

Seals, Sea Lions, and Walruses

K–3 Teacher’s Guide

A SEAWORLD EDUCATION DEPARTMENT PUBLICATION

CONTENTS

Goals and Objectives	2
Vocabulary	2
What Are Seals, Sea Lions, and Walruses?	3
Where Do Pinnipeds Live?	4
Why Do Scientists Study Pinnipeds?	5
Pinniped Picks	6
Who Am I?	8
Harbor Seal Visor	10
Habitat Sweet Habitat	12
Lunch Time!	13
One For You, Two For Me	14
The Name Game	15
Pinnipeds Around The World	16
Growing Up Is Hard to Do	18
Flipped Friends	20
Directions For Making Your Flipped Friends	22
Bibliography	24
Pre/Post Assessment	inside back cover

To the Teacher

The *Seals, Sea Lions, and Walruses* Teacher’s Guide for grades K–3 was developed at SeaWorld to help you teach your students—in an active, hands-on way—about pinnipeds and the ecology of the ocean. Our goal is to integrate science, mathematics, art, geography, and language. SeaWorld curriculum supports the *National Science Education Standards*.

The brief background information in this Guide was written for you, the teacher. It will help you do these activities with your students. We suggest you also refer to some of the resources listed on page 24 for more in-depth information. SeaWorld strives to provide teachers with up-to-date information and activities that motivate students to appreciate and conserve wildlife, the oceans, and the natural world.

Do you have comments or suggestions regarding the activities in this Teacher’s Guide? We’d love to hear your opinion. Write the SeaWorld San Diego Education Department, email us at SWC.Education@SeaWorld.com or call 1-800-380-3202.

Goals of the Seals, Sea Lions, and Walruses Unit

Students will explore the natural history of seals, sea lions, and walruses and recognize that humans are an interconnected part of these animals' ecosystems.

Objectives

After completing the SeaWorld Seals, Sea Lions, and Walruses unit, the student will be able to...

1. Identify two differences between a seal and a sea lion.
2. Name and describe three pinniped adaptations.
3. Role play how a walrus might find and eat its food.
4. Find locations on a globe or map where Pacific walruses and California sea lions live.
5. Describe the habitats of the Pacific walrus, California sea lion, and harbor seal.
6. Express a concern for how some human activities may negatively impact the lives of pinnipeds.
7. Share their learning experiences with family and friends.

Vocabulary

blubber — a layer of fat between the skin and muscle of most marine mammals.

calf — the young of certain large mammal species such as whales, manatees, and walruses.

colony — a group of organisms of the same kind living together.

ecosystem — a unit of plants, animals, and nonliving components of an environment that interact.

endangered — in danger of becoming extinct.

flippers — broad, flat limbs supported by bones and adapted for swimming.

food chain — a diagram showing the transfer of energy via "who eats whom" in an ecosystem.

habitat — the normal, usual, or natural place where a plant or animal lives.

haul out — to leave the water to get on land.

herd — a group of certain large animals that associate together.

marine mammal — a mammal adapted to live in the marine environment and dependent on the ocean for food.

molt — *n.* The shed exoskeleton, hair, feathers, or skin of an animal. *v.* To shed the exoskeleton or the outer layer of hair, feathers, or skin.

Pinnipedia — the scientific order that includes seals, sea lions, and walruses.

predator — an animal that eats other animals.

prey — *n.* an animal eaten by another animal. *v.* to hunt and eat other animals.

pup — the young of certain animals such as seals, sea lions, and otters.

threatened — likely to be in danger of becoming extinct.

vibrissae — stiff, tactile whiskers on the face of certain mammals.

What Are Seals, Seal Lions, and Walruses?

These animals are pinnipeds.

Scientists group seals, sea lions, fur seals, and walruses together in the scientific order called *Pinnipedia*. All pinnipeds have four *flippers*—one pair in front (foreflippers) and one pair in back (hind flippers), a thick layer of *blubber*, and sensitive whiskers called *vibrissae*.

Pinnipeds are divided into three families—the walruses, the true seals, and the eared seals. The eared seals, which include both sea lions and fur seals, have visible, external ear flaps.

Pinnipeds are mammals.

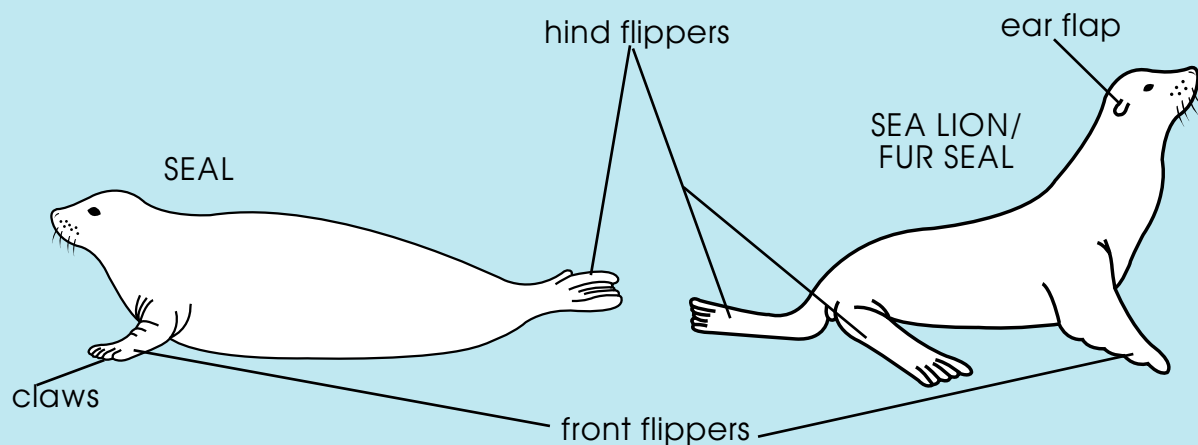
Pinnipeds share five characteristics with other mammals. They are warm blooded (maintain a high and constant body

temperature independent of the surroundings), give live birth, nurse their young, breathe air, and have hair.

Pinnipeds live on land and in the sea.

Because these animals live in the marine environment and they find their food at sea, pinnipeds are *marine mammals*. Other marine mammals include whales and sea otters. Although pinnipeds spend most of their lives in the water, they come ashore to rest, give birth, and *molt*. Once each year, usually in the spring, they gather on beaches or sea ice to give birth and breed. After the pupping season, adults often come ashore again to molt: they shed the outer skin layers with old fur and hair. They also *haul out* on shore to rest and bask in the sun throughout the year.

What's the difference between a seal and sea lion/fur seal?



Seals and sea lions/fur seals differ in a number of ways, but here are four that are easy to spot. Sea lions/fur seals show external ear flaps; seals show only ear holes. Sea lions/fur seals have long, hairless, front flippers with short nails; seals have short, fur-covered front flippers with long claws. Sea lions/fur seals can rotate their hind flippers forward to walk on land; seals hold their hind flippers straight and move on land in a forward rolling motion of their bellies. Sea lion/fur seal whiskers are smooth; most seal whiskers are beaded or crimped.

Where Do Pinnipeds Live?

You'll find pinnipeds around the world.

Seals, sea lions, and walruses live along the shorelines of the world's continents, from Antarctica to Greenland. Each species is adapted to live in its particular *habitat*. The smallest fur seal, the Galápagos fur seal, lives in hot weather close to the equator. Some large pinnipeds, like the southern elephant seal, swim in the chilly waters of the south pole region.

Walruses play it cool.

Walruses swim in cold Arctic waters and prefer to haul out on snow-covered moving pack ice or ice floes rather than mainland beaches. *Herd*s of walruses also come ashore on small rocky islands when ice isn't present. Because walruses eat mostly animals that live on the ocean bottom, they're generally found where the water is less than 100 m (325 ft.) deep. They prefer a habitat with a gravelly bottom.

California sea lions hit the beaches.

California sea lions inhabit the rocky and sandy beaches of coastal islands and mainland shores of the eastern North Pacific Ocean. During the spring breeding season, they gather on land in large groups called *colonies*. In autumn and winter, adults range off the west coast of North America from the islands off Baja California, Mexico to the northern tip of Vancouver Island in Canada.

Harbor seals lie low.

Harbor seals inhabit shallow areas of estuaries, rivers, and places where

sandbars, beaches, or rocks are uncovered at low tide. They prefer flat spots because unlike a sea lion, a seal can't rotate its hind flippers forward. On land, a seal moves by undulating its body in a caterpillarlike motion. In the water, it often rests floating vertically.

