

# Ocean Connectors

## Whale Activity Guide

by Galena Robertson



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## About the Author

Galena Robertson grew up in San Diego, CA with a dedication to protecting the environment. She spent time working in the Mammal Department of the San Diego Zoo. While achieving a Bachelor's of Science Degree in Wildlife, Fish, & Conservation Biology at UC Davis, Galena had the opportunity to intern with Ocean Connectors summer camps. During this internship, her passion for wildlife and environmental education developed even further, and she was tasked with creating a tool to educate students about whale conservation. She hopes this activity book will foster young environmental stewards around the world and help raise awareness about whales and the threats they face.

## About Ocean Connectors

Ocean Connectors is an interdisciplinary environmental education project that crosses borders and cultural boundaries, linking students to create a shared sense of stewardship and to promote an early interest in environmental issues. Ocean Connectors uses migratory marine species such as sea turtles, whales, and sea birds as tools to educate and connect youth in underserved communities on the Pacific Coast of the U.S. and Mexico. Ocean Connectors is a fiscal sponsorship project of The Ocean Foundation, a 501(c)(3) nonprofit corporation.

## Acknowledgements

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I would firstly like to thank Frances Kinney, Ocean Connectors Director, whose vision for this book helped make it a reality.

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And most of all, thank you to *you*, our readers, students, and educators, who share a love for whales, wildlife, and conservation.

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Whale Wisdom... gray whales can have 100 pounds of barnacles and whale lice

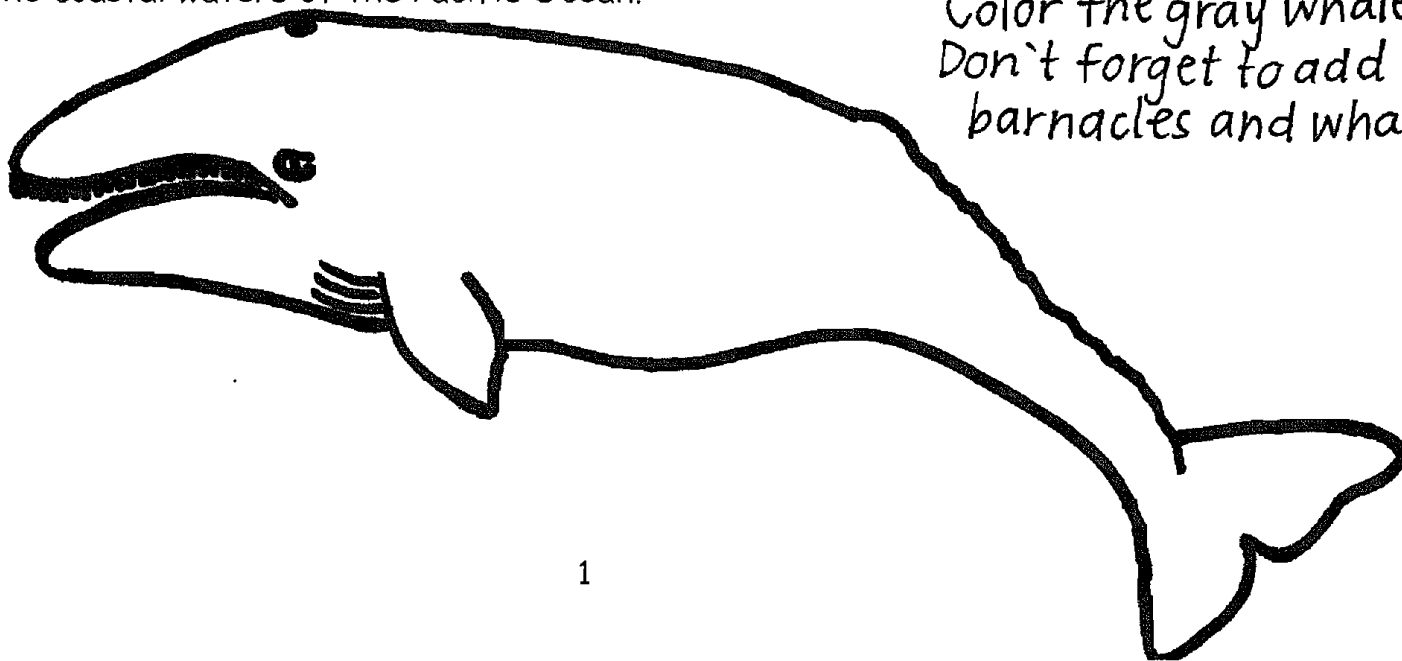
# Gray Whale

*Eschrichtius robustus*

The gray whale gets its name from its gray body color. Though this whale is mostly dark gray, **barnacles** and whale lice that live on it leave white and light gray patches. Unlike most whales, the gray whale lacks a **dorsal fin**, and instead has a dorsal hump. Gray whales can grow to be about 50 feet long! That's about as long as one and a half school buses! The gray whale is a **baleen** whale, meaning that instead of teeth, it has overlapping plates made of **keratin** that look just like straw. Gray whales have 130 to 180 **baleen** plates on each jaw! This whale rolls onto its side and uses these plates to capture and eat small crustaceans that live near the ocean floor, meaning that the gray whale is a **benthic** feeder. Gray whales can often be seen **breaching**, or throwing themselves out of the water and coming down with a loud splash! The average life span of gray whales is unknown, but some female gray whales have lived to be about 75 years old. Their natural **predators** are killer whales and large sharks, but humans also threaten these whales. The gray whale was once hunted to near **extinction**. Today, while still considered **threatened**, the Eastern Pacific gray whale has made an impressive comeback. Around 20,000 gray whales can now be found at feeding grounds, breeding grounds, or **migrating** between the two in the coastal waters of the Pacific Ocean.

living on them at one time!

Color the gray whale!  
Don't forget to add  
barnacles and whale lice!

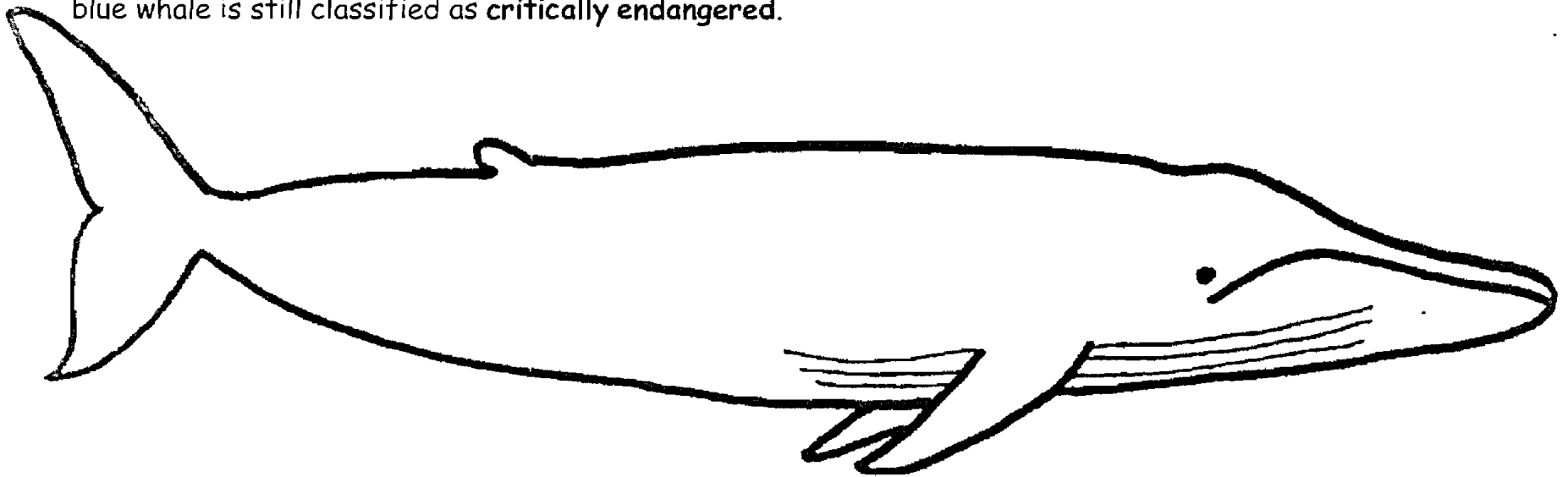


Whale wisdom... a blue whale's heart is as big as a small car!

