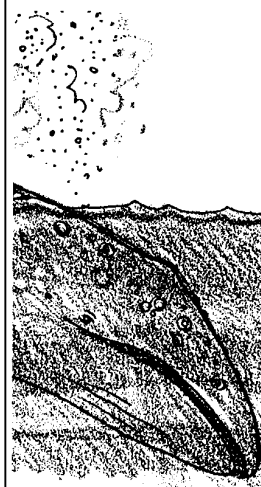


A Whale Is Born - December 21

Key Concepts

1. The life environments of the gray whale vary between two extremes, from the frigid feeding waters of the Arctic, to the warm, calm lagoons of Baja California, Mexico.
2. An extensive migration links the gray whale's dual needs for feeding and for giving birth.
3. A whale's first three months in the shallow lagoons of Mexico are dominated by constant protection, attention and feeding.



Background

“A Whale Is Born” begins a story line, interwoven throughout this curriculum guide, in which you and your students follow a mother California gray whale and her calf through their long migration from nursery grounds in Baja California, Mexico, to feeding grounds in the Alaskan Arctic, and back. This narrative serves as a vehicle for the integration of a variety of lessons on behavior and adaptations of marine mammals, the environments in which they live, and some issues facing people who observe them.

California gray whales are mammals, and like all mammals, they are warm blooded, they breathe air, and they give birth to active young which they nurse with milk. Because whales are mammals living in the sea, they face a special set of problems: they must maintain their body temperature in cold water, they must rise to the surface for air, and they must bear and nurse their young under water. They must also navigate and communicate through vast distances of water, often with limited visibility. These are important problems for all marine mammals. The lessons that follow will explore some of the ways whales solve these problems.

Gray whales belong to the major group of marine mammals known as baleen whales, that is, whales which feed by filtering their food through plates of baleen, a fingernail-like material that hangs from the upper jaw. The other major group, toothed whales, have mouths with teeth, and hence feed in an entirely different manner. Like most other baleen whales in the Pacific, gray whales are highly migratory. They depend on a seasonally rich food source

in northern latitudes, but move to warmer, but nutrient poor waters each winter to mate and bear their young. Gray whales live only in the North Pacific. In addition to the large California gray whale population which migrate along the west coast of North America, a smaller group known as the “Korean” gray whales migrates along the Asian coastline. Gray whales apparently lived in the Atlantic Ocean in prehistoric times, as evidenced by the fossil record, but are now extinct there.

Twice over the past 150 years, the gray whale was nearly eradicated by whaling. As a result of protection, this species has shown a dramatic recovery and is now a common whale along the North Pacific coast. In June 1994, the California gray whale was removed from the Endangered Species List, although the much smaller population in the western Pacific is still protected.

The gray whale’s life span is believed to be around 60 years. They reach sexual maturity somewhere between the ages of five and eleven years.

Mating usually occurs during a three-week period in late November and early December while the whales are in their southern range. A calf conceived one winter is born the following winter. The mother gray whale will not mate again for a year after her calf is born, so her next calf will be born two years after the first. For this reason, only about half of the mature female population bears calves in any one winter. Calves are most often born in quiet waters of certain shallow lagoons along the coast of Baja California. However, occasional “at sea” births have been reported.

The most famous of the shallow lagoons used by gray whales is Scammon’s Lagoon, named for a 19th century whaling captain, Charles Scammon, whose discovery of their winter breeding grounds opened up one of the worst periods of slaughter in whaling history. Whalers then took over the lagoons, often trapping the calves to attract and kill the frantic mother whales, and driving the whales to the edge of extinction.

Despite these excesses, Scammon’s observations and illustrations, compiled during the mid 1850’s, were among the first scientific data gathered on gray whales and whalers in the Pacific. An interesting passage from his writings is included in the Answer Key below as part of the response to question 11. You are encouraged to share this passage with students after they complete the reading.

Materials

For each student:

- “A Whale Is Born” student text pages
- 1 “Gray Whale Migration Route” map

For the class:

- overhead transparency: “Gray Whale Migration Route”
- Recommended: Several atlases for student use, and maps and sea charts of the migration route, ocean waters and the Pacific Rim (display in the classroom)

Teaching Hints

In “A Whale Is Born”, students begin the story of the long migration undertaken by a mother California gray whale and her calf. In short narrative readings, interspersed throughout this curriculum guide, students track these whales from nursery grounds in Baja California, Mexico, to feeding grounds in the Alaskan Arctic, and back. In this introductory lesson, students read a text and use maps to learn how and where a California gray whale calf starts its life.

