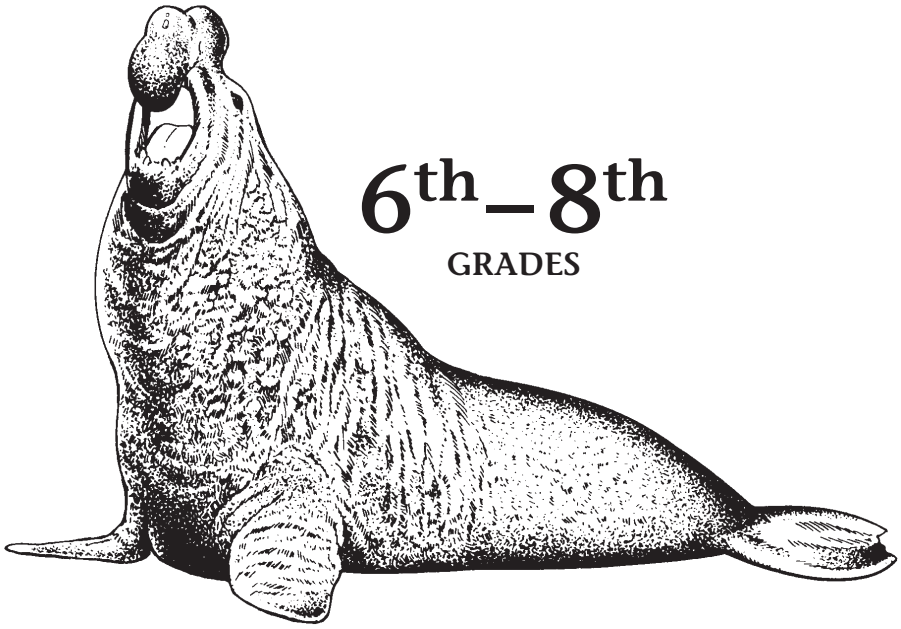
Creating
Coastal Stewardship
through Science

Discovering Northern Elephant Seals

at Point Reyes National Seashore

2001 First Edition



6th–8th GRADES

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National Park Service, Department of the Interior

EXXON

National Park Foundation

Point Reyes National Seashore Association

Publishing Information

This curriculum guide was funded with grants through the National Park Foundation.

The listing of a resource in this curriculum does not presume its endorsement by the National Park Service.

This guide may be obtained by participating in a teacher workshop at Point Reyes National Seashore or through a teacher in-service training at your school.

Teachers are encouraged to offer their feedback by filling out the enclosed evaluation form or contacting Point Reyes National Seashore directly.


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Preface

The intent of these guides is to provide middle school students with the opportunity to observe natural processes at Point Reyes National Seashore so they might take a greater interest in environmental stewardship and science. Teachers from fifteen area schools developed and field-tested seven "Creating Coastal Stewardship through Science" guides for classroom and field trip use. Each guide is carefully designed to facilitate a hands-on learning experience using science and the environment. Natural resources such as Pacific gray whales, northern elephant seals, tule elk, California quail, Douglas iris, and the San Andreas Fault are highlighted because they are easy to identify and to observe. All activities are linked to the California State Science Standards (2000) and the National Science Standards.

You may use this guide alone or in conjunction with other guides. We highly recommend that whenever you use a guide, you use the pre-visit activities to fully prepare the students for the field trip. These activities address student safety, wildlife observation techniques, equipment use, field journal development, and concepts that need to be taught prior to the park visit. Use of the post-visit activities is also critical to the learning process because they guide the students in making scientific deductions and in developing their environmental stewardship ethics.

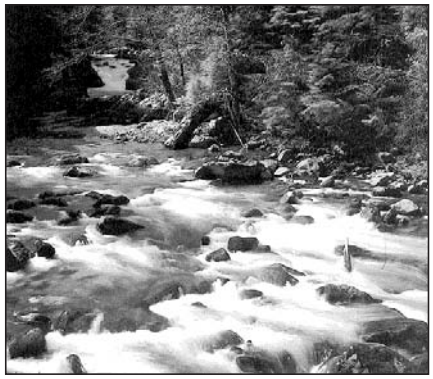
Following this preface, you will find background information on the National Park Service and an overview of Point Reyes National Seashore. To provide your students with a better understanding of the place that they will be visiting, we recommend that you share this information with them. For an in-depth overview of the National Park Service, visit our website at ***www.nps.gov***.

Point Reyes National Seashore provides outstanding opportunities for learning about natural and cultural resources. There are also exceptional educational opportunities provided by Park partners such as the Point Reyes Bird Observatory, Audubon Canyon Ranch, and Point Reyes National Seashore Association. To learn more about the Park and our partners, visit our website at ***www.nps.gov/pore***.

The National Park Service

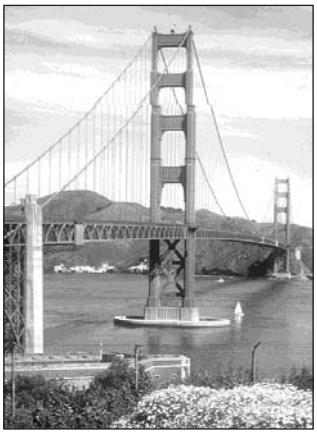
The National Park Service cares for special places saved by the American people so that all may experience our heritage.

Experience Your America

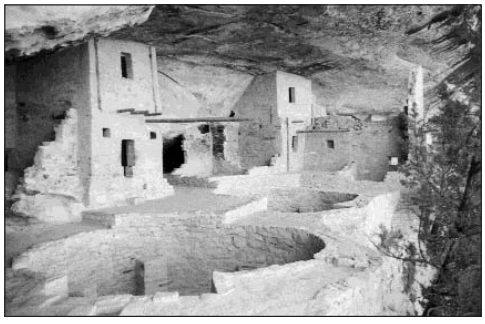

Olympic National Park

On August 25, 1916, President Woodrow Wilson signed the act creating the National Park Service, a new federal bureau in the Department of the Interior responsible for protecting the 40 national parks and monuments then in existence and those yet to be established.

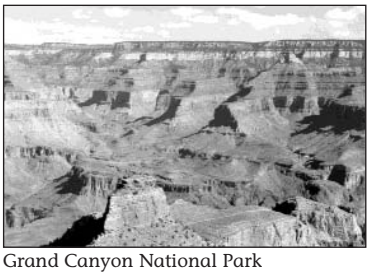
This "Organic Act" of 1916 states that "the Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."


Golden Gate National Recreation Area

The National Park Service still strives to meet these original goals, while filling many other roles as well: guardian of our diverse cultural and recreational resources; environmental advocate; world leader in the parks and preservation community; and pioneer in the drive to protect America's open space.


Mesa Verde National Park

The National Park System of the United States comprises over 379 areas covering more than 83 million acres in 49 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. Although not all parks are as well known as the Grand Canyon and Yellowstone, all are areas of such national significance that they have been included in the National Park Service—ancient ruins, battlefields, birthplaces, memorials, recreation areas, and countless other wonders. Point Reyes National Seashore is one of ten national seashores.

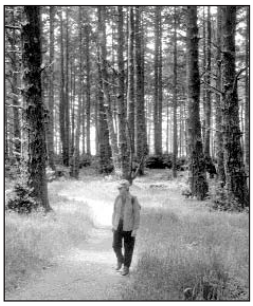

Grand Canyon National Park

The future of the National Park System lies in understanding and protecting its meanings, values, and resources. Each part of the system represents the United States and a part of our heritage. Preservation of individual sites and the entire system will ensure the essence of quality remains in our lives and the lives of all future generations.

Point Reyes National Seashore


Bruce Farnsworth

Point Reyes National Seashore was established to preserve and protect the natural and cultural features and natural ecosystems along the diminishing undeveloped coastline of the western United States. Located just an hour's drive from a densely populated metropolitan area, the Seashore is a sanctuary for countless plant and animal species. With half of Point Reyes National Seashore designated as wilderness, it provides a sanctuary for the human spirit—for discovery, inspiration, solitude, and recreation—and a reminder of the human connection to the land.

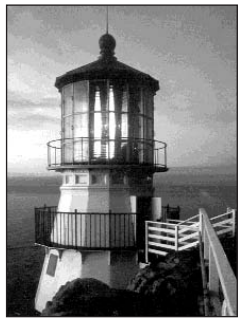

Sue Van Der Wahl

Point Reyes National Seashore comprises over 71,000 acres, including 32,000 acres of wilderness area. Estuaries, windswept beaches, coastal scrub, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline located just an hour's drive from an urban area populated by seven million people. Abundant recreational opportunities include 140 miles of hiking trails, backcountry campgrounds, and numerous beaches.

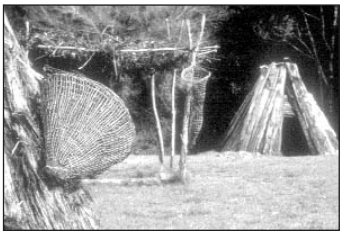
The San Andreas Fault separates the Point Reyes Peninsula from the rest of the North American continent. Granite bedrock found here and not found again until the Sierra Nevada range suggests the peninsula is geologically dynamic. According to geologists, the land that is now called Point Reyes has moved some 300 miles northwest over a period of 100 million years and is still moving.


Rich Stallcup

As wildland habitat is developed elsewhere in California, the relevance of Point Reyes as a protected area with a notably rich biological diversity increases. Over 45% of North American avian species and nearly 18% of California's plant species are found here. Point Reyes also contains some examples of the world's major ecosystem types. For this reason, and because Point Reyes is dedicated to the conservation of nature and scientific research, it was recognized in 1988 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere program and named as part of the Central California Coast Biosphere Reserve.


Bruce Farnsworth

The cultural history of Point Reyes spans many lives and ways of living with the land. The Coast Miwok people are the first known residents of this peninsula. Archeologists have identified over 100 village sites in the Seashore and cultural traditions are still celebrated in the Park annually. Overlapping the Coast Miwok were Mexican land grantees, lighthouse keepers, and lifesaving station crews. To this day, agricultural operations that were built near the turn of the twentieth century continue within the Seashore's pastoral zone.


NPS Collection

Educational Opportunities at

Point Reyes National Seashore

Point Reyes National Seashore provides an outdoor classroom and learning laboratory for the study of geological and ecological processes and changing land-use values in which a greater understanding of and caring for public lands can be fostered.

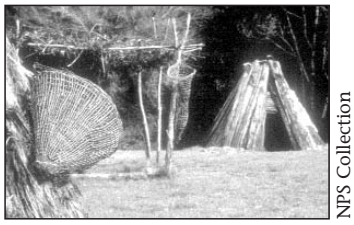
Ranger-led Curriculum-based Education Programs

Reservations for Ranger-led programs are requested in writing and assigned on a first-come, first-served basis. Visit ***www.nps.gov/pore*** for the reservation form and calendar.


NPS Collection

K-2 Students explore the natural resources of the Seashore with Park Rangers in the Bear Valley area or in their classroom.

3-4 Students immerse themselves in the Coast Miwok culture by completing a comprehensive curriculum and visiting the Coast Miwok cultural exhibit, Kule Loklo.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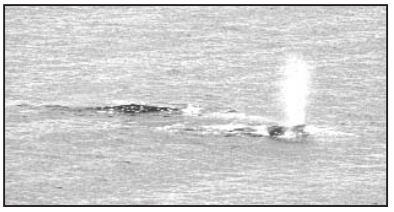
NPS Collection

4 Students revisit the days of early lighthouse keepers while operating the original Point Reyes Lighthouse clockwork with Park Rangers.


NPS Collection

5 Students study the oceanic influences on the Point Reyes Peninsula by completing a classroom curriculum and viewing gray whales and elephant seals with Park Rangers.

6-8 Students participate in Ranger-led stewardship activities such as habitat restoration, water quality monitoring, and beach cleanups.

Ranger-led Training Programs


NPS Collection

9-12 Students become DOCENTS to assist middle school teachers with classroom teaching and use of scientific research tools on Seashore field trips (service learning credits earned).

Students become RESEARCH ASSISTANTS at the Pacific Coast Learning Center by participating in the inventorying and monitoring of Seashore resources.


NPS Collection

Teachers Teacher workshops are offered throughout the year for existing Park curricula and for field trip planning. Visit the Seashore's website at ***www.nps.gov/pore*** for a calendar of workshops.

Classroom and Field Trip Curriculum

Based on the National and State Science and Social Science Standards

3-4 

Teacher packets are available for field trips to the recreated Coast Miwok village, Kule Loklo, located near the Bear Valley Visitor Center.

The "Creating Coastal Stewardship through Science" middle school curricula are available to teachers who attend a one-day workshop at Point Reyes or a teacher in-service training.

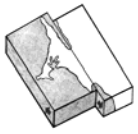
6-8 

Completion of the ***Identifying Resident Birds*** Curriculum, as a companion to a birdwatching field trip, will enable students to observe and identify different bird species, their habitats and their behaviors. A visit to Point Reyes Bird Observatory will also enable students to observe bird banding and netting and to understand the most common threats to bird survival.

Completion of the ***Monitoring Creek Health*** Curriculum, as a companion to a Ranger-led creek program, will enable students to observe and understand the complexity and sensitivity of creek habitats and their role in protecting them.

Completion of the ***Discovering Northern Elephant Seals*** Curriculum, as a companion to an elephant seal viewing field trip, will enable students to observe and understand the amazing adaptations and behaviors of Northern elephant seals.

Completion of the ***Defining Habitats*** Curriculum, as a companion to a Park field trip, will enable students to observe and understand the complex land and ocean habitats of the Point Reyes Peninsula and their roles in habitat protection.



Completion of the ***Uncovering the San Andreas Fault*** Curriculum, as a companion to a geology field trip, will enable students to observe and understand the existence of the San Andreas Fault and the implications that it has for area residents.

Completion of the ***Investigating Tule Elk*** Curriculum, as a companion to an elk viewing field trip, will enable students to observe and understand their behaviors and the issues that surround their management.

Completion of the ***Observing Pacific Gray Whales*** Curriculum, as a companion to a whale watching field trip, will enable students to observe and understand gray whale adaptions and behaviors, and the factors that influence their survival.

Educational Facilities

The **Historic Lifeboat Station** is available to educational groups for overnight use. Nightly fees are charged. Group size must be under 25 (including chaperones). Reservations are made on a first-come, first-served basis by completing the boathouse form on our website at ***www.nps.gov/pore***.

The **Clem Miller Environmental Education Center** is an overnight facility available by lottery to school groups visiting for multiple-night stays September through May. The facility is used for summer camps during the summer months. Fees are charged. For information, contact Point Reyes National Seashore Association at (415) 663-1200, website ***www.ptreyes.org***.