## Blue Whale

*Balaenoptera musculus*

The blue whale gets its name for its body color. While on the surface the blue whale appears blue-gray, the water gives the whale a more aquamarine color. Though the blue whale has a relatively slender body compared to other whales, it is the largest animal to ever live on Earth, including dinosaurs! The largest blue whale ever recorded was 108 feet long, which is longer than three school buses! Despite its enormous size, the blue whale is a **baleen** whale that feeds almost exclusively on **krill**, one of the world's smallest creatures, and can eat 8,000 pounds daily during the summer feeding months. An adult blue whale weighs more than 25 full-grown elephants! The blue whale travels toward the poles in the spring to feed during summer, and **migrates** toward the equator in the fall to breed in warmer waters during winter. Scientists believe that the blue whale inhabits all of the planet's oceans and can live to be 80-90 years old, but the location of blue whale breeding grounds is still a mystery. Due to its large size, this whale has no natural **predators**, but humans nearly hunted the blue whale to **extinction** in the early 1900s. Today, the blue whale is still classified as **critically endangered**.



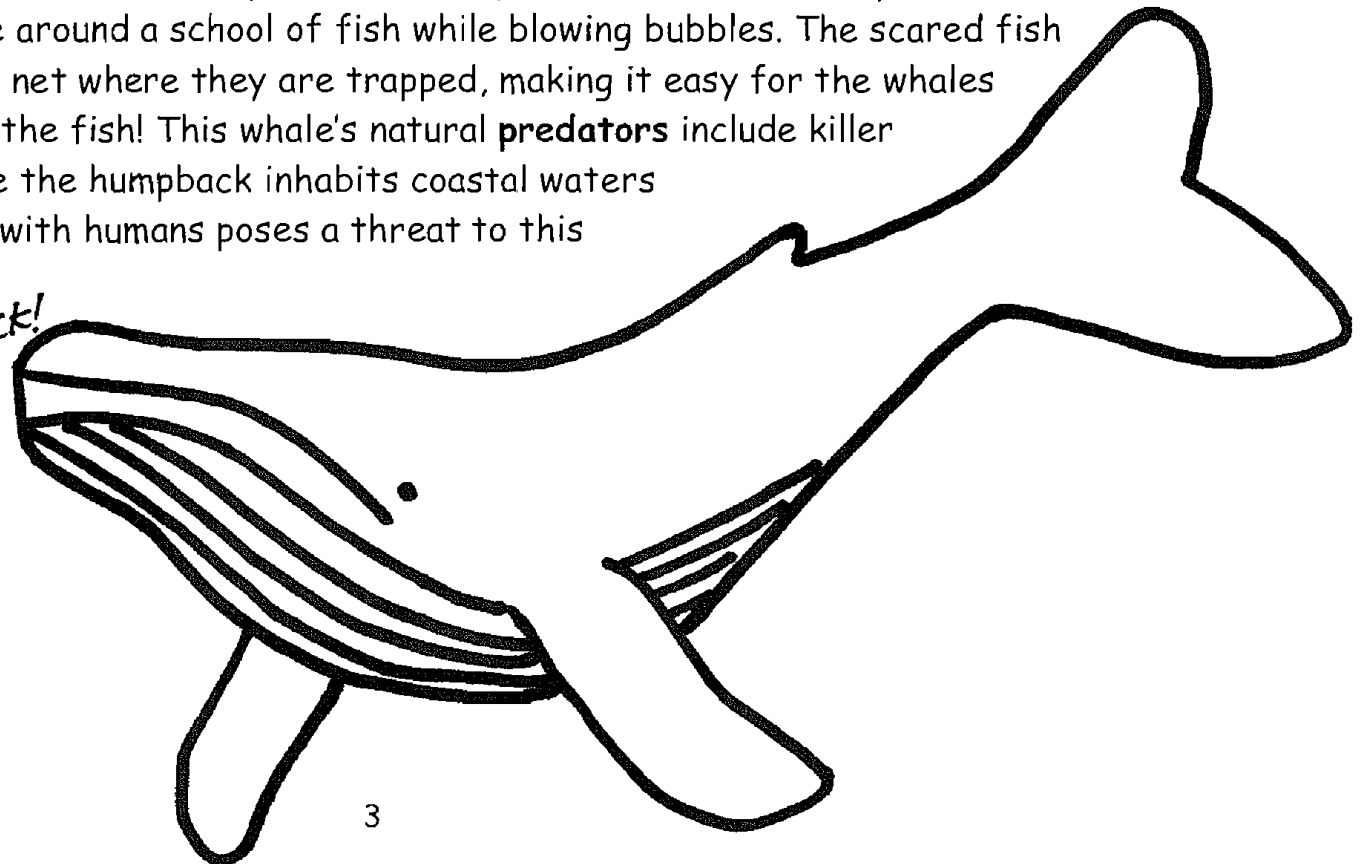
# Humpback Whale

*Megaptera novaeangliae*

whale wisdom... the humpback's genus is Megaptera, which means "huge wings".

An irregularly shaped **dorsal fin** atop a large hump gives the humpback whale its name. The humpback has a black back with a black and white underside, and bumps along its head and lower jaw that help regulate body temperature and sense objects in the water. The humpback whale has the largest **pectoral fin** of any whale, which can be as long as one third of the whale's total body length! A humpback can reach 50 feet in length, which is as long as one and a half school buses. Like gray whales, the humpback whale performs **breaching**, during which the whale throws itself out of the water. As a **baleen** whale, the humpback eats mostly **krill** and small fish, and is one of the only whales to help other whales of its species catch prey. Two whales swim in a circle around a school of fish while blowing bubbles. The scared fish flee to the center of the bubble net where they are trapped, making it easy for the whales to take one big gulp—and eat all the fish! This whale's natural **predators** include killer whales and large sharks. Because the humpback inhabits coastal waters worldwide, frequent interaction with humans poses a threat to this **endangered** whale.

This is a hungry humpback!  
Draw a bubble net here?



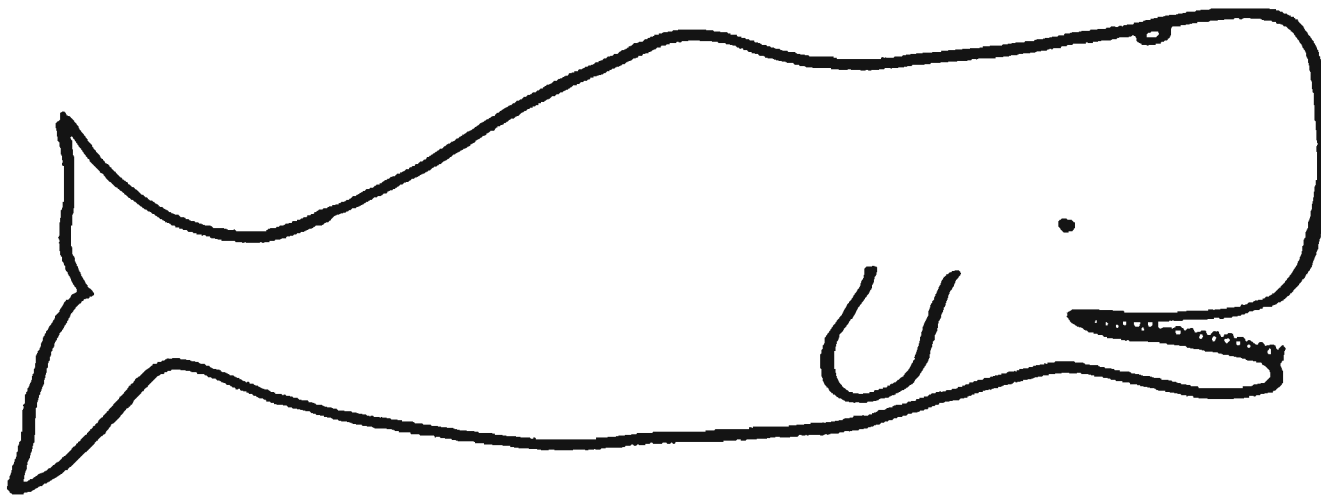
Whale  
wisdom... a sperm whale's  
brain can weigh up  
to TWENTY pounds!

