for subpods called matriline; up to 45 for pods; 200+ when clans get together

Life Cycle: Gestation for orcas is from 15 to 18 months. Calves nurse for 2 years. Calves start eating food at 1 year. Females can reach sexual maturity as early as 6 years of age. Females remain fertile until the age of 40 or so. Female orcas typically live to be about 50, but cases of 90-year-old orcas have been found. Females become mature at 15 years. Male orcas typically live to be 30-50.





Sotalia Fluviatilis

Tucuxi

Habitat: This species of dolphin lives near the coasts of Eastern South America and enters estuaries and rivers.

Distinguishing Characteristic: This dolphin looks like a bottlenose dolphin, but is smaller.

Teeth: 104-140

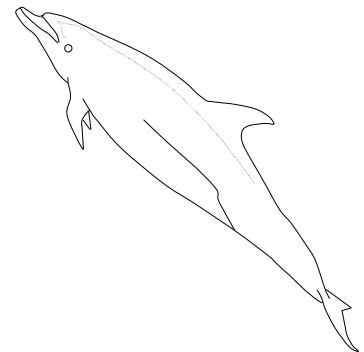
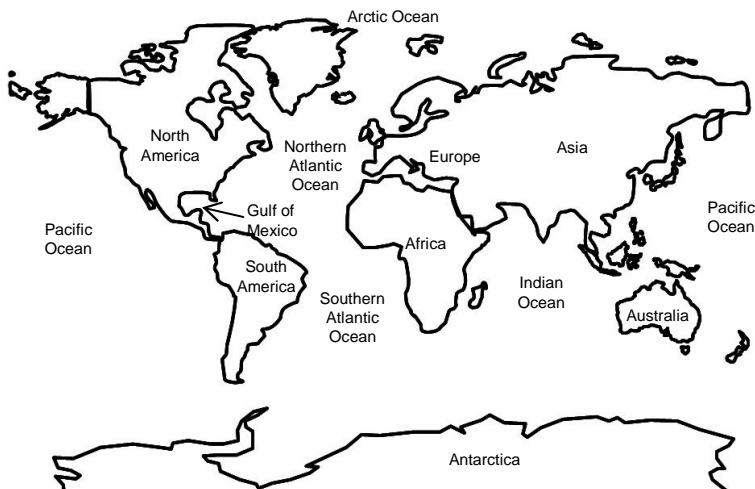
Diet: Small fish

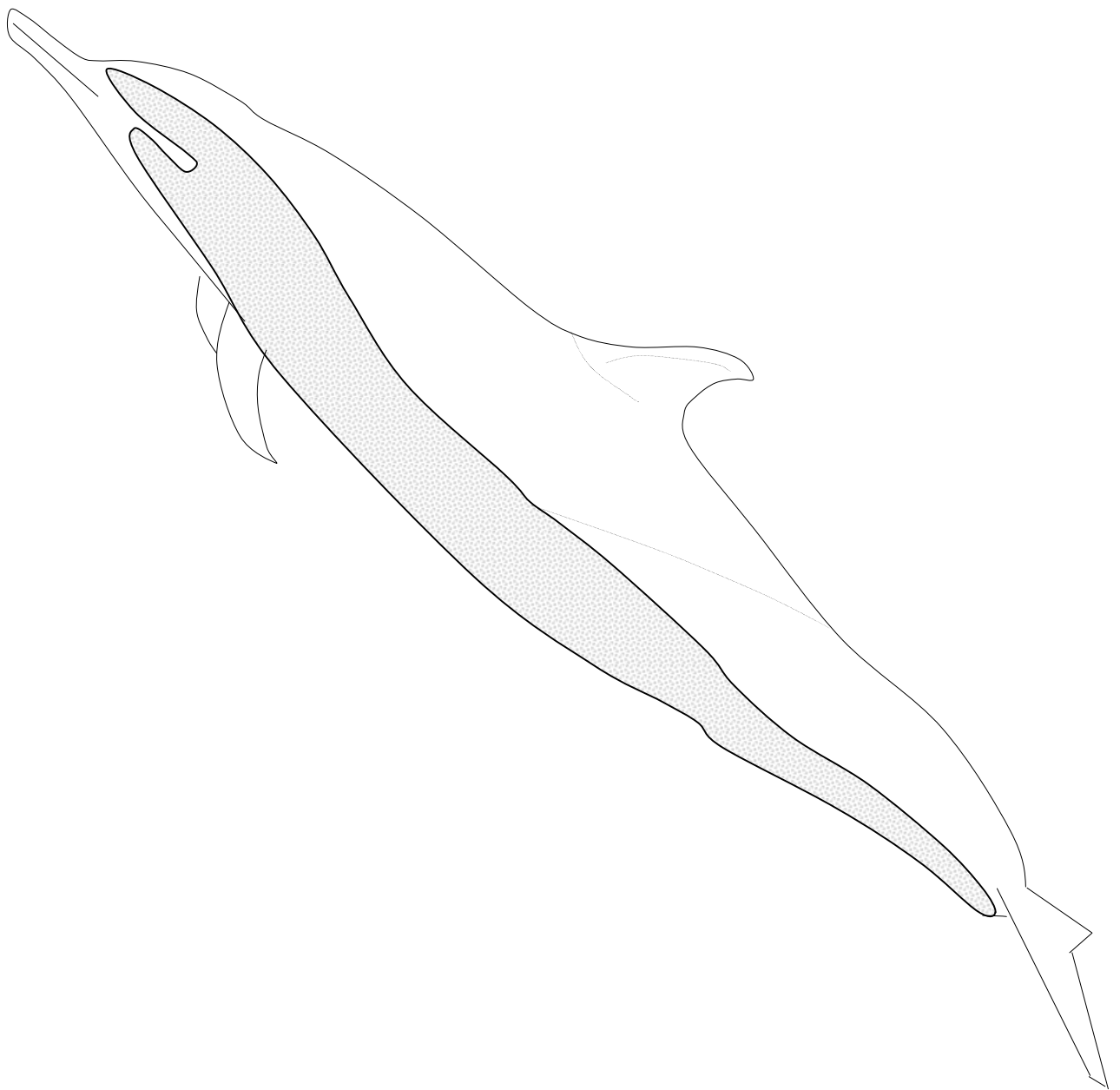
Length: Up to 7 feet

Weight: Up to 88 pounds

Pod Size: 4; 20-50

Life Cycle:





Stenella Attenuata

Pantropical Spotted Dolphin

Habitat: The Pantropical spotted dolphin likes the warmer waters, near the equator in the Pacific Ocean and off the coast of the United States in the Atlantic Ocean.

Distinguishing Characteristic: Pantropical spotted dolphins are thin with long thin beaks. The beak and the melon is separated by a crease. These dolphins have dark jaws with white “lips.” Calves do not have their spots yet and are often confused with bottlenose dolphins. This species of dolphin hangs out with the Yellowfish Tuna. It does not eat the tuna, but they share the same food. Consequently, this dolphin was frequently caught in tuna nets.

Teeth: 136-192

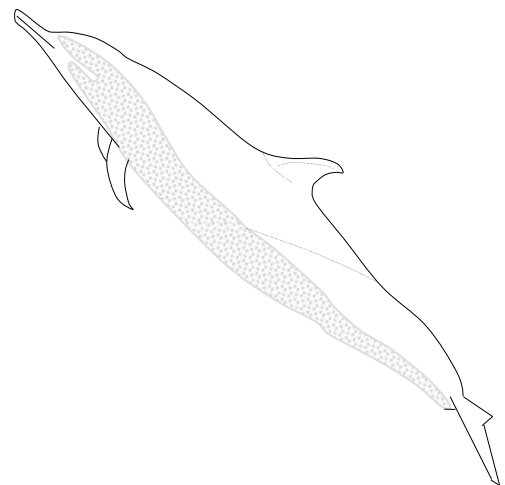
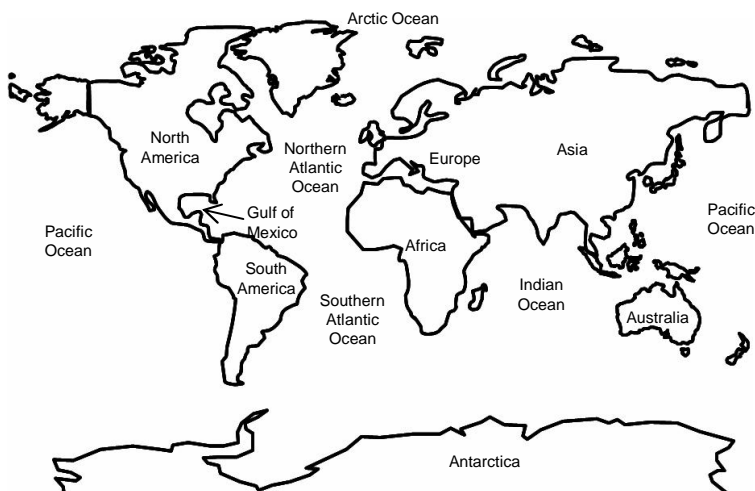
Diet: Small fish, squid, and crustaceans

Length: Up to 8.5 feet

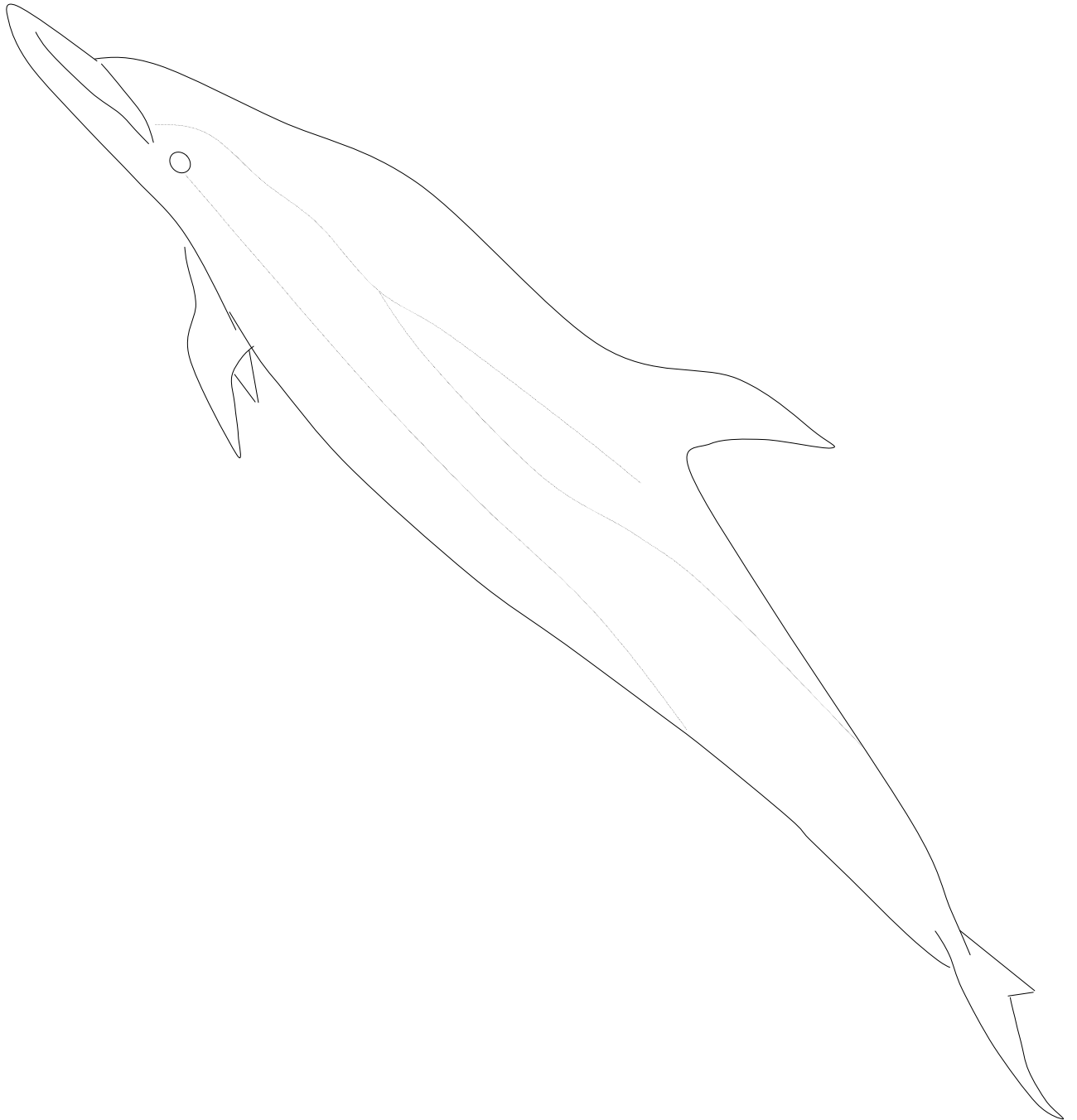
Weight: About 260 pounds

Pod Size: 100; 2000+

Life Cycle: Unknown



Color the map with where this dolphin lives. **107**



Stenella Coeruleoalba

Striped Dolphin

Habitat: The striped dolphin lives primarily in the Pacific Ocean off the coast of the United States, Mexico, and Columbia and deeper into the ocean. The striped dolphin also lives in the Gulf of Mexico and in the Atlantic Ocean off the coast of the United States.

Distinguishing Characteristic: These dolphins get their names from the blue stripes on their backs. They have a stripe on the top of their body from beak to tail and on each side from flippers to tail.