Duplicate the text pages, one set per student.

You may choose to assign this activity as an in-class assignment, as homework, or as a small group assignment.

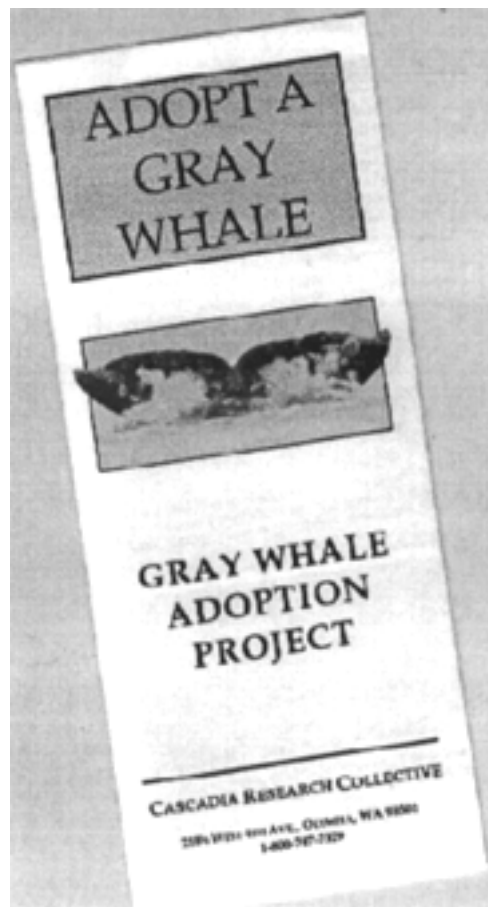
As you begin this time with a gray whale, you may wish to consider “adopting” a gray whale. For a modest donation, the Cascadia Research Collective Gray Whale Adoption Project provides an annual adoption which includes an adoption certificate, a custom photograph of the whale you have adopted, information and sighting history of that whale, and an annual update on the status of Cascadia’s research and new findings on gray whales.



Like to have a whale named after you or your school? For an additional donation, you can even choose a name for one of the whales now only identified by a number. The project supports Cascadia's research and educational efforts in identifying and tracking gray whales, examining strandings, and providing information on gray whales to the public and students. For more information, contact:

Cascadia Research Collective
218 1/2 W. Fourth Avenue
Olympia, Washington 98501
1-800-747-7329.

If you are using these materials in conjunction with *Voyage of the Mimi*, you may wish to use this lesson before or after students view the video installment, *Expedition 1: Planet Ocean*.



Key Words

blow - the breath of a whale, usually audible and visible as a fine spray

flukes - a whale's tail fins

lagoon - a shallow, semi-enclosed area of water connected to a larger body of water

mid-wife - in this case, a whale which assists in the birth of another whale's calf

Extensions

1. Use the map, "Gray Whale Migration Route" to make a wall mural of the gray whales' range. You may want to keep a record of the position of the whales studied in the story line of the student text on this map as you complete the lessons in this guide. (For a change in perspective, the mural can also be turned sideways with Alaska to the left and Mexico to the right and hung high along a wall.)

2. Ask students to use library resources or personal travels of their own to find out more about the waters the gray whales inhabit from Mexico to the Arctic. What cities would they pass? What differences in temperature and salinity might they experience? What kinds of coastlines would they pass along the migration route? What coastal currents might the whales encounter? Would the currents help or hinder the whales?
3. Have students write about the trip north from a whale's perspective, possibly as a travel guide for other whales. For example, what would our coastlines look like to them? What landmarks might be important to their navigation? What contacts might they make with humans along the way?
4. Have students gather vital statistics such as habitat, range, life span, birth weight, growth rate of some other whales to compare with gray whales. Make charts or maps of migration patterns comparing several whale species.
5. Use the book, *The Marine Mammals of the Northwestern Coast of North America, Together with an account of the American Whale-Fishery* (Dover Publications Inc. New York. 1968.) by Captain Charles M. Scammon to learn more about his activities. Write a sea chantey, short story, or script for a play based on his life.
6. Use a Spanish/English dictionary to translate the Spanish names of the calving lagoons to discover their English meanings.
7. If your students enjoyed "scaling up" the adult gray whale in the preceding activity "Big As Life", consider having them use the pattern found at the end of this section to create a full-size baby gray whale.