## Sperm Whale

*Physeter macrocephalus*

The sperm whale is the largest of the **odontocetes**, or toothed whales. A sperm whale has 40-52 teeth on its bottom jaw. We only have 16 teeth on our bottom jaws! Also unlike humans, sperm whales don't have any teeth on their upper jaw. Instead, they have holes into which their bottom teeth fit. They use these teeth to eat squid, octopus, rays, sharks, and fish. Because the sperm whale likes to dive very deep into the dark ocean, where it can hold its breath for up to two hours, it uses **echolocation** to sense its surroundings. This means that the whale emits a sound that bounces off of objects and back to the whale. The whale will be able to tell exactly what surrounds it, even at a mile deep where it is too dark to see! Sperm whales are dark gray and can reach 50 feet in length. One third of the whale's length is its head, which contains the largest brain of any animal! Sperm whales also have spermaceti oil in their head cavities, which is what the sperm whales were primarily hunted for. Humans used the oil to light lamps. Because sperm whales were heavily hunted in the past, they are still recovering and are **endangered** today.

Draw what a sperm whale  
might use echolocation to  
sense in dark, deep waters.



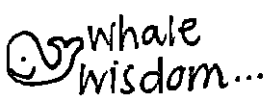
whale wisdom... some newborn calves can weigh up to 2,000 pounds!

## The Life Cycle of a Baleen Whale

It all begins when the mother whale **migrates** from the cold Arctic waters to the warm tropical waters to give live birth. When it's time, she swims close to the water's surface for its warmth and low pressure, and so that her **calf** can easily take its first gulp of air. Once born, the calf is guided to the surface by its own mother, and sometimes even by other female whales. After its first breath, the calf will feed on its mother's milk, which is high in nutrients and fat. The milk is as thick as toothpaste so that it stays together in the water. The calf can eat up to 50 gallons a day! This will help the calf build its first layer of **blubber** to stay warm and store energy. The calf is very large, as it is usually one fourth of its mother's body length at birth, but it still has a lot of growing to do. Because calves are so big, females usually give birth to only one calf at a time, every other year. While still very young, the calf will learn important lessons from its mother, such as how to feed, migrate, breed, and survive. Eventually, the calf will grow up and become comfortable being away from its mother. The growing whale will accompany other whales on annual migrations to the cold waters in the summer and the tropical waters in the winter. In the summer, whales can eat between four and eight THOUSAND pounds of **prey** every day! It takes a lot of food to make a whale happy. They have to eat enough in the summer to help them survive in the winter, when most whale species go several months without eating. When whales are 6-13 years old, they are ready to have calves of their own. They find a mate and migrate toward the equator in the winter. Around 10-14 months later, the mother whale will return to the same waters to give birth, and the cycle of life starts again.

Draw an adult whale in the winter **HERE**.  
Does this adult have a calf?

Draw an adult whale in the summer **HERE**.  
What is this whale eating?



scientists use satellite transmitters to track whales on their migrations.

# Gray Whale Migration Challenge

The California gray whale may travel further than any other marine mammal during its annual **migration**. After feeding in the Alaskan seas during the summer, the gray whale begins a two to three month journey south to the warm waters surrounding Baja California, Mexico. They swim day and night, usually 2-6 miles per hour. Their **blubber** provides the energy they need, as they will probably not feed for several months. The whales arrive to the Baja California peninsula between late December and January, where they will **calve** in shallow coastal lagoons. After spending the winter in tropical waters, the California gray whale returns to colder waters to feed in the summer. In one year, a gray whale can travel over 10,000 miles!

Can you help this whale migrate south for the winter?



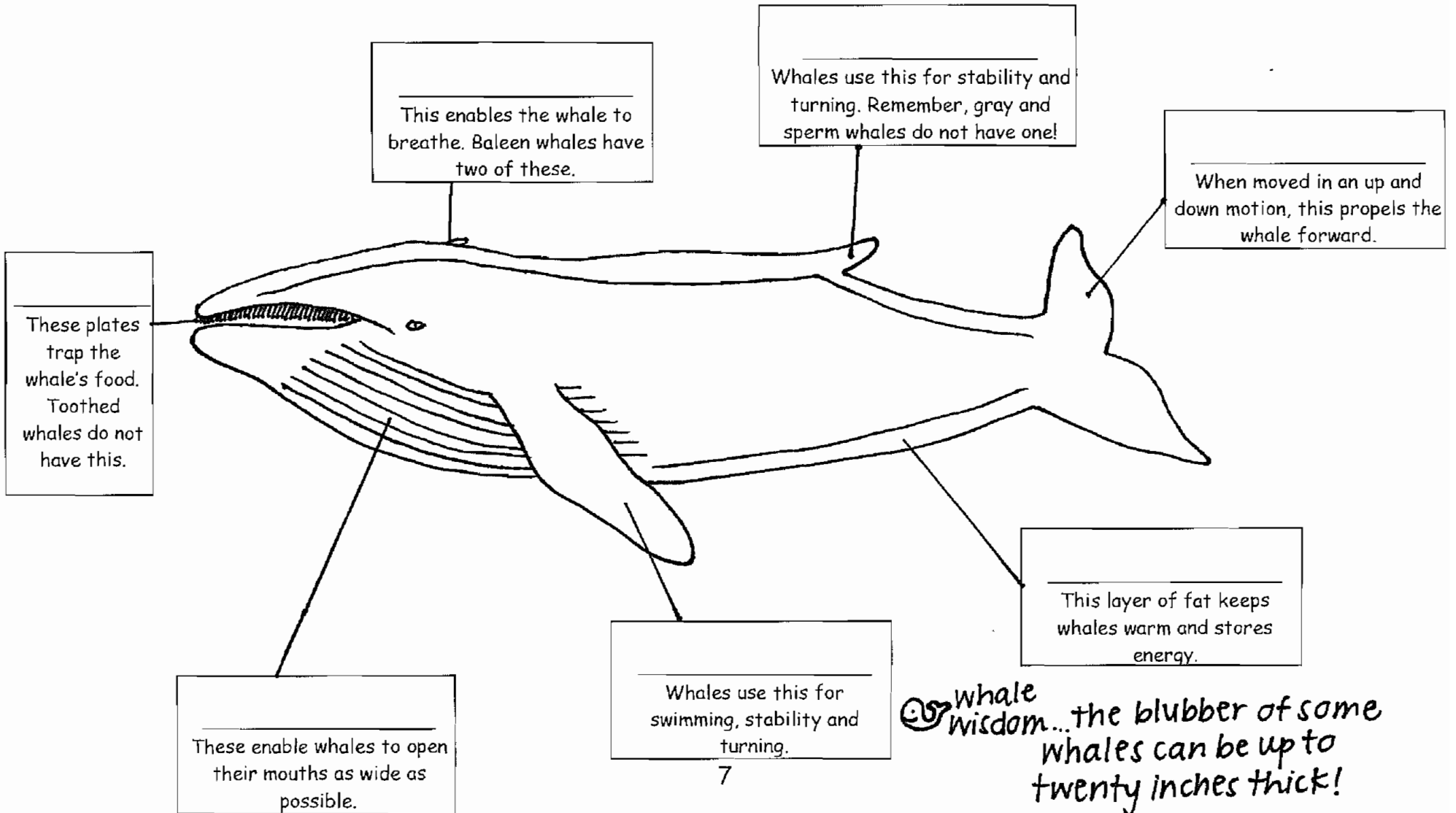
BAJA CALIFORNIA  
You made it!




# Whale Anatomy

Can you label the whale's anatomy? Use the word bank and descriptions of each body part to help you fill in the blanks.