Teeth: 120-210

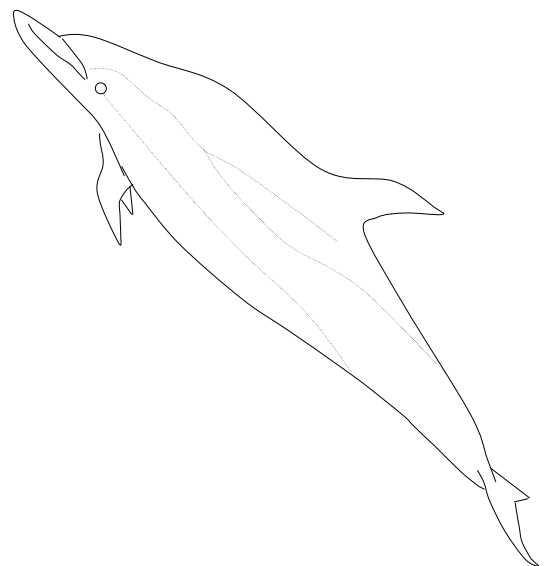
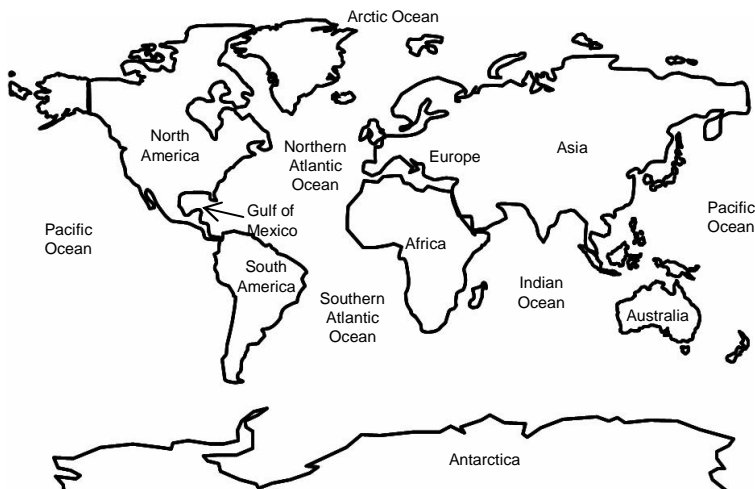
Diet: Lanternfish and squid

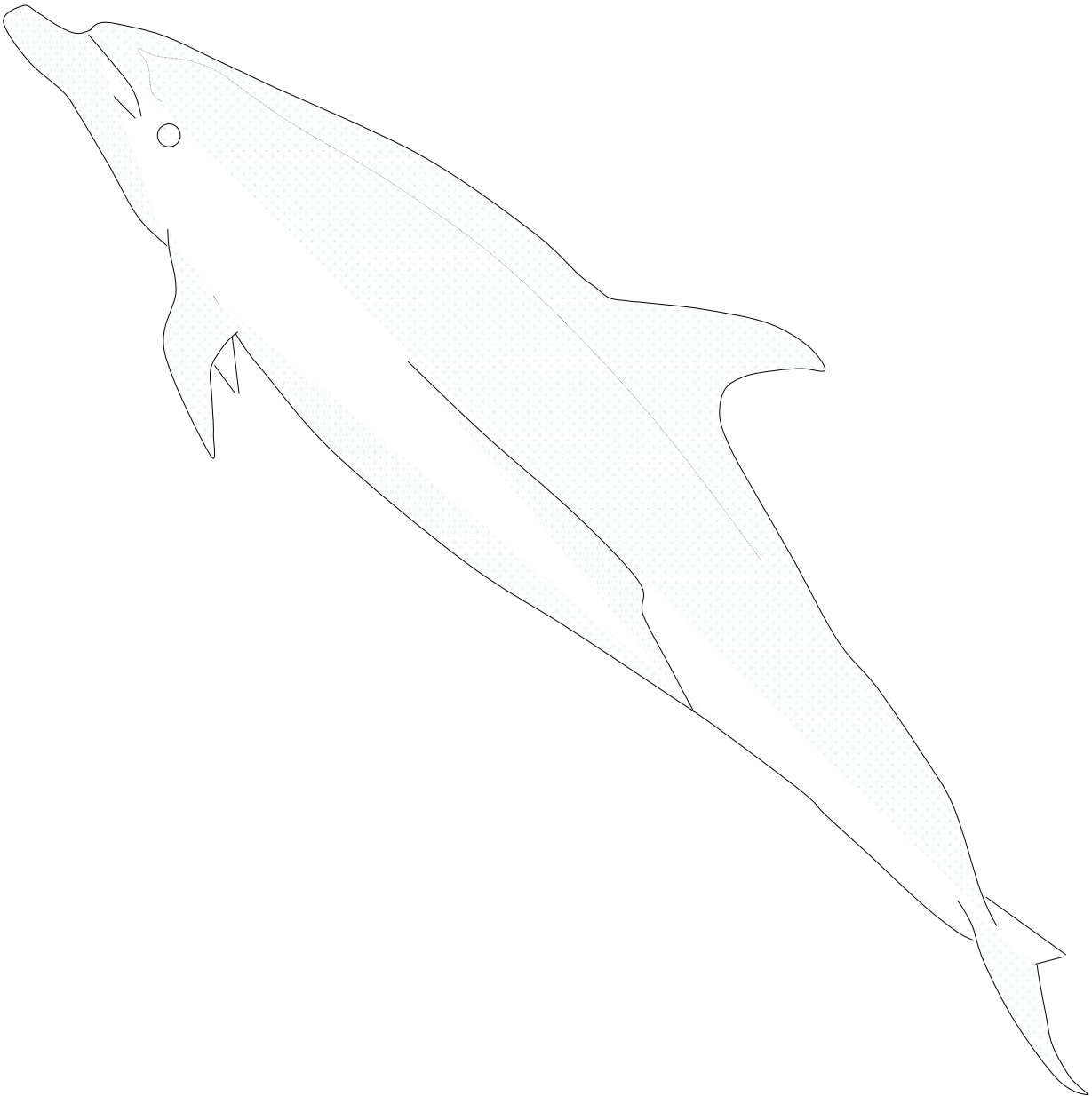
Length: About 8.5 feet long

Weight: Up to 345 pounds

Pod Size: 100-500; 2000+

Life Cycle: Babies nurse for up to 16 months. Gestation lasts about 12 months. Males become adults at about 9 years of age and females at about 7 years of age. These dolphins can live to be 55 to 60 years old.





Stenella Frontalis

Atlantic Spotted Dolphin

Habitat: The Atlantic spotted dolphin is only found in the Atlantic Ocean. They primarily live off of the eastern coast of the United States, the Gulf of Mexico, and the eastern cost of Africa.

Distinguishing Characteristic: Atlantic spotted dolphins do not start out with spots, and can be mistaken for bottlenose dolphins when they are calves. This dolphin has a long, chubby beak.

Teeth: 120-168

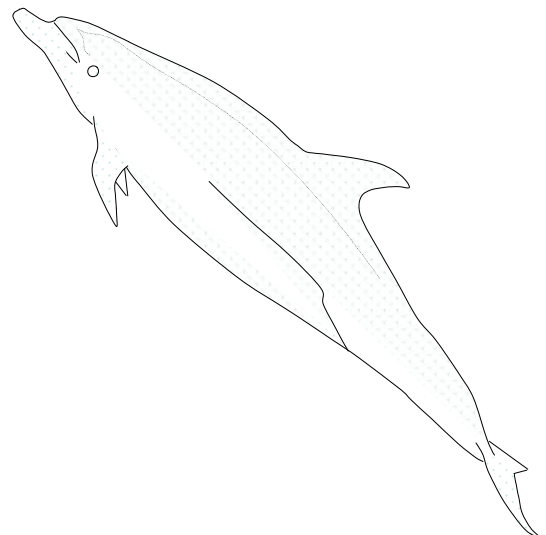
Diet: Fish and squid

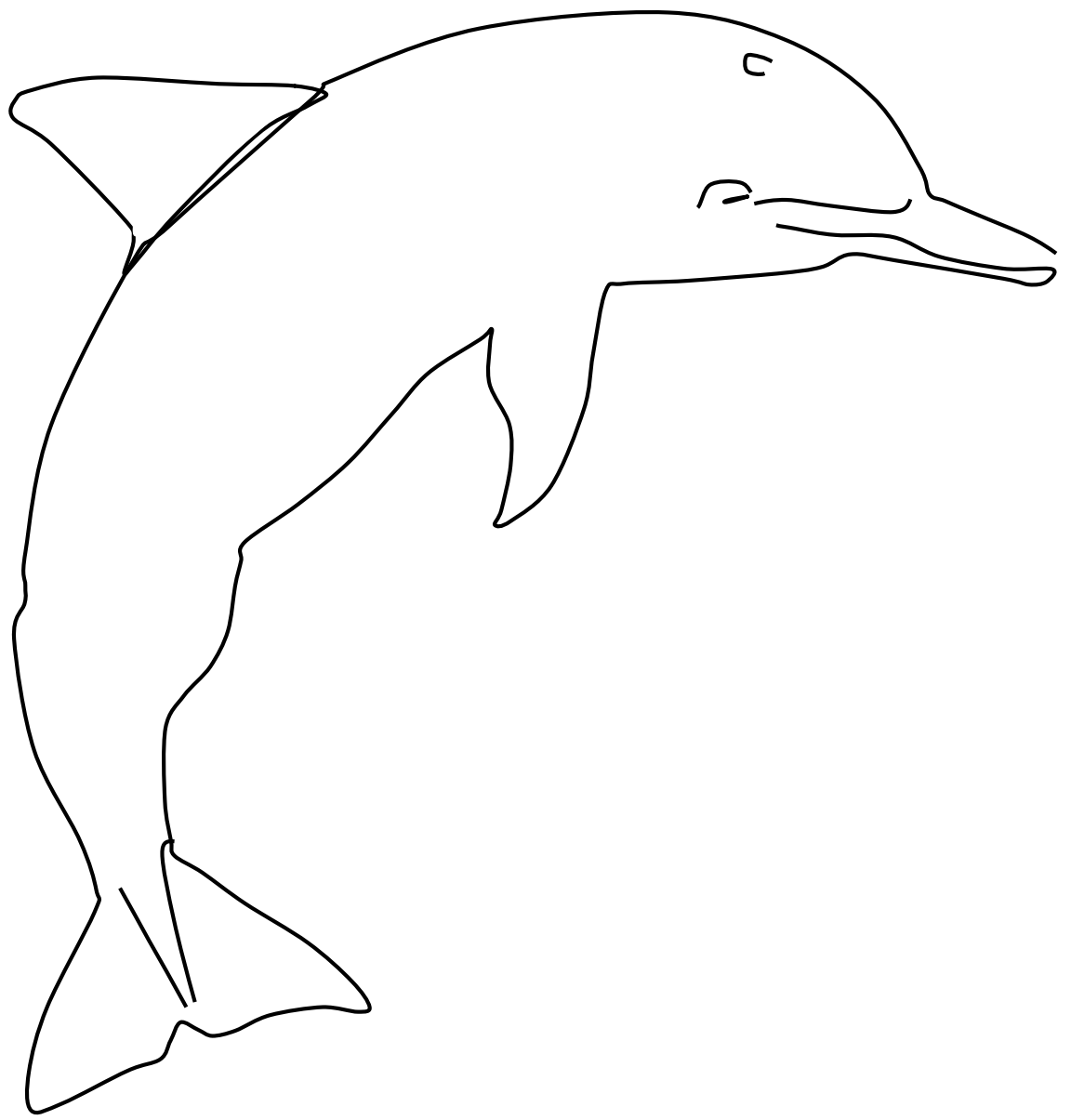
Length: Up to 7.5 feet long

Weight: Up to 315 pounds.

Pod Size: 5-15; 50+

Life Cycle:





Stenella Longirostris

Spinner Dolphin

Habitat: The Spinner dolphin likes warm water. Most live off of the coasts of Mexico, Peru, and Columbia.

Distinguishing Characteristic: Spinner dolphins are thin and have long beaks. Spinners are known for jumping out of the water and spinning up to seven times before re-entering the ocean water.

Teeth: 180-248

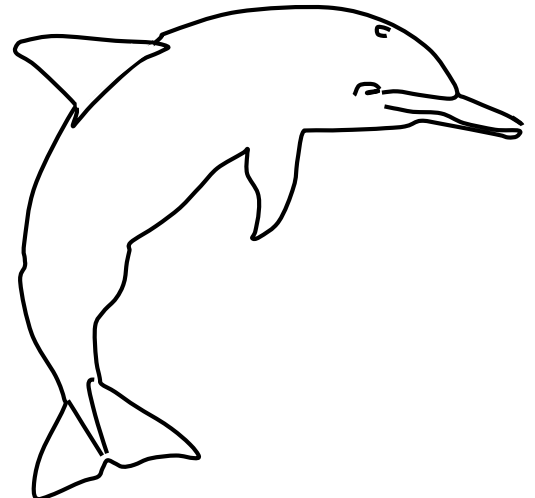
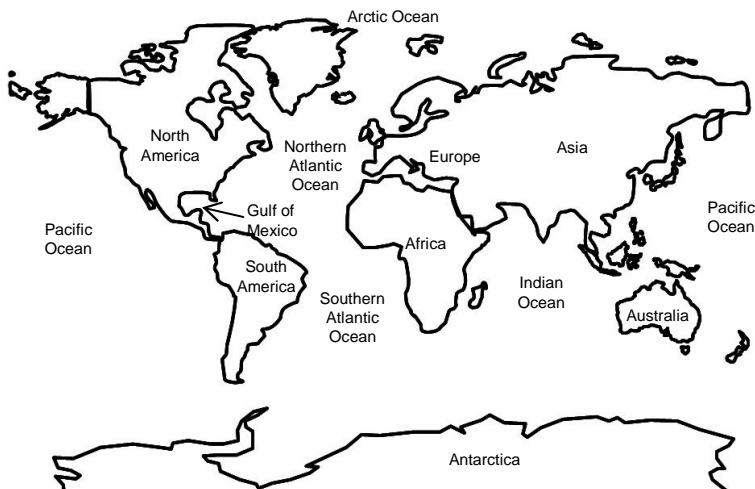
Diet: Mid-water fish and squid

Length: Up to 8 feet long

Weight: Average 170 pounds

Pod Size: 200; 2000+

Life Cycle: These dolphins have been known to live up to 20 years old. Babies nurse for about two years.