Pups and calves grow fast.

A baby seal or sea lion is called a *pup*. A baby walrus is called a *calf*. Pups and calves are born on land or sometimes in the water. They grow rapidly on their mother's fat-rich milk. Soon they enter the sea to develop their survival skills. They learn to swim, dive, catch *prey*, and haul out.

The first year of life at sea is often the most difficult. Finding enough food, surviving storms at sea, escaping *predators*, and withstanding disease are all challenges these young animals face.



Most pinnipeds, like this California sea lion, have good eyesight under water.

Why Do Scientists Study Pinnipeds?

There's a lot to learn from pinnipeds.

Scientists study pinnipeds to learn about their natural history, reproduction, and behavior. The information helps when scientists try to save species that are *endangered*.

Most studies observe pinnipeds when they're on land while pupping, breeding, or molting. What are they doing the rest of the year? And where are they doing it? Little is known about pinniped behavior at sea including diving, migrating, habitat use, feeding strategies, and social interactions.

New technology helps scientists study seals at sea.

Scientists at Hubbs-SeaWorld Research Institute (H-SWRI) are using compact satellite-linked radio transmitters to track seal movements. With this new technology, scientists can virtually dive and swim with seals, learning more about pinniped behavior.

Time-depth recorders reveal hidden secrets.

H-SWRI scientists use a small computer called a time-depth recorder (TDR). The TDR is temporarily glued to the hair on the back of a seal or sea lion. It falls off when the animal comes ashore later in the year to molt. The TDR records time and depth measurements and stores the data until it is transmitted to a satellite. The satellite calculates the seal's position and then sends all the data to the H-SWRI laboratory for analysis.

Elephant seals dive deeply.

Scientists have used TDRs to document the year-round diving patterns and foraging migrations of northern elephant seals in the Southern California Channel Islands. Elephant seals gather on the Channel Islands in the winter to breed and again in the spring and summer to molt. Scientists weren't sure what the seals did during the eight to nine months the seals are at sea.

Dr. Brent Stewart is a H-SWRI scientist who uses TDRs to study the diving patterns and movements of elephant seals during the months they spend at sea. He documented diving depths, dive durations, and the amount of time the seals spend resting at the surface between dives. His study revealed some fascinating information.

For example, twice each year, male northern elephant seals (*Mirounga angustirostris*) migrate from the Channel Islands 4,025 km (2,500 miles) north to Alaska's Aleutian Islands, where they spend 40 to 50 days feeding before returning to Southern California (another 4,025 km). Each leg of the migration takes about 40 days.

The diving depths of northern elephant seals was also surprising. Some seals dove deeper than 1,800 m (6,000 ft.) and several dives lasted 80 minutes or more. Elephant seals are some of the deepest divers of any marine mammals.

This study's results helped in planning future studies of elephant seal movements at sea using satellite systems.

Pinniped Picks

Use these cards to help your students get started exploring pinnipeds. Here are some ideas for ways to use these cards in your classroom:

- Use the facts on the cards to help you prepare lesson plans and lead discussions in class.
- Copy and cut apart the cards. Distribute a different card to each learning group. Visit the school library to learn more about the animals. Groups may even adopt that animal as their "mascot" while working on this unit.
- Copy and cut apart the cards. Distribute a complete set to each student or group of students. Students compare similarities and differences among various pinnipeds.
- Copy and cut apart the cards. Use the cards to sort endangered or threatened species from those that are not. Visit the library to find more species to add to your "endangered list." Do some of these animals live in your area?

California sea lion

Zalophus californianus californianus

size: Male to 2.4 m (7.9 ft.) and to 390 kg (860 lb.)
Female to 2 m (6 ft.) and to 110 kg (240 lb.)

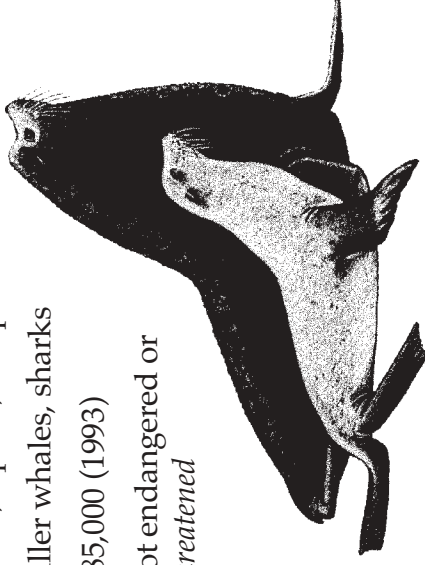
distribution: British Columbia to northern Mexico

prey: fishes, squids, octopuses

predators: killer whales, sharks

population: 185,000 (1993)

status: not endangered or threatened



©2001 Sea World, Inc. All Rights Reserved.

harbor seal

Phoca vitulina

size: Male about 1.9 m (6.2 ft.) and 70 to 159 kg (150–351 lb.)

Female about 1.7 m (5.6 ft.) and 60 to 110 kg (132–242 lb.)

distribution: Pacific (Arctic to Baja California, Mexico), Atlantic (Greenland to Florida), and European waters

prey: fishes, shrimps, squids, octopuses

predators: killer whales, sharks, and Steller sea lions. Coyotes and eagles eat juveniles.

population: 500,000 (1981)

status: not endangered or threatened



©2001 Sea World, Inc. All Rights Reserved.

Pacific walrus

Odobenus rosmarus divergens

size: Male to 3.6 m (11.8 ft.) and to 1,900 kg (4,189 lb.)

Female to 3 m (10 ft.) and to 1,200 kg (2,646 lb.)

distribution: northeastern Pacific and Arctic oceans

prey: clams, mussels, fishes, snails, crabs, shrimps, and squids. Some eat seals and small whale carcasses.

predators: killer whales, polar bears

population: 240,000 (1980s)

status: not endangered but regulated in international trade to restrict harvest



©2001 Sea World, Inc. All Rights Reserved.

Steller sea lion
Eumetopias jubatus

size: Male 3.3 m (10.8 ft.); 1,000 kg (2,200 lb.)
Female 2.5 m (8.2 ft.); 270 kg (600 lb.)

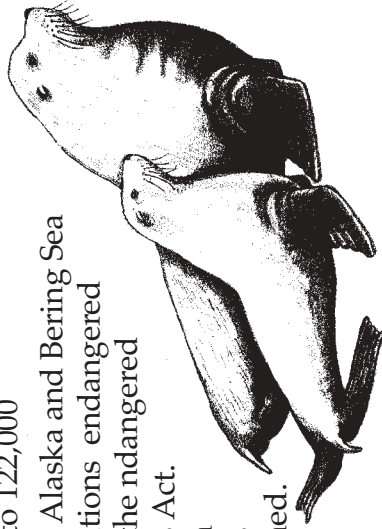
distribution: central California north to the Arctic and across to Japan

prey: fishes, squids, octopuses. Some eat seals.

predators: killer whales, sharks

population: 95,000 to 122,000

status: Gulf of Alaska and Bering Sea populations endangered under the Endangered Species Act. Eastern stock is threatened.



©2001 Sea World, Inc. All Rights Reserved.

northern elephant seal
Mirounga angustirostris

size: Male 4 m (13 ft.) 2,000 kg (4,410 lb.)
Female to 3 m (10 ft.); 600 kg (1,323 lb.)

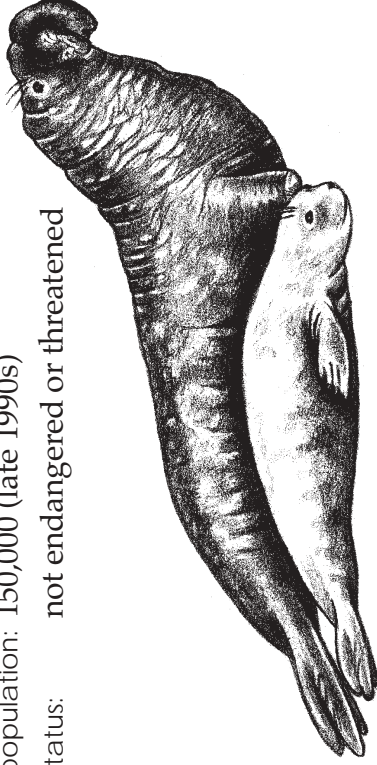
distribution: California to Baja California, Mexico

prey: squids, octopuses, deep-water fishes, small sharks and skates

predators: killer whales, sharks

population: 150,000 (late 1990s)

status: not endangered or threatened



©2001 Sea World, Inc. All Rights Reserved.