WORD BANK: baleen, fluke, dorsal fin, throat grooves, blubber, pectoral fin, blowhole



 **Whale Wisdom...** Scientists can tell how old toothed whales are by the size of the teeth.

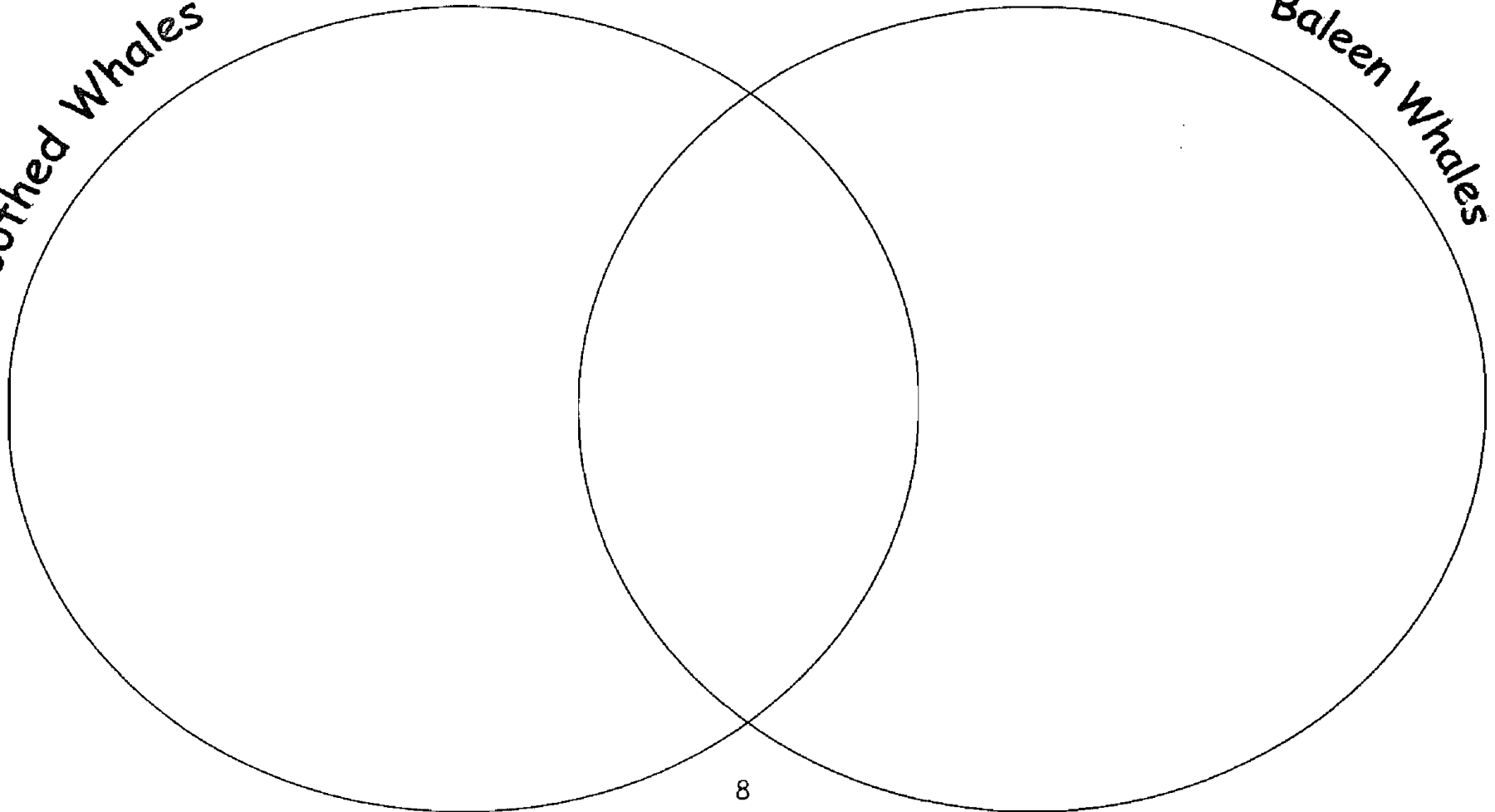
## Toothed vs. Baleen


Can you tell the difference between toothed and baleen whales? Use the words in the word bank to fill in the Venn diagram. Put toothed whale characteristics on the toothed whale side, baleen whale characteristics on the baleen whale side, and characteristics that both share in the overlapping section.

eats mostly krill	mammal	females larger than males	one blowhole	have baleen
breathes air	have teeth	males larger than females	eats fish and squid	two blowholes
warm-blooded	have hair	largest animal	have blubber	give live birth

Toothed Whales

Baleen Whales

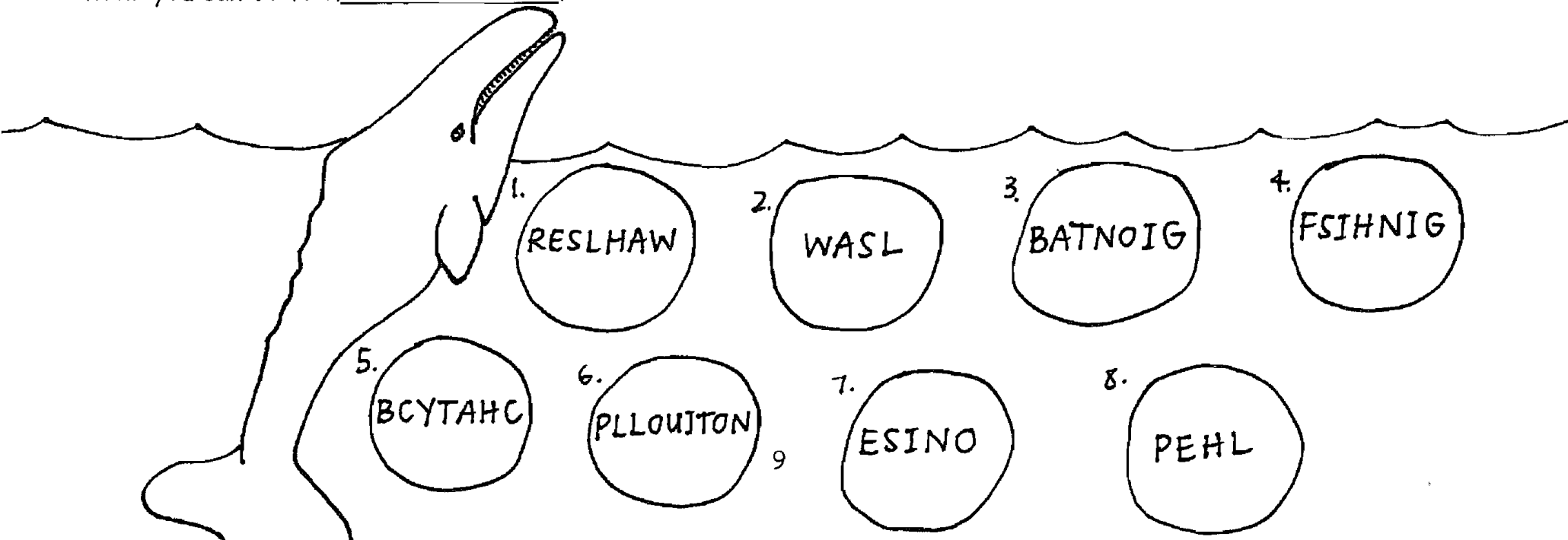


 whale wisdom... some fishermen use inexpensive nets that can drown whales.

## Spyhop Scramble

Gray whales are known for **spyhopping**, which means they poke their heads out of the water to view their surroundings. Whales face many dangerous threats in the ocean. What kinds of things do they need to watch out for? Unscramble the words in the bubble to help you fill in the paragraph.

During the 1800s and early 1900s, whales were in danger of being hunted by 1. \_\_\_\_\_, who depleted the populations of many whale species. While today hunting whales is illegal, some people are trying to pass 2. \_\_\_\_\_ that will allow the hunting of a certain number of whales each year. Whales are also **threatened** by 3. \_\_\_\_\_ collisions, because being hit by large ships can injure or even kill whales. Some boats are part of the fishing industry, which causes additional problems for whales. Whales must watch out for 4. \_\_\_\_\_ nets and lines, in which they can easily become tangled and caught as 5. \_\_\_\_\_. Habitat degradation due to 6. \_\_\_\_\_ in the form of chemicals and trash may harm whales as well. When people make a lot of loud 7. \_\_\_\_\_, it can interfere with whale communication and possibly make whales stray from their natural **migration** routes. Now that you know the many threats whales face, what do you think you can do to 8. \_\_\_\_\_?



© whale wisdom... In the 1700s, some people would pay \$1,500 for a whale to use its oil & bone.