Steno Bredanensis

Rough Toothed Dolphin

Habitat: The Rough Toothed Dolphin lives in warm, tropical areas such as off the coast of Mexico, the Gulf of Mexico, the Atlantic Ocean near the Gulf of Mexico, and the west coasts of Africa.

Distinguishing Characteristic: There is no clear break between the dolphin's melon and beak and the dolphins are gray in color. Their undersides are white with a hint of pink. The teeth have "rough" vertical edges.

Teeth: 80-108

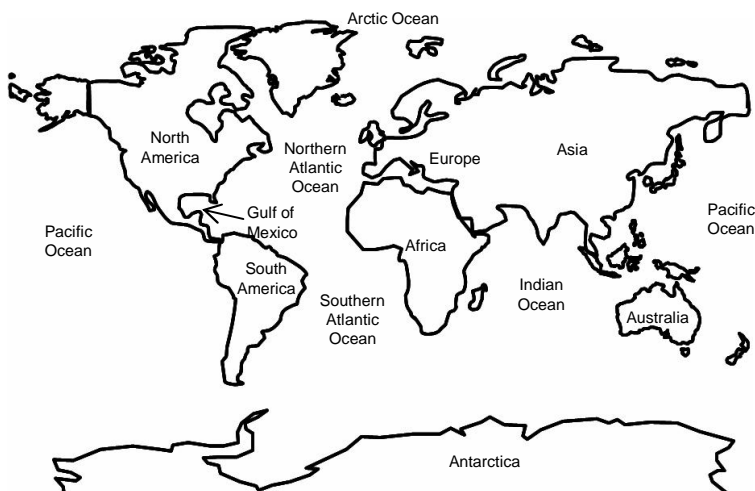
Diet: Large fish, especially mahi mahi

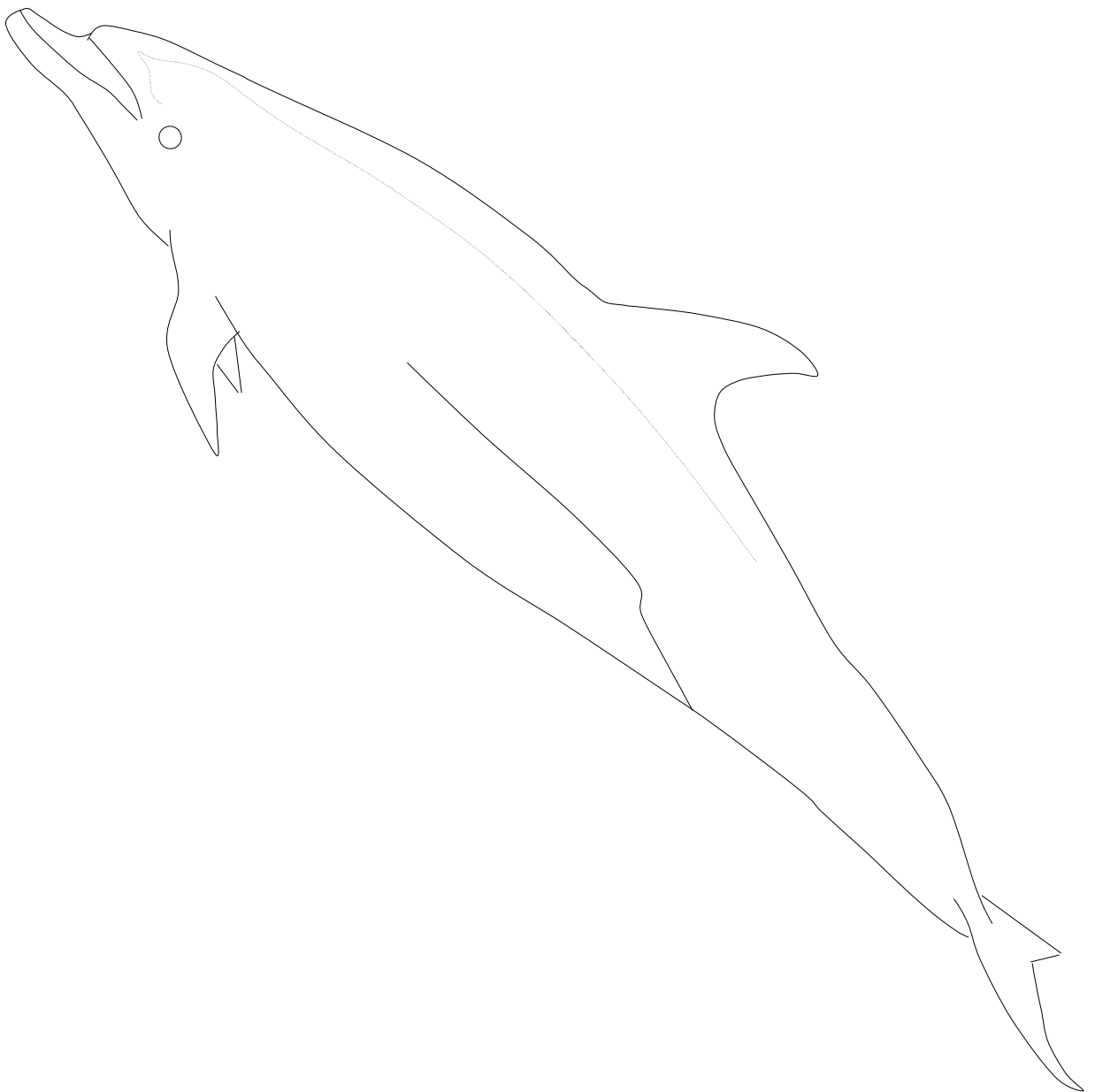
Length: Up to 9¼ feet long

Weight: Up to 330 pounds

Pod Size: 10-20; 100+

Life Cycle: Females reach sexual maturity at 10 years of age and males at 14. These dolphins have been known to live up to 32 years old.





Tursiops Truncatus

Bottlenose Dolphin

Habitat: Bottlenose dolphins can be found in any oceans; however, they mostly live in the Atlantic Ocean, the Pacific Ocean, off the coast of the United Kingdom, and the Gulf of Mexico. Bottlenose dolphins prefer the coastal areas of the ocean to deep water.

Distinguishing Characteristic: The beak of this dolphin looks like a bottle. There is an easily seen crease that separates the melon and the beak of this dolphin. Bottlenose dolphins have backsides that range from light gray to almost black. Their tummies are white and sometimes have a pinkish hue. The bottlenose dolphin is the dolphin most frequently seen in TV shows and aquariums.

Teeth: 76-100

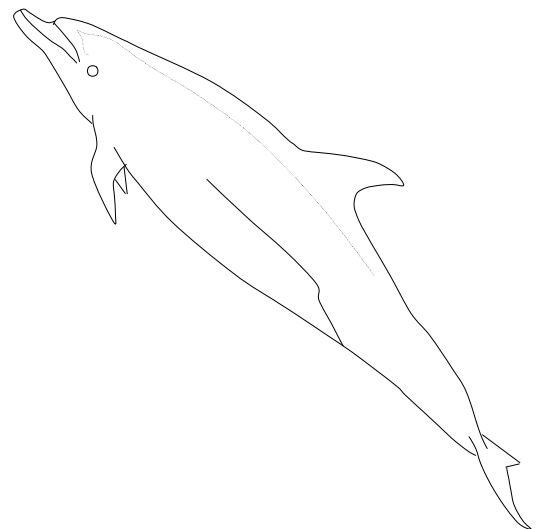
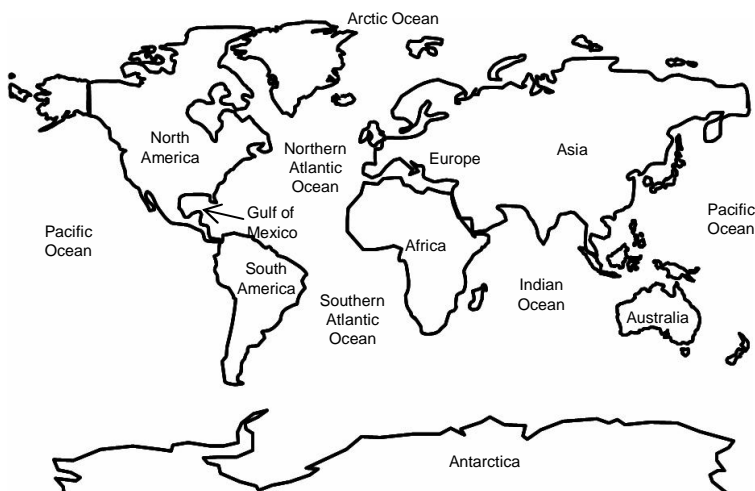
Diet: Fish, squid, crustaceans

Length: Up to 12 feet long

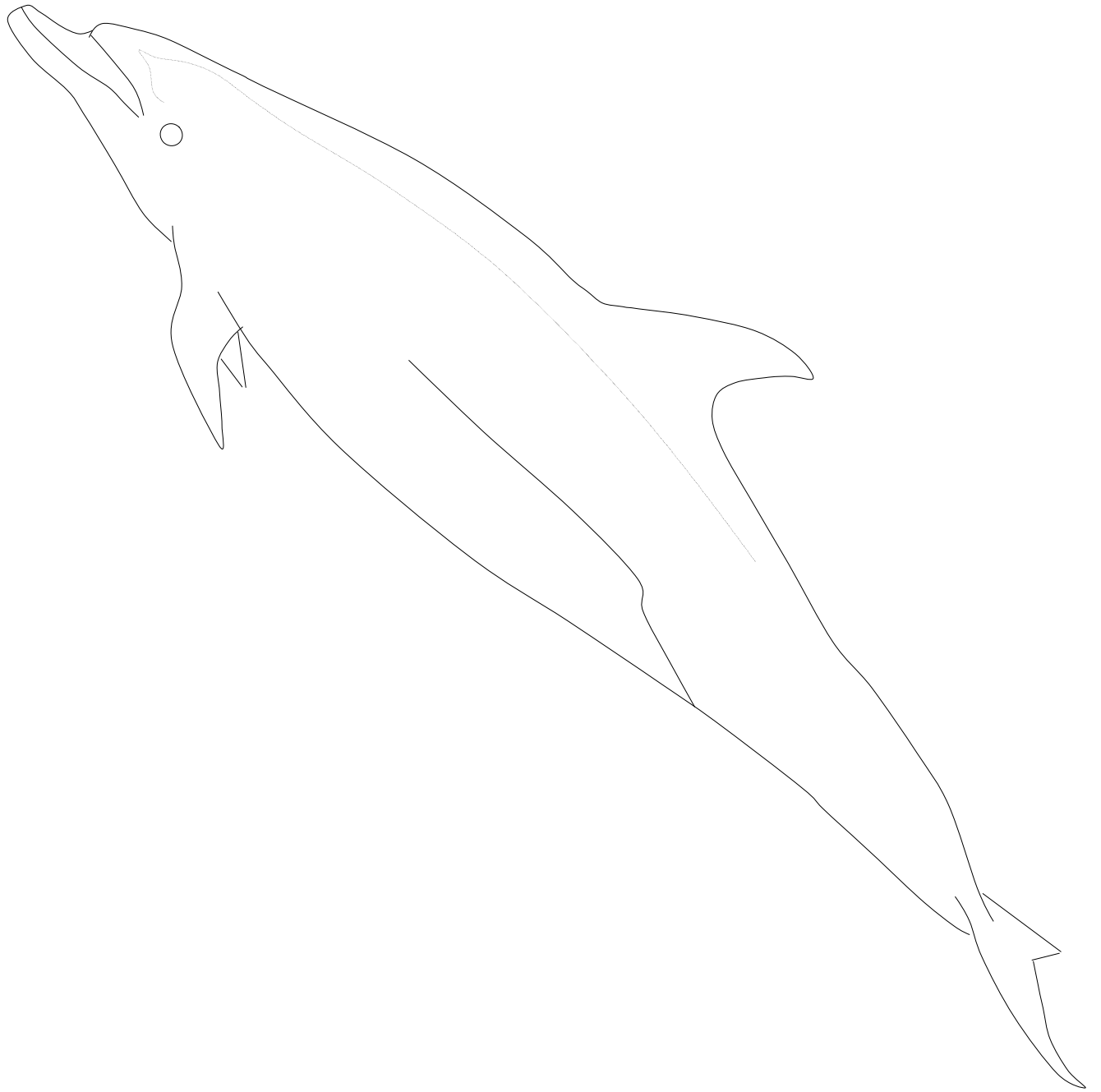
Weight: Between 419 and 573 pounds

Pod Size: 20; 200+

Life Cycle: Bottlenose dolphins usually live to be about 40 years old, but some have lived even longer. Females can have babies up until their death.



Color the map with where this dolphin lives. **117**



Compare the Species

Label the dolphin with its name.