Answer Key

1. The "blow" of a whale is the breathing of a whale, usually both visible and audible. Because a whale may hold its breath for anywhere from five minutes to an hour or more, the exhalation can be explosive and powerful enough to send a fine spray high into the air.
2. The back of a gray whale is gray in color, spotted by barnacles and lighter pigmentation. There may be scars. Near the tail is a series of knobs that look like knuckles. These knobs, along with other markings identify this whale as a gray whale. Since a mature whale may be 45 feet long, students might also mention that its back would be large.
3. The gray whale has traveled nearly 7,000 miles since leaving the Arctic. This is slightly over two and a half times the distance across the continental United States.

4. From the context clues available in the text, your students should be able to define “lagoon” as a large, shallow bay or body of water separated from the sea. The whales are gathering in the lagoon to give birth.
5. As an air-breathing mammal, death by drowning during delivery may be a significant cause of death.
6. Answers will vary, and of course, even the experts don’t know the answer. It is thought that being born tail first may minimize the newborn’s risk of drowning because in this position the newborn receives oxygen via the umbilical cord until the last possible moment. For a whale born head first, the “midwife” whale may be critical in helping the newborn reach the surface for air quickly, because it’s head may be out of the birth canal longer before the rest of the body is free. Your students may suggest other reasonable hypotheses.
7. A “midwife” whale helps the new calf to the surface for its first breath, but it may play other roles as well. Mid-wife whales have been observed helping by pulling the newborn out by the tail. Additionally, she may help care for the newborn after birth. This cooperation in the birth process is interesting and somewhat unusual in marine mammals.
8. Your students should be able to suggest a variety of advantages to birth in the shallow lagoons. The shallow bottom provides support for the female, the calm waters reduce the risk of suffocation for both cow and calf, and the lagoons provide a convenient gathering place, which allows effective mutual cooperation between females. Also, the warmer waters keep the calves warm while they develop blubber. Finally, the increased salinity makes the whales more buoyant, so they can breath and rest more easily.
9. The weight at two months may be computed as follows:
$$(60 \text{ days} \times 230 \text{ pounds/day}) = 13,800 \text{ lb}$$
$$13,800 \text{ lb} + 2,000 \text{ lb birth weight} = 15,800 \text{ lb}$$

The calf weighs 15,800 pounds at 2 months old.
10. There is very little food for gray whales along the coast of Baja California. Whales return to arctic waters each summer to take advantage of extremely rich food resources.
11. Gray whale females are very protective of their calves, and would attack the whalers when provoked. Whalers hunting in the nursery often felt the full

force of a female's wrath when they came between mother and calf. Captain Scammon gives an interesting eye witness account of one such incident, which you may want to share with your students:

“When the parent animals are attacked, they show power of resistance and tenacity of life that distinguish them from all other Cetaceans. Many an expert whaler has suffered in his encounters with them, and many a one has paid the penalty with his life ...

In the winter of 1856, we were whaling about the esteros (estuaries) of Magdalena Bay, where, in attacking sixteen whales (California grays), two boats were entirely destroyed while the others were staved fifteen times ... All these serious casualties happened before a single whale was captured ...

After several days of rest, ... two boats' crews were selected, and the pursuit was renewed. The men, on leaving the vessel, took to the oars apparently with as much spirit as ever; but on nearing a whale to be harpooned, they all jumped overboard, leaving no one in the boat, except the boat-header and the boat-steerer ... We were chasing a cow and calf, and I charged my boat-steerer to be careful and not touch the young sucker, for if he did, the old whale would knock us into chopsticks ... A moment later the boat-steerer sung out: 'Cap'n, I've killed the calf and the old cow is after us.' Well, just about this time, I sung out to the men to pull for the shore if they loved their lives; and when the boat struck the beach, we scattered. I'll admit I never stopped to look round; but when the boat-steerer yelled out: 'Cap'n, the old whale is after us still.' I told all hands to climb trees.”