Guadalupe fur seal
Arctocephalus townsendi

size: Male to 1.9 m (6.2 ft.); to 170 kg (375 lb.)
Female to 1.4 m (4.6 ft.); to 55 kg (121 lb.)

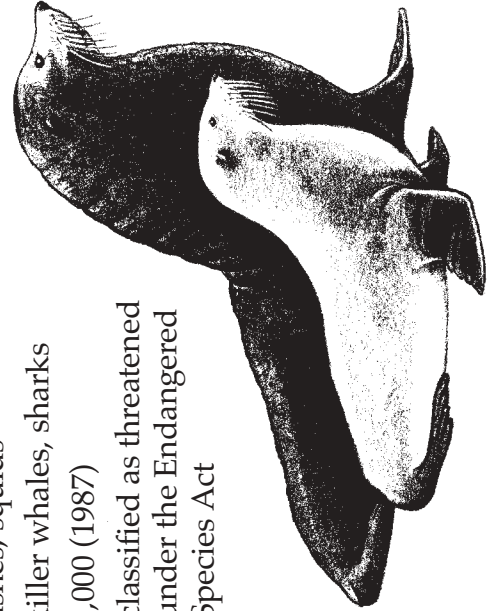
distribution: central California to Guadalupe Island, Mexico

prey: fishes, squids

predators: killer whales, sharks

population: 6,000 (1987)

status: classified as threatened under the Endangered Species Act



©2001 Sea World, Inc. All Rights Reserved.

Hawaiian monk seal
Monachus schauinslandi

size: to 2.4 m (8 ft.); 270 kg (600 lb.)
females slightly larger than males

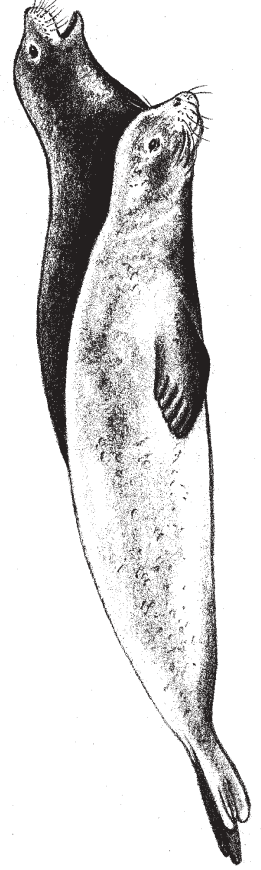
distribution: northwestern Hawaiian Islands (leeward chain)

prey: eels and other fishes, octopuses, lobsters

predators: sharks

population: about 1,500 (early 1990s)

status: classified as endangered under the Endangered Species Act



©2001 Sea World, Inc. All Rights Reserved.

Who Am I?

OBJECTIVE

Students will be able to identify two differences between seals and sea lions.

MATERIALS

per student:

- copy of *Who Am I?* funsheet on page 9
- crayons, particularly red and blue

per class:

- enlarged copy of page 3 illustration "What's the difference between a seal and a sea lion/fur seal?"
- chalkboard or writing surface

BACKGROUND

Seals, sea lions, and walrus belong to the scientific order Pinnipedia. These animals have flippers; broad, flat limbs supported by bones. Sea lions are named "eared seals" because they have external ear flaps on the sides of their heads. Sea lions have large front flippers and can rotate the hind flippers forward to "walk" on land. Seals do not have ear flaps, only ear holes; they have short front flippers and cannot rotate their hind flippers. Walrus have no ear flaps but can rotate the hind flippers to "walk" on land.



ACTION

1. Ask students if they can describe a sea lion. What does it look like? Where does it live? How does it swim? Does it move on land? Ask students the same questions about a seal.
2. Draw an outline of a seal and a sea lion on the board. Pattern the outlines using the illustrations on page 3.
3. Ask students to name or describe some differences they see between these two animals. Emphasize the differences described on page 3.
4. Distribute the *Who Am I?* funsheet

copies and crayons to students. Ask students to write the name of the animal below each one. (Students may copy words from the board.) Now students can draw the missing parts of the matching pair. Color all four animals when finished.

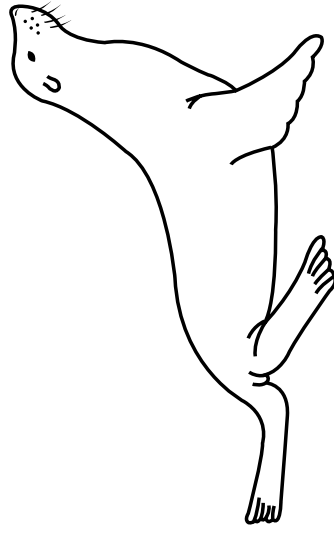
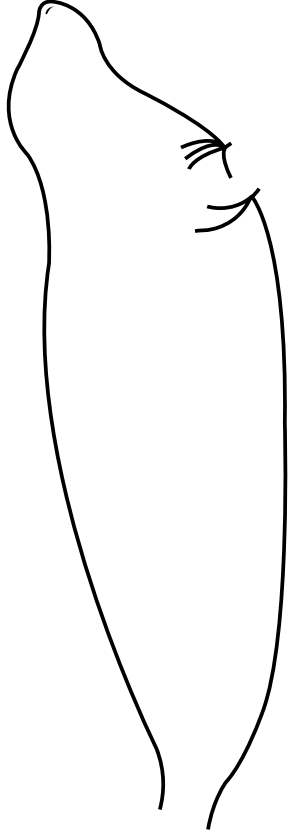
DEEPER DEPTHS

Show pictures of different seal and sea lion species. See if students can correctly identify each as a seal or sea lion.

Name _____

Who Am I?

Can you tell which is a seal and which is a sea lion? Write the names below the animal. Now help their friends by drawing flippers, ears, eyes, and whiskers.



Harbor Seal Visor

OBJECTIVE

Students will be able to describe the senses of a harbor seal and how the seal uses these senses.

BACKGROUND

Harbor seals have good eyesight, an acute sense of hearing, and, with their whiskers, a good sense of touch. Hearing is probably the most important sense, both above and below water. Hearing under water helps seals locate prey like fish. Hearing in air helps seals locate each other and their pups. Seals have good eyesight under water. Their large eyes are sensitive to light; they can see in dark water.

MATERIALS

per student:

- a small, white paper plate cut according to pattern on page 11
- harbor seal head on white construction paper (pattern page 11)
- two 12" strands of black yarn
- nose cut from black construction paper (pattern page 11)
- eyes cut from brown construction paper (pattern page 11)
- three pipe cleaners (various colors)

per class:

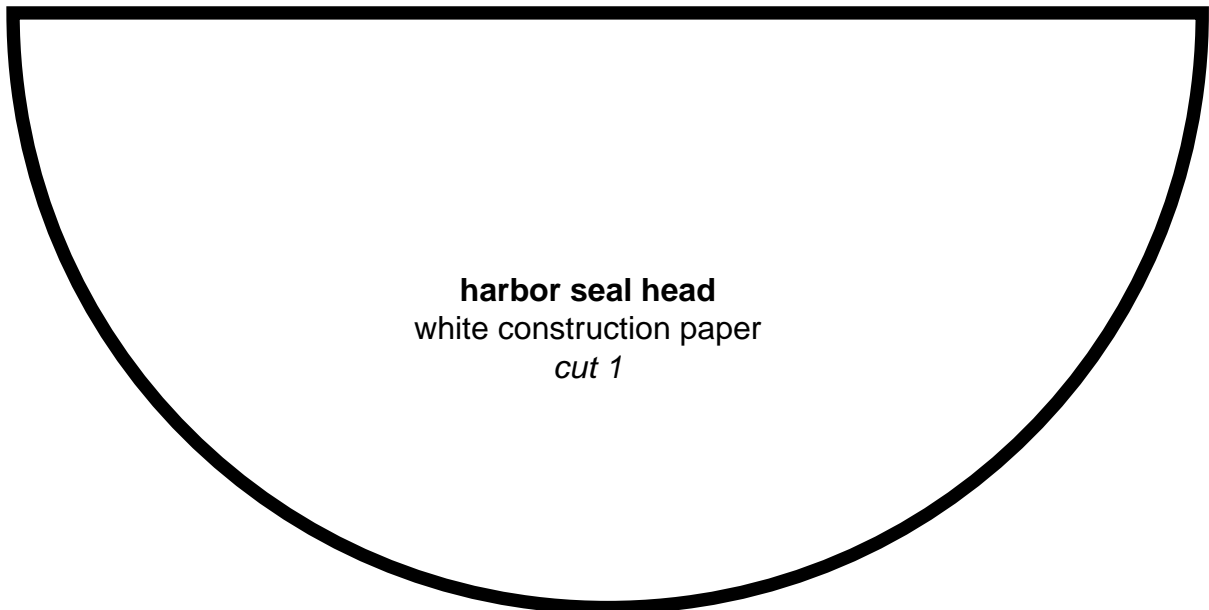
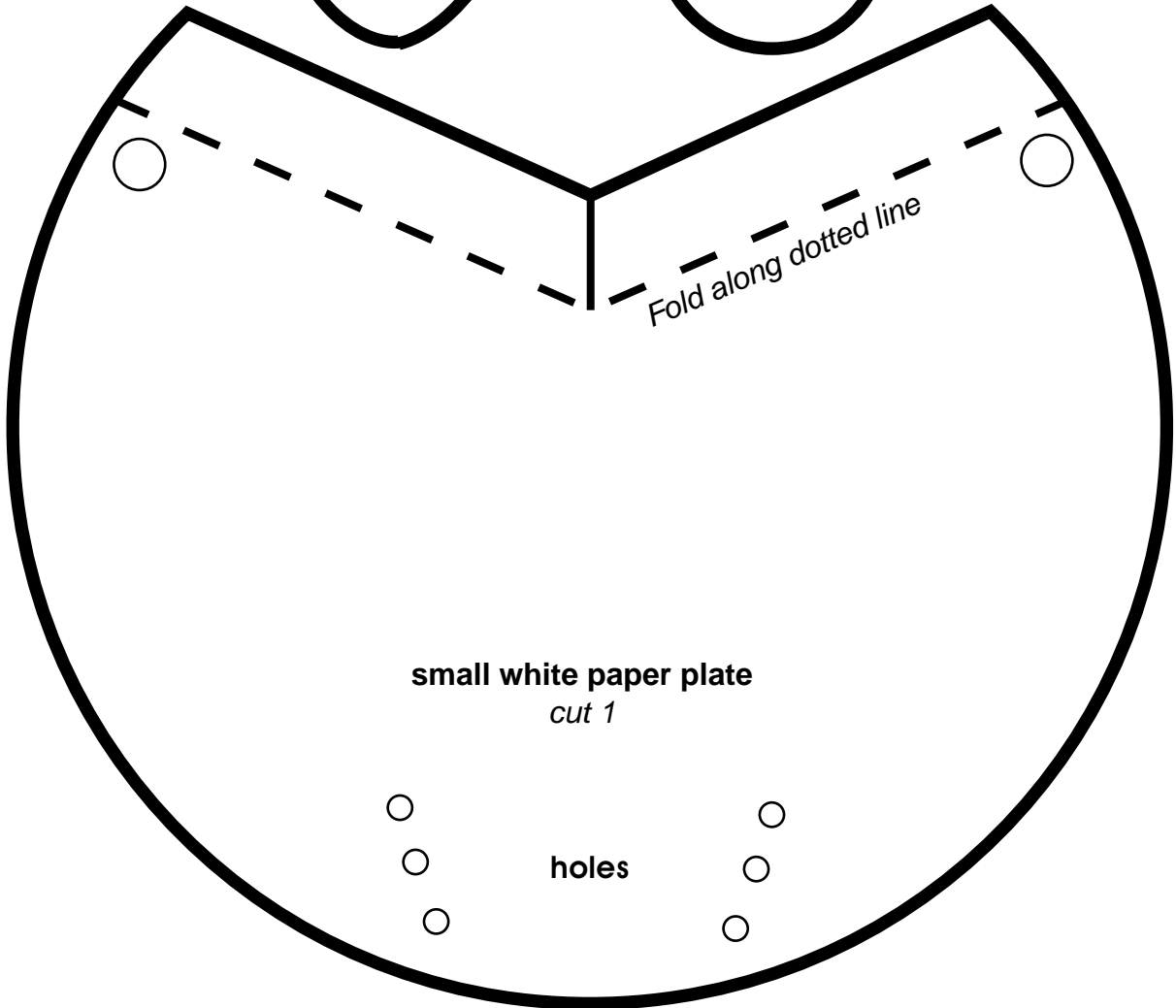
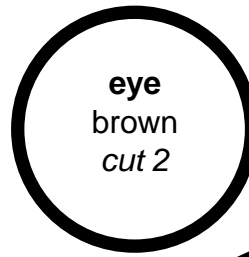
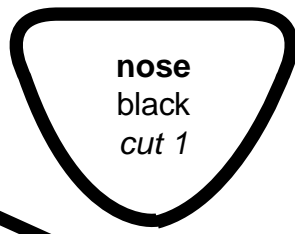
- black tempera paint
- paint bowls
- sponges cut into 2-inch cubes
- glue
- crayons
- clothespins



ACTION

1. Distribute harbor seal heads and cut paper plates to students. Students glue straight edge of head piece to folded-up flaps of paper plate.
2. Distribute harbor seal eyes to students. Ask them how a harbor seal uses its eyes. Glue eyes to head.
3. Distribute harbor seal noses to students. Ask how a harbor seal uses its nose. Tell students all seals can close their noses and hold their breath, some for more than an hour (elephant seals).
4. Distribute clothespins, sponges, and black paint. Clip the clothespin on the sponge. Show students how to dip sponge in black paint and dab "spots" on the harbor seal. A small amount of paint is best.
5. Distribute pipe cleaners. These are whiskers. How do harbor seals use whiskers? Thread pipe cleaners through holes in paper plate.
6. Tie yarn through holes in paper plate. When paint is dry, students can wear their harbor seal visors.

Pattern For Harbor Seal Visor



Habitat Sweet Habitat

OBJECTIVE

Students will be able to describe the general habitats of seals, sea lions, and walruses.

BACKGROUND

Pinnipeds live in many different habitats around the world. California sea lions favor rocky shorelines often exposed to high surf. Harbor seals prefer the calmer waters of bays or estuaries. Pacific walruses haul out onto pack ice.

MATERIALS

per student:

- 12" x 18" white construction paper
- one small brown paper bag (lunch sack size)

per class:

- glue
- salt
- crayons
- colored pencils



ACTION

1. Lead a discussion about the habitats of different animals. Encourage students to think about their own habitats, too. Describe the habitats of a California sea lion, a harbor seal, and a Pacific walrus.
2. Tell students they will create each of these three animals' habitats using natural objects they collect from outside. Ask students what each animal would need in its habitat, and what kinds of things they could use to represent them.
3. Give each student a brown paper bag. Take the class outside and have students collect natural objects such as grass, leaves, petals, rocks, bark, sand, and dirt. Provide students with salt to represent snow.
4. After the group returns to the classroom, give each student a piece of construction paper. Have students

fold the paper into three sections. Have students use glue, crayons, and colored pencils to create their habitats, one for each animal.



Harbor seals often haul out onto shore to rest on sandy beaches.

Lunch Time!

OBJECTIVE

Students will be able to place sequential photos in chronological order and use the photos to describe the feeding behavior of a walrus.