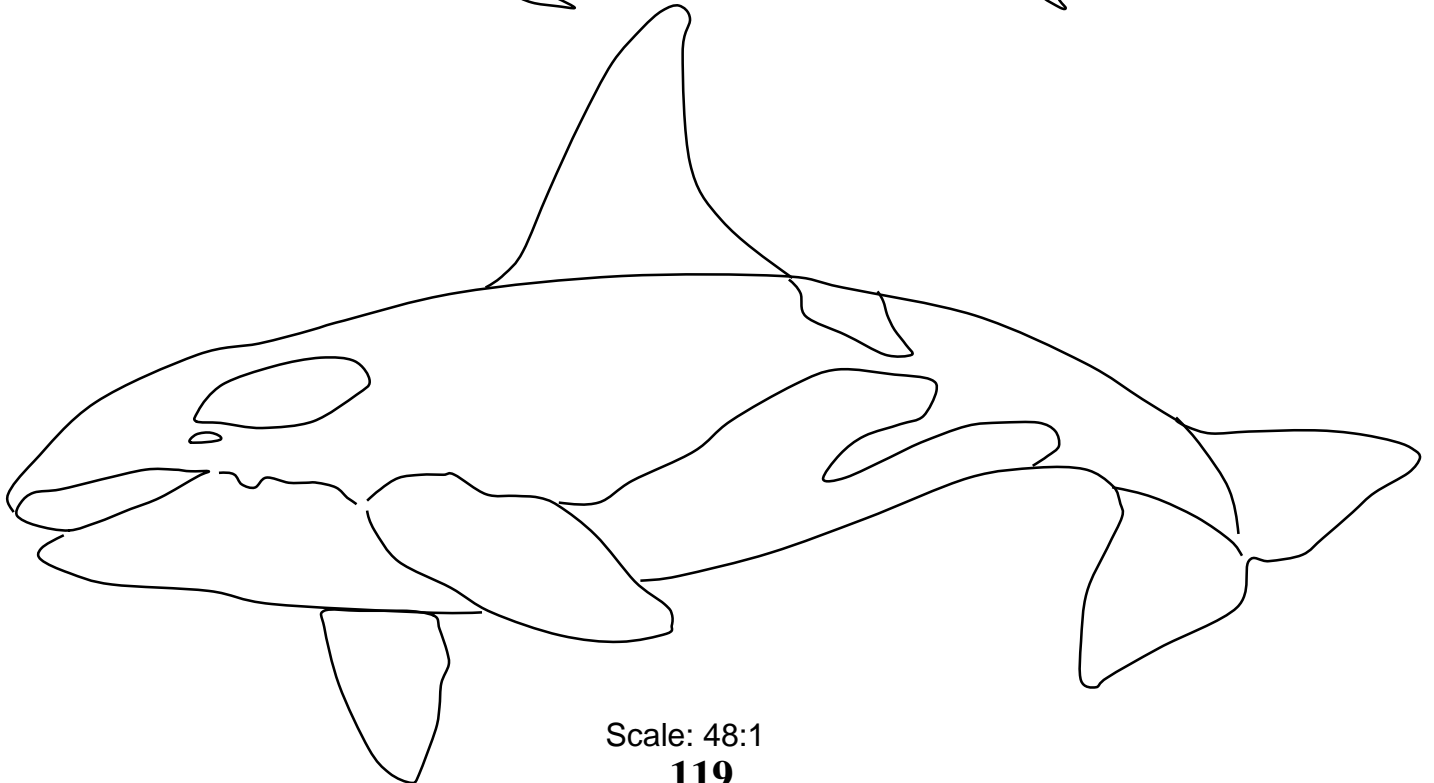
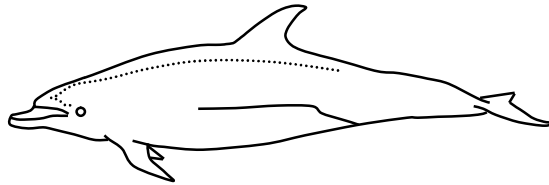
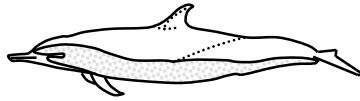
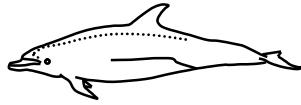
Tucuxi

Orca

Bottlenose

Pantropical Spotted

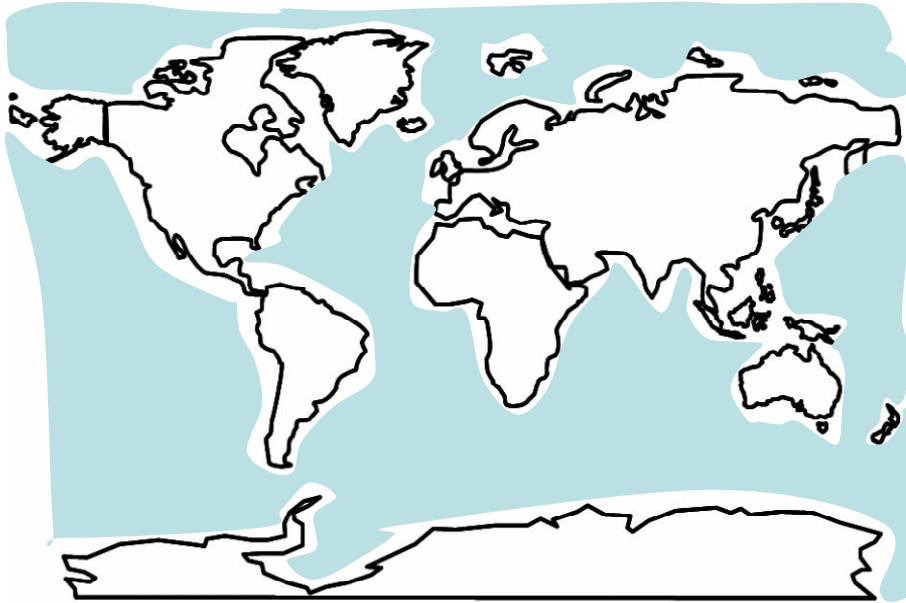
Pilot Whale



Scale: 48:1



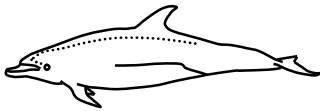
Answers



Tucuxi



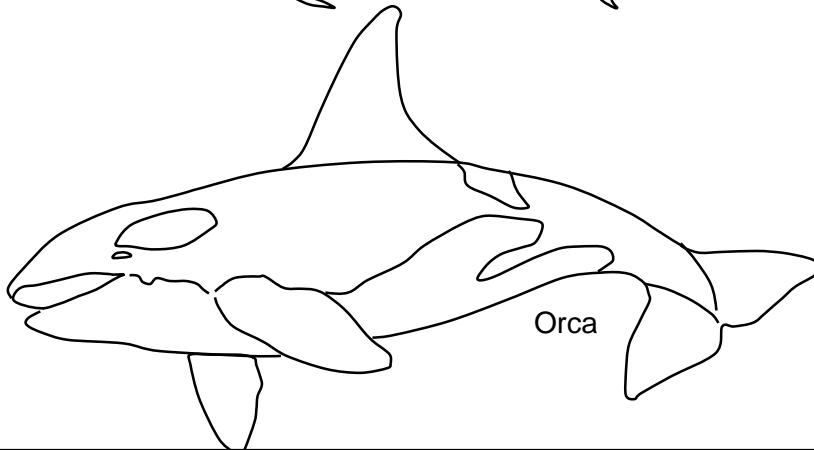
Pantropical Spotted



Bottlenose



Pilot Whale



Orca

Appendices

Dolphin Unit Test

1. How many species of dolphins are there? _____
2. Which dolphin is the biggest? _____
3. Is a dolphin a fish? _____
4. What are three characteristics of mammals? _____

5. What is the difference between SONAR and echolocation?

6. What does a dolphin breathe? _____
7. What are baby dolphins called? _____
8. Which part of a dolphin is born first, its tail or its head? _____
9. What shape is a dolphin? _____
10. How many chambers are there in a mammals heart? _____
11. How do scientists classify animals? _____
12. How is a species referred to by a scientist? _____
13. After a dolphin dies, how can you tell how old it was? _____

Dolphin Unit Test



Dolphin Unit Test

Look carefully at the map on the previous page.

- 1. Where does the Rough Toothed Dolphin live? Color that area gray.*
- 2. Where does the Bottlenose Dolphin live? Color those areas blue.*
- 3. Color the area where the Chilean Dolphin lives black.*
- 4. Color the area where the Pantropical Spotted Dolphin lives with spots.*
- 5. Color orange the areas where Orca prefer to live.*

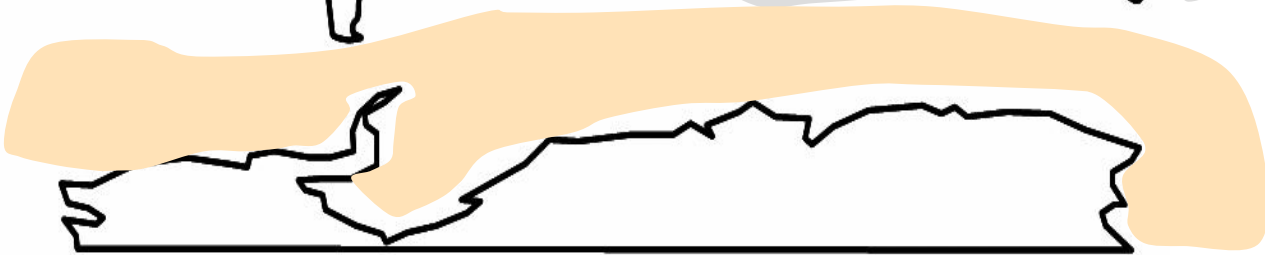
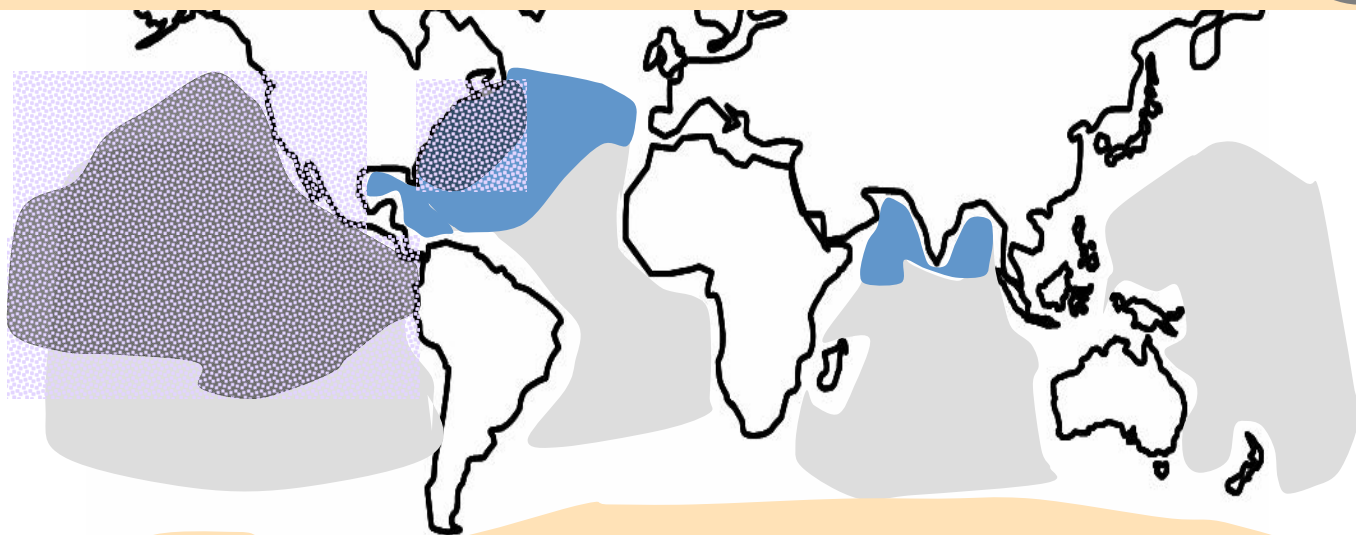
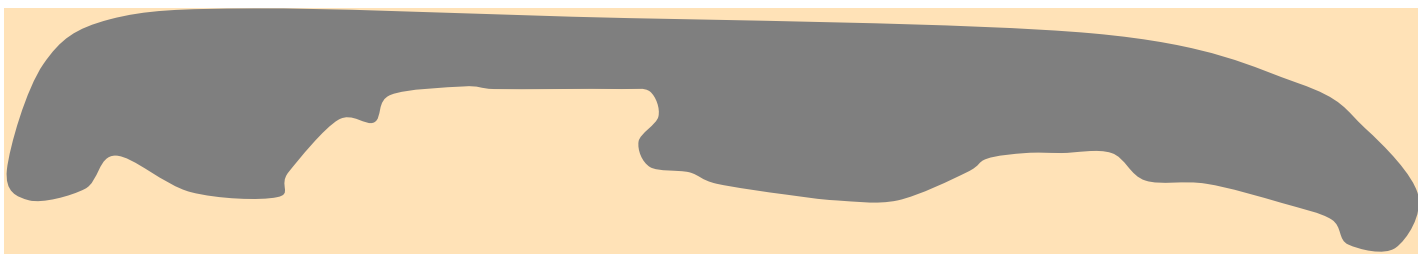
Draw a picture of a dolphin in the space below.

Dolphin Unit Test

1. How many species of dolphins are there? 35
2. Which dolphin is the biggest? The orca, also known as the killer whale
3. Is a dolphin a fish? No, a dolphin is a mammal.
4. What are three characteristics of mammals? _____
Four-chambered hearts, warm blooded, bear live young, have mammary glands to nurse young,
breathe air, have hair at some point in their life
5. What is the difference between SONAR and echolocation?