## Whales Need YOUR Help!

Many people don't know that whales have already overcome many obstacles in the past. Hundreds of years ago, **whaling** was as common as fishing. People used whale **blubber** to make oil and wax for soaps, lamps, and candles. Whale **baleen** was made into corsets for women to wear, and whale teeth were commonly carved into chess pieces or piano keys. Some people even killed whales for their meat. Over 200 years of hunting whales for these reasons nearly caused the **extinction** of some species, many of whose populations were reduced by 95%. Today, it is illegal to hunt whales in many countries, and we have substitutes for the products whales were once killed for. Though the threat of hunting is reduced, whales still face other dangers, such as boating collisions, pollution, and entanglement in fishing gear (known as **bycatch**). Since you know that whales are still in jeopardy, you can help them! The best thing you can do is to be educated and spread the word to your friends and family. If more people know about threats to whales, more people will be willing to help. You can reduce pollution by recycling and reusing as much as possible. Below, write three things you can do to help whales and three things you can tell other people about whales. When you get home, share these with your family!

What can you do to help whales?

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

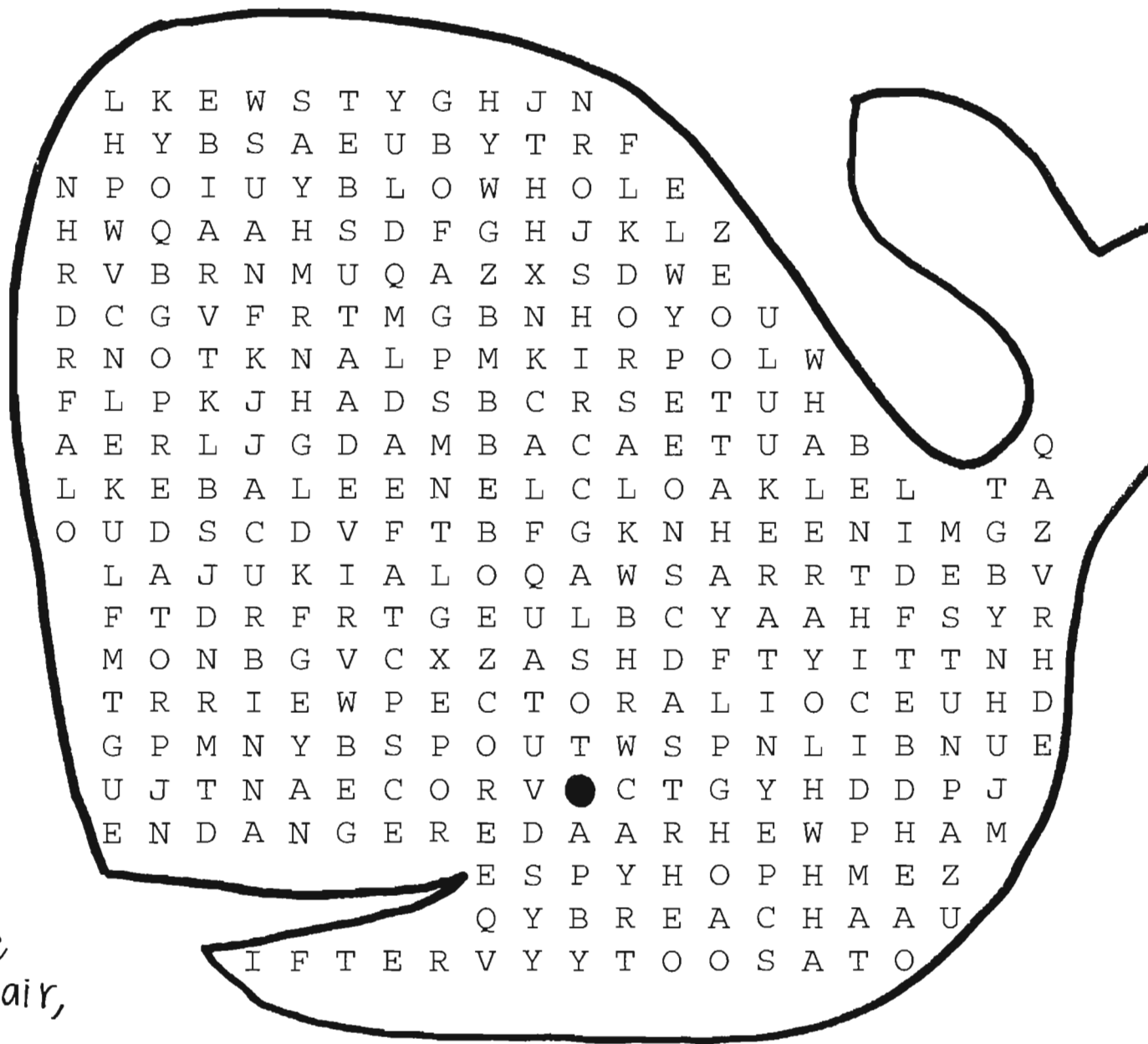
What can you tell others about whales?


1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

# Whale Word Search

Can you find all of the words in the whale word search? The words can go up, down, forwards, backwards, and even diagonal. Think about how each word relates to whales.

- |          |            |
|----------|------------|
| Gray     | Migrate    |
| Blowhole | Ocean      |
| Plankton | Endangered |
| Humpback | Spyhop     |
| Baleen   | Breach     |
| Fluke    | Pectoral   |
| Calf     | Keratin    |
| Dorsal   | Whaler     |
| Spout    | Benthic    |
| Blue     | Predator   |

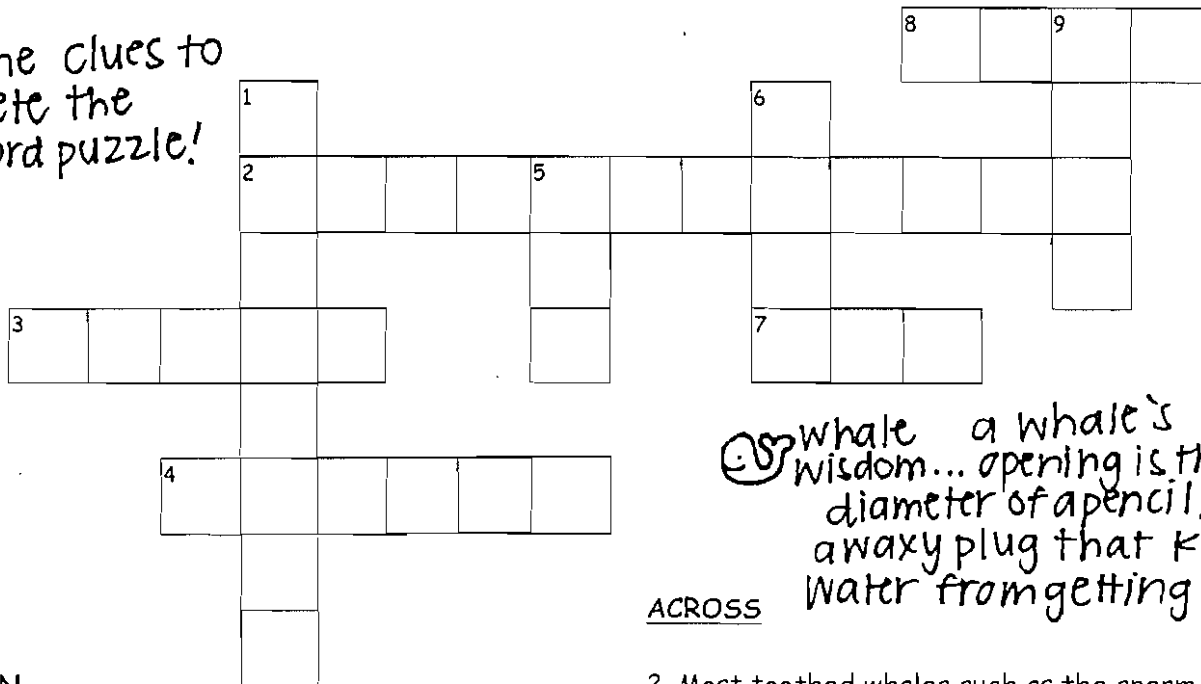



 *Whale wisdom... like all other mammals, whales are warm-blooded, have hair, and breathe air!*

# Did You Hear That?

Scientists believe that whales may use sound to communicate with each other. Whales can make sounds in multiple ways. First, they can use their voices. To do this, a whale forces air out through passages in its nose, resulting in a loud sound than can travel hundreds of miles underwater. Blue whales can make sounds that are so low that humans cannot hear them! Whales can also sing a "song" which means they make a repeated pattern of noise for 30 minutes. Second, whales that **breach**, or jump out of the water, make a very loud splash, which may also be used for communication. Scientists think that whales may communicate to find mates for the breeding season. Most species of toothed whales, like the sperm whale, use sound for **echolocation**, which allows them to sense objects in very dark waters. There is still much research to be done to learn more about whales and their amazing sounds.