The **Pacific Coast Learning Center** is a day-use facility located on Highway 1. This facility is used by researchers and students to study the natural and cultural resources of the Seashore.

The **Bear Valley Visitor Center** is a day-use facility open to school groups Monday through Friday from 9 A.M. to 5 P.M. Exhibits on natural and cultural resources are found here. Books, brochures, and other educational materials are available.

The **Ken Patrick Visitor Center** is located on Drakes Beach, approximately 30 minutes from the Bear Valley Visitor Center. This facility is open year-round on weekends and holidays from 10 A.M. until 5 P.M. Ranger-led elephant seal programs meet at this Visitor Center. Exhibits and a 150-gallon saltwater tank are located here. Books, brochures, and other educational materials are available.

The **Lighthouse Visitor Center** is located on the outermost tip of the Peninsula, approximately 45 minutes from the Bear Valley Visitor Center. This facility is open Thursday through Monday from 10 A.M. until 4:30 P.M. (closed Tuesdays and Wednesdays). Ranger-led whale programs and lighthouse tours meet at this Visitor Center. Exhibits on maritime history and whale biology are located here. Books, brochures, and other educational materials are available.

The **Lighthouse** is located below the Lighthouse Visitor Center at the bottom of a 308-step staircase. The lens room is usually open from 2:30 P.M. until 4 P.M. Thursday through Monday or as weather and staffing permit. High winds always close the lens room. Space in the lens room is limited so reservations are required for groups. Call (415) 663-1534 to confirm existing weather conditions.

Group Camping/Overnight Opportunities

* This listing is provided for your convenience and does not constitute a recommendation or endorsement of any of these facilities.

All overnight camping in **Point Reyes National Seashore** requires a permit and advance reservations. Group sites are very limited and in high demand. Sky, Coast, and Wildcat Camps are all backcountry campgrounds that require hiking to access them. A fee is charged. For more information, visit the Seashore's website at ***www.nps.gov/pore.***

The **Point Reyes Hostel** offers a domitory-style group cabin with a fully equipped kitchen and showers. For additional information and reservations, call (415) 663-8811 during office hours 7:30 to 9:30 A.M. and 4:30 to 9:30 P.M.

Samuel P. Taylor State Park, located 6 miles east of the Seashore on Sir Francis Drake Boulevard, offers campsites for groups. A fee is charged. Reservations are highly recommended. For more information, visit the reservations website at ***www.reserveamerica.com.***

Olema Ranch Campground is located half a mile from Seashore headquarters on Highway 1. It is privately owned. Several large group sites are available. Fees are charged. For more information, call (415) 663-8001.

The **Marconi Center** is located 8 miles north of Seashore headquarters on Highway 1. This facility is operated by California State Parks. Lodging, conference rooms, and catered meals are provided for a fee. For more information, call 1 (800) 970-6644 or visit the website at ***www.marconiconfctr.org.***

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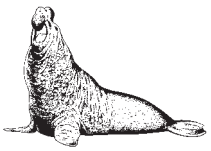

Discovering Northern Elephant Seals

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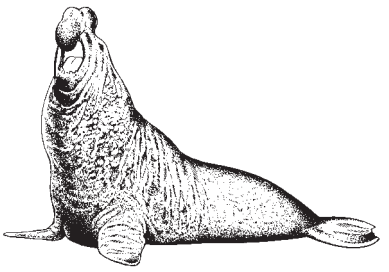
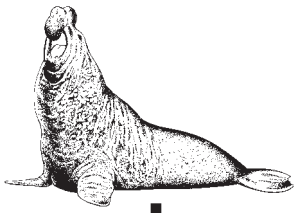


Discovering Northern Elephant Seals

Teacher Preparation

Attachments:

Discovering Northern Elephant Seals



Point Reyes National Seashore is one of the best places in California to see northern elephant seals as they come ashore for breeding and molting. As you watch their behavior, remind yourself that we almost lost this opportunity forever. By 1910, fewer than 1,000 northern elephant seals were believed to be alive. When you observe the elephant seal colonies on the beach, remember they are here because we made decisions to change our lives and our relationship to the planet.

Completion of this unit, as a companion to your park field trip, will enable your students to observe and understand the amazing features and behaviors of northern elephant seals.

Considerations

When: January through March

Where: Elephant Seal Overlook and Historic Lifeboat Station in the Chimney Rock area. Due to the narrowness of the road, school buses cannot access the overlook; cars or vans must be used.

How: This unit may be used independently of all other units. If you want to use an additional unit during your visit, we suggest that you consider the "Observing Pacific Gray Whales" unit. Whales are usually visible January through April from the Point Reyes Headlands.

Weather: The chart below lists average climate expectations based on previous years' data. The weather is subject to change quickly and can vary dramatically from different locations within the Seashore on the same day.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature (Fahrenheit)												
Normal Daily Maximum	53	55	55	57	60	62	64	64	65	62	58	54
Normal Daily Minimum	41	42	42	43	47	50	51	52	51	48	45	42
Extreme High	78	85	80	92	94	99	96	96	103	96	81	79
Extreme Low	21	26	29	32	32	39	39	42	39	32	29	18
Precipitation (inches)												
Normal	12.0	9.0	8.0	4.0	3.0	1.0	0.3	0.8	2.0	4.0	9.0	12.0
Maximum	20.0	16.0	15.0	11.5	8.0	4.0	2.5	6.0	7.0	13.0	18.0	19.0

Grade Level: This unit was designed for middle school students (6th–8th grade), but it has been field tested for fifth grades as well. Most lessons can be easily adapted to accommodate the needs of your particular grade.

Seasonal Events: Consult the chart below to assess which months may be best for a class visit to Point Reyes National Seashore.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Gray Whale Migration	✔		✔	✔								
Elephant Seal Breeding	✔	✔	✔									
Bird Migration			✔	✔	✔				✔	✔	✔	✔
Coho Spawning	✔											✔
Steelhead Trout Spawning		✔										✔
Tule Elk Rut Season							✔	✔	✔			
Peak Flower Blooms			✔	✔	✔							
Tidepooling	✔	✔	✔									
Geology	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Ocean and Land Habitats	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Resident Birds	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

Chaperone Preparedness and Assistance

The success of your field trip will depend on your ability to actively prepare and involve your parent chaperones in the field trip activities. Without adult guidance, many of the students will not complete their field journals. It is essential that your field trip have as much structure as your classroom lessons. To accomplish this, we recommend that you assign each of your parents to a small group of students with the field observations and with the journal questions. Provide each chaperone with their own copy of the student journals and encourage them to complete it with the students.

Suggested Lesson Plan

PRE-VISIT		Time Needed: 8 hours
Activity #1	How Can I Learn about the Secret Lives of Elephant Seals? *Students use a newspaper and vocabulary list to complete questions and activities about elephant seals.*	2 hours
Activity #2	How Are Elephant Seals Adapted to Their Environment? *Using adaptation cards, students create posters identifyng elephant seal adaptations.*	2 hours
Activity #3	Who Is in the Elephant Seal Food Pyramid? *Students identify the components of the elephant seal's food pyramid and create their own version.*	2 hours
Activity #4	What Can We Expect on Our Field Trip to Observe Elephant Seals? *Students create field journals for use on their field visit to Point Reyes National Seashore.*	1 hour
Activity #5	Safety and Stewardship Challenge. *Proper behaviors around National Park resources are examined in a game format.*	1 hour
Activity #6	How Do I Use Binoculars? *Students practice using binoculars in the classroom and outside.*	varies
ON-SITE		Time Needed: 3 hours
Field Journal	How Can Teachers, Chaperones, and Students Make the Most of Their Field Trip? *Students observe elephant seals and complete their field journals while visiting Point Reyes National Seashore.*	3 hours
Optional	How Can We Inspire Others to Protect Elephant Seals and Their Habitat? *Students videotape elephant seals during their field trip, then create a presentation for others.*	time varies
Optional	How Can I Capture My Experience in a Story, Poem or a Drawing? *There are many ways to appreciate elephant seals; here are some suggestions to foster creativity.*	time varies
POST-VISIT		Time Needed: 5 hours
Activity #1	How Can We Learn from Our Field Journals? *Students compile data from their field journals to draw conclusions between what they have previously learned in class and what they experience in the field.*	2 hours
Activity #2	How Are Decisions Made for Elephant Seals? *Students research and role-play various interest groups involved in elephant seal management, then develop their own strategy.*	2 hours
Activity #3	What Happens at the Marine Mammal Center? *Students tour the Marine Mammal Center's rehabilitation hospital to view elephant seal and sea lion patients.*	1 hour (and travel time)
Activity #4	How Do I Choose and Complete the Best Stewardship Project? *Students develop action plans to complete a project that will benefit habitats and their environment.*	time varies

Field Trip Logistics

Students need:	*Teachers need:*	*Chaperones need:*
❒ rain gear	❒ rain gear	❒ rain gear
❒ warm, layered clothes	❒ warm, layered clothes	❒ warm, layered clothes
❒ gloves and hat	❒ gloves and hat	❒ gloves and hat
❒ sunscreen and sunglasses	❒ sunscreen and sunglasses	❒ sunscreen and sunglasses
❒ bag lunch with drink	❒ bag lunch with drink	❒ bag lunch with drink
❒ water	❒ water	❒ water
❒ waterproof boots or tennis shoes	❒ waterproof boots or tennis shoes	❒ waterproof boots or tennis shoes
❒ clipboard with field journal and pencil	❒ map with directions	❒ map with directions
❒ permission slip	❒ pencil sharpeners and extra pencils	
	❒ teacher backpack and field trip kits from Bear Valley Visitor Center	
	❒ first aid kit	
Optional:		
❒ small backpack	❒ small backpack	❒ small backpack
❒ binoculars	❒ binoculars	❒ binoculars
	❒ camcorder/camera	❒ camcorder/camera

Other Things to Remember:

- Elephant seals are at Point Reyes during the rainy and windy season. Kids need warm, waterproof clothing. Sunscreen is needed on sunny days.
- The Overlook Trail can be very muddy. Have the students wear closed-toe shoes.
- Ticks are abundant at the overlook area. Have everyone wear light-colored clothing and tuck their pant legs into their socks. Everyone will need to check themselves thoroughly for ticks before returning home. See attachments in this Teacher Preparation for more information.
- Binoculars and spotting scopes will assist the students in viewing the elephant seals. These may be checked out from the Bear Valley Visitor Center. If you plan to use this equipment, it is essential that you train the kids how to use binoculars before their visit. See the enclosed binocular activity.
- Travel time from Point Reyes Station to the elephant seal overlook is 1 hour. Most groups visit the Chimney Rock area between 10 a.m. and 1 p.m. If you plan to visit during this time, have students bring a bag lunch and something to sit on. Following lunch, have them check the entire area for trash.
- The overlook trail is not accessible to wheelchairs. To arrange wheelchair access to the boathouse viewing area, call the Bear Valley Visitor Center at (415) 464-5100 and request that the boathouse gate be unlocked for your field trip. Please do this at least three days before your trip.

Evaluation Process

We need your help! Since this guide was designed for your use, only your feedback will make it work. Following the teacher preparation is a preaddressed evaluation form. Please complete, fold in thirds, affix postage, and drop in the mailbox. In addition to the evaluation forms, we encourage other types of feedback. Please send any of the following items from your students:

1. Video-tape or photos of Park field trip
2. Completed student journals
3. A class portfolio illustrating lesson activities
4. Any completed stewardship activities, including posters or newsletters
5. Any completed classroom projects or photographs of projects
6. Other ways of illustrating student feedback

Please indicate if these items need to be returned. We will use them to create a project library, highlight classroom efforts on our website and in park publications, and to complete evaluations of student outcomes.

Send to: National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes, CA 94956

Reservations

To avoid conflicts with other groups and to be notified about any unusual closures, please call the Park to notify us about your field trip date and time. Call (415) 464-5139 or e-mail ***PORE_education@nps.gov***. You may also use the reservation form provided in this Teacher's Preparation unit.

Elephant Seal Kit Contents

Kits are available for checkout at the Bear Valley Visitor Center. Clem Miller Environmental Education Center users may check them out at the Ed Center. These are available on a first come, first served basis.

- ❏ 20 pairs of binoculars
- ❏ 1 spotting scope
- ❏ teacher backpack with field guides (birds, plants, flowers, marine mammals)

California Science Standard Links

	"Discovering Northern Elephant Seals" Unit										
	Pre-Visit						On-Site	Post-Visit			
	#1	#2	#3	#4	#5	#6	Field Journal	#1	#2	#3	#4
Sixth Grade											
1											
2											
3											
4											
5	a,b,-e	c,e	a,b	a,e			a,b,e	a,b,-e	b,e		
6											
7	b,c		d	b,h		b	b,f,h	d,e,-f,h			
Seventh Grade											
1											
2	a										
3	e						e		e		
4											
5	a,d	a,c,d									
6						b,d					
7	a,d		a,c	a		a	a,c	c			
Eighth Grade											
1											
2											
3											
4											
5											
6											
7											
8											
9	b			b			b	b			

Correlations to "A Child's Place in the Environment"

California's State Approved Environmental Education Curriculum

	"Discovering Northern Elephant Seals" Unit										
	PRE-VISIT						ON-SITE	POST-VISIT			
	#1	#2	#3	#4	#5	#6	Field Journal	#1	#2	#3	#4
A Child's Place in the Environment: Grade 6 Lessons											
What Are Some Components of an Ecosystem?	✔		✔					✔	✔		
What Role Does Diversity Play in an Ecosystem?	✔		✔						✔		
How Does the Sun's Energy Flow through an Ecosystem?											
What Interrelationships and Niches Can Be Identified in an Ecosystem?				✔	✔		✔		✔		
What Cycles Exist in an Ecosystem and How Do They Sustain an Ecosystem?	✔			✔							
What Examples of Ecological Principles Can Be Observed in an Ecosystem?	✔		✔	✔			✔	✔			
What Are the Components and Relationships of Human Communities and How Do They Compare to Ecosystems?									✔		
What Are Some Limiting Factors in Human Communities and in Ecosystems?							✔	✔	✔	✔	✔
How Do Energy Sources Used in Human Communities Compare to Those Used in Ecosystems?											
How Can Organic Solid Waste in Human Communities Be Composted?											
How is Land Used by Our Community and How Are Land-Use Decisions Made?								✔	✔		
How Can the Disposal of Solid Waste Affect the Quality of the Environment?											
How Does the Motor Vehicle Transportation System Affect the Environment?											
How Do Human Beings Affect Watersheds?											
What Human Actions Enhance, Protect, and Sustain the Quality of the Environment?	✔		✔		✔	✔		✔	✔	✔	✔
What Have Communities Done to Become More Sustainable?											
What Projects Can Students Implement to Make Their Classroom and School or Community More Sustainable?	✔				✔	✔				✔	✔