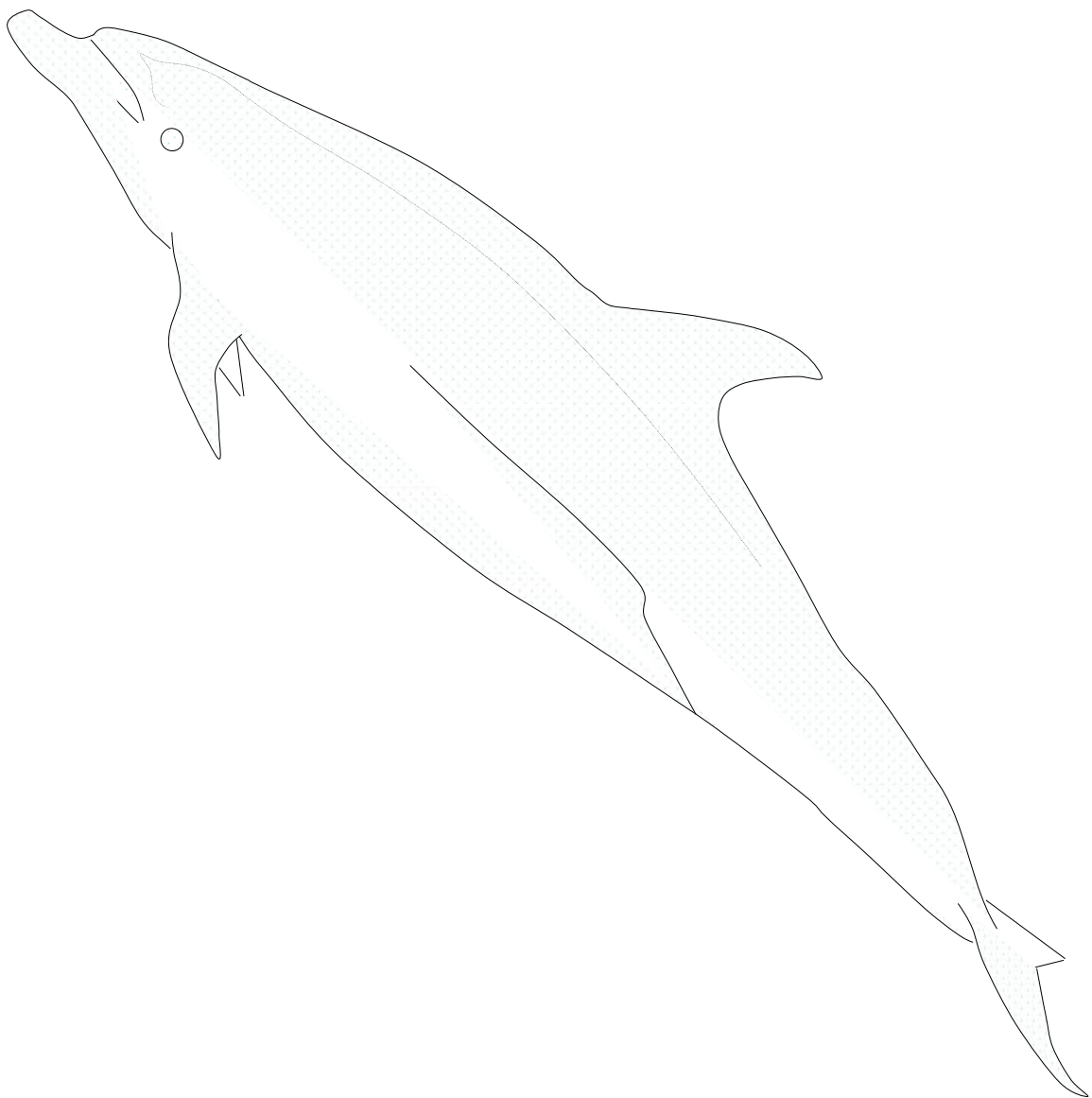
SONAR is hardware used by the Navy; echolocation is a natural thing that some animals do.
6. What does a dolphin breathe? air
7. What are baby dolphins called? calves
8. Which part of a dolphin is born first, its tail or its head? tail
9. What shape is a dolphin? spindle shaped
10. How many chambers are there in a mammals heart? 4
11. What is the name of the system scientists use to classify animals? Taxonomy
12. How is a species referred to by a scientist? Genus, Species
13. After a dolphin dies, how can you tell how old it was? Teeth rings

Dolphin Unit Test

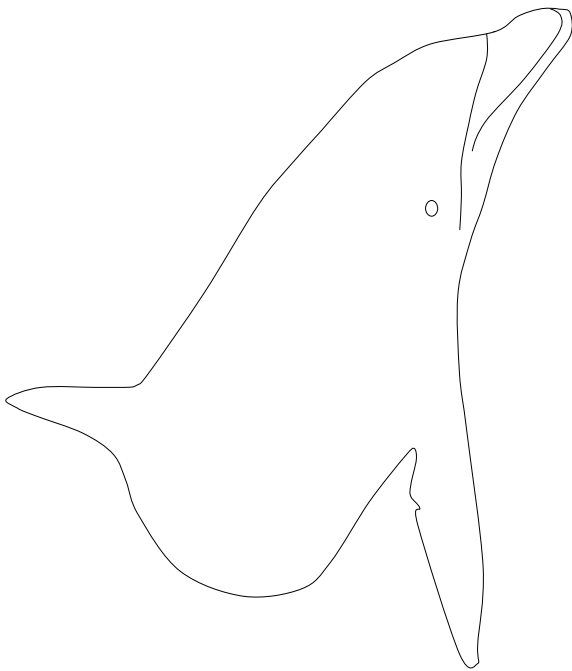
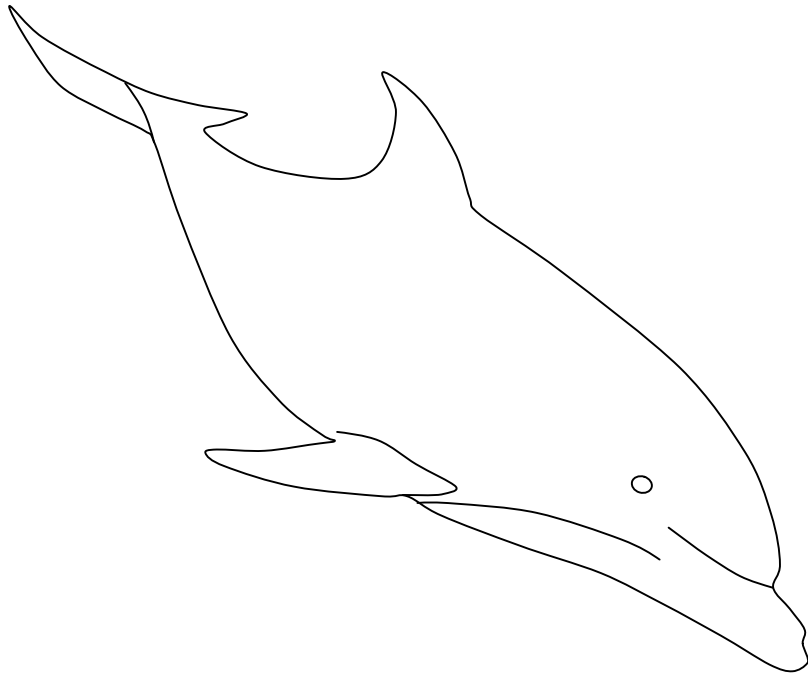