12. Scammon's Lagoon is located in Mexico.

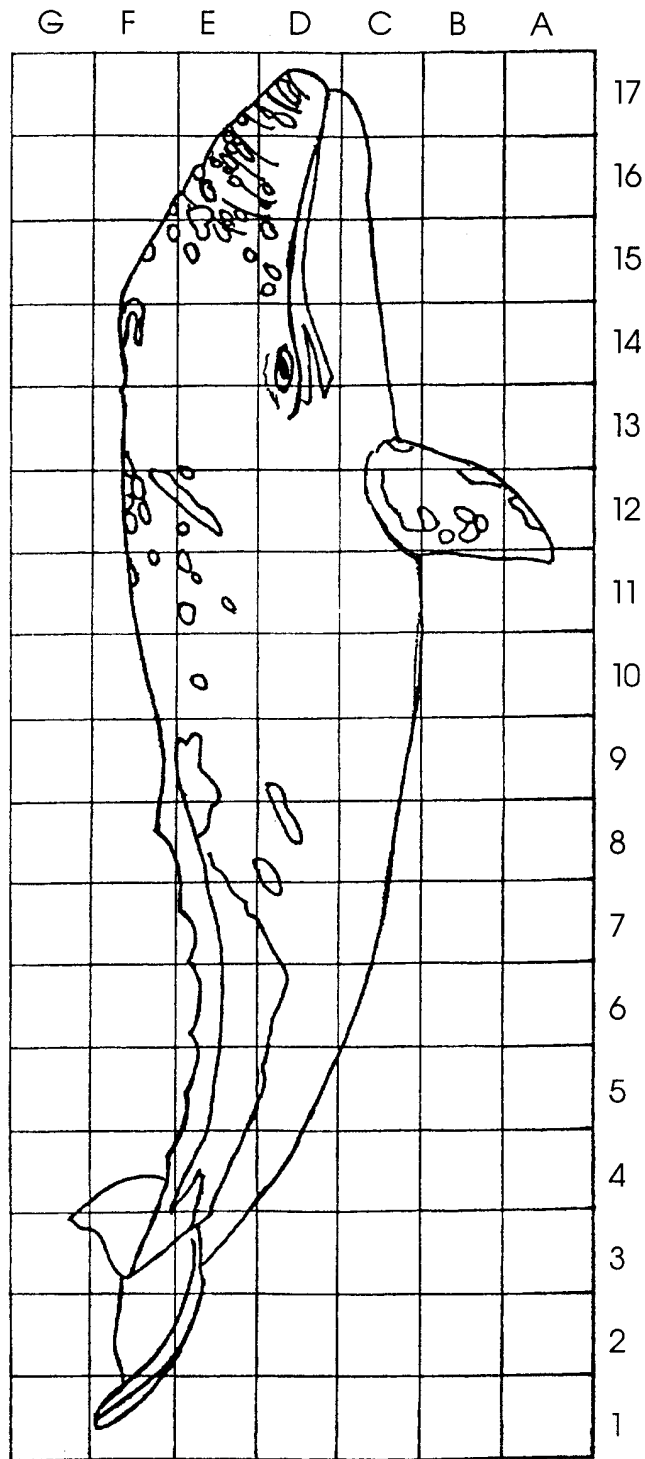
13. The four lagoons used by the whales are:

- a. Laguna Ojo de Liebre (Scammon's Lagoon)
- b. Laguna Guerrero Negro
- c. Laguna San Ignacio
- d. Bahia Magdalena