Use the clues to complete the crossword puzzle!



 whale wisdom... opening is the diameter of a pencil, and has a waxy plug that keeps water from getting in.

## DOWN

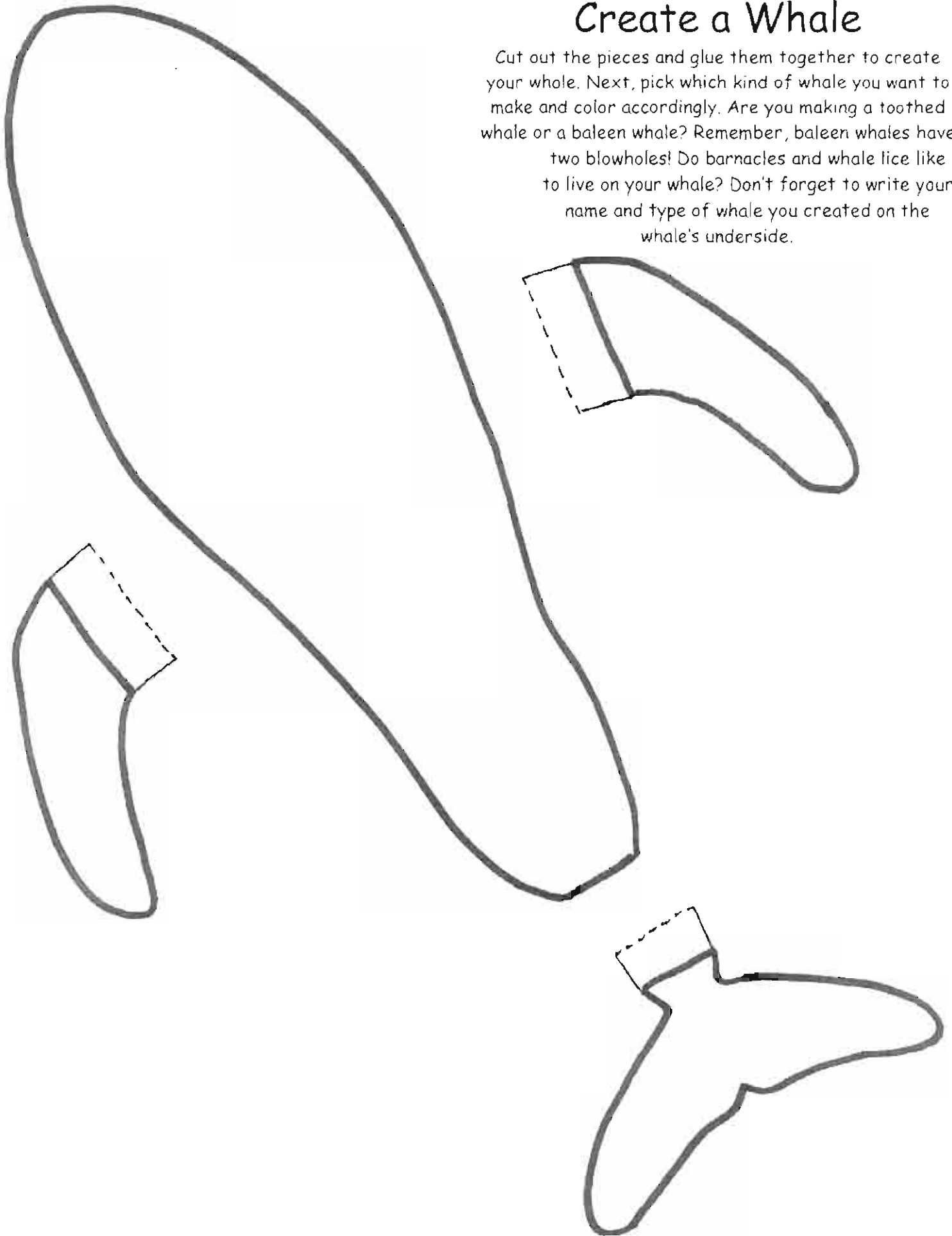
1. Scientists still need to do more \_\_\_\_\_ to find out more about whale sounds.
5. Blue whales can make sounds that are too \_\_\_\_\_ for humans to hear.
6. Whales may make sounds to attract a \_\_\_\_\_ for breeding season.
9. Whales can sing a \_\_\_\_\_, which is a pattern of noise that repeats for 30 minutes.

## ACROSS

2. Most toothed whales such as the sperm whale use this skill to sense objects in dark waters.
3. Some whales can make sounds that travel hundreds of \_\_\_\_\_ through the water.
4. Though not sure, scientists believe whales may use this jumping out of the water behavior to communicate.
7. Whales have one very small \_\_\_\_\_ on each side of their head, which allows them to hear other whales.
8. While for most animals, the \_\_\_\_\_ is used for smelling, whales depend on it to make sounds.

# Create a Whale

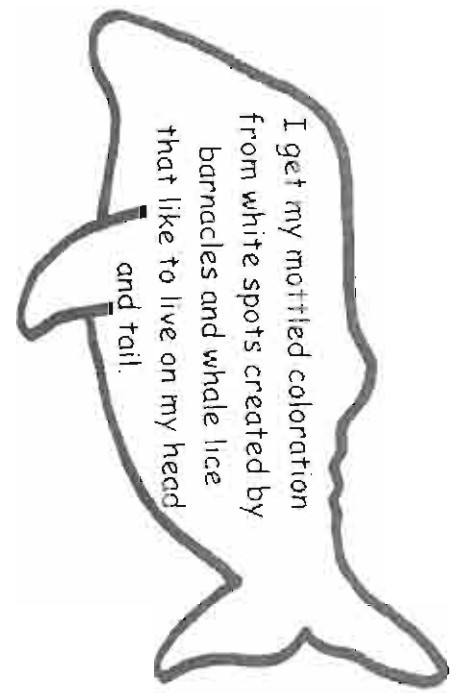
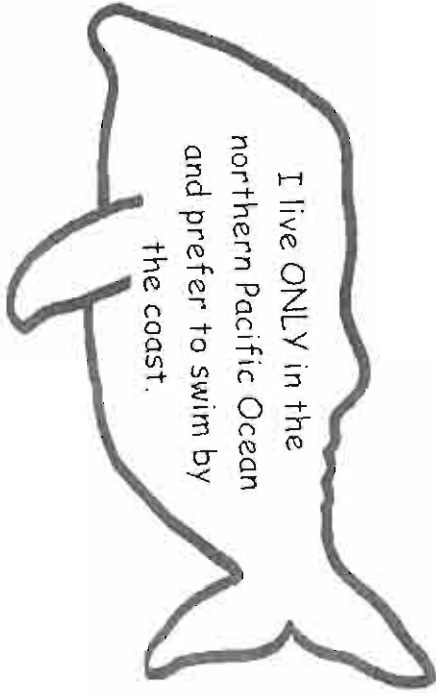
Cut out the pieces and glue them together to create your whale. Next, pick which kind of whale you want to make and color accordingly. Are you making a toothed whale or a baleen whale? Remember, baleen whales have two blowholes! Do barnacles and whale lice like to live on your whale? Don't forget to write your name and type of whale you created on the whale's underside.