Acknowledgments

This unit was written by area teachers, Park Rangers, scientists, and Marine Mammal Center staff. Special thanks to the following people:

Point Reyes National Seashore: Division of Science

Dr. Sarah Allen, Senior Scientist
Dawn Adams, Natural Resource Specialist
David Press, Biologist

Workshop Participants

Trudie Behr-Scott, Hill Middle School, Novato
Steve Ladresh, Bolinas School, Bolinas
Erin Blackwood, Marine Mammal Center

Point Reyes National Seashore: Division of Interpretation

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Heidi Strickfaden
Leila Raim
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Divison of Interpretation

Layout and Design

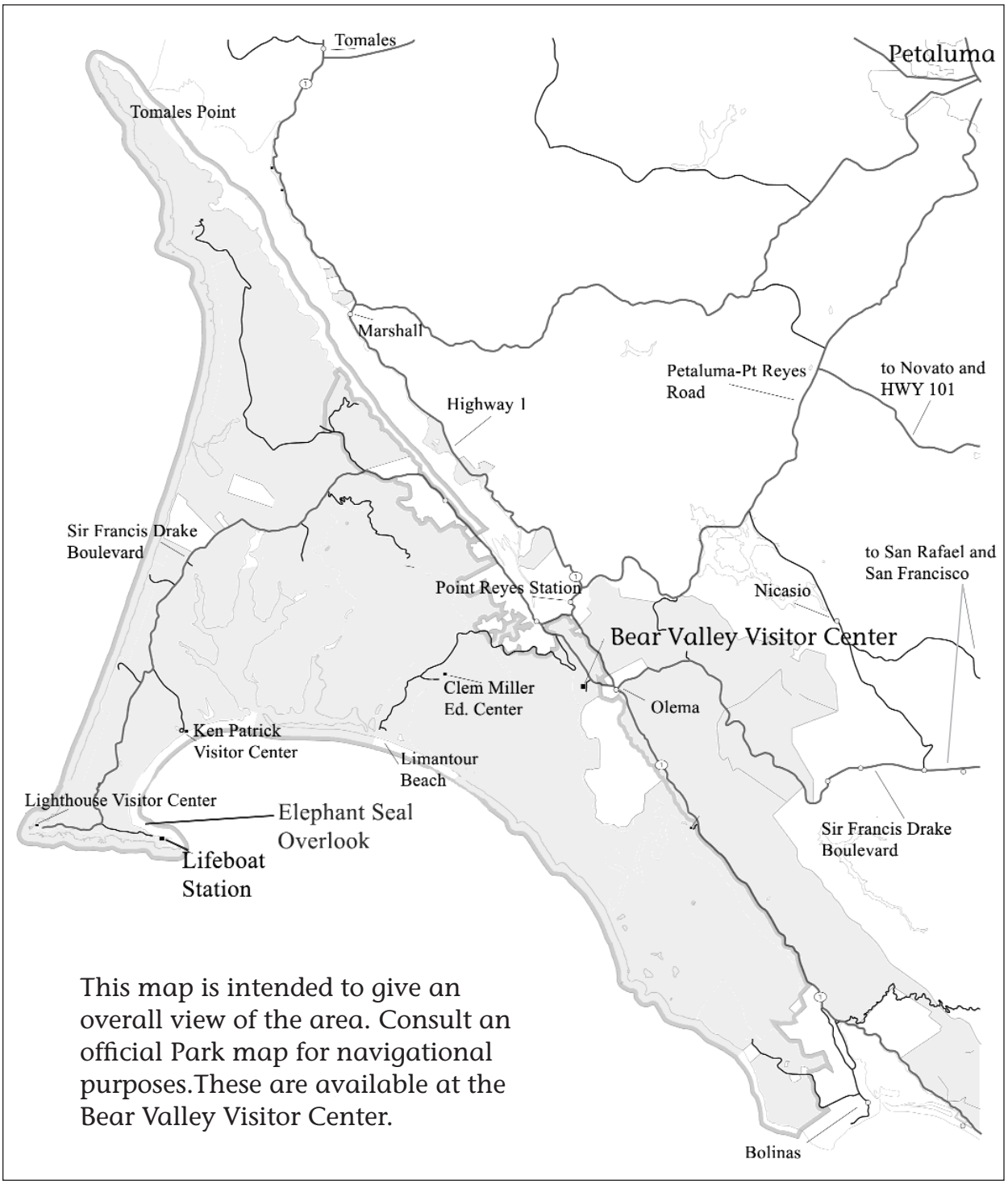
Myrna Vladic, Bad Dog Graphics, San Anselmo
Lynne Dominy
Christie Denzel Anastasia

Special Thanks

Dude Williard, Artist, Bolinas

Point Reyes National Seashore

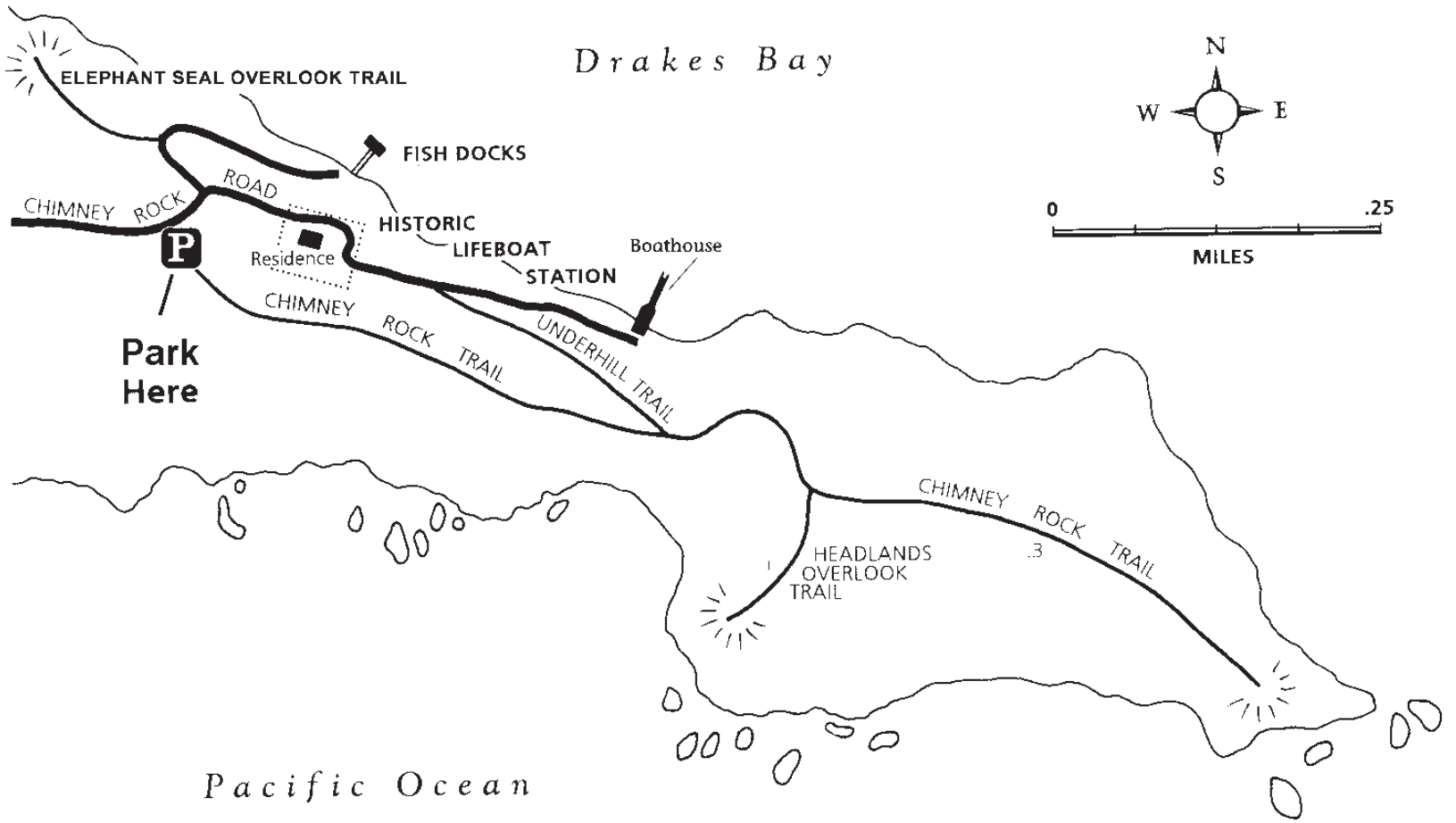
Attachment



Approximate Driving Times/Distances

Petaluma to Bear Valley VC	40 min./19 miles
Novato to Bear Valley VC	40 min./19 miles
San Anselmo to Bear Valley VC	30 min./20 miles
Bear Valley VC to Limantour Beach	20 min./9 miles
Bear Valley VC to Tomales Point	30 min./19 miles
Bear Valley VC to Ken Patrick VC	30 min./15 miles
Bear Valley VC to Elephant Seal Overlook	45 min./22 miles

Map of Chimney Rock Area

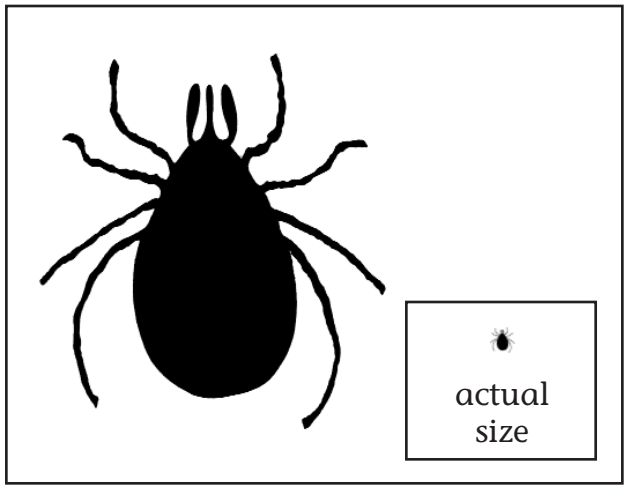


The Chimney Rock Road is CLOSED to buses. Use cars or vans to transport students to the overlook or trail.

Attachment

Lyme Disease, Stinging Nettle, and Poison Oak

Lyme disease is an illness caused by bacteria transmitted to people by tick bites. Not all ticks carry the disease. Field studies in Marin County show that 1–2% of the western black-legged ticks carry Lyme disease. Since there are several other species of ticks in Marin, the odds of a tick bite producing Lyme disease is less than 1 in 100. Even so, Lyme disease can be severe; it is important to understand the prevention and symptoms.



Symptoms:

arthritis and joint pain
lethargy
heart problems
pain/limping
fever
kidney problems
depression
bull's-eye rash (50% of victims)

Tick species in California include:

Western black-legged tick and Pacific coast tick (West Coast)
Lone star tick and American dog tick (throughout U.S.)

How to avoid tick bites:

- Wear light-colored, long-sleeved clothes so you can more easily see the ticks.
- Tuck shirt into pants and pants into socks to keep ticks away from your skin.
- Stay on trails.
- Apply an insect repellent, labeled for ticks, to shoes, socks, and pants.
- Check yourself completely after a hike. Closely check any skin irritation. Ticks anesthetize the skin before biting so you'll seldom feel the original bite.

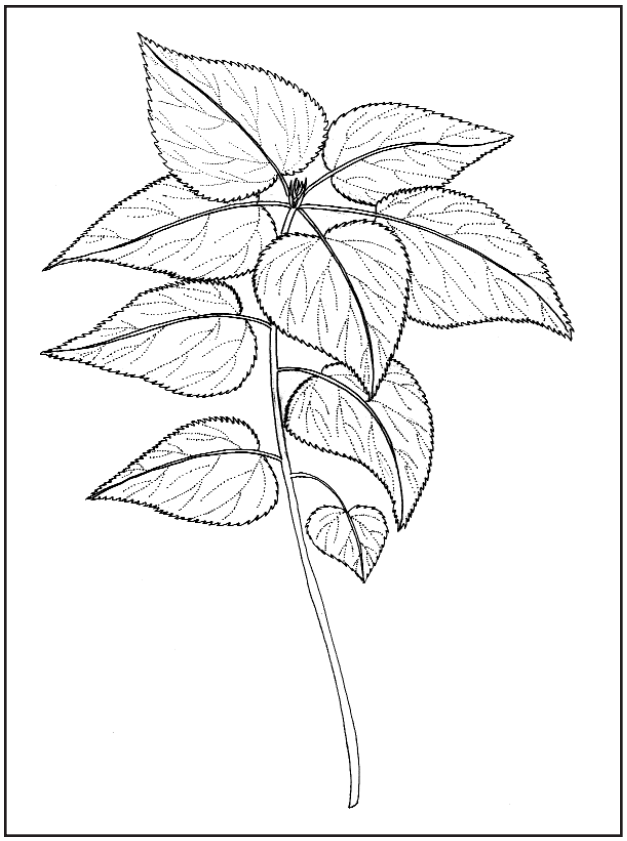
What to do if bitten:

- Use tweezers to grasp tick at point of attachment, as close to skin as possible. Gently pull tick straight out.
- Save tick, notify your doctor.
- Don't panic—ticks need to be embedded for 24–48 hours to transmit bacteria. The ticks that transmit Lyme disease are usually in a developmental phase in which they are smaller than the head of a pin.

References:

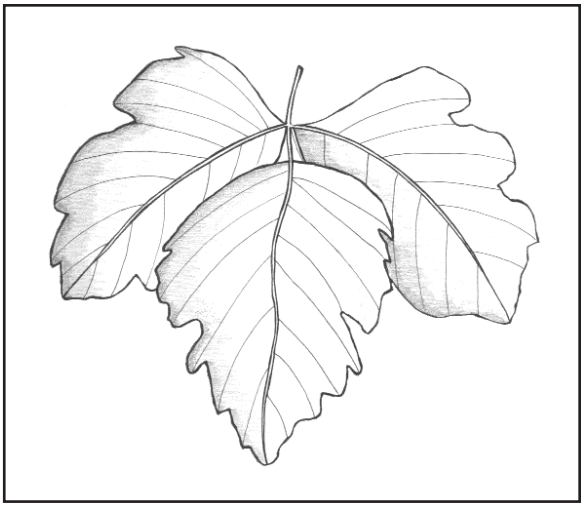
Ticks and Lyme Disease in the National Parks
Lyme Disease Foundation/***www.lyme.org***

Lyme Disease, Stinging Nettle, and Poison Oak
(continued)



Stinging nettle is native to Europe, but grows at Point Reyes National Seashore. It can cause a painful rash that stings for up to twelve hours after brushing up against the plant. A topical analgesic (used to treat poison ivy or bug bites) can be applied to help alleviate the sting. Study the picture and have someone point out the plant in the Seashore to aid in its identification.