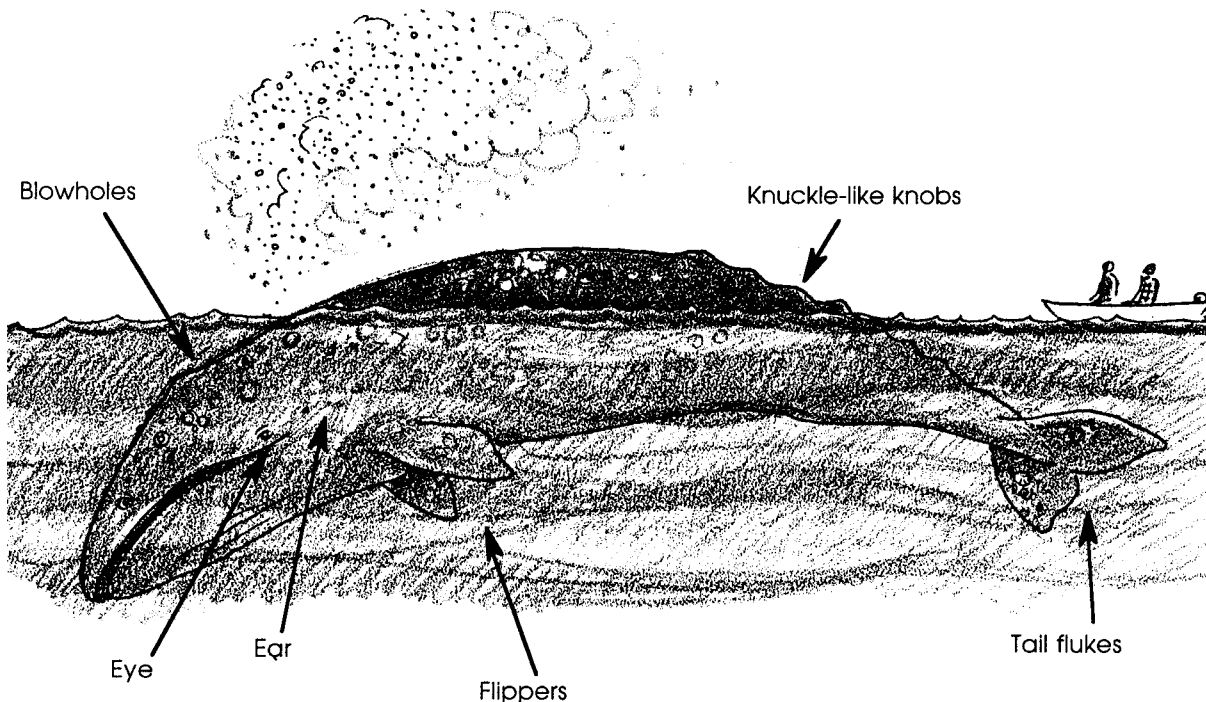
14. The Chukchi Sea and the Bering Sea lie between the U.S. and Russia.

- 15.a. Alaska is between the Arctic and Pacific Oceans.
b. Oceans are considerably larger than seas.
16. California gray whales pass through the waters of:
a. Mexico
b. United States
c. Canada, and
d. Russia.

Baby Whale Grid Pattern



A Whale Is Born - December 21



December 21

A loud, fast gush of air and a low, bushy mist of spray break the silence. They mark the sudden “blow” of a whale. From the surface, an observer sees a long, curved back. It is mottled gray and speckled with barnacles and scars. There is no fin.

Toward her tail she has a line of knuckle-like knobs. These are the characteristics of a California gray whale. She slides deeper into the ocean. Smoothly, she moves her 45-foot long body through the water.

1. What is meant by the “blow” of a whale?
2. What features identify this whale as a California gray whale?

For two and a half months she has been swimming southward. The steady rhythm of her breathing and swimming, breathing and swimming has carried her onward. She has traveled nearly 7000 miles, the longest migration of any marine mammal in the world. Finally, she is near the end of her journey. The baby that has been growing within her for thirteen months now moves strongly.

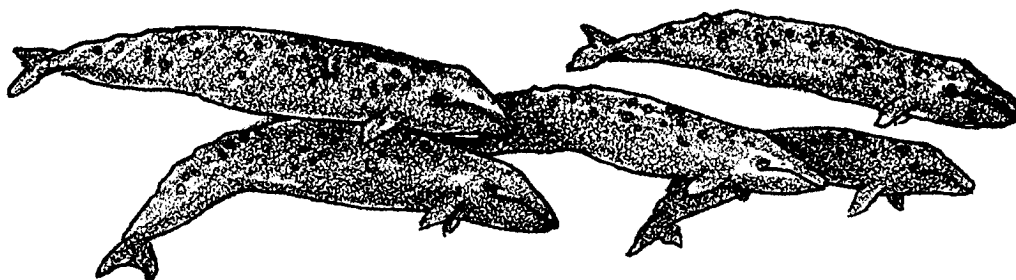
3. The distance across the continental United States is about 2,700 miles. About how many trips across the United States equal the distance of the whale's migration?