Extra Coloring Pages

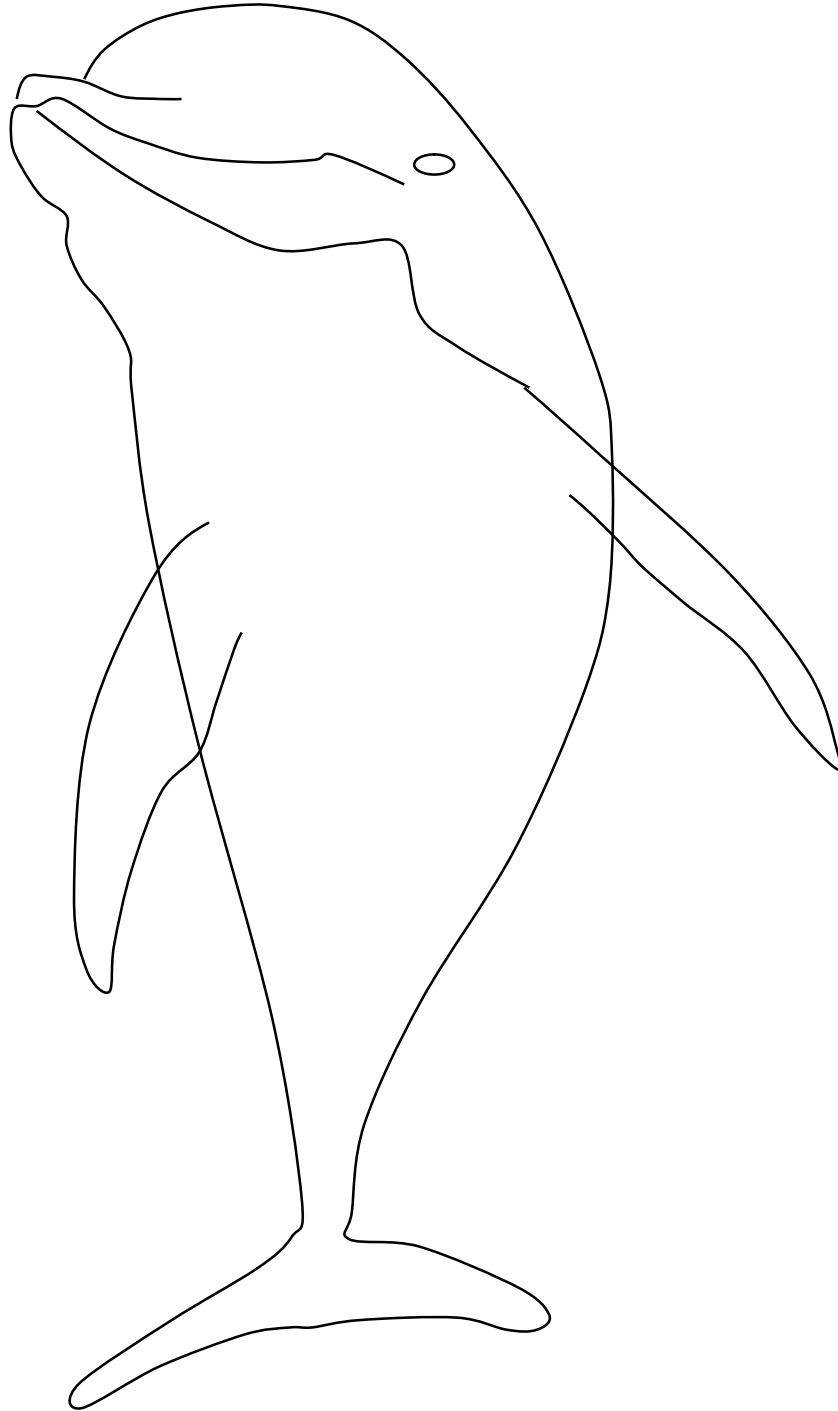
Atlantic Spotted Dolphin



Bottlenose



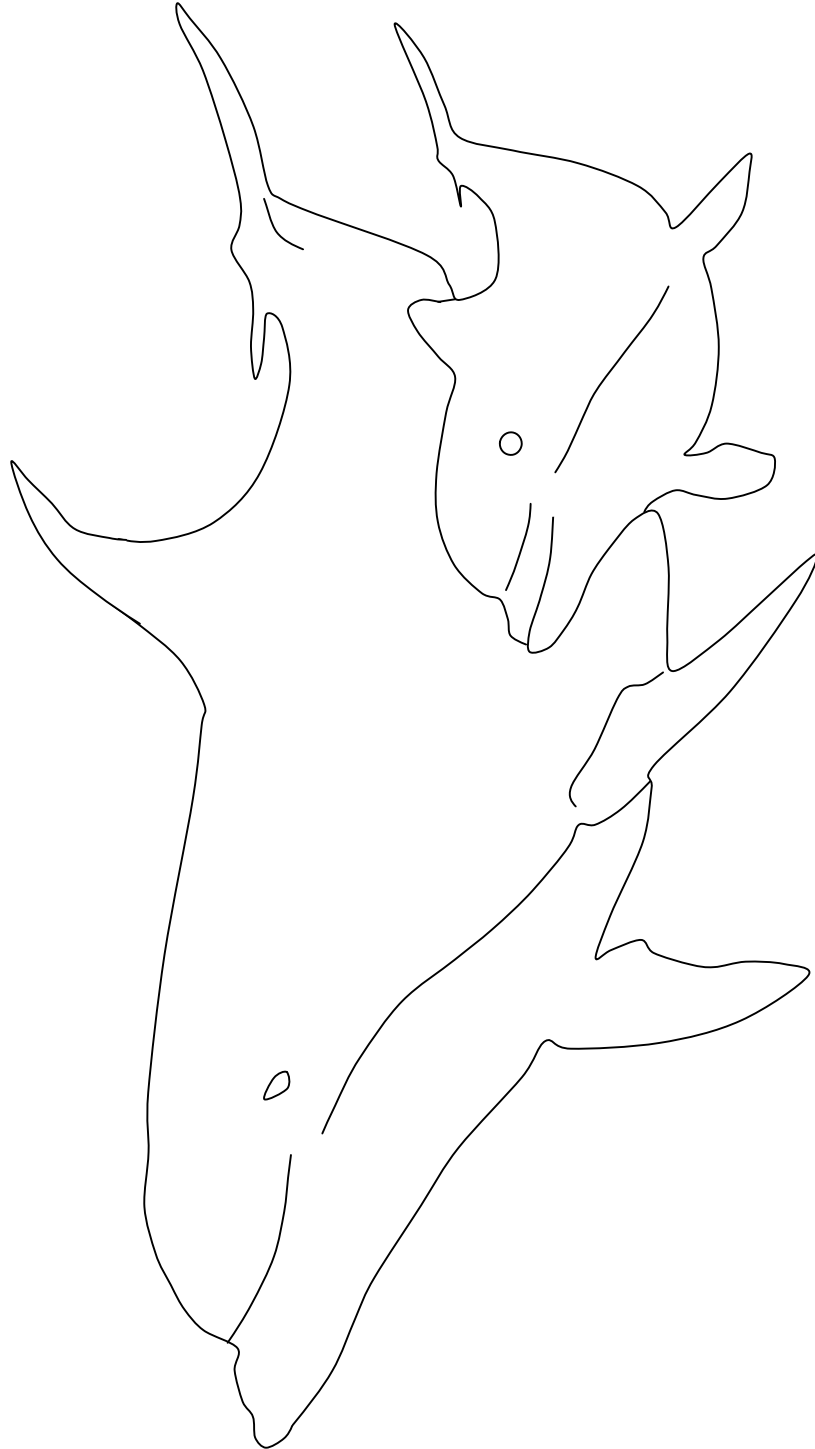
Bottlenose



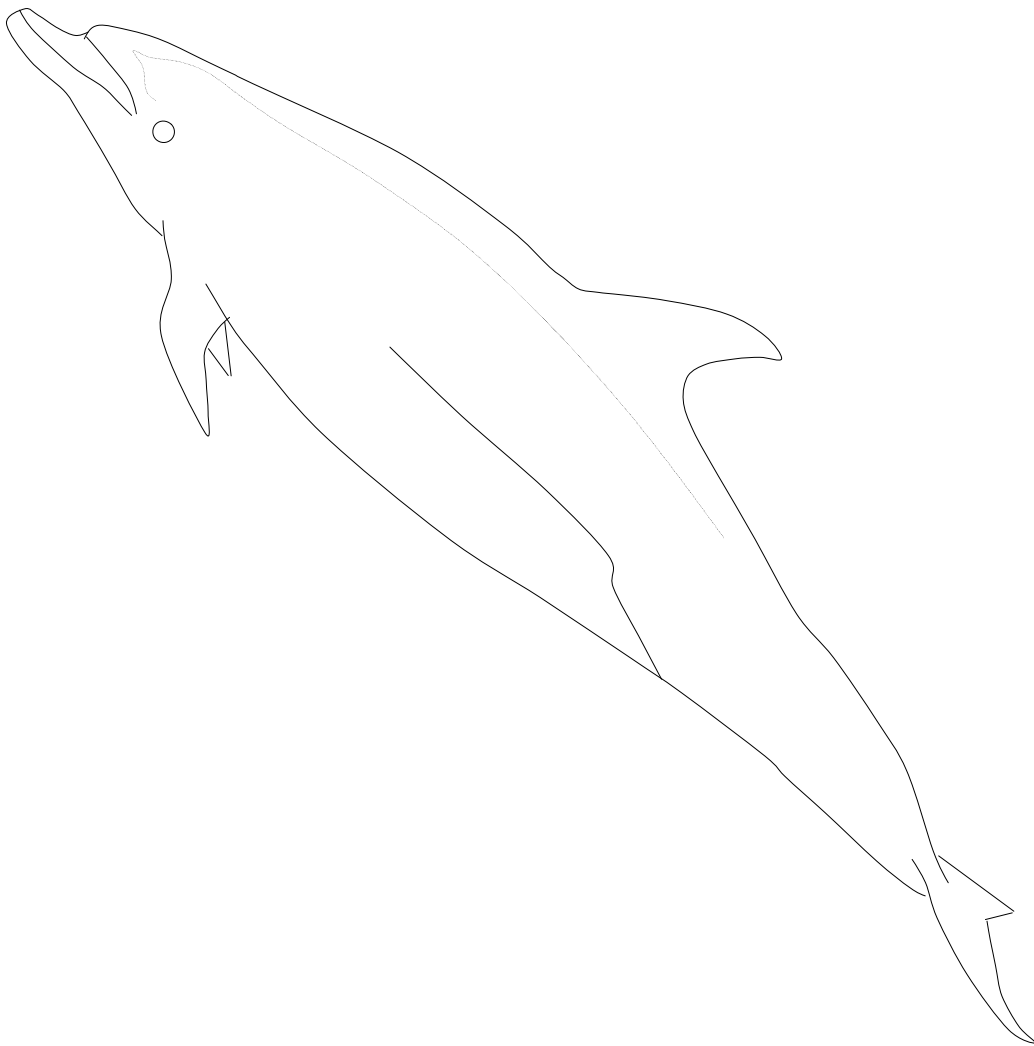
Bottlenose



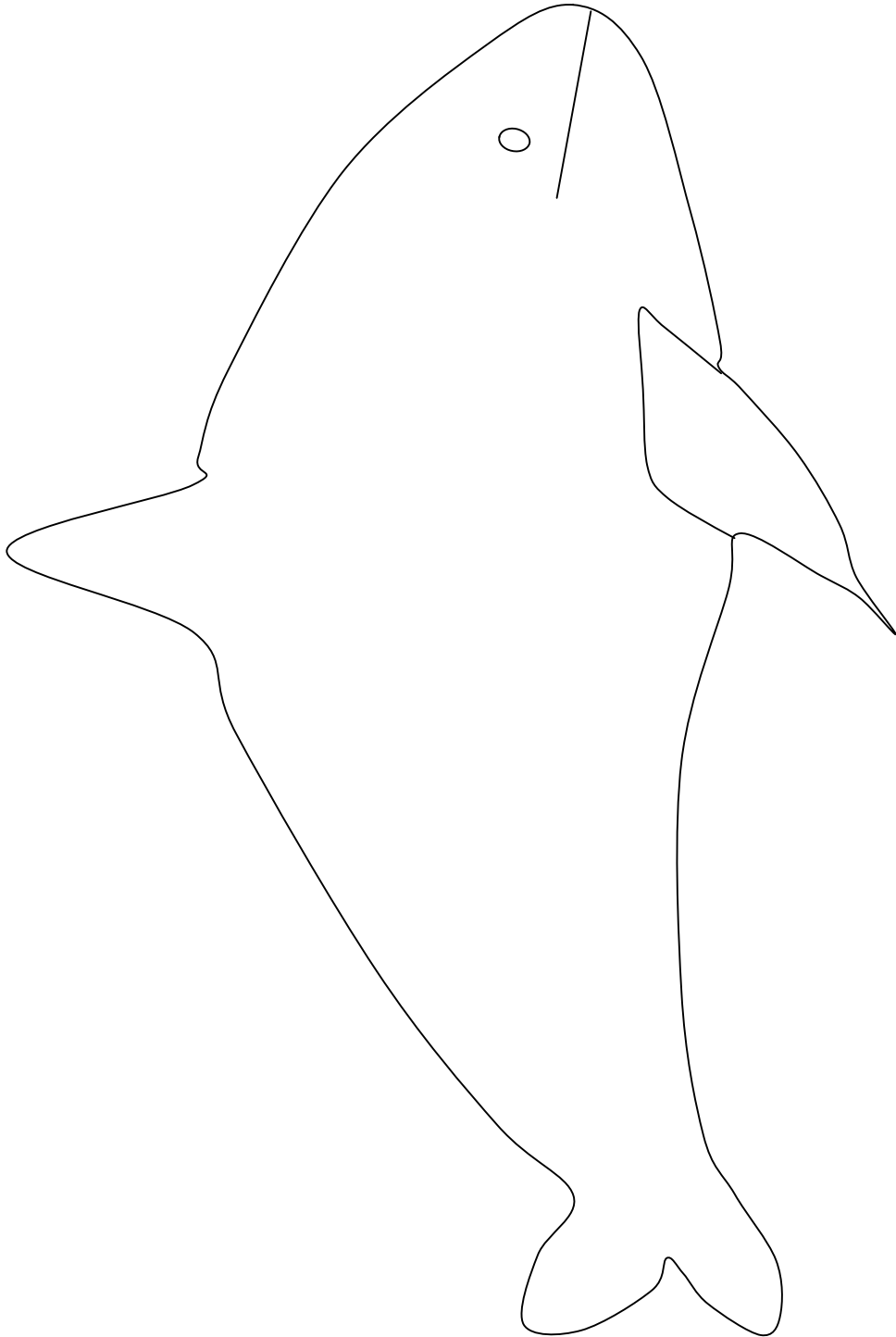
Bottlenose



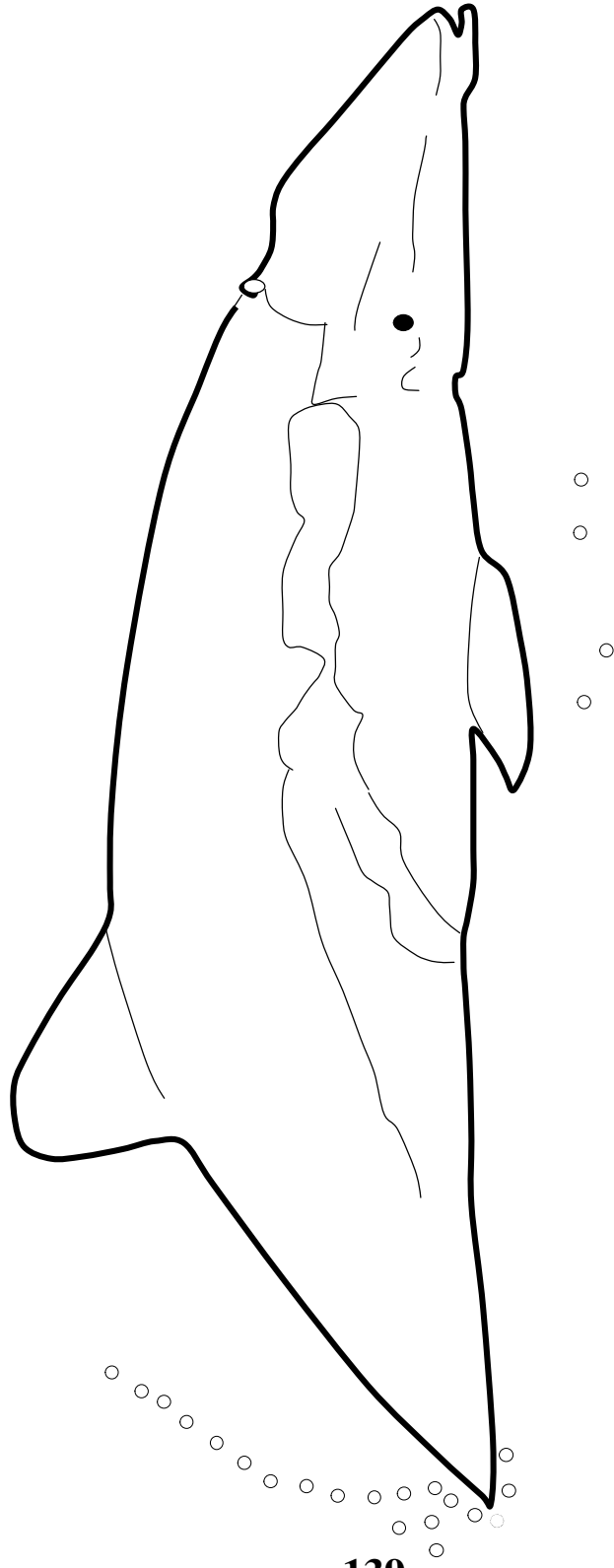
Bottlenose



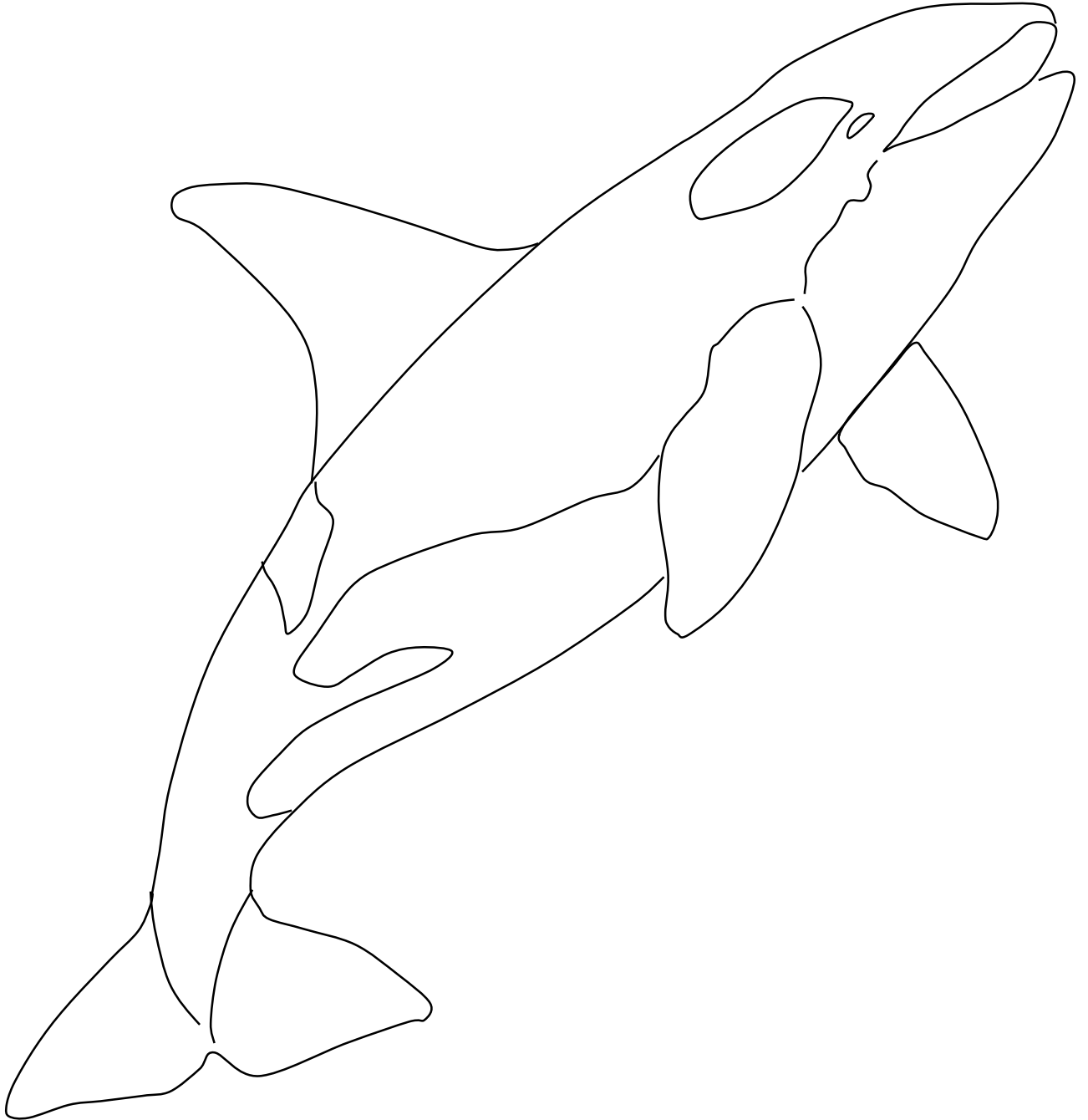
Harbor Porpoise



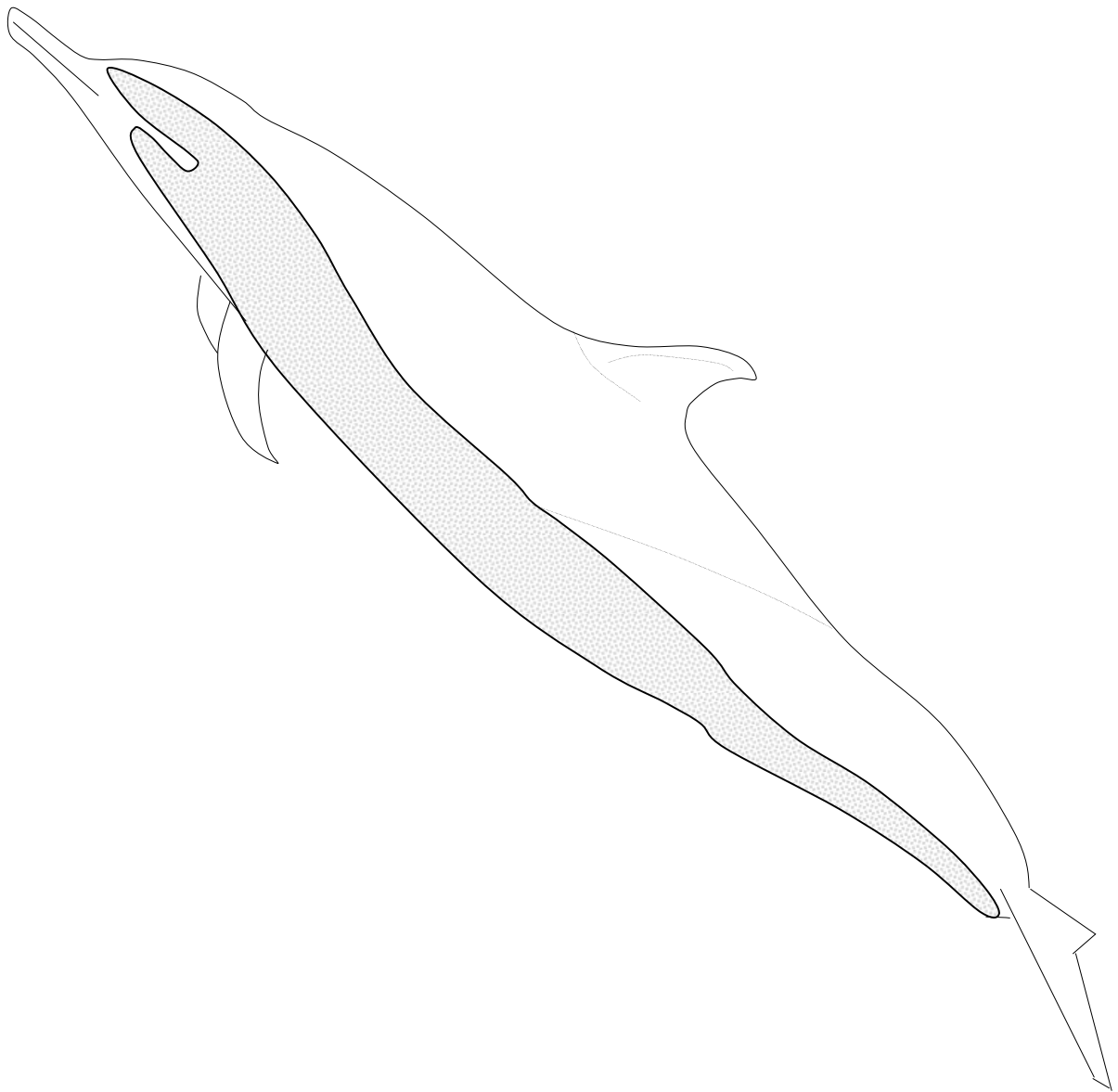
Chilean Dolphin



Orca



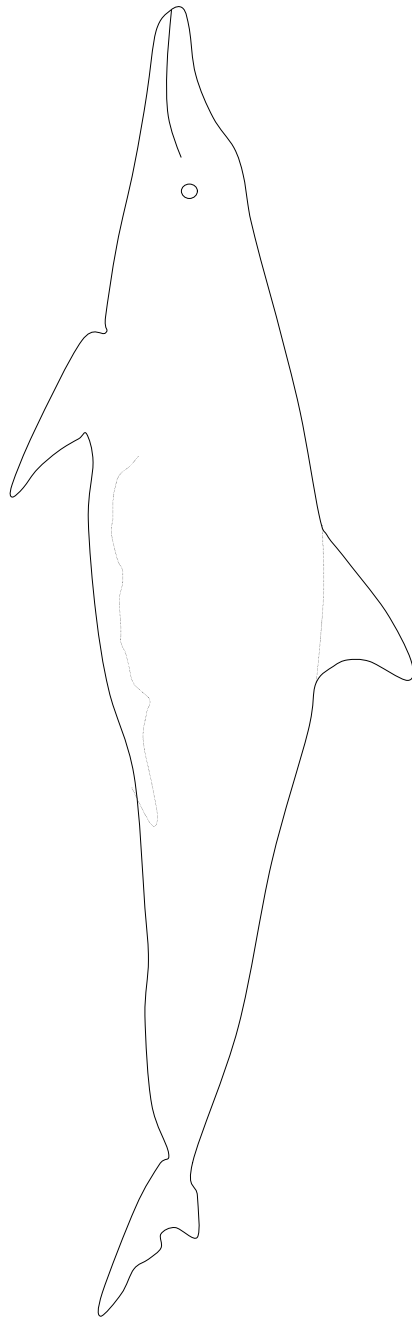
Pantropical Spotted Dolphin