Poison oak usually causes an itchy rash if you are sensitive to it. You can get a rash by touching the plant, its leaves or roots. You can also contract poison oak by petting your dog (if the oils are on its coat) or by touching clothing that has touched poison oak. Rashes may occur several days after the initial contact with the plant. Severe rashes may affect the lungs. If you have difficulty breathing, call 9-1-1 or go to the nearest emergency room immediately. Preventive topical ointments are available to help avoid reactions to poison oak. Learn to recognize the compound leaves with a shiny appearance.



Creating Coastal Stewardship through Science

Reservation Form

If you are planning a trip to Point Reyes National Seashore to use this curriculum, please notify the Park to avoid conflicts with other groups and to be notified about any unusual closures. Mail this form at least two weeks in advance (fold in thirds and affix postage) or call (415) 464-5139, to leave a message.

Teacher Name: _____

School Name: _____

School Address: _____

City/State: _____ Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Grade: _____ Class Size: _____

Home Phone: _____

Field Trip Options

Monitoring Creek Health
Observing Pacific Gray Whales
Discovering Northern Elephant Seals
Defining Habitats
Investigating Tule Elk
Uncovering the San Andreas Fault
Identifying Resident Birds

Field Trip Preferences

Field Trip Topic	Dates (list three in order of preference)	Time
1. _____	_____	_____
	_____	_____
	_____	_____
2. _____	_____	_____
	_____	_____
	_____	_____

Comments

_____ Confirmation Letter
_____ Materials Sent

Creating
COASTAL
STEWARDSHIP
through Science

National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Program Coordinator
Point Reyes Station, California 94956

Creating Coastal Stewardship through Science

Evaluation Form

Please help us develop and improve our programs by taking a few minutes to complete this form. This evaluation form is preaddressed, but needs to be folded in thirds and provided with postage. If you prefer, email comments to: ***PORE_Education@nps.gov***

Name: _____ School Name: _____

School Address: _____

City/State/Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Class Size/Grade: _____

Date of Visit: _____ Program/Location: _____

Getting Your Visit Set Up

Do you have any suggestions to make logistics easier? (maps, directions, reserving programs)

Curriculum materials

Which lessons were the most effective?

Relevance of content to my students and curriculum:

Grade appropriateness?

Program assessment

How does this program fit into California/National Standards and your personal education program?

Strengths/weaknesses of program?

Best part of experience?

What is the level of support at your school for this program?

What could the National Park Service do to improve your education program?

Overall, how would you respond if a colleague asked about this program?

Highly recommended Recommended Recommended with some qualifications
Not recommended

National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes Station, California 94956

Creating
COASTAL
STEWARDSHIP
through Science

Adaptations	an organism's adjustment to environmental conditions that makes it more fit for survival
Advocacy	the active support of a cause
Alpha	a male (elephant seal) that has secured dominance over other males for mating rights
Blubber	the thick layer of fat between skin and muscle layers of marine mammals, a way of storing energy when food is available that keeps elephant seals warm in cold water
Bull	an adult male elephant seal (also, adult male cattle and elk)
Carrying capacity	maximum population of a species that can be sustained in a habitat over the long term; usually refers to a particular species, but can be applied to more than one
Conservation	the wise and careful use of earth's resources
Consumer	a species that relies on other plants or animals for food
Cow	adult female elephant seal (also, adult female cattle and elk)
Delayed Implantation	for elephant seals, the fertilized egg floats in the uterus for up to 3 months before it implants and develops into a fetus
Diatoms	tiny, single-celled algae that form at the bottom of the food pyramid
Dominance	high status in a social group
El Niño	a warm ocean current that develops along the coast of Ecuador and Peru and can cause catastrophic weather conditions
Endangered	threatened with extinction
Environmentally Friendly	behaviors, actions, or products toward a healthy environment
Extinction	the condition of being gone forever
Fetus	a developing organism, prior to birth
First order consumer	an organism, usually an animal, that feeds on plants or other animals

Vocabulary

Food chain	a series of organisms linked together by their feeding habits
Food pyramid	a diagram that shows the relationship between producers and consumers in a food web
Forage	search for food
Fourth order consumer	an organism at the top of the food pyramid
Gestation	time between fertilization and the birth of an offspring
Habitat	the natural environment of an organism; place that is natural for the life and growth of an organism, "address"
Harem	a group of females associated with one male for protection and reproduction (elephant seals and tule elk form harems)
Haul-out	the place where a seal or sea lion comes to land to rest, mate, molt or give birth; the act of coming out of the ocean and onto shore
Krill	small marine crustaceans that are the major food source of baleen whales, but also eaten by elephant seals
Metabolism	the sum total of chemical changes that occur in an organism, elephant seals break down blubber to provide energy. ex: low metabolism or high metabolism
Mission	an overriding goal or strategy used for management, what one believes in
Molt	to shed a skin layer and connected hair to make way for new skin and hair underneath
National Park System	areas of national significance, scenic beauty, or historic importance, preserved for the use and enjoyment of this and future generations
National Park Service	people who manage the National Park System
National Seashore	an area of seacoast set aside and preserved for the public good
Niche	the ecological role, position, or function of an organism in a community of plants and animals, "profession"
Phytoplankton	plankton of plant origin
Pinniped	order of mammals including seals, sea lions, and walruses

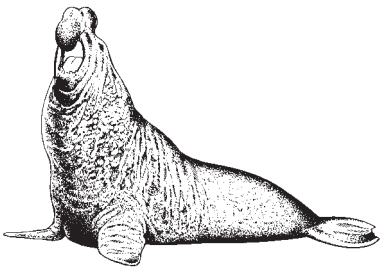
Vocabulary

Plankton	microscopic plants and animals floating on the ocean's surface; the primary food source of many marine animals
Population	organisms of the same species that occur in a particular place at a given time; a population may contain several discrete breeding groups or stocks
Preservation	protecting and keeping in an unaltered condition
Primary Producer	plant producing energy from sunlight
Proboscis	a long, flexible snout (nose)
Pup	a newborn elephant seal
Rehabilitation	restoration to a condition of health
Research	scholarly or scientific investigation to understand how things work, used to form basis for management decisions
Restoration	returning something to its original state
Second Order Consumer	an organism, usually an animal, that feeds on other animals
Semiannual	occurring twice a year
Sleep apnea	cessation in breathing while sleeping
Social behavior	behavior between animals
Stewardship	taking care of the environment by being involved; taking action and participating in clean ups and education programs, helping others become more aware, and making responsible choices
Subadult 2	a male elephant seal with a definite large nose, (but not long enough to touch the ground while lying on belly), and no chest shield
Subadult 3	a male elephant seal with a nose long enough to touch the ground when lying on belly, a slightly developed chest shield, and some scarring
Subadult 4	a male elephant seal with a developed nose, (but not a fully developed notch above the nose) and a chest shield that does not rise above the eyes.
Third order consumer	an organism, usually an animal, that is a predator

Vocabulary

Toxin	a poisonous substance
Value	an amount considered to be an equal exchange for something else
Weaned	no longer receiving nourishment through nursing
Weaner	a pup that no longer relies on mothers' milk, under one year of age
Worth	the quality of something that makes it desirable, useful, or valuable
Yearling	an elephant seal that is one year old and has not completed its second year, harbor seal size, blonder, and smaller than all other adults on the beach
Zooplankton	small (often microscopic) aquatic animals suspended or weakly swimming in water

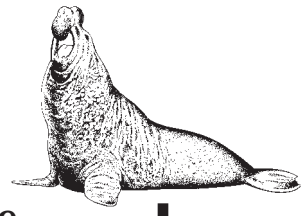
Creating
Coastal Stewardship
through Science



Discovering Northern Elephant Seals

Pre-Visit Activities

How Can I Learn about the Secret Lives of Elephant Seals?



Students receive an Elephant Seal Newspaper to complete three activity sheets focusing on northern elephant seal populations, behaviors, annual migrations, and relationships to humans. This overall introduction to elephant seal biology and ecology prepares students for the next two lessons and their field trip.

Time required: 2 hours

Location: classroom/ homework

Suggested group size: entire class

Subject(s): science, history, math

Concept(s) covered: population dynamics, human ecology, life cycles, biology, ethics

Written by: Erin Blackwood, The Marine Mammal Center
Trudie Behr-Scott, Hill Middle School

Last updated: 11/27/00

Student Outcomes

At the end of this activity, the students will be able to:

- Complete activity sheets based on their comprehension of the *Elephant Seals* newspaper.
- Understand how natural and human activities relate to elephant seal populations.
- Understand the role and importance of students and Point Reyes National Seashore in conserving northern elephant seals.

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade: 5a- food webs
5b- organisms and the physical environment
5e- resources available and abiotic factors
7b- appropriate tools and technology to perform tests, collect data, and display data
7c- develop qualitative statements about the relationships between variables

7th grade: 2a- differences between the life cycles and reproduction of sexual and asexual organisms
3e- extinction of a species occurs when the environment changes and the adaptive characteristics for a species are insufficient for its survival
5a- animals have levels of organization for structure and function
5d- reproduction
7a- appropriate tools and technology to perform tests, collect data, and display data
7d- construct scale models and appropriately labeled diagrams to communicate scientific knowledge

8th grade: 9b- evaluate the accuracy and reproducibility of data.

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A – Think critically and logically to make the relationship between evidence and explanations; use mathematics in all aspects of scientific inquiry.
- Content Standard C – Structure and function in living systems; Reproduction and heredity; Regulation and behavior; Populations and ecosystems; Diversity and adaptations of organisms.
- Content Standard F – Science and technology in society.

Materials

To be photocopied from this guide:

- **Pre- and Post-Evaluation** activity sheets
- *Elephant Seals* newspaper
- **Vocabulary** sheets located in Teacher's Preparation/Attachments
- **Wild Wonders of the Deep** activity sheet
- **The Secret Lives of Elephant Seals** activity sheet
- **Worth versus Value** activity sheet

Vocabulary

Refer to vocabulary sheets located at the end of the Teacher's Preparation Unit.

Procedures

1. **Pre- and Post-Evaluation**
   Distribute Pre- and Post-Evaluation activity sheets. Remind students this is not a graded test, but rather a measure of our success; each student will retake the same test after several lessons. (Note: You may choose to save these completed tests and redistribute in the first post-visit lesson. Students change their answers based on what they have learned.)

2. **Distribute newspaper**
   Students receive and read *Elephant Seals* newspaper. Students can work in pairs or individually to complete activities.

3. **Reading comprehension**
   Read the *Elephant Seals* newspaper as a class and clarify any questions or comments from students.

4. **Activity sheets**
   Give each student appropriate activity sheets, vocabulary list, and instructions for completion.

5. **Conclusions**
   Review students' answers, compare graphs, exchange ideas, and relate these concepts to lessons already covered earlier in the year.

Extension Ideas

1. Using charts and graphs in the *Elephant Seals* newspaper, have students speculate as to elephant seals' activity on their proposed field trip to Point Reyes National Seashore.

2. Discuss other pinnipeds found in California coastal waters: California sea lion, northern fur seal, Pacific harbor seal, Steller (northern) sea lion, Guadelupe fur seal. What are the identifying characteristics? How are they related to each other? Challenge students to create an evolutionary tree showing the five species above, or enlarge it to include other species such as the walrus.

Pre- and Post-Evaluation

Teacher Master

Vocabulary Match-Up

Draw connecting lines between words and their definitions.

Harem	Order of mammals including seals, sea lions, and walruses
Molt	Newborn elephant seal
Pinniped	Male elephant seal that has secured dominance over other male elephant seals for mating rights.
Proboscis	Shedding of skin layer and connected hair to make way for new skin and hair
Yearling	Group of females associated with one male for protection and reproduction
Weaner	A long, flexible snout characteristic of adult male elephant seals
Pup	An animal that is one-year-old, or one that has not completed its second year
Alpha Bull	Pup, under one year of age, that no longer relies on it's mothers milk

Elephant Seal History

Using the number 1–9, put these events in chronological order.

3 Mexican government bans elephant seal hunting

2 Fewer than 1,000 northern elephant seals remain

5 Worldwide population reaches an estimated 150,000 animals

1 British whale and seal hunters record seeing northern elephant seals from Baja, California to Mexico.

6 Elephant seals return to Point Reyes Headlands

4 United States bans elephant seal hunting

Species Challenges

Circle factors that have a negative impact on the survival of elephant seals even today.

Hunting

Storms

Habitat loss

Habitat protection

Proximity (nearness) of people to elephant seal colonies

Disease

Educating people about elephant seals

Scent left behind by dogs

Pre- and Post- Evaluation

(continued)

Teacher Master

Life Cycle Information — True or False?

T (F) Elephant seals spend only 20% of their lives at sea.

T (F) Elephant seal pups can swim as soon as they are born.

(T) F Elephant seals haul out on land to molt, to mate, and to give birth.

(T) F Male elephant seals will battle to gain a position as the top bull, or alpha.

National Park System

In your own words, describe the mission of the National Park Service.

answers will vary

Stewardship

What can you do to help elephant seals? List your ideas on the back of this paper.

answers will vary

Name _____ Date _____

Activity Sheet

Pre- and Post-Evaluation

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Pre and Post Evaluation

(continued)

Activity Sheet

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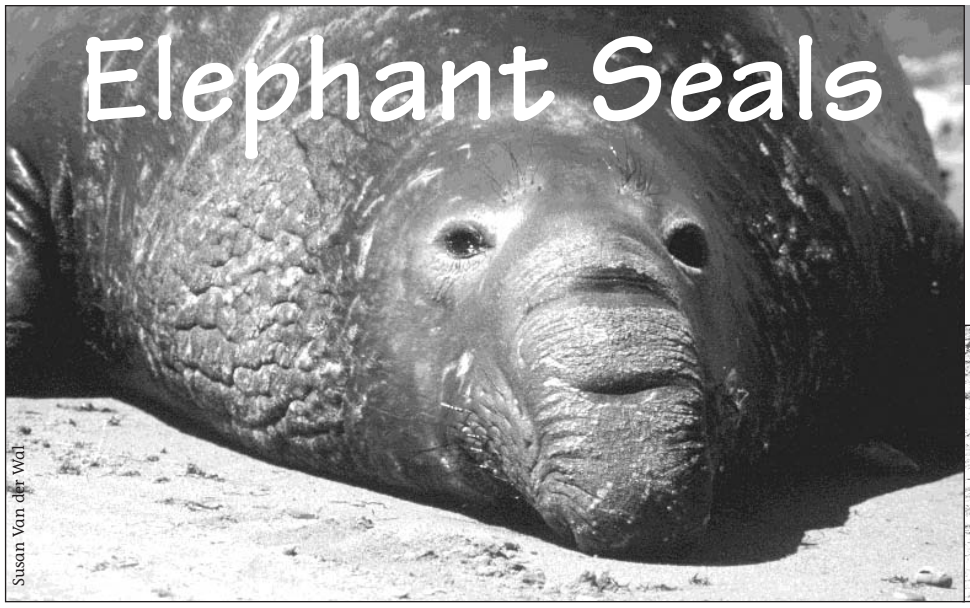
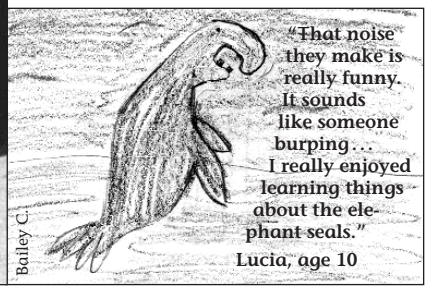
Elephant Seals



Susan Van der Wal

Inside:



"That noise they make is really funny. It sounds like someone burping… I really enjoyed learning things about the elephant seals."
Lucia, age 10

Bailey C.