The whales have closely followed the shoreline as they traveled. Scientists suspect this helps them find their way. The whales stay in shallow water and keep the sounds of the surf to one side.

Finally they approach the entrance to Scammon's Lagoon. Scammon's Lagoon is a large, shallow bay. It is one of several where gray whales return each winter. Inside the lagoon, the water is warm, quiet and protected. The lagoon is cut off from the powerful open ocean. Gray whales gather here by the thousands to give birth to their young.

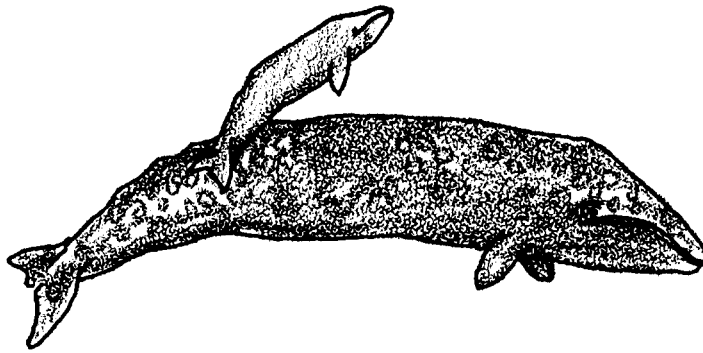
4. What is a lagoon? Why are the whales gathering here?

As the tide falls, the whale feels a current from the lagoon's out-going water. She swims near the mouth of the lagoon. There, several other gray whales are waiting. More whales join the slowly circling group. The whales are waiting for the tide to change. Finally the waters reverse their direction. Along with many other whales, she swims through the outer channel. She enters the glassy calm of the lagoon. Her journey is over for now. She has found a quiet, shallow backwater to rest and wait.



Diego sits quietly in a small boat, as dawn breaks over Scammon's Lagoon. He has just finished the morning whale count. Two hundred seventy eight in his section of the study area. This is only his second day on the survey. For the boy, the excitement of being here in the lagoon is great. He is surrounded by hundreds of resting whales. They make the earliness of the hour seem unimportant. His teacher had recommended him to a friend who studying gray whales in the lagoon. The friend was regularly counting the whales. Diego, who had always been fascinated by whales, had jumped at the chance to volunteer. A feeling of well-being washes over him. He smiles as he watches the sun rise and listens to sounds of the whales stirring around him.

Days later, the whale feels signs within her body that the calf is about to be born. She moves into a shallow backwater. The water is barely deep enough to cover her body. As she squeezes her powerful muscles, a female calf emerges, tail flukes first. The baby is just 16 feet long and weighs about 1,500 pounds. A “mid-wife” whale (sometimes called an “auntie”) is by her side. The “auntie” helps by quickly and gently pushing the newborn calf to the surface. There, the calf takes her first breath of air. The first breath is followed by a second. The second is followed by a third. Now the most hazardous moment in the small whale’s life is past. Soon the newborn calf can move to the surface and breathe with no assistance.



5. Why might its own birth be the most hazardous moment in a small whale’s life?

6. In truth, very little is known about the birth of whales. We have seen that dolphins are born tail-first. From this, many scientists think that large whales are born tail-first. Others believe that head-first deliveries may be more common in gray whales. Can you think of any reasons one position would be safer than the other?

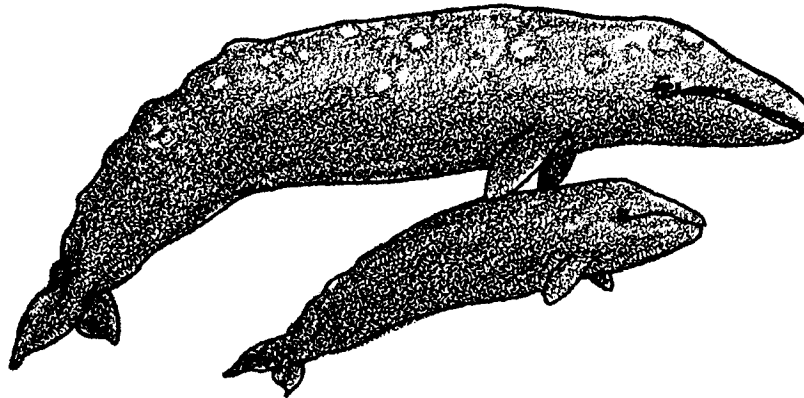
(Hint: Remember, whales are air-breathing mammals being born under water. In thinking about this problem, consider the position of the blow hole on a whale.)