MATERIALS

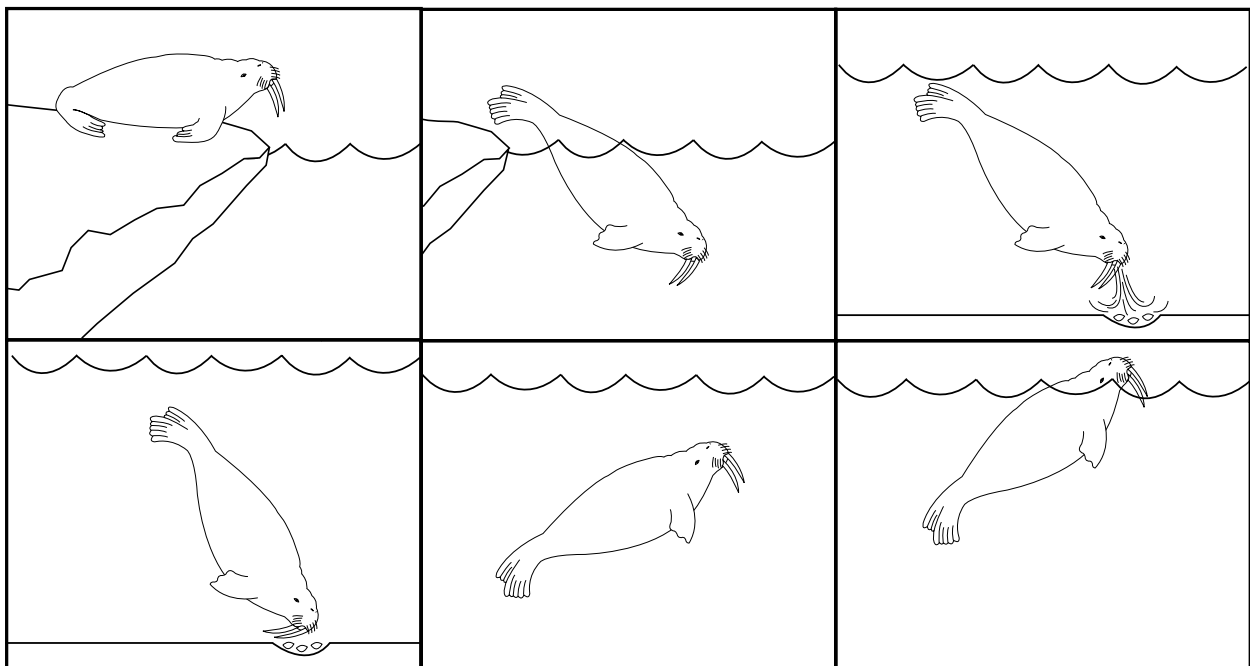
per student:

- cut apart photocopies of the cards below (enlarge 200%)
- sheet of blank paper
- glue sticks



ACTION

1. Ask students what they think a walrus eats. Write answers on board or have students stand and recite their answers. Have class decide which are true and which are false. (*Pinniped Picks* on page 6 lists all prey, but walruses eat mostly clams.)
2. Ask students how they think walruses eat clams. Where do clams live? Are clams hard or soft? Do walruses have teeth? How do they find clams?
3. Distribute the card series to students or student groups. Have students decide the feeding sequence and place the cards in order.
4. After all students have ordered the cards, turn the class into "walruses" and role play the feeding sequence. After role play, ask students to glue cards onto paper and color.



One For You, Two For Me

OBJECTIVE

The students will be introduced to a *food chain*. Given objects to count and information on how much pinnipeds eat, students will be able to count and graphically demonstrate how much four different pinnipeds eat.

MATERIALS

per student:

- enlarged photocopies of California sea lion, harbor seal, Pacific walrus, and northern elephant seal illustrations (pages 6 and 7)
- blank paper
- glue
- 80 or more small dried beans

BACKGROUND

The term *food chain* helps describe the interaction between animals and plants—specifically, who eats whom. Pinnipeds feed on a wide variety of prey items. Walruses suck the meat from thousands of hard-shelled clams. Hawaiian monk seals crunch on spiny lobsters. Depending on an animal's size and activity level, food consumption may range from 4% to 9% of body weight.



ACTION

1. Define a food chain. Discuss with your students why food chains are important. Give an example of a food chain for a seal, sea lion, and a walrus. (See prey items on *Pinniped Picks* cards, pages 6 and 7.) Discuss how these animals find and eat their food.

2. Discuss with your students how much food a seal, sea lion, and walrus eat in one day. These are estimates of what an average adult pinniped eats each day.

California sea lion	12 kg (26 lb.)
harbor seal	6 kg (13 lb.)
Pacific walrus	27 kg (60 lb.)
northern elephant seal	34 kg (75 lb.)

3. Distribute dried beans to students. Tell students each dried bean is one

fish that weighs 1 kilogram. (If you are using pounds, one bean equals a one-pound fish.) Students count out how much fish each animal would eat in one day.

4. Distribute paper and photocopies of pinnipeds. Have students glue illustrations to the paper, then glue the correct number of "fish" around each animal.

DEEPER DEPTHS

Have students count the "fish" for all four animals and glue them on a blue sheet of construction paper to represent an ocean full of fish.

The Name Game

OBJECTIVE

The students will be able to sound and recognize the letters that begin the names of animals and place the animals with the same letters into groups.

MATERIALS

per class or student group:

- enlarged photocopies of California sea lion, harbor seal, Pacific walrus, and northern elephant seal illustrations (*Pinniped Picks*, pages 6 and 7)
- scissors
- 26 milk cartons
- ocean and land animal pictures from magazines



ACTION

1. To prepare for this activity, cut out animals from magazines and photocopy the images from the *Pinniped Picks* cards.
2. Place all pictures on a table or distribute them to student learning groups.
3. Ask students to name the animals that they know. Introduce those animals new to students. Which animals live in the ocean? Which animals live on land? Can some of the animals live on land and in the ocean?
4. As a class or in student groups, sort the animals according to the first letter in each animal's name. Place like-letter animals in a milk carton and write the letter on the front. Arrange the cartons alphabetically. There will probably be some missing letters. Can the students name which ones?

DEEPER DEPTHS

Using the animals in the letter cartons, have students choose a favorite and tell a imaginary or real story about that animal. As an extra challenge, can a student create a story using all the animals in a letter carton?



The name walrus comes from the Danish word *hvalros*, meaning sea horse.

Pinnipeds Around The World

OBJECTIVE

The students will be able to locate the distribution of California sea lions and Pacific walruses.

MATERIALS

per student:

- enlarged photocopy of map on page 17
- colored pencils

per class:

- globe

BACKGROUND

Pinniped populations can be found worldwide from the cold waters of the Arctic and Antarctic to the warm tropical waters of Hawaii. Populations usually concentrate around areas of high productivity, those areas of the ocean that support large numbers of fishes and squid (important prey items of most pinnipeds). Pinnipeds also favor coastlines that offer places to haul out, or come ashore. Some pinnipeds, like California sea lions, can be found on rocky shorelines. Others, like harbor seals, frequent sandy beaches.