Wild Wonders of the Deep

Point Reyes National Seashore is one of the few places in California where you can see North America's largest seal, the northern elephant seal. On shore for only a few months each year, these large but elusive creatures are often heard before they are seen. They are very social on land yet live a solitary existence at sea. This is the story of a remarkable species, living a life of extremes.

A Close Call with Extinction

While exploring the Pacific Coast in the 1800s, a British whale and seal hunter named Charles Scammon saw northern elephant seals from Baja California in Mexico, to Point Reyes, California, north of San Francisco. Elephant seals currently range from Mexico to Alaska and spend 80 percent of their life in the open sea. Sharing the fate of many of the oceans' great whales, they were hunted to the brink of extinction for their oil-rich blubber. One bull elephant seal would yield nearly 25 gallons of oil. Though we don't know exactly how many northern elephant seals were alive before the twentieth century, it has been estimated that fewer than 1,000 existed by 1910. The Mexican government banned elephant seal hunting in 1922, followed shortly by the United States government. Since then, the population of northern elephant seals has recovered at an average annual rate of 6 percent. Today, thanks to government protection and the seals' distant lives at sea, the worldwide population has grown to an estimated 150,000 animals.

Elephant seals exemplify the remarkable recovery of a near-extinct species.

After being absent for more than 150 years, elephant seals returned to Point Reyes Headlands in the early 1970s. In 1981, the first breeding pair was discovered near Chimney Rock. Since then, researchers have found that the colony is growing at a dramatic annual average rate of 16 percent. When severe storms occurred in 1992, 1994, and 1998, many pups were killed. During the El Niño winter of 1998, storms and high tides washed away approximately 85% of the 350 young pups before they had learned to swim. Nevertheless, the Point Reyes winter population of elephant seals is between 1,500 and 2,000. Fanning out from their initial secluded spot, the seals' expansion to popular beaches is causing concern for both their safety and that of their human visitors.

Proximity of People and Pets Raises Concern

A beach full of lumbering and slumbering seals is a rare and spectacular sight. Some people feel compelled to get "just a little closer". Unlike other seals and sea lions that react by stampeding into the water when disturbed, elephant seals do not always retreat from humans. Instead they may react by fighting with each other or moving to another section of beach. An ill-timed move could crush a pup or separate a female from her pup, creating a possible life-or-death situation for the young elephant seal. Human presence especially frightens pregnant females and new mothers, discouraging them from returning the next year. When surprised or approached too closely, elephant seals will also chase or bite people. Any change in elephant seal behavior caused by a person is, by definition, a violation of the Marine Mammal Protection Act. If you are less than 100 feet from an elephant seal, you are too close.

Dogs pose a safety concern to elephant seals. Predatory behavior and possible disease transmission (from dogs to seals, or vice versa!) could create serious problems for either animal. A dog's scent can frighten and disturb seals. Even on a leash, a dog may threaten seals by barking or cause injury by biting. Some beaches in the Park will temporarily be closed to dogs as the beaches become inhabited by breeding elephant seals.

Kim Linse

Leashed dogs are welcome on South Limantour, North, South, and Kehoe Beaches when wildlife restrictions are not in place. Please inquire at the Visitor Centers about pet restrictions and watch for closure signs.

Competition for Habitat

Sensitive resources such as birds and plants are also affected by elephant seals. The western snowy plover, a federally-threatened species under the Endangered Species Act, breeds on few California beaches. Loss of habitat to beachfront development and human recreation has forced elephant seals and plovers to compete for limited protected space. Also, rare plants native to coastal dunes are potentially at risk. Elephant seals and their curious

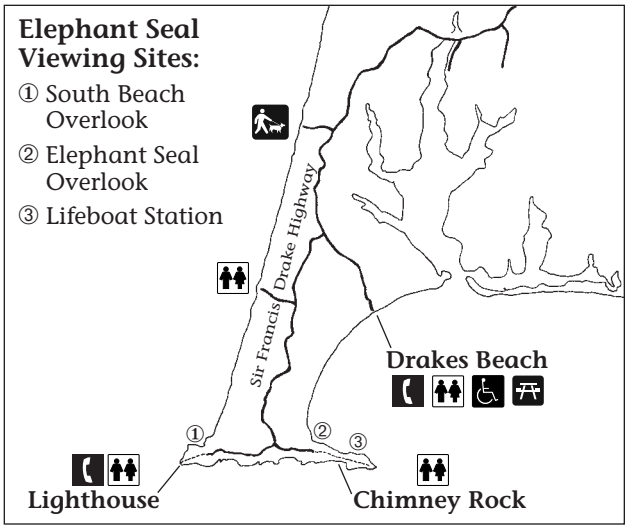
(please see page 2)

(continued from page 1)

human visitors may physically crush plants that are struggling to remain alive.

The Park's task is to balance the expansion of the elephant seal colony while providing for the health of other species. To manage this balance, the Park will continue its docent program, which provides visitors with on-site information and safety messages at the overlooks. To anticipate where the elephant seals might expand to next, researchers will attempt to discover why seals prefer to breed on some beaches and not others. This information will allow the Park to make informed choices about appropriate beach use by people, pets, and wildlife.

Biologists monitor seal behavior.



At Sea

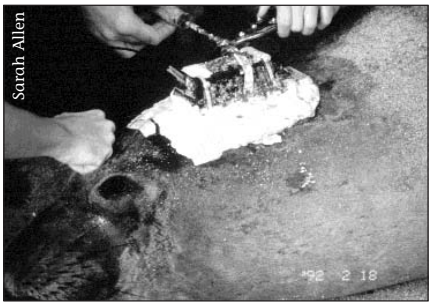
The Secret Lives of Elephant Seals

Northern elephant seals are mysterious and unique creatures. Not only do they spend most of their life in the ocean, but 90 percent of that time is spent underwater: eating, sleeping, digesting, and traveling. They are built to survive continuous dives to depths that would squeeze the life out of any other mammal. The average dive reaches 2,000 feet, lasts close to half an hour and is followed by only 3 to 5 minutes at the surface to breathe. Imagine being able to live in such extremes!

The deepest dive on record is over 5,000 feet and the longest dive is 2 hours!

Why do they dive so deep? The oceans are full of food for millions of animals, but relatively few feed at the depths elephant seals prefer. As a result, they face little competition for food. Feeding in almost total darkness, elephant seals use their large eyes and the bioluminescence of some prey, such as octopus and squid, to find food where other predators would not even be able to see. They may use their stiff yet sensitive 3- to 8-inch whiskers to "feel" some food, such as Pacific hake, skates, rays, shrimp, small sharks and crabs.

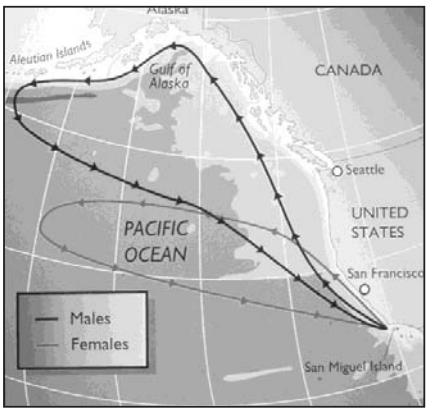
What allows such deep diving? Pressure increases as any object goes deeper into the ocean. As animals dive, the pressure on the outside compresses the air in their bodies. Elephant seals differ from humans in that when they dive, they carry all the oxygen they need in their blood rather than in their lungs. Before they dive, elephant seals exhale, collapsing their lungs so there is little air to be compressed. As they dive, the seals' fat is also compressed so that the animals lose buoyancy and sink, allowing the seals to achieve great depth with little effort.



Electronic devices (time depth recorders) attached to elephant seals measure the depth and duration of dives, the amount of time spent resting at the surface between dives, and the sequential patterns of dives.

Elephant seals prolong their dives by reducing their heart rates. A seal resting on land has a heart rate of 55 to 120 beats per minute, but when diving, the heart slows to 4 to 15 beats per minute. The seal maintains normal blood pressure by decreasing the blood supply to its extremities, allowing the blood to flow primarily to the vital organs and the brain. This also helps the seal conserve body heat when down in the cold ocean depths.

During semiannual migrations, adult males and females not only travel thousands of miles apart, but also tend to have different feeding patterns. Males tend to return to the same feeding areas off the Aleutian Islands each year, while females tend to feed in the northeast Pacific and near Hawaii. To complete their two annual round-trips, females journey over 11,000 miles, males 13,000 miles. Males dive deeply and repeatedly for food. After about 3 weeks, they have eaten so much that their dive pattern changes to a flat-bottom dive, following the bottom contours as they rest and digest. Females also dive deeply and repeatedly, but they go deeper during the daytime than at night.



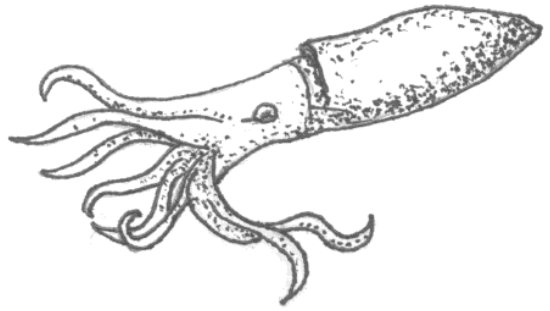
Northern elephant seals journey between their feeding grounds and land twice each year. They return to land in winter to breed and in spring/summer to molt (shed).

Although their locations and diving patterns differ, both sexes dive repeatedly for 4 to 5 months during summer and fall. Research suggests that elephant seals forage continuously during their migrations and, furthermore, they don't sleep! They may take underwater "catnaps" when they dive, as their heart rate slows, making only brief, infrequent surface appearances. This pattern, and the incredible amount of time spent below the surface, explains why so few of them have been seen in the open ocean despite their rapidly growing population.

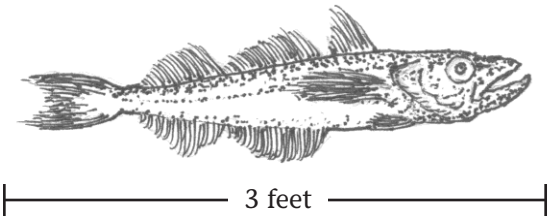
Point Reyes National Seashore is one of the few places on the Pacific Coast where northern elephant seals can be observed and studied on shore. Their semiannual sojourns to the shores of Point Reyes provide a unique opportunity to glimpse the lives and behaviors of these elusive ocean giants. Visit the Elephant Seal Overlook near Chimney Rock and discover for yourself the secrets of these wild wonders of the deep!

What Do Elephant Seals Eat?

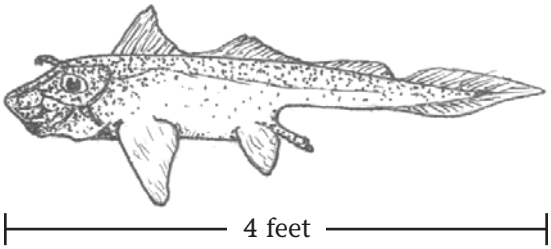
While elephant seals are at sea, they need to store enough energy to sustain themselves when they haul out to give birth and mate in the winter and again in the summer when they molt. But how do you find out what an elephant seal eats at sea when it dives to depths of up to 5,000 feet? By looking at the stomach contents of elephant seals that have died, scientists have found that seals have a varied food source with their favorite or most common food being squid that can be up to 6 feet long.



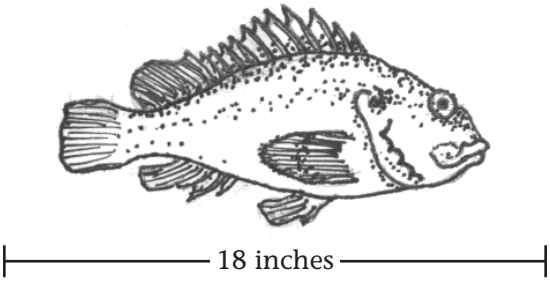
Squid are the most frequently consumed prey of the northern elephant seal. They live far offshore in deep water and are found in large groups. This grouping occurs during the breeding cycle and also when following large schools of prey.



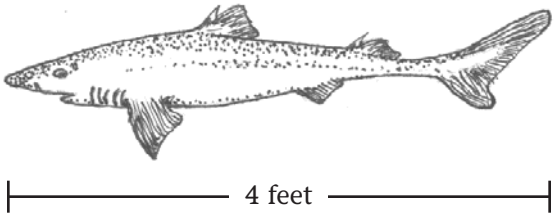
Pacific hake range from northern Alaska to Magdalena Bay in California, and are found at depths of 183 to 914 meters. They are schooling fish migrating vertically each day (feeding nearer to the surface as night approaches), and offshore in the winter. It feeds mainly on fishes, but also on squid and crustaceans.



Ratfish are found mainly in the cooler regions of the Atlantic, Pacific and Indian Oceans. They are long-bodied fish, sharklike in many respects, with a long dorsal spine that is connected to a venom gland. They are very abundant and are found at depths of 92 to 913 meters.



Rockfish belong to the family of redfishes and scorpion fishes, and are found worldwide, except in the Antarctic region. They are abundant fish living at depths of 73 to 640 meters, and are important commercial species, as well as an important prey of halibut and albacore. Average length is 18 inches.



Dogfish have a sharp spine in front of the dorsal fin which can inflict serious wounds made worse by the venom that is injected. These sharks are found worldwide in inshore waters at depths up to 950 meters.