7. A “mid-wife” whale may be very important to the survival of new born calves. What does a “mid-wife” whale do to help a newborn through the dangers of an underwater delivery?

The waters of Scammon's Lagoon are shallow and calm. They provide a safe nursery for newborn whales just learning to breath and swim. The water in the lagoon is saltier than in the open ocean. The saltier water makes it easier for the newborn calf to float. The warmth of the water is important too. The calf does not yet have a thick layer of blubber to keep it warm.

8. What are some possible advantages to gray whales in bearing their offspring in shallow lagoons?

The young whale quickly finds her first food supply, her mother's nipple. For the next two months, she will drink 50 gallons of rich milk each day. The milk is high in fat, protein, and vitamins. In fact, the gray whale's milk is ten times richer than cow's milk. The newborn gray whale will gain about 230 pounds a day. This means she will gain one ton every nine days during the next two months. The baby whale will continue to nurse for at least four months. She may nurse for as long as a year. Before it stops nursing, it will have begun to eat solid food from the sea floor.



9. A newborn whale calf will average 2,000 pounds at birth. How much will this whale weigh at the end of two months if it gains 230 pounds a day?
(Hint: Two months is 60 days.)

Meanwhile, the calf's mother will eat almost nothing. Her only source of energy is the food she ate during the past summer. The food was stored as body fat. It is also her calf's only source of energy and nutrition. This is a remarkable feat. It is possible only because the food supply in the north is so rich and abundant. During the summer, the whale is able to strain huge quantities of food from the muddy bottom near the arctic shore. She uses the

baleen plates in her mouth to filter through soft mud. Working a bit like a comb, small shrimp and worms are caught on the plates. She will teach her calf to feed this way on their migration north.

10. Scammon's Lagoon seems like a nice place. Why is it necessary for gray whales to leave it and swim 7000 miles to arctic waters each summer?