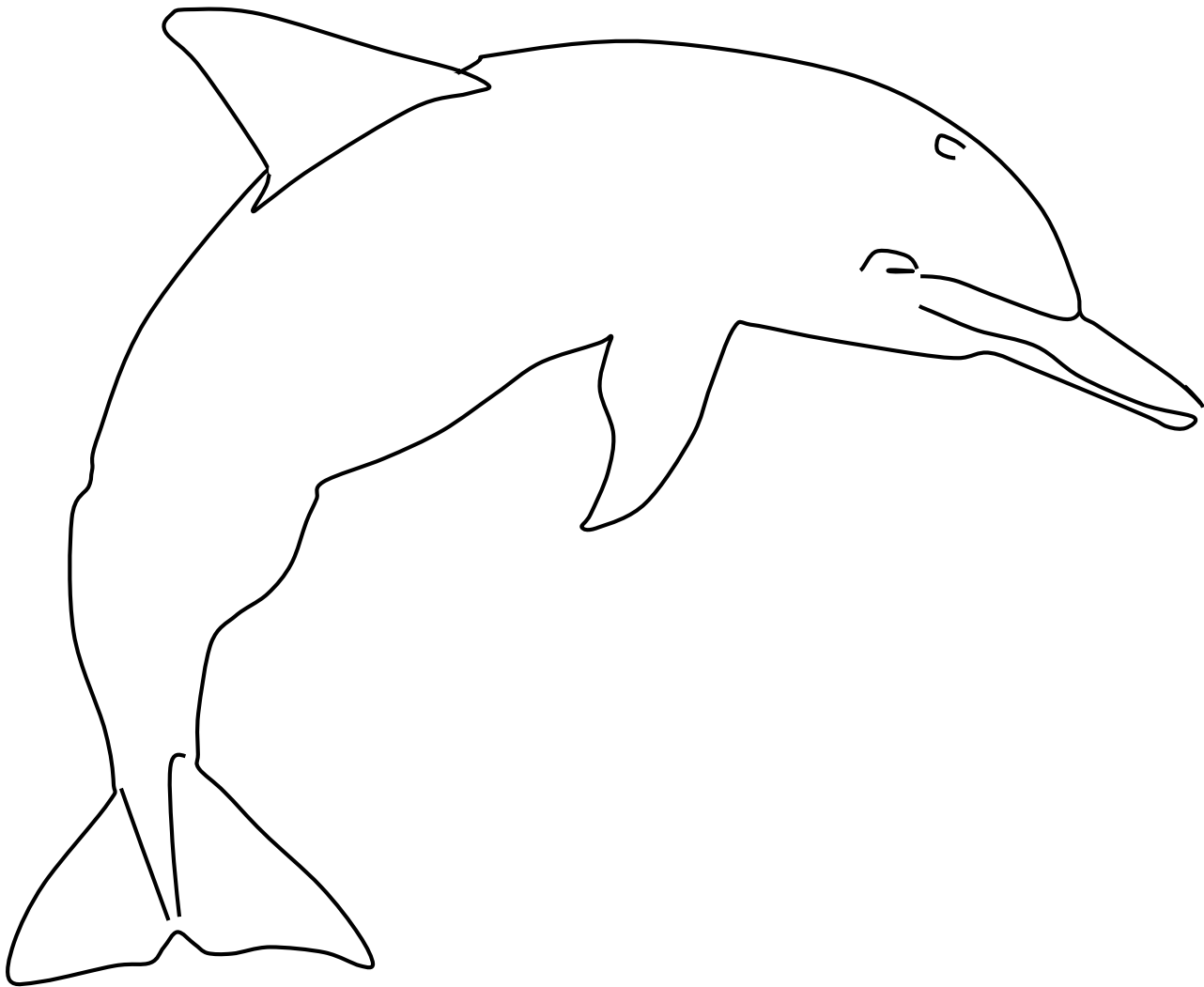
Pilot Whales



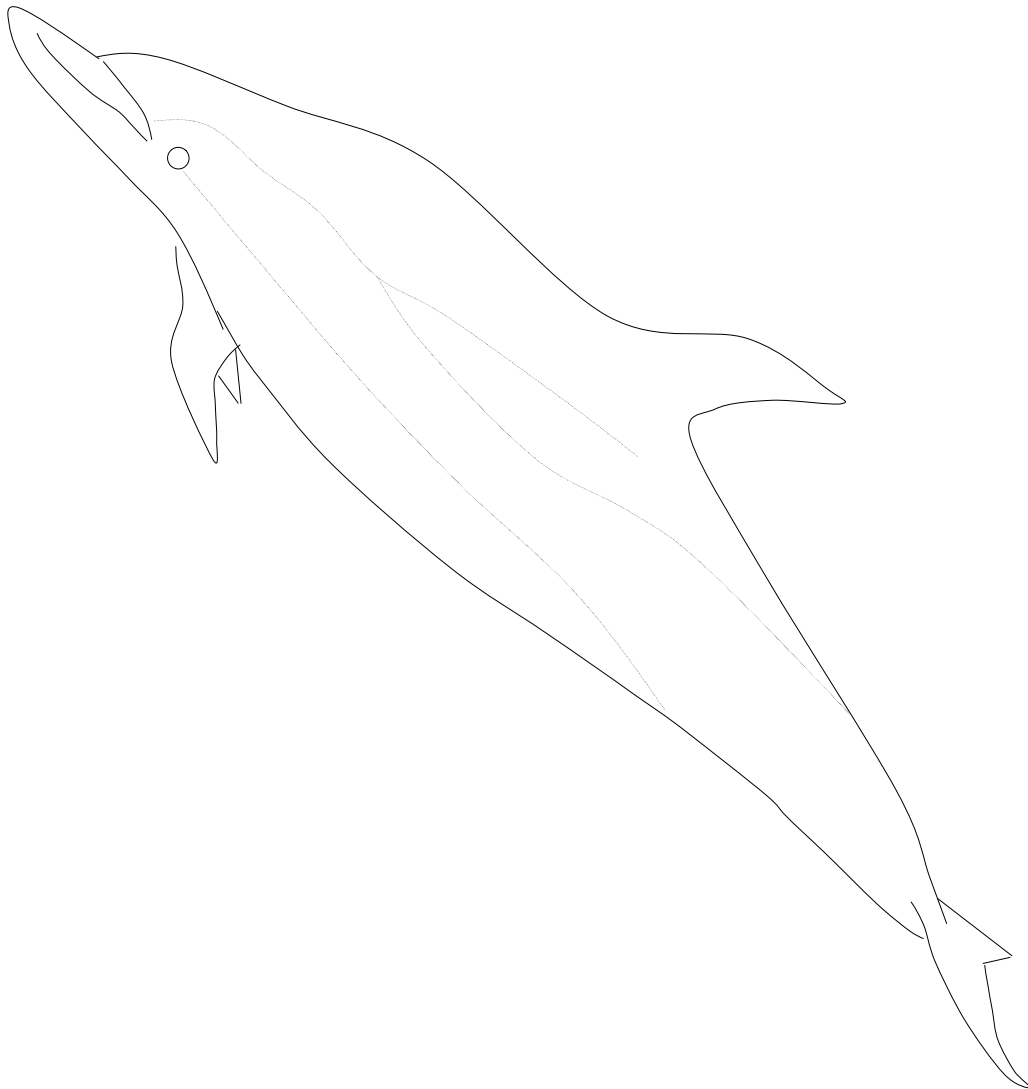
Rough Toothed Dolphin



Spinner Dolphin

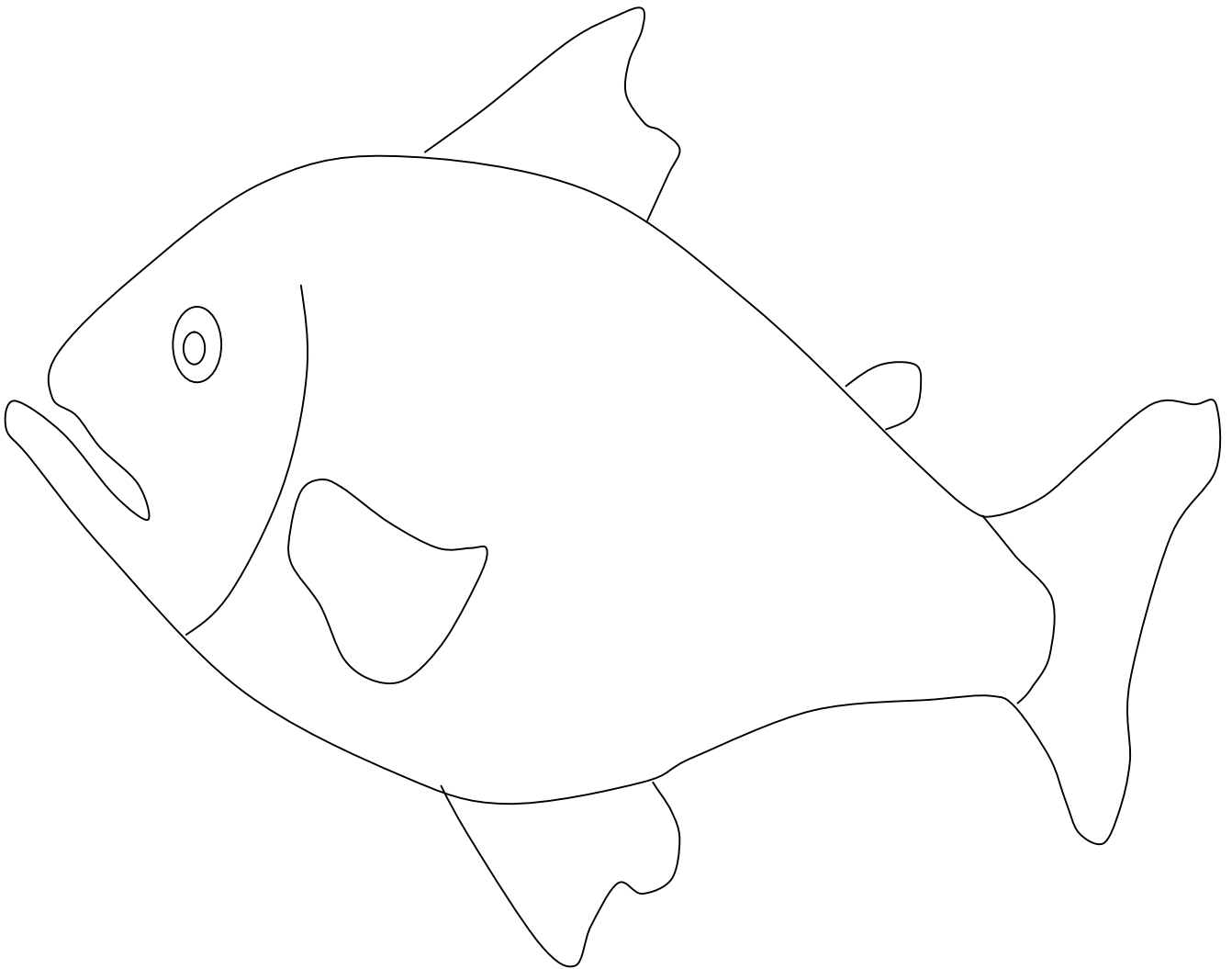


Striped Dolphin



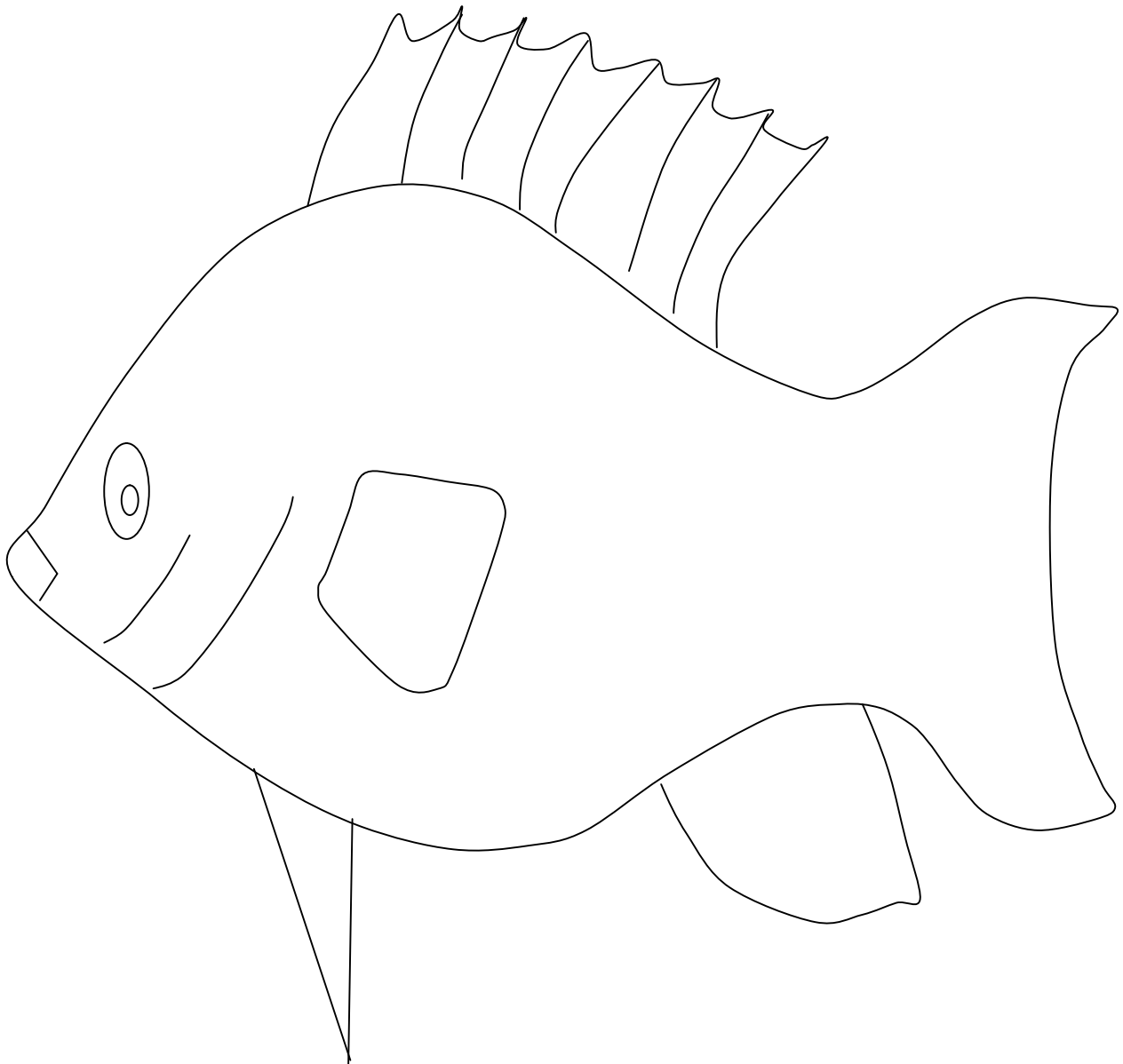
Fish

Dolphins eat small fish.



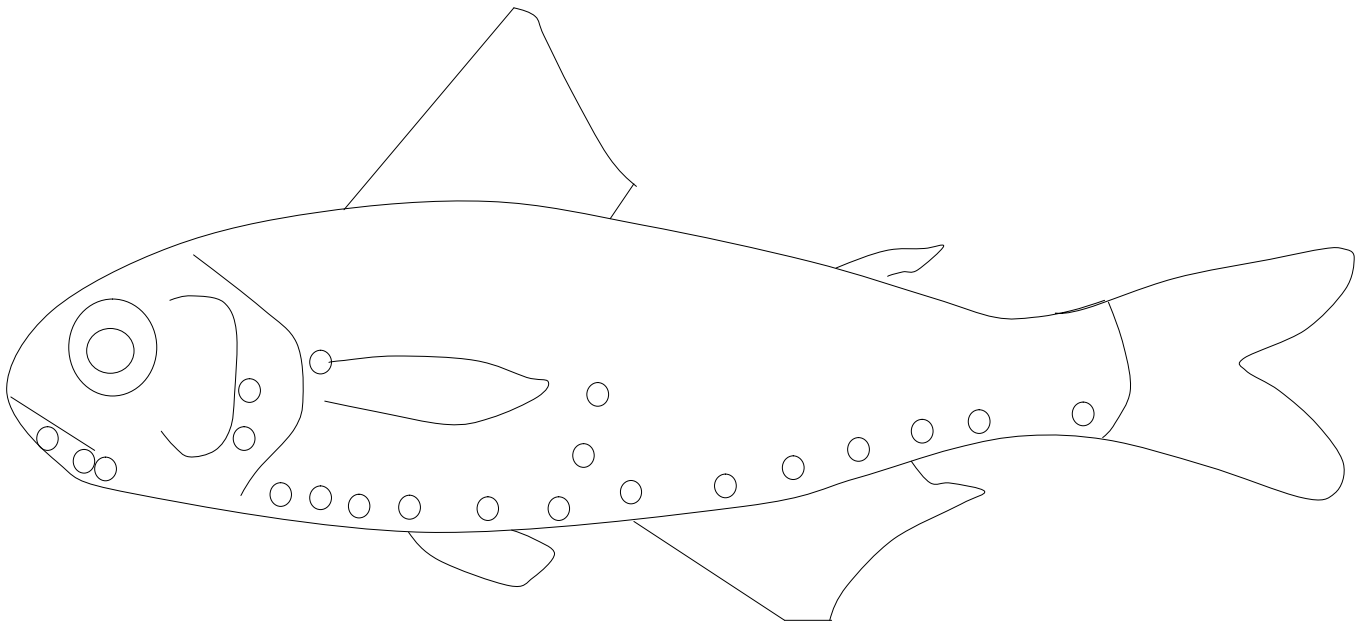
Fish

Dolphins eat small fish.



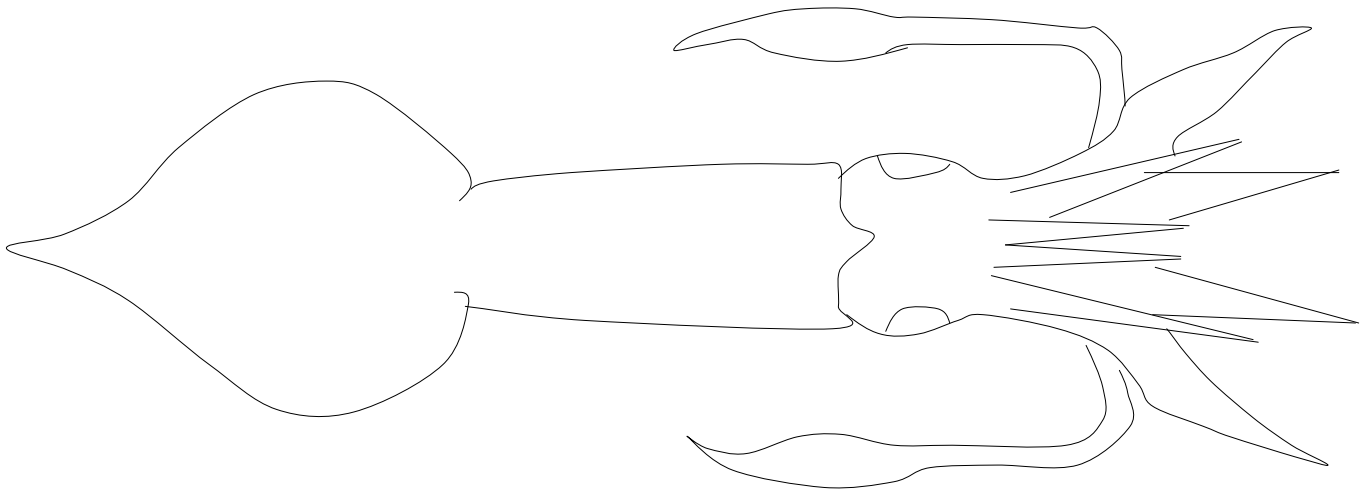
Lanternfish

Some dolphins eat lanternfish. Below is a drawing of a lanternfish. The little circles represent parts of the fish that produce light, thus giving rise to its name, the lanternfish.



Squid

Some dolphins eat squid. Below is a drawing of a squid. Squid have ten arms, two of which are longer than the rest.



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Jones, Hardy. “The Dolphin Defender.” Nature. 2005.

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If you liked this workbook, check occasionally at my website for new workbooks.

<http://www.unitstudiesbygwen.com> or <http://gwen.nicodemus.name>