On Land

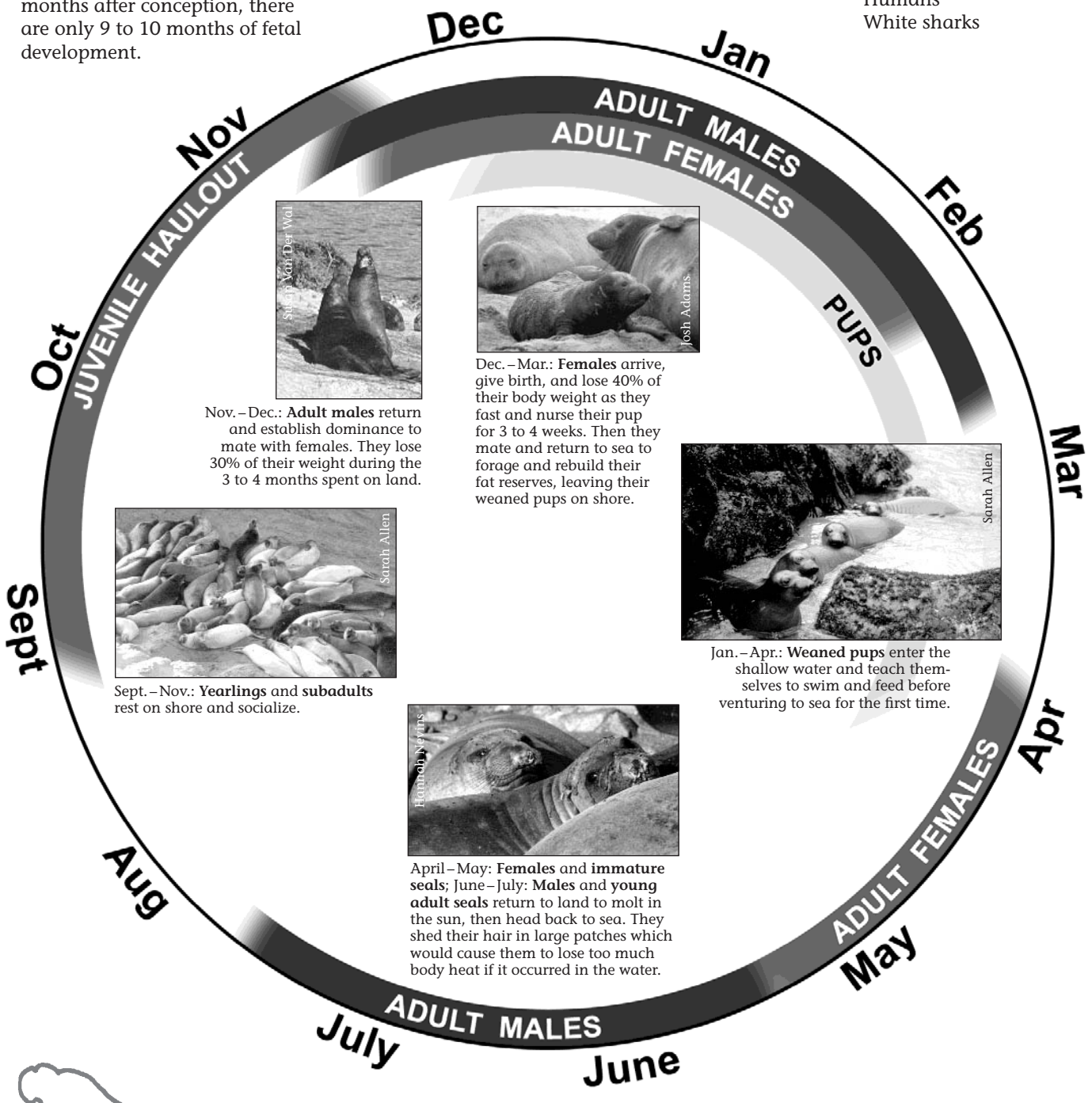
Northern elephant seals can be seen on land at Point Reyes National Seashore for a few months each year. During the rest of the year, elephant seals live only in the ocean.

Delayed Implantation

Although pups are born 12 months after conception, there are only 9 to 10 months of fetal development.

Predators

Orcas
Humans
White sharks



Nov.–Dec.: **Adult males** return and establish dominance to mate with females. They lose 30% of their weight during the 3 to 4 months spent on land.

Dec.–Mar.: **Females** arrive, give birth, and lose 40% of their body weight as they fast and nurse their pup for 3 to 4 weeks. Then they mate and return to sea to forage and rebuild their fat reserves, leaving their weaned pups on shore.

Jan.–Apr.: **Weaned pups** enter the shallow water and teach themselves to swim and feed before venturing to sea for the first time.

Sept.–Nov.: **Yearlings** and **subadults** rest on shore and socialize.

April–May: **Females** and **immature seals**; June–July: **Males** and **young adult seals** return to land to molt in the sun, then head back to sea. They shed their hair in large patches which would cause them to lose too much body heat if it occurred in the water.

0 feet — 13-18 feet

Bulls weigh 3,000-5,000 pounds.

0 feet — 8-10 feet

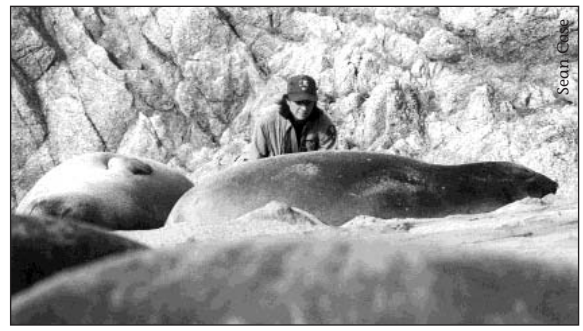
Cows weigh 800-1,200 pounds.

0 feet — 3-4 feet

Pups weigh 70 pounds at birth. When weaned at 4 weeks, they weigh nearly 300 pounds.

Elephant Seal Monitoring

Have you ever wondered how scientist learn about animals as unusual as elephant seals? By monitoring elephant seals at Point Reyes researchers and scientists determine trends in seal populations, migration, and reproductive success. This data is used as a baseline to determine trends, quantify annual reproductive success, and learn about their biology.


Sean Gese

When Does the Monitoring Happen?
Elephant seals arrive at Point Reyes in December through March during the breeding season and again during May through July, as seals return to Point Reyes to molt (shed and regrow their entire fur coat).

Where Does the Monitoring Happen?
The monitoring occurs in all the elephant seal colonies found on the Point Reyes Headlands including the colony that you will visit at Chimney Rock.

What Are the Methods?
Researchers visit elephant seal colonies regularly during the pupping and mating season. They count seal numbers, births, deaths, and document unusual behavior. Listed below are other methods that researchers use to determine biology and to track individual animals.

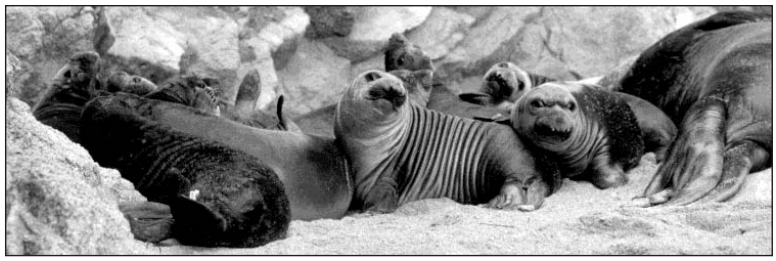
Flipper Tags
These tags are made of colored plastic. The color of tags used by researchers can let you know the geographic location where the animal was tagged. Marine mammal rehabilitation hospitals, like The Marine Mammal Center, tag their rehabilitated patients that are released back to the wild with orange tags only. Sea lions are tagged on their front flippers. Seals are tagged in the webbing between digits on their hind flippers.

Brands
Researchers will tag and permanently brand numbers on the animal's back or side in an effort to track the animal during its entire life. Tags are not as reliable as a brand. Tags may fall off, or the numbers may rub off. Tags are harder to see. The continued observation of branded individuals can provide a wealth of information about range, behavior, and life history of not only that individual but the entire species. The numbers are put on with either a hot brand or a cold brand. A hot brand is done with a heated metal number. The cold brand is a copper number chilled with liquid nitrogen. With both procedures the animal must be held still—not an easy task. The hot brand takes seconds to leave a mark, while the cold brand may take a minute or more. Hot brands are easier to apply, but they kill the fur follicles and cause deep damage if done carelessly. Cold brands are not as damaging. The fur grows back white in color, so the number is visible.

Dye Marks
Numbers, names, or identifying marks are sometimes dyed into the fur of seals and sea lions. Regular hair dye, donated by a company or by Lady Clairol TM, is used. Dye marks are only temporary as they disappear when the animal molts.

Time Depth Recorders, Radio Tags and Satellite Tags
Time depth recorders (TDRs) are set in a white plasterlike base and are glued with epoxy to the seal's back. These are convenient to use with elephant seals that return to the same location on land when they molt, so the TDR can be easily retrieved. The information gathered by a TDR is transferred to a computer for analysis. TDRs are activated by sensing light and dark. TDR data enable scientists to see how often the animal dives, and the depth and duration of the dive. Researchers have also used TDRs with harbor seals.

Radio tags and satellite tags have a small transmitter and battery encased in epoxy. The antenna can be internal or protrude. The tags may be attached to a flipper or glued to the head or back with super glue. Each radio tag has a specific radio frequency. The signal is detected using a handheld receiver.



Seal Viewing Tips

- ❑ For your own safety, always observe elephant seals from a distance. Use binoculars and spotting scopes. If a seal becomes alert or nervous and begins to move away, you are too close.
- ❑ Stay at least 100 feet from any marine mammal.
- ❑ Do not come between a cow and pup, a bull and a group of cows, or two bulls challenging each other.
- ❑ Watch quietly; whisper. Move slowly.
- ❑ Bring your pets only where they are allowed.
- ❑ Observe beach closures and restrictions.


Susan Van Der Wal

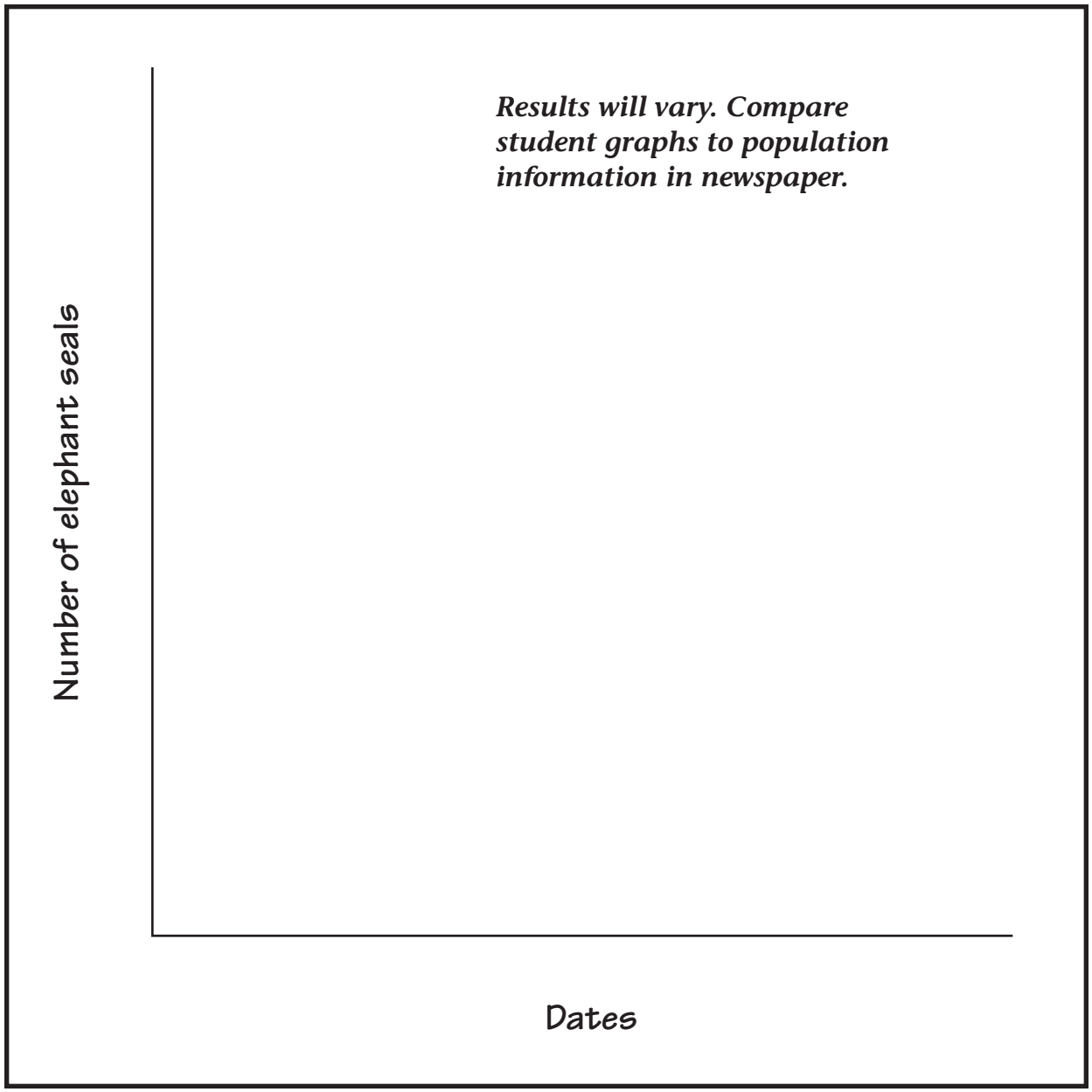
Special Thanks

Special thanks for support and contributions:

Point Reyes National Seashore Association
Gulf of the Farallones National Marine Sanctuary
Año Nuevo State Reserve
Marine Mammal Center
Canon, USA, Inc. "Expeditions in the Park"
National Park Foundation

1. **Using the newspaper, make a list of any relevant information on dates and corresponding population numbers of elephant seals.**

2. **Graph your information below using a line graph or a bar graph.**



Results will vary. Compare student graphs to population information in newspaper.