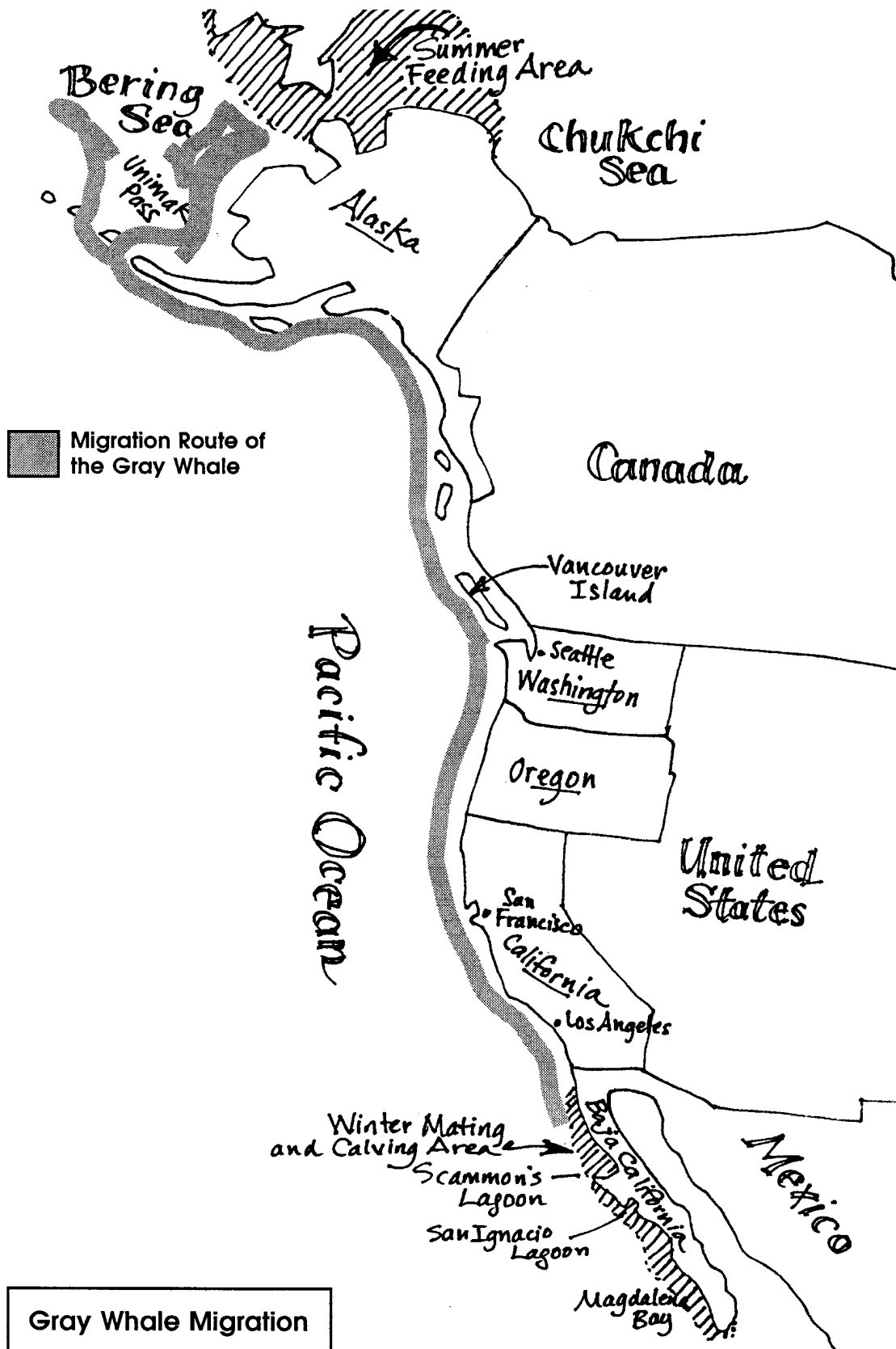
During its first few weeks of life, the calf grows rapidly. Together, her "auntie" and her mother act as protectors and guides. Slowly she gains some independence from her mother. She begins to play with other calves. Even so, the relationship between the calf and her mother remains strong. As she grows during the next two months, the newborn whale will be fed, nurtured and protected constantly.

11. Nineteenth century whalers discovered the secret nurseries of the gray whales. They hunted the whales in the shallow lagoons. Sometimes the whalers were attacked by mother whales. Because of these attacks, they gave these whales the name "devil fish." What might have caused the whales to attack the whalers?

Diego sees no aggressive behavior in his morning visits. In fact, he is surprised by the lack of fear many of the whales show toward people. Some whales even seem curious about him. They approach his boat for a closer look. He has heard stories about certain "friendly" whales. These whales approach boats boldly, eager to be rubbed and scratched. Diego is cautious around these animals. He careful not to make moves which might disturb them. He does not want to cause a mother to turn on him aggressively. After all, a sudden move by one these enormous animals could easily capsize his boat!

Diego knows the whales will soon be leaving the lagoon. He wonders about the places they are going over the months to come. Diego has never been outside of Mexico. He hopes to travel himself someday.

After three months in the lagoon, the calf has grown to 20 feet long. She now swims well. Her body is covered with a thick layer of blubber. The blubber will keep her warm when she reaches the icy northern waters. Many adult whales have already left the lagoon to begin the journey north. Now those with calves begin leaving as well. The calf sticks close beside her mother. Perhaps she senses that dangers from orca whales or humans may lurk along the way.



Use the map, “Gray Whale Migration”, to answer the following questions:

12. In what country is Scammon’s Lagoon located?

13. Four lagoons which lie along the west coast of Baja California are used by the gray whales for calving. What are the Spanish names of these four lagoons?
 - a.
 - b.
 - c.
 - d.

14. The gray whales summer feeding grounds, lie directly between the United States and Russia. In which two seas are these feeding grounds?

15. a. Alaska is also bordered by two oceans. What are they?

b. From studying the map, what would you say is probably the difference between a sea and an ocean?

16. What four countries do the California gray whales pass during their yearly migration?
 - a.
 - b.
 - c.
 - d.