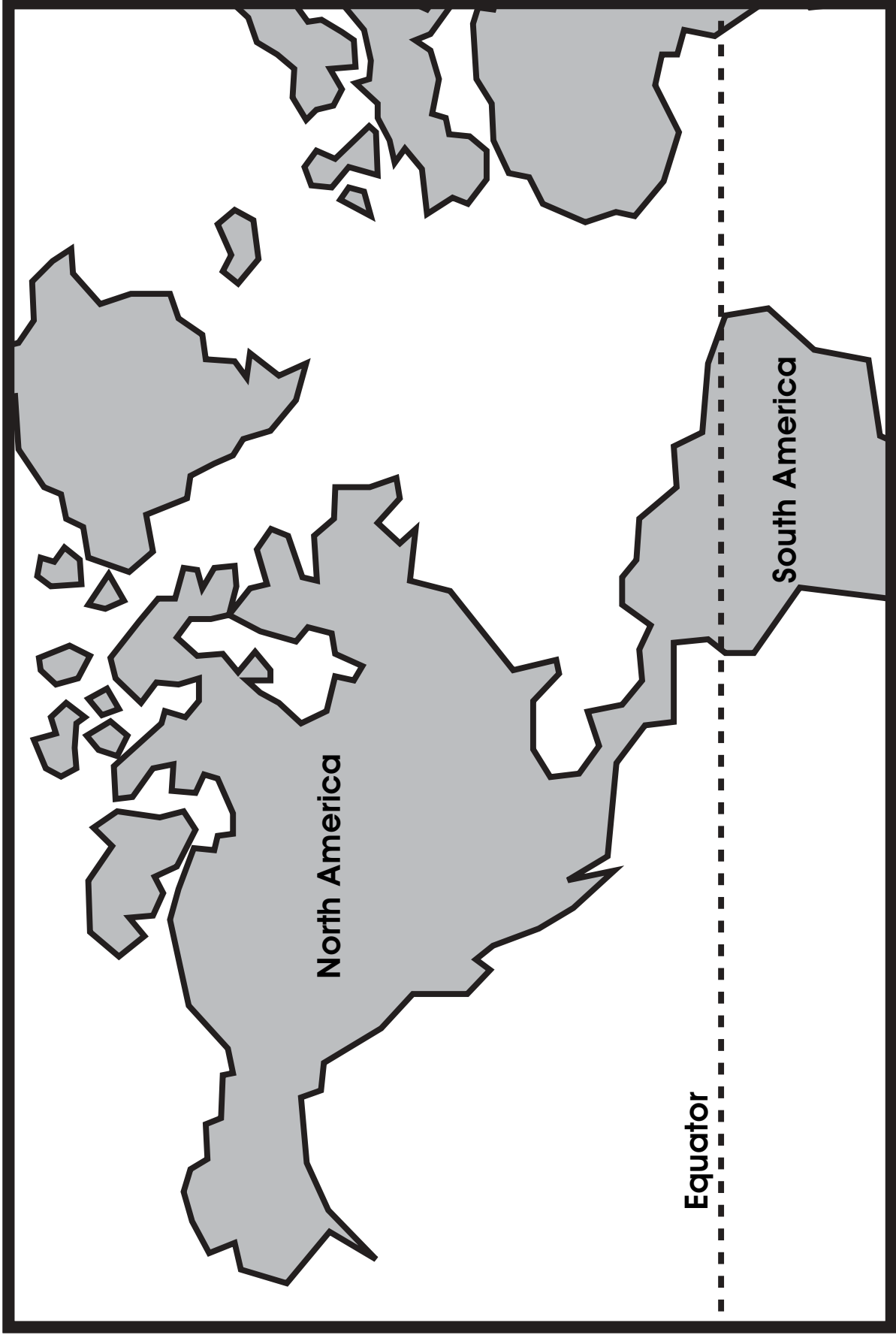
ACTION

1. Show the world globe to students. Ask for volunteers to come up and find the Pacific Ocean, Atlantic Ocean, United States, Canada, Alaska, California, North Pole, and the Equator.
2. Distribute copies of world maps. Ask students to find the same locations identified on the globe. Students can mark locations by writing names or by colors (for example, Pacific, dark blue; Atlantic, light blue; United States, orange; California, green; Canada, yellow; Alaska, purple; North Pole, pink; and Equator, black).
3. Ask students where they think California sea lions live. Mark the distribution on the map.
4. Ask students where they think Pacific walruses live. Mark the distribution on the map.
5. Ask students where they live. Mark it on the map. Do they see California sea lions or Pacific walruses where they live?

DEEPER DEPTHS

Chart the distribution of some other pinnipeds. Use *Pinniped Picks* on pages 6 and 7 to begin. Students can choose one animal and present their results to class or work in student groups with two or three animals. Research more pinnipeds using library resources.

Pinnipeds Around The World



Growing Up Is Hard To Do

OBJECTIVE

Acting as a sea lion pup, the student will be able to discover some of the survival challenges these young animals face.

BACKGROUND

The first years of an animal's life are often the most difficult. Only 40% to 60% of California sea lion pups survive their first year. Weather, ocean currents, disease, and food availability can change the number of predators or prey.

MATERIALS

per student group:

- copy of *Challenge Cards*, page 19
- one jump rope
- 10 or more poker chips
- one empty half-gallon milk carton
- two or more yard or meter sticks

per class:

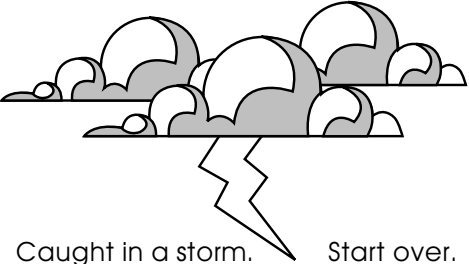
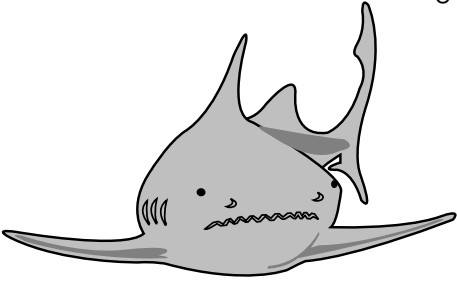
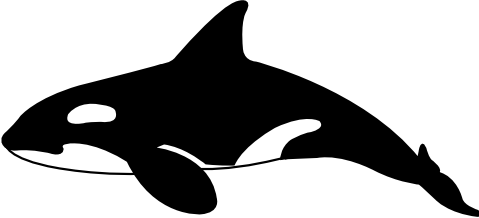
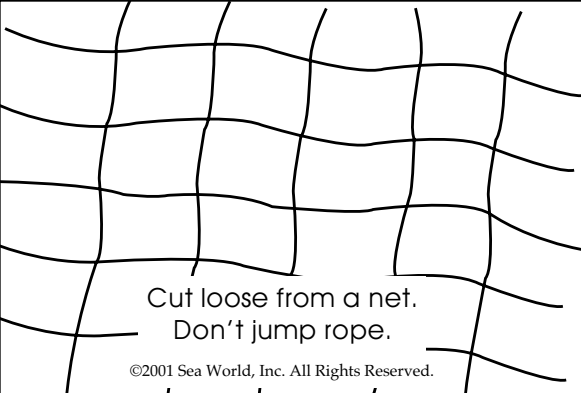
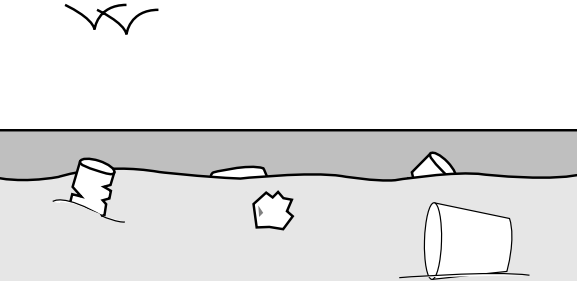
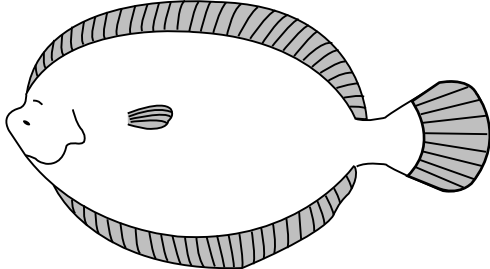
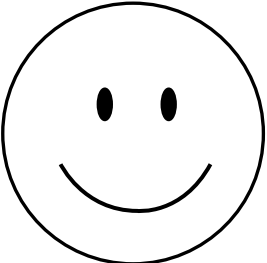
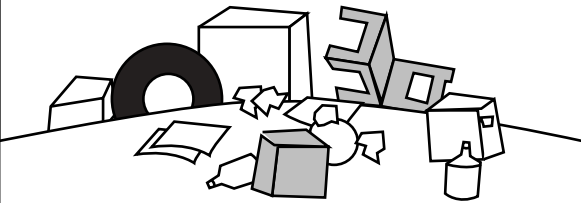
- large playing area



ACTION

1. Before you begin, set up the playing lanes by arranging the game elements in the following order: start/finish line, challenge cards, jump rope, milk carton and poker chips, yardsticks, and a turn-around place. Place the yardsticks about 2 ft. apart. Each lane represents an area where sea lions are found and the challenges a sea lion might face in its first few years.
 - follow the instructions.
 - Jump rope four times or more (avoiding predators).
 - Place poker chip between the knees and drop into milk carton (eating is not easy).
 - Jump onto land by jumping over the yardsticks (haul out to rest).
 - Return (jumping into the ocean again and returning to start without doing the other challenges).
2. Introduce the game by asking students what they think a sea lion pup's life is like. Discuss how young sea lions often don't survive the first few years. Discuss some dangers a sea lion pup might encounter. Ask students for an estimate: Out of every 10 pups, how many survive the first year?
3. Divide the class into student groups, making each group a team. Show them the challenge course. To "survive" each student must:
 - Pick up one *Challenge Card* and
4. Begin play with teams lined up behind the starting line of each playing lane. Team members play one at a time and tag the next team member to begin. Students are "out" if they miss the jump rope, miss the milk carton, can't jump over the yardsticks, or if a *Challenge Card* says so.
5. At the conclusion, count how many pups "survived" their first year. Take that number, divide it by the total number of players, and multiply by 100. This gives you the percentage of sea lions that survived. How well did you do?