Activity Master

3. **Think about the following questions and record your thoughts.**
   a. Why was the population so low in 1910?
   ANSWER: *Overhunting by humans for their oil-rich blubber.*

   b. Why did the population increase so dramatically?
   ANSWER: *Mexico and the United States banned hunting.*

   c. Elephant seals are protected from hunting today, but what other threats exist for them? Can anything be done to prevent some of these threats?
   ANSWER: *Expanded use of elephant seal pupping/breeding beaches by people and their pets pose a serious threat.* ***Prevention:*** *people and their pets can use other beaches when elephant seals are present. Expanded hunting of elephant seals by other countries is a potential threat.* ***Prevention:*** *Develop lobbying groups to create political support for international hunting bans and work to educate other countries about oil options.*

4. **What do you think will happen to the populations of elephant seals in the next 10 years? Why?**
   ANSWER: *Answers may vary. Elephant seal populations are likely to grow if people choose to limit their use of elephant seal haul out areas. If people do not keep sandy, protected beaches available to the elephant seals, then populations will drop unless they are able to relocate.*

Migration Patterns

1. How many times do elephant seals journey between their feeding grounds and land each year?
   ANSWER: *Twice—once to give birth/mate and once to molt.*

2. Why do they haul out on land?
   ANSWER: *To give birth, mate and molt*

3. Where do males travel? Females?
   ANSWER: *Males travel between California and Alaska; females travel between California and Hawaii.*

4. How do adult travel patterns differ from the activities of a yearling seal?
   ANSWER: *Yearling seals rest on shore and socialize from September to November. They may not make the complete trip to the feeding grounds like the adults.*

Underwater World

An elephant seal will repeatedly spend 30 minutes underwater and 3 minutes at the surface. Use the activity below to help you determine how much time these mighty ocean dwellers spend both underwater and at the surface during a 24-hour period.

underwater minutes = __30 min.__ **surface minutes** = __3 min.__

a = 1 hour = __60__ minutes

b = (24 hours × a) = __1440__ minutes in one day

c = **(underwater minutes + surface minutes)** = __33__ minutes for one cycle

d = **(b ÷ c)** = __44 (average)__ cycles of underwater/surface activity

e = **(d × underwater minutes)** = __1320__ total underwater minutes in 24 hours

f = **(d × surface minutes)** = __132__ total surface minutes in 24 hours

ANSWER: __22__ hours underwater in 24 hours
__2.2__ hours at the surface in 24 hours

Activity Master

Elephant Seal Newspaper Activity

Worth Versus Value

Worth is the the quality of something that makes it desirable, useful, or valuable. ***Value*** is an amount considered to be an equal exchange for something else. When considereing issues of preservation and conservation, these two terms are critical because they often guide decision making. In our modern society natural resources, such as elephant seals, are often viewed only in terms of their economic worth or value. However, new ways of thinking challenge us to recognize the worth and value of natural resources not so much for monetary rewards but for the worth and value that they hold just existing in the natural environment.

Think about how the concepts of worth and value relate to elephant seals and answer the following questions.

1. **What is the value of an elephant seal?**
   ANSWERS will vary. *Values can be defined as economic, scientific, cultural, ecological, humanistic, intrinsic . . .*

2. **What have been the economic uses of elephant seals in the past?**
   ANSWER: *Blubber for oil; scientific collections/study specimens.*

3. **List three benefits and three consequences of oil use.**

BENEFITS	**CONSEQUENCES**
1) *Lubrication between metal parts*	1) *Pollution (land and marine)*
2) *Creates jobs*	2) *Environmental degradation*
3) *Income source for some countries*	3) *Continued use of oil insures depletion of nonrenewable resources (elephant seals)*

4. **Are there other alternatives?**
   ANSWERS will vary: *use recycled oil; reduce use of oil with alternative transportation methods; support alternative fuels and research for alternatives; synthetic oil or vegetable oils*

5. **Why are elephant seals in Point Reyes protected by the National Park Service? Is protection in Point Reyes National Seashore enough?**
   ANSWERS will vary. *The National Park Service exists to protect natural resources, such as elephant seals, and their habitats for their value and their worth.* ***NO.*** *Protection within National Park Service areas is not enough. Elephant seals travel and hunt outside of National Parks, thus they are affected by people in many places. Their ocean habitat, food sources, and beach habitats must be protected to insure their survival. They rely on adequate space and shelter, clean air and water, and adequate food — just like we do. The entire environment must be protected to insure their survival and ours.*

6. **How does this message from the National Park Service apply to elephant seals?**

A Message from the National Park Service:

The National Park Service cares for special places saved by the American people so that all may experience our heritage

ANSWERS will vary. *The National Park Service provides the species with a protected habitat within National Park Service areas. It encourages research on the species and the education of people so that they understand and value the existence of the species. The National Park Service promotes stewardship of elephant seals— encouraging people to make choices and take actions that will insure the survival of the species so they can be enjoyed by future generations.*

Name _____ **Date** _____

Elephant Seal Newspaper Activity

Wild Wonders of the Deep

Activity Sheet

1. **Using the newspaper, make a list of any relevant information on dates and corresponding population numbers of elephant seals.**

2. **Graph your information below using a line graph or a bar graph.**

Number of elephant seals

Dates

Activity Sheet

Name _____ **Date** _____

Elephant Seal Newspaper Activity

Wild Wonders of the Deep

(continued)

3. Think about the following questions and record your thoughts.

a. Why was the population so low in 1910?

b. Why did the population increase so dramatically?

c. Elephant seals are protected from hunting today, but what other threats exist for them? Can anything be done to prevent some of these threats?

THREATS **PREVENTION**

4. What do you think will happen to the populations of elephant seals in the next 10 years? Why?

Name _____ **Date** _____

Activity Sheet

Elephant Seal Newspaper Activity

The Secret Lives of Elephant Seals: at Sea, on Land

Migration Patterns

1. How many times do elephant seals journey between their feeding grounds and land each year?

2. Why do they haul out on land?

3. Where do males travel? Females?

4. How do adult travel patterns differ from the activities of a yearling seal?

Underwater World

An elephant seal will repeatedly spend 30 minutes underwater and 3 minutes at the surface. Use the activity below to help you determine how much time these mighty ocean dwellers spend both underwater and at the surface during a 24-hour period.

underwater minutes = _____ **surface minutes** = _____

a = 1 hour = _____ minutes

b = (24 hours × a) = _____ minutes in one day

c = (**underwater minutes + surface minutes**) = _____ minutes for one cycle

d = (**b ÷ c**) = _____ cycles of underwater / surface activity

e = (**d × underwater minutes**) = _____ total underwater minutes in 24 hours

f = (**d × surface minutes**) = _____ total surface minutes in 24 hours

ANSWER: _____ hours underwater in 24 hours

_____ hours at the surface in 24 hours

Activity Sheet

Name _____ **Date** _____

Elephant Seal Newspaper Activity

Worth Versus Value

Worth is the the quality of something that makes it desirable, useful, or valuable. ***Value*** is an amount considered to be an equal exchange for something else. When considereing issues of preservation and conservation, these two words are critical because they often guide decision making. In our modern society natural resources, such as elephant seals, are often viewed only in terms of their econimic worth or value. However, new ways of thinking challenge us to recognize the worth and value of natural resources not so much for monetary rewards but for the worth and value that they hold just existing in the natural environment.

Think about how the concepts of worth and value relate to elephant seals and answer the following questions.

1. What is the value of an elephant seal?

2. What have been the economic uses of elephant seals in the past?

3. List three benefits and three consequences of oil use.

BENEFITS	CONSEQUENCES
1)	1)
2)	2)
3)	3)

4. Are there other alternatives?

Name _____ Date _____

Elephant Seal Newspaper Activity

Worth versus Value

(continued)

Activity Sheet

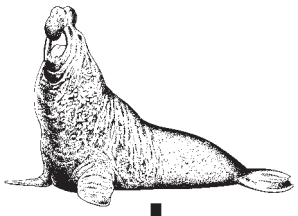
5. **Why are Elephant Seals in Point Reyes protected by the National Park Service? Is protection in Point Reyes National Seashore enough?**

6. **How does this message from the National Park Service apply to Elephant Seals?**

A Message from the National Park Service:

The National Park Service cares for special places saved by the American people so that all may experience our heritage

How Are Elephant Seals Adapted to Their Environment?



Students create posters or skits based on specific adaptive characteristics of elephant seals. Most of these adaptations will be observable on the field trip.

Time required: 2 hours

Location: classroom

Suggested group size: 30 students, divided into teams

Subject(s): science

Concept(s) covered: adaptation: biological water conservation, fasting, waste removal, thermoregulation, delayed implantation, diving mammals, secondary sexual traits, etc.

Adapted from: MARE: Marine Activities, Resources and Education, Regents of the University of California

Written by: Trudie Behr-Scott, Hill Middle School
Leila Raim, Volunteer, Point Reyes National Seashore

Last updated: 11/27/00

Student Outcomes

At the end of this activity, the students will be able to:

- Produce a poster outlining one specific elephant seal adaptation.
- Lay a foundation for elephant seal behaviors to be observed on field trip.

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade 5c- organisms can be categorized by functions
5e- resources available and abiotic factors

7th grade 5a- animals have levels of organization for structure and function
5c- bones and muscles work together to provide a framework for movement
5d- reproduction

Pre-Visit Lesson Plan

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following area:

- Content Standard C – Structure and function in living systems; regulation and behavior; diversity and adaptations of organisms

Materials

To be provided by the teacher:

- Poster paper, scissors, drawing supplies

To be photocopied from this guide:

- **Adaptation Note Taking Guide** activity sheet (one per student)
- **Elephant Seal Adaptation Cards** activity sheet (one per class)

Vocabulary

Adaptation, blubber, conservation, delayed implantation, fetus, gestation, metabolism, proboscis, toxin

Procedures

1. **Introduce concept of adaptation**
   Lead a discussion of adaptations. What are some examples of adaptations for humans, cats, dogs, or other types of mammals?
2. **Form teams**
   Divide students into teams so that each Elephant Seal Adaptation Card (15 total) has students responsible for making a poster. Each student team will receive an adaptation card, a note-taking guide, and poster paper. Each team will produce a poster highlighting their particular adaptation.

   Group that receives "Thermoregulation: Size Matters" as an adaptation will produce life-sized silhouettes of elephant seals instead of a poster. Silhouettes of a female and pup can be drawn inside a male silhouette or on a separate piece of paper. Use a grid method to transfer drawing (1" = 3 to 4 feet) or project the images onto paper using an overhead projector. Students can trace the image at an appropriate size.

   Group that receives **Vocalizations** as an adaptation will need to visit a website and share sounds with other students. ***http://www.parks.ca.gov/central/bayarea/an228/an228m.htm*** Keyword: elephant seals and sounds
3. **Display posters**
   Hang posters where they will get attention and teach others about elephant seals. Try a parent open house or the auditorium. Use the "Size Matters" adaptation posters as a safety message instructing students to remain at a distance from elephant seals.
4. **Optional skit activity**
   Students working in teams will receive an adaptation card and be instructed to portray their adaptation using theatrics and drama. Other students will guess what is being portrayed.

Extension ideas

1. Have students design and draw animals suited to live in a cold, dark environment under great oceanic pressure. What adaptations help your animals cope with physical conditions of the deep sea? How do they find food, avoid being eaten, reproduce, and communicate with one another?
   (source: *Sea Searcher's Handbook:* Monterey Bay Aquarium)
2. Explain how natural selection favors animals that have adapted to their environment. Imagine an elephant seal that evolved to live in a different environment. What would that elephant seal look like? What would it eat? How would it defend itself? Would an elephant seal need its blubber if it lived in the desert? What adaptations would it need to live in outer space? Choose a different environment (forest, marsh, city, etc.) and draw an elephant seal in that new environment. Create new body parts that it will need to survive in its new home. Label the parts.
3. Have students create adaptations for an organism facing challenges in its environment (western snowy plovers, red-legged frogs, and native grasses).
4. Discuss evolution of marine mammals from land mammals. Why would land mammals return to a marine environment?

Name _____ Date _____

Adaptation Note-taking Guide

Activity Sheet

Read your Elephant Seal Adaptation Card and list all of the ideas that you would like to include on your poster below:

Questions that I still have or things that I want to know more about:

Name _____ Date _____

Activity Sheet

Elephant Seal Adaptation Cards

A

Elephant Seal Adaptation:

Fasting

Adult male elephant seals do not eat for up to 3 months while they are on land trying to establish and maintain dominance over other males. If they were to leave their harem, other males might mate with the females. Female elephant seals fast for a month while they give birth, nurse their pups, and mate. Weaners will fast for 1 to 2 months after weaning. This is an advantage because it postpones the time they need to search for food until they have learned to swim.

B

Elephant Seal Adaptation:

Concentrated Urine

Animals need to flush out wastes that are formed by digesting food for energy. One type of waste formed through digestion is urine. Urine helps to flush out toxins and excess water. Elephant seals have large and powerful kidneys, an adaptation that concentrates large amounts of toxins into a small amount of urine. This helps them to save precious water all the time, but especially while fasting. Elephant seal urine is thick and brightly colored.

C

Elephant Seal Adaptation:

Energy from Fat

In adult males, blubber may account for nearly 50 percent of an adult male's weight at the beginning of the breeding season. By the end of breeding season adult elephant seals (of both sexes) lose about one-third of their weight. Blubber is an adaptation for animals that fast. When they are fasting, elephant seals use their blubber as stored energy. As they use their blubber for "food" a chemical by-product of their metabolism is water. This is how they can produce enough energy and water while fasting.

Name _____ Date _____

Elephant Seal Adaptation Cards

Activity Sheet

D

Elephant Seal Adaptation:

Thermoregulation: Keep Cool, Stay Warm

Elephant seals have "shunts" in their circulatory systems. A shunt acts like a valve, diverting blood flow in one direction or another. When in the water, they shunt blood away from their body surface in order to keep their core and vital organs warm. When on land, they cool off by sleeping with a front flipper raised straight up in the air. They shunt blood to the surface and heat is "dumped" into the air. Blubber helps them stay warm in cold water. It insulates like a wetsuit. Imagine that a human wetsuit is a quarter-inch thick, and an elephant seal blubber layer may be 6 inches thick. So much blubber makes it hard to stay cool on land. Sometimes elephant seals sleep in tidepools or rain puddles. This is a good adaptation for staying cool and losing less water to evaporation. Elephant seals also flip cold, damp sand on their backs to reflect the sun away and stay cool.

E

Elephant Seal Adaptation:

Chest Shields

As a secondary sex trait (like a man's beard), male elephant seals develop a hard chest shield of thickened skin and scar tissue. It begins to develop when the animal is about 2 to 3 years old. By the time the male is a fully developed bull, about 8 to 9 years old, the shield covers most of the chest. It grows up to slightly above the level of the male's eyes, almost forming a type of "necklace." The chest shield protects them from major injuries during fights with other males.