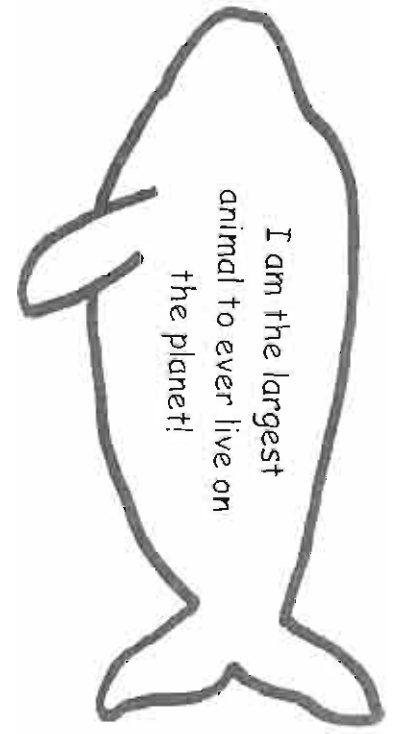
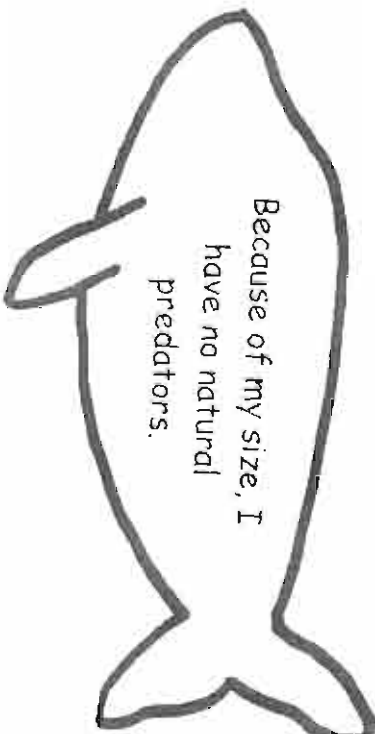
# Which Whale Are YOU?

Attention new whale experts! It's time to show how much you really know about the different species of whales. Photocopy, cut out, and give every friend a different whale name tag to decorate. Then use the clues to guess who is a gray whale, blue whale, sperm whale, humpback whale, beluga whale, or pilot whale!

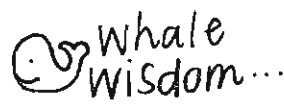
## Gray whales



## Blue whales

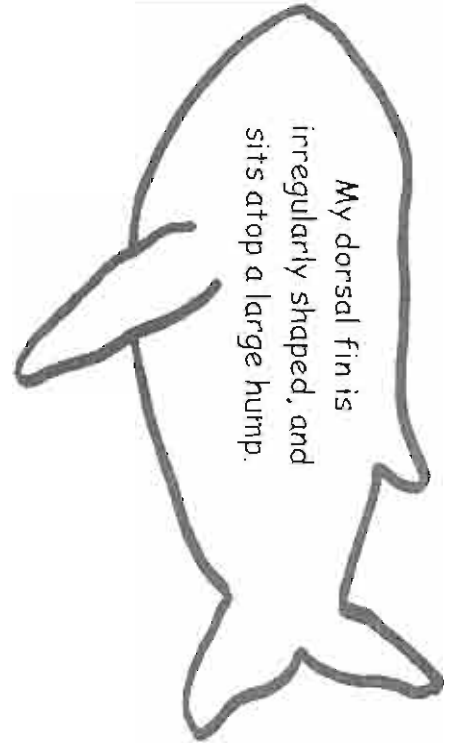
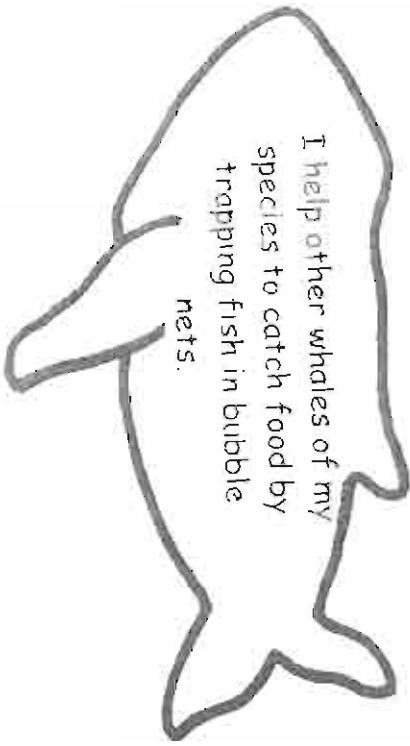




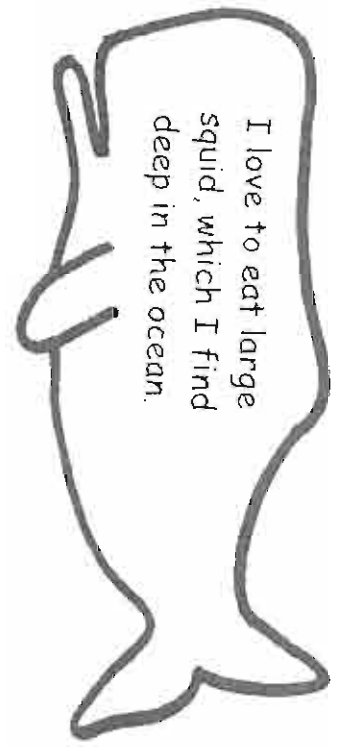
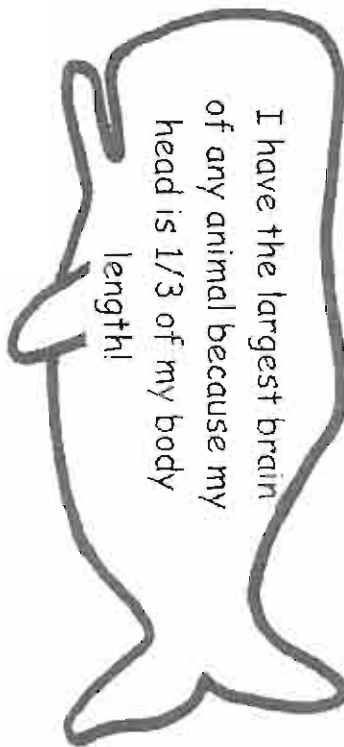
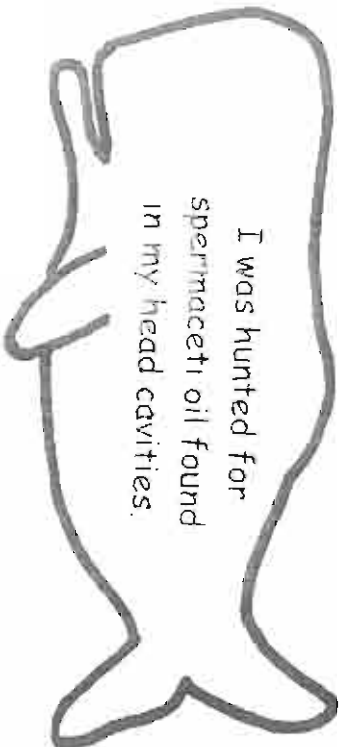


Whale Wisdom... Though rare, pilot whales can be found in pods of up to 1,000 whales!