Challenge Cards

 <p>Caught in a storm. Start over.</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>	<p>A shark is chasing you. Walk backwards to the next challenge.</p>  <p>©2001 Sea World, Inc. All Rights Reserved.</p>
 <p>You become a snack for a killer whale. You are out.</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>	 <p>Cut loose from a net. Don't jump rope.</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>
 <p>Yea! A beach clean-up. Skip a turn and rest.</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>	 <p>Ate an extra large lunch. Skip food challenge</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>
 <p>No extra challenges today.</p> <p>©2001 Sea World, Inc. All Rights Reserved.</p>	<p>Caught in trash. Hop on one foot to next challenge.</p>  <p>©2001 Sea World, Inc. All Rights Reserved.</p>

Flipped Friends

OBJECTIVE

The student will be able to name and describe seven sea lion adaptations.

BACKGROUND

Adaptations are body parts of an animal that make it more suited to live in its environment. Adaptations include the ways an animal moves, eats, hears, or smells, increasing its chances for survival.

MATERIALS

per student dress-up:

- swim fins
- toy plastic teeth
- costume parts made from page 22 (You can substitute a down vest, coat, hat, and two oven mittens for these body parts.)



ACTION

1. Prepare for the dress-up by gathering or making the necessary parts. See page 22 for more details.)
2. Begin the dress-up by choosing and introducing a student volunteer. Throughout the activity, ask the class to compare and contrast human behaviors and adaptations with those of a sea lion.

HIND FLIPPERS. Point to the student's feet. Talk about behaviors humans do that require feet (playing soccer, dancing, riding a bike, running, etc.). Ask the class if sea lions do these behaviors. Have students name sea lion behaviors. What adaptations do sea lions need? Sea lions use hind limbs for steering through the water as they swim and for walking on land. Sea lions have hind flippers instead of feet. (*Put swim fins on student's feet.*)

FRONT FLIPPERS. Point out the student's arms and hands. (*Put front flippers on.*) Role-play how sea lions move their front (pectoral) flippers in an up-and-down motion to swim. Point out that California sea lions do not have fur on their front flippers.

BLUBBER. Explain that warm-blooded mammals, like humans, lose body heat quickly in cold water. What adaptation do sea lions have that helps them stay warm? Sea lions are insulated with a thick layer of blubber. (*Put on blubber layer.*) Blubber also helps to streamline a sea lion's body, and can be used as a reserve energy source when food is scarce.

FUR. Ask the class to name what sea lions have covering their bodies that hides their blubber. Tell the class that a sea lion's fur is very sleek and smooth. (*Put on the coat for fur. Also put fur hat on the student's head.*)

EARS. Show the class that sea lions have ear flaps that stick out from the sides of their heads—seals don't. This is one way we can tell the difference between seals and sea lions.

WHISKERS. Is it light or dark in the ocean? What do sea lions use to explore their surroundings and find food in the dark and murky water? They have sensitive whiskers, similar to a cat's whiskers. (*Put on whiskers.*)

TEETH. What do people use to eat food? Are our teeth flat or pointed? Do we chew our food or swallow it whole? What do sea lions use to catch food? A sea lion uses its pointed teeth to catch its food, then swallows it whole. (*Put toy plastic teeth in student's mouth.*)



Turn a student into a sea lion using different items for body parts and explain sea lion adaptations.

3. Now you have created a sea lion! Review sea lion adaptations as you take body parts off.

- Pointed teeth to capture prey.
- Whiskers to explore surroundings and detect prey.
- Fur as a body covering.
- Blubber for insulation, streamlining, and a reserve energy source.
- Pectoral flippers for swimming and walking on land.
- Hind flippers for steering in the water and walking on land.

DEEPER DEPTHS

Discuss how humans adapt themselves to live, work, or play in various environments. For example, bring in a wetsuit and scuba or snorkeling gear to discuss how we can adapt ourselves for a sea lion's environment. Or bring in snow suits, mittens, hats, and boots, and discuss how humans adapt themselves to survive in a cold environment like that of a polar bear, walrus, or penguin.

Have students research what astronauts must wear in order to survive outside the earth's atmosphere (bringing our environment with us).

Directions For Making Your Flipped Friends

OBJECTIVE

Students, with parental help, will be able to create a sea lion costume.



MATERIALS

fabric:

- white quilted fabric: 1- 2/3 yd. (45 inch wide) or 1 yd. (60 inch wide)
- brown plush fur: 2 yd. (45 inch wide) or 1-1/2 yd. (60 inch wide)
- brown vinyl: 3/4 yd. (45 inch wide)

notions:

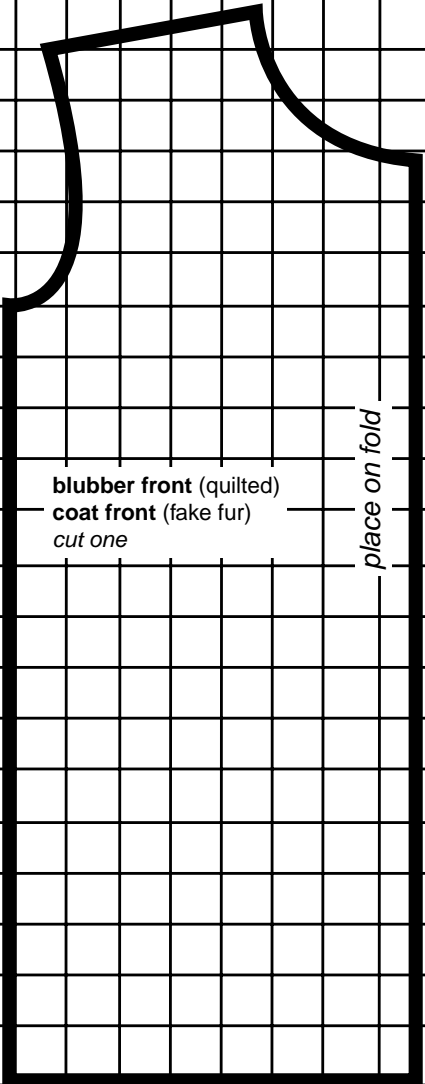
- brown thread
- 3/4 yd. of 1-inch black hook and loop tape
- 1 yd. ribbon
- six 6-inch white or black pipe cleaners
- 12 inches of 1-inch wide elastic
- pins
- scissors
- seam marking materials

pattern:

- enlarge pattern on page 23 onto pattern drafting paper

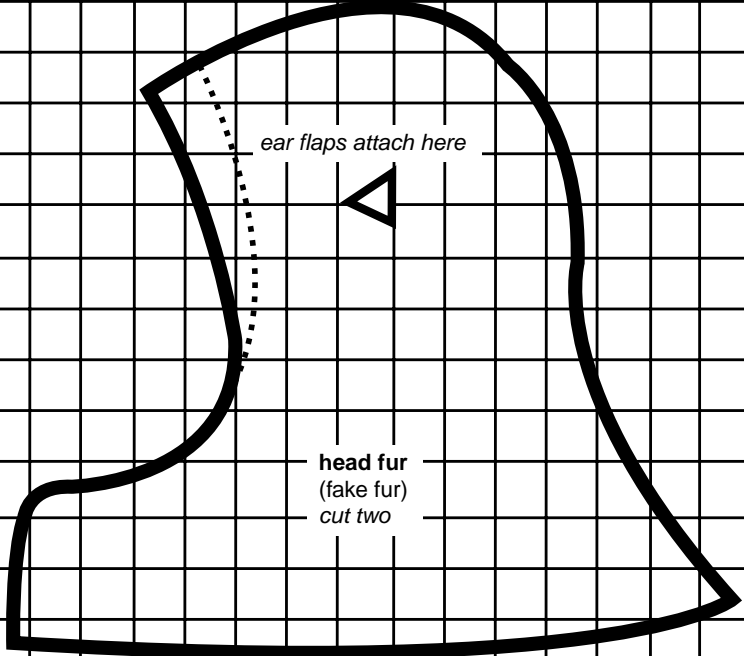
ACTION

1. Enlarge the pattern on page 23 onto drafting paper and cut the pieces. Cut the blubber from the quilted fabric, the coat and head fur from the plush, and the pectoral flippers from the vinyl material. Cut four 2-inch triangles for ear flaps from the vinyl scraps. Mark all seams at 5/8 inch.
2. **BLUBBER.** Sew shoulder seams first. Fold the neck and armholes under and stitch. Sew the side seams. Turn under the back edges and the bottom and stitch. Sew pieces of ribbon on the back for ties.
3. **COAT.** Repeat steps for sewing blubber. Use a hook or pin to pull fur fibers from seams to hide lines.
4. **HEAD FUR.** Sew the back seam. Turn the top edge under and stitch. Sew two vinyl triangles together (right sides out). Sew to outside of head piece as shown on pattern.
5. **FLIPPERS.** Sew seams and trim and clip edges. Turn flippers right side out. Join the two flippers with elastic at the top front edges. (The elastic stretches across the student's chest.) Sew ribbon on the top back edges for ties OR join the two flippers with elastic at the top front edges and with another elastic strip at the top back edges. The flippers will then slip over the student's head.
6. **WHISKERS.** Cut a 12-inch hook and loop tape. Pull the two sides apart and sew opposite ends together so one side faces up and the other faces down (the sides will reattach behind the student's head). Sew the middle of the pipe cleaners to the middle seam of the hook and loop tape.