F

Elephant Seal Adaptation:

Big Noses/ Proboscis

As a secondary sex trait (like a man's deepening voice), male elephant seals develop a large bulblike snout known as a proboscis. Females and young males are very hard to tell apart. But when a male is about 2 years old, and the nose starts to grow, they can easily be distinguished. By the time a male reaches sexual maturity, at about 4 years, its nose may be a foot long. A fully developed bull, age 8 or 9 years old, may have a nose 2 feet long. The size of the snout and the loudness of the vocal threat will often discourage a challenge and allow a male to save energy by avoiding actual battles.

Name _____ Date _____

Elephant Seal Adaptation Cards

Activity Sheet

G

Elephant Seal Adaptation:

Delayed Implantation

Most adult female elephant seals mate and have a pup each winter. A pup is born 11 months after its mother mates. But a female elephant seal does not become pregnant immediately after mating. Fetal development stalls for 2 to 3 months; then the embryo implants on the wall of the uterus and the active gestation period of 8 to 9 months begins. Delayed implantation allows the pregnant female to build her strength back up (after fasting) before the new fetus begins to develop. This adaptation also makes it possible for birthing and mating to occur close together while large numbers of mature animals are on the same beach.

H

Elephant Seal Adaptation:

Female Choice in Mates

Female elephant seals have some choice in deciding with which male they will mate. If they are not ready to mate they protest, resist, and try to escape. When approached by a male other than the dominant bull, the female will usually protest loudly to alert the dominant bull of the other male's presence. These behavioral adaptations enable the biggest, strongest males to mate with females. Sometimes, however, less dominant males do succeed in mating with a receptive female, and often females mate with nondominant males as they leave the colony.

I

Elephant Seal Adaptation:

Deep Continuous Diving at Sea

Elephant seals dive deeper and longer and more often than any other marine mammal. The average adult dive is about 1,500 feet, but they often dive over 5,000 feet deep (about a mile)! They stay down an average of 22 minutes but may remain underwater for more than 90 minutes. They spend 3 to 5 minutes resting at the surface and then dive again. They do this continuously, spending 85 to 90 percent of their time underwater. Scientists are not sure why elephant seals are able to accomplish this, but they suspect that at such great depths elephant seals have almost no competition for their food. They are also safer from their primary nonhuman predator, the great white shark. Scientists are not absolutely certain about what elephant seals eat, but it is likely that they feed on octopus, squid, rays, hake, salmon, and rockfish.

Name _____ Date _____

Activity Sheet

Elephant Seal Adaptation Cards

J

Elephant Seal Adaptation:

Vocalizations

The sounds made by elephant seals are distinctive, meaningful, and play a role in their social order. Males rear up, throw back their heads, open their mouths wide and trumpet to advertise challenges and threats. Females use different sounds to discourage unwanted suitors and to warn other females away from their pups. Each mother and pup have special vocalizations that are instantly recognized by each other. These help to keep the female and pup together during the first week of nursing. Scientists have determined that different colonies even have different dialects.

K

Elephant Seal Adaptation:

Molting

All mammals lose and replace their hair. For example, dogs and humans shed their hair. Similarly, elephant seals molt. Once a year elephant seals lose and replace all their hair over a period of just a few weeks. They slough off their fur in patches and this is called a radical molt. This process reduces insulation, due to hair loss, and requires increased blood flow to the skin's surface in order to supply nutrients to the newly growing hair. Because heat loss occurs more rapidly in water than on land, elephant seals haul out onto beaches while the radical molt occurs.

L

Elephant Seal Adaptation:

Black Pup Fur

Pups are born with soft, black fur attached to skin that is extremely loose and wrinkled. A newborn has no blubber, but gains weight very rapidly, nursing on milk that is up to 50 percent fat (human mother's milk is 4 percent fat). Until the pup has accumulated blubber, its black fur, which absorbs heat, helps the pup keep warm. The black coat begins to molt within 3 to 4 weeks, and is replaced by silvery-tan hairs, in a process that takes 2 to 3 weeks to complete.

Name _____ Date _____

Activity Sheet

Elephant Seal Adaptation Cards

M

Elephant Seal Adaptation:

Sleep Apnea/ Breath Holding

Elephant seals' nostrils have the ability to remain closed when the animal is at rest. This allows the seal to sleep at sea without drowning. It also means the animal is not breathing while sleeping (sleep apnea). Upon waking, the nostrils must be snorted open. The apnea duration varies according to age, but can last between 4 and 10 minutes. Sleep apnea is a great strategy for conserving energy and water loss while on land.

N

Elephant Seal Adaptation:

Locomotion

The flippers of seals are different from those of sea lions, and therefore they move differently on land and in the ocean. Seals have shorter front flippers they hold close to their bodies as they swim, using powerful hip muscles and their rear flippers to propel them. Seals cannot rotate their rear flippers forward under their bodies. When moving on land they move with their front flippers and heave their bodies forward, undulating like an inchworm. Their rear flippers drag uselessly behind. Because they are not able to climb onto rocks, they haul out on low sloped, sandy beaches. When necessary, elephant seals can move very quickly for short distances.

O

Elephant Seal Adaptation:

Thermoregulation: Size Matters

Elephant seals are BIG. Males grow up to be 15 feet long and may weigh more than 5,000 pounds. Females grow to 9 feet long and weigh about one-third as much as adult males. Pups are 3 to 4 feet long and weigh 60 to 80 pounds at birth. Elephant seals' blubber accounts for much of their weight and is an adaptation to help them stay warm. The bigger an animal is, the less surface area (or skin exposed to the air) it has in relation to its volume, so it loses less heat.

Name _____ Date _____

Activity Sheet

Elephant Seal Adaptation
Thermoregulation: Size Matters

Elephant Seal Bull

13–18 feet

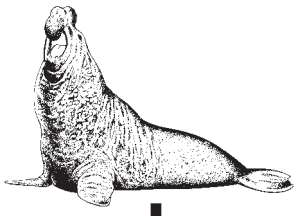
Elephant Seal Cow

8–10 feet

Elephant Seal Pup

3–4 feet

Who Is in the Elephant Seal's Food Pyramid?



Students will construct a food pyramid to lay a foundation for understanding the elephant seal life cycle and behaviors.

Time required: 90 minutes

Location: classroom

Suggested group size: entire class working in teams

Subject(s): science, art

Concept(s) covered: food pyramid, human ecology

Adapted from: MARE: Marine Activities, Resources and Education
Regents of the University of California

Written by: Heidi Strickfaden and Kim Linse, National Park Service

Last updated: 12/12/00

Student Outcomes

At the end of this activity, the students will be able to:

- Understand the elephant seals' role in a food pyramid.
- Understand human's role in every food pyramid.

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade	5a- food webs
	5b- matter is transferred from one organism to others in the food web
	7d- communicate the steps and results from an investigation
7th grade	7a- appropriate tools and technology to collect and display data
	7c- communicate logical connections

National Science Standard Links (grades 5–8)

This activity is linked to the national science standards in the following areas:

- Content Standard A – Use appropriate tools and techniques to gather, analyze, and interpret data
- Content Standard C – Populations and ecosystems, diversity and adaptations of organisms
- Content Standard F – Populations, resources, and environments

Materials

To be provided by the teacher:

- Art supplies for drawings
- Research materials: Field Guide to Pacific Coast Fishes (Peterson), Pacific Coast Field Guide (Audubon), Internet access, encyclopedia

To be photocopied from this guide:

- **Marine Food Pyramid** activity sheet

Vocabulary

diatom, food chain, food pyramid, habitat, krill, niche, primary producer, zooplankton, 1st–4th order consumer

Procedures

1. **Ecology Discussion**

   Lay the foundation for your lesson with the following background information:

   Just as we depend on community members such as doctors, police officers, and grocers to help support our daily activities, other living organisms depend on each other and various ecosystem functions for survival. Within natural communities, living organisms have a place to live (habitat) and a job (niche). Some living organisms are producers; others are consumers. Together with their varied niches, these living organisms form a balanced pyramid. This pyramid illustrates the flow of energy from one tier, or trophic level, to the next. As you move up the food pyramid, less biomass (or fewer organisms), is present at each trophic level than at the lower level. Organisms that are higher on the food pyramid generally require more biomass, or energy, from the lower levels for survival. If any one level becomes too large or too small, the pyramid can topple.

   Understanding the place that elephant seals hold in their food pyramid lays a foundation for understanding their life cycles and behaviors. In addition, understanding the connection between these various trophic levels allows us to understand the direct and indirect ways in which elephant seals are impacted by the health and abundance of organisms at these different trophic levels.

2. **Discussion of Food Pyramids**

   Start by discussing food pyramids. What is a food pyramid? What does it mean to be on the top of the food pyramid versus the bottom? Discuss individual organisms and their role as producers and consumers. Discuss differences between 1st–4th order consumers. If students are having difficulty understanding this concept use an example of a food pyramid from another organism (i.e. mountain lion, grizzly bear). Discuss differences between 1st–4th order consumers. Why is it important for us to understand food pyramids when studying elephant seals?

   Next discuss elephant seals and their role in the food pyramid. Who eats elephant seals? Who do elephant seals eat? What type of consumer are they? What is their habitat? What is their niche? Who do they have to compete with for survival? What do they do to avoid competition?

3. **Students Research Food Pyramid Organisms**
   Students work in groups and research organisms from the following list. Students will refer to previously gathered research material and the section of the elephant seal newspaper entitled "What Do Elephant Seals Eat?"

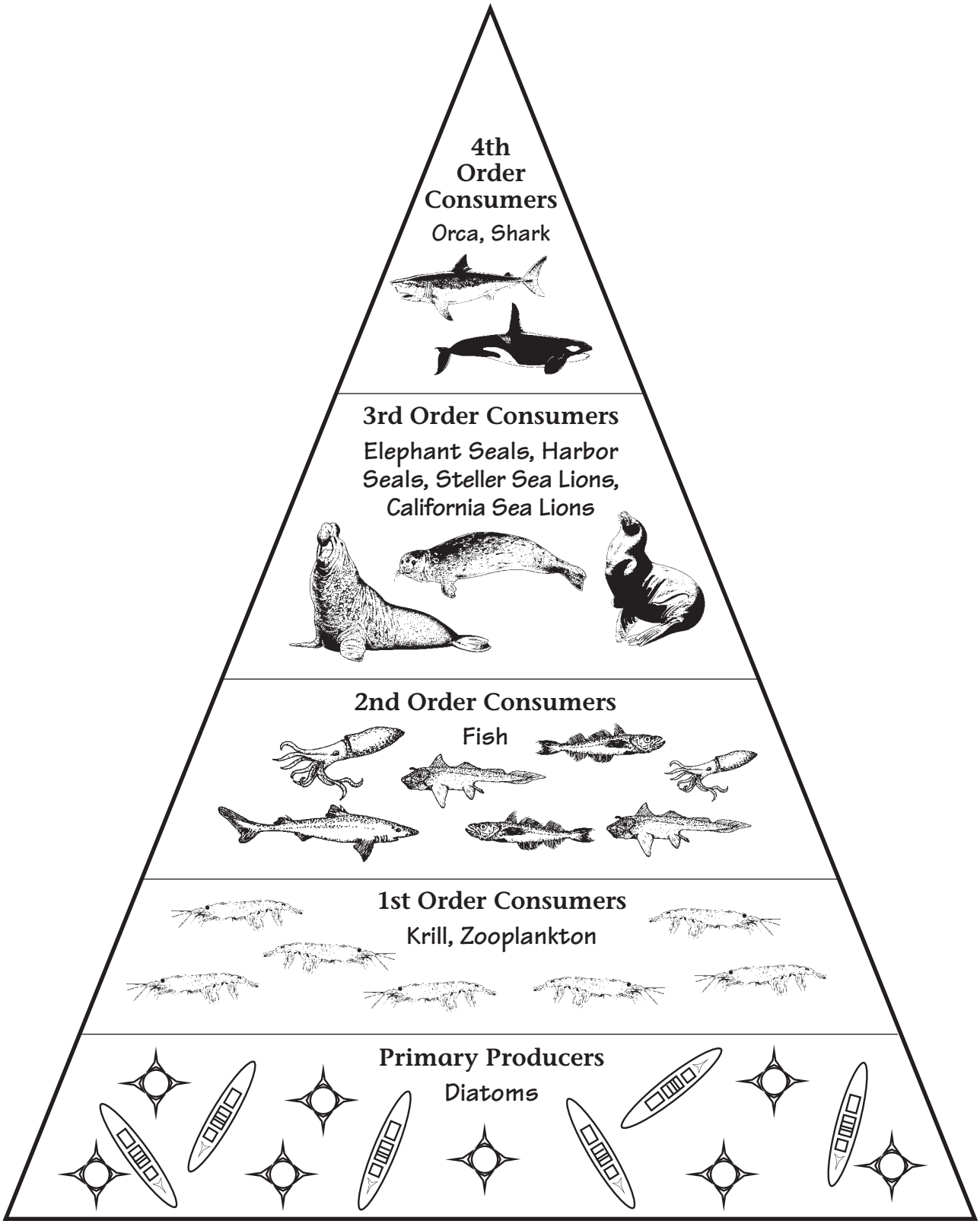
white shark	orca	elephant seal	harbor seal
steller sea lion	California sea lion	fish	squid
octopus	dogfish	Pacific hake	skate
ray	smaller shark	bottom	fish ratfish
rockfish	krill	zooplankton	diatom

   Students' reports should include a picture of their organism and answer the following questions:
   1. What is your organism?
   2. List three characteristics that describe your organism.
   3. Where does it live? what depth? what temperatures?
   4. What does it eat (prey)?
   5. What eats it (predator)?
   6. Where is your organism's place in the food pyramid?
4. **Students Create a Food Pyramid**
   Either on the chalkboard, or on a large piece of poster paper, create a blank food pyramid for the class. Use the **Marine Food Pyramid** activity sheet as a model. Starting with primary producers, have students assemble their pictures in the appropriate tiers of the pyramid and give a brief description of their organism. As other reports are presented, string or chalk can be used to draw in food chains as they are mentioned. Once the master food pyramid is complete, students should transcribe the information onto their blank individual **Marine Food Pyramid** activity sheet.
5. **Discussion of Human Impacts**
   When pyramid construction is complete, begin discussion of humans' impact on food pyramids. Where do humans fit into this food chain? Are human populations balanced with their position in the food chain (i.e., higher order consumers usually have lower population numbers because of their large territory sizes)? How could human impacts on the different trophic levels impact elephant seals?

Extension ideas

1. Reconstruct pyramid as a hanging mobile or mural.
2. Draw a food pyramid that includes humans/ human impacts.
3. Write a story about a year in the life of an elephant seal. Write from the perspective of a mature cow, bull, weaner, or newborn pup. Refer to the elephant seal newspaper to review lifecycle information. Include diet, adaptations, successes and challenges.