### Humpback whales



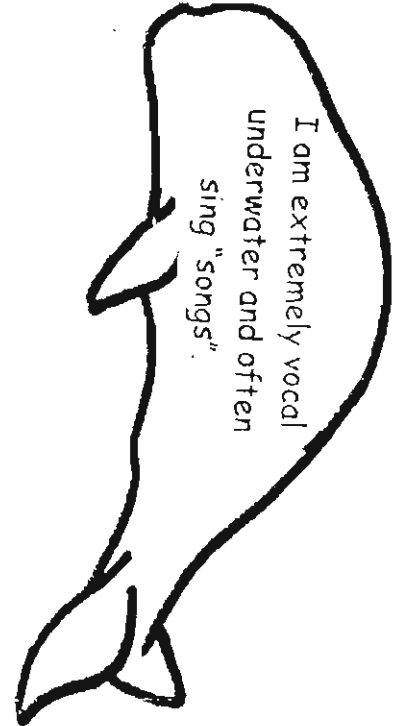
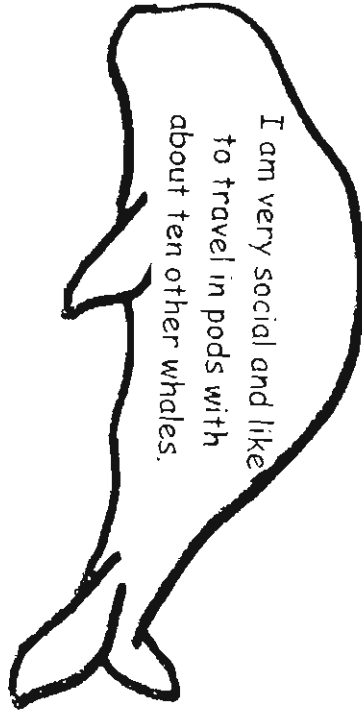
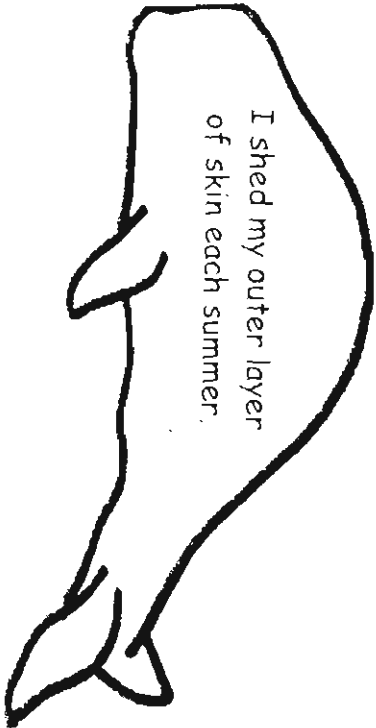
### Sperm whales



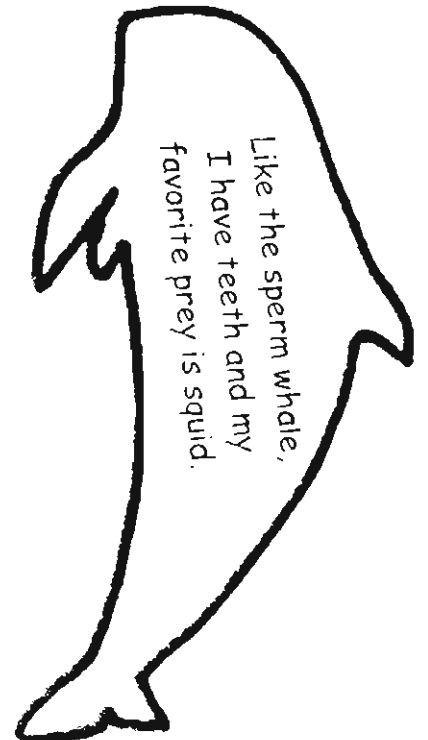
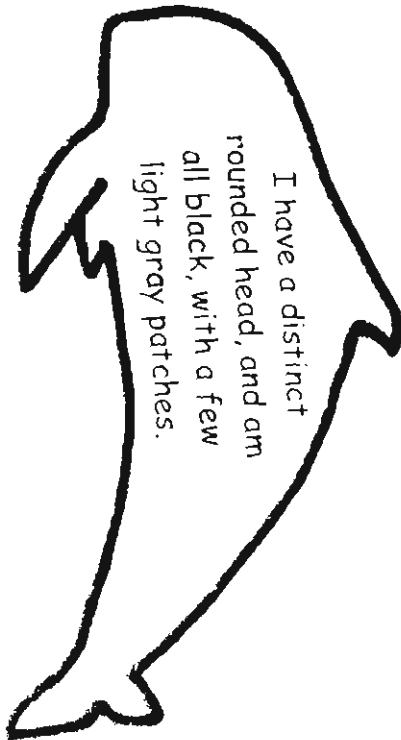
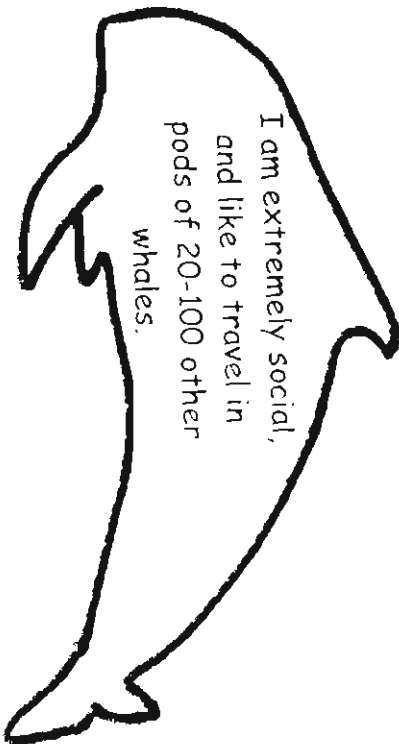


Whale Wisdom... Though beluga whales are white as adults, they are born gray or brown!

### Beluga whales



### Pilot whales



# Whale Glossary

**Baleen:** plates of keratin that hang from the upper jaws of baleen whales. Whales use baleen to strain ocean water and catch prey.

**Barnacle:** small, hard-shelled animal that attaches to surfaces underwater, sometimes to whales

**Benthic:** involving the bottom of the ocean

**Blowhole:** the hole or holes on top of a whale, which it uses to breathe

**Blubber:** a layer of fat between a whale's skin and muscle that keeps whales warm and stores energy

**Breach:** the act of jumping out of the water and falling back to the surface

**Bycatch:** animals caught unintentionally

**Calf:** young whale

**Dorsal fin:** the fin on a whale's back

**Echolocation:** sonar used by some animals that allows them to discover their surroundings through sound

**Endangered:** at risk of becoming extinct

**Extinction:** the permanent disappearance of a species from the planet

**Fluke:** the tail of a whale

**Gestation period:** the length of time a female is pregnant

**Keratin:** the substance baleen is made of. Fingernails and hair are also made of keratin.

**Krill:** very small marine crustaceans

**Migrate:** the movement from one location to another, usually by a group of organisms, and usually repeated

**Odontecete:** a toothed whale

**Pectoral fin:** the fins on either side of a whale

**Plankton:** very small marine organisms, eaten by some whales

**Pod:** group of whales

**Predator:** an animal that preys upon other animals for survival

**Range:** the area where an animal is found

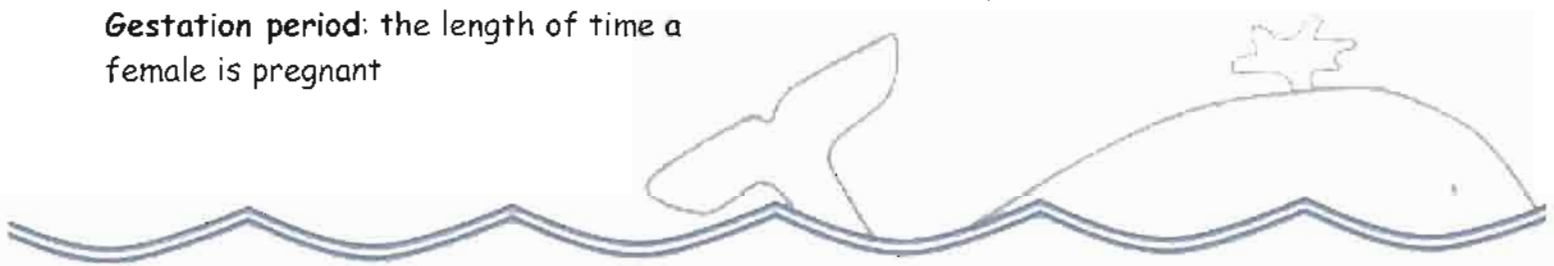
**Spout:** a whale's exhalation

**Spyhop:** a whale's behavior in which it pokes its head out of the water to view the surroundings

**Threatened:** at risk of becoming endangered

**Throat grooves:** the grooves along a whale's throat that allow the whale to open its mouth as wide as possible

**Whaler:** a person who hunts whales





## THE OCEAN FOUNDATION



Ocean Connectors is a fiscal sponsorship project of The Ocean Foundation, a 501(c)(3) nonprofit corporation. Learn more or make a donation at [www.oceanconnectors.org](http://www.oceanconnectors.org) and [www.oceanfdn.org](http://www.oceanfdn.org).

The whale activity guide can be downloaded from <http://oceanconnectors.org/resources>.

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