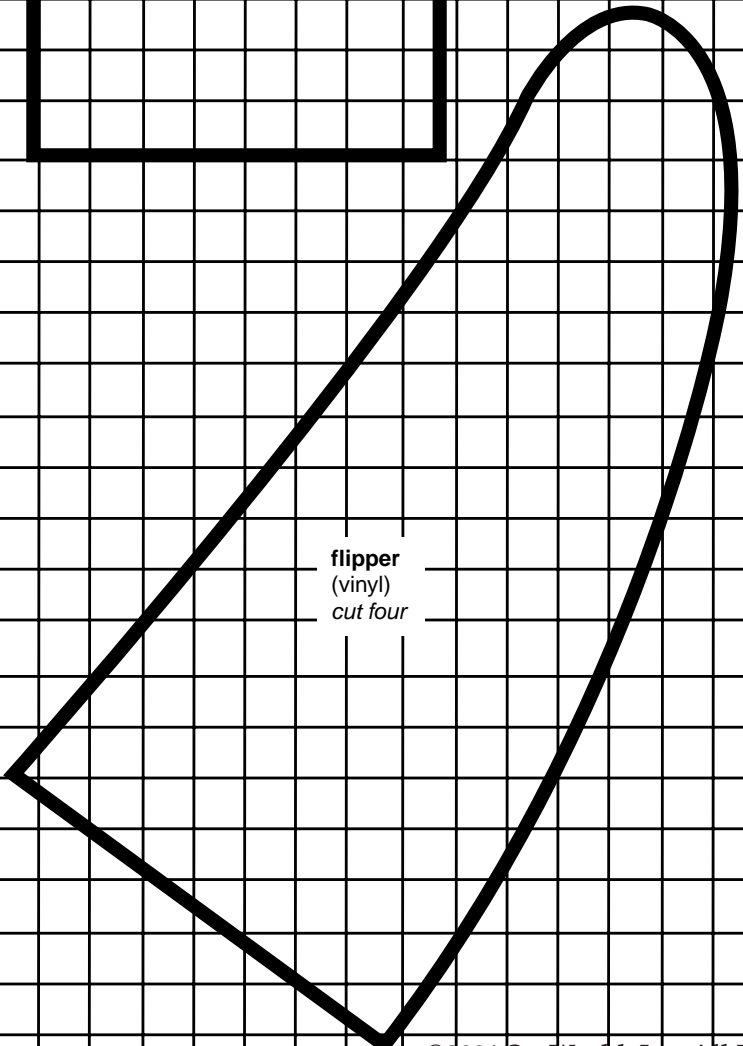
blubber front (quilted)
coat front (fake fur)
cut one

place on fold

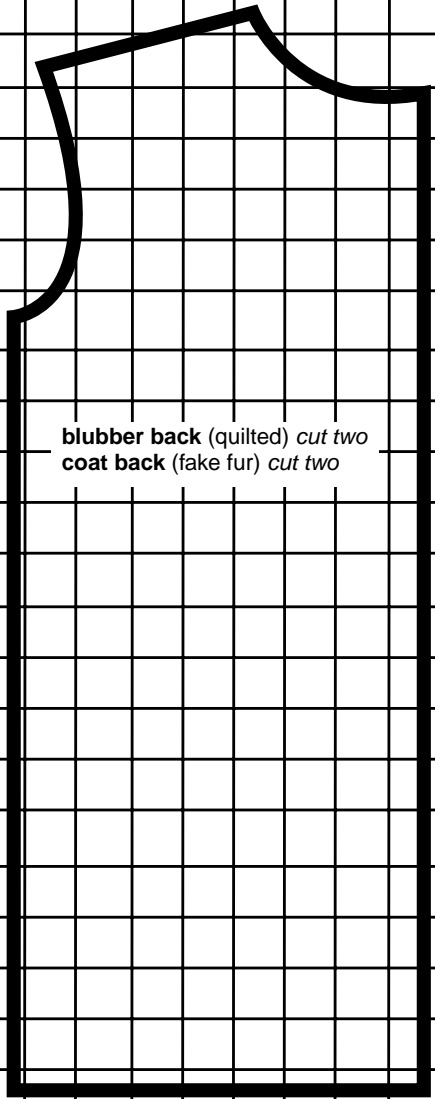


ear flaps attach here

head fur
(fake fur)
cut two



flipper
(vinyl)
cut four



blubber back (quilted) *cut two*
coat back (fake fur) *cut two*

1 square = 1.5 inches

Bibliography

- Bonner, W. Nigel. *Seals and Sea Lions of the World*. New York: Facts On File Publications, 1994.
- Byrum, Jody. *Pinnipeds from Pole to Pole. Seals, Sea Lions, and Walruses*. San Diego: SeaWorld Education Department, 2000.
- DeLong Robert L. and Brent S. Stewart. "Diving Patterns of Northern Elephant Seal Bulls." *Marine Mammal Science*. 7(4), 1991, pp 369-384.
- Gordon, David George. *Seals and Sea Lions*. Monterey, California: Monterey Bay Aquarium, 1994.
- Harrison, R.J., Richard C. Hubbard, Richard S. Peterson, Charles E. Rice, and Ronald J. Schustermann, eds. *The Behavior and Physiology of Pinnipeds*. New York, Meredith Corp., 1968.
- King, Judith. *Seals of the World*. Second edition. New York: Comstock Publishing, 1983.
- Parham, Donna. *To the Rescue. The SeaWorld/Busch Gardens Animal Rescue and Rehabilitation Program*. San Diego: SeaWorld Education Department, 2001.*
- Reeves, Randall R., Brent S. Stewart, and Stephen Leatherwood. *The Sierra Club Handbook of Seals and Sirenians*. San Francisco: Sierra Club Books, 1992.
- Reidman, Marianne. *The Pinnipeds: Seals, Sea Lions, and Walruses*. Berkeley: University of California Press, 1990.
- Renouf, Deane, ed. *Behavior of Pinnipeds*. London: Chapman and Hall, 1991.
- Ridgway, Sam H. and Richard J. Harrison F.R.S., eds. *Handbook of Marine Mammals. Volume 1: The Walrus, Sea Lions, Fur Seals, and Sea Otter and Volume 2: Seals*. San Diego: Academic Press, 1981.

Shamu TV® on Video*

Rescue at Sea: A Pinniped Challenge, 1999.

Books for Young Readers

- Arnold, Caroline. *Sea Lion*. New York: Morrow, 1994.
- Baker, Lucy. *Seals*. New York: Puffin Books, 1990.
- Debbie's favorite book *Flip Flop the Walrus* to come
- Brown, Joseph E. *Wonders of Seals and Sea Lions*. New York: Dodd, Mead & Co., 1976.
- Leon, Vicki and Frank Baltis. *Seals and Sea Lions*. San Luis Obispo, California: Central Coast Books, 1999.
- Patent, Dorothy Hinshaw. *Seals, Sea Lions, and Walruses*. New York: Holiday House, 1990.
- Resnick, Jane. *All About Seals, Sea Lions, and Walruses*. Bridgeport, Connecticut: Third Story Books, 1994.
- Sler, Joëlle. *The Seal*. Watertown, Massachusetts: Charlesbridge Publishing, 1992.
- Wexo, John Bonnett. *Zoobooks. Seals & Sea Lions*. San Diego: Wildlife Education, Ltd., 1992.

*These books and videos available through SeaWorld San Diego. Call 1-800-380-3202 for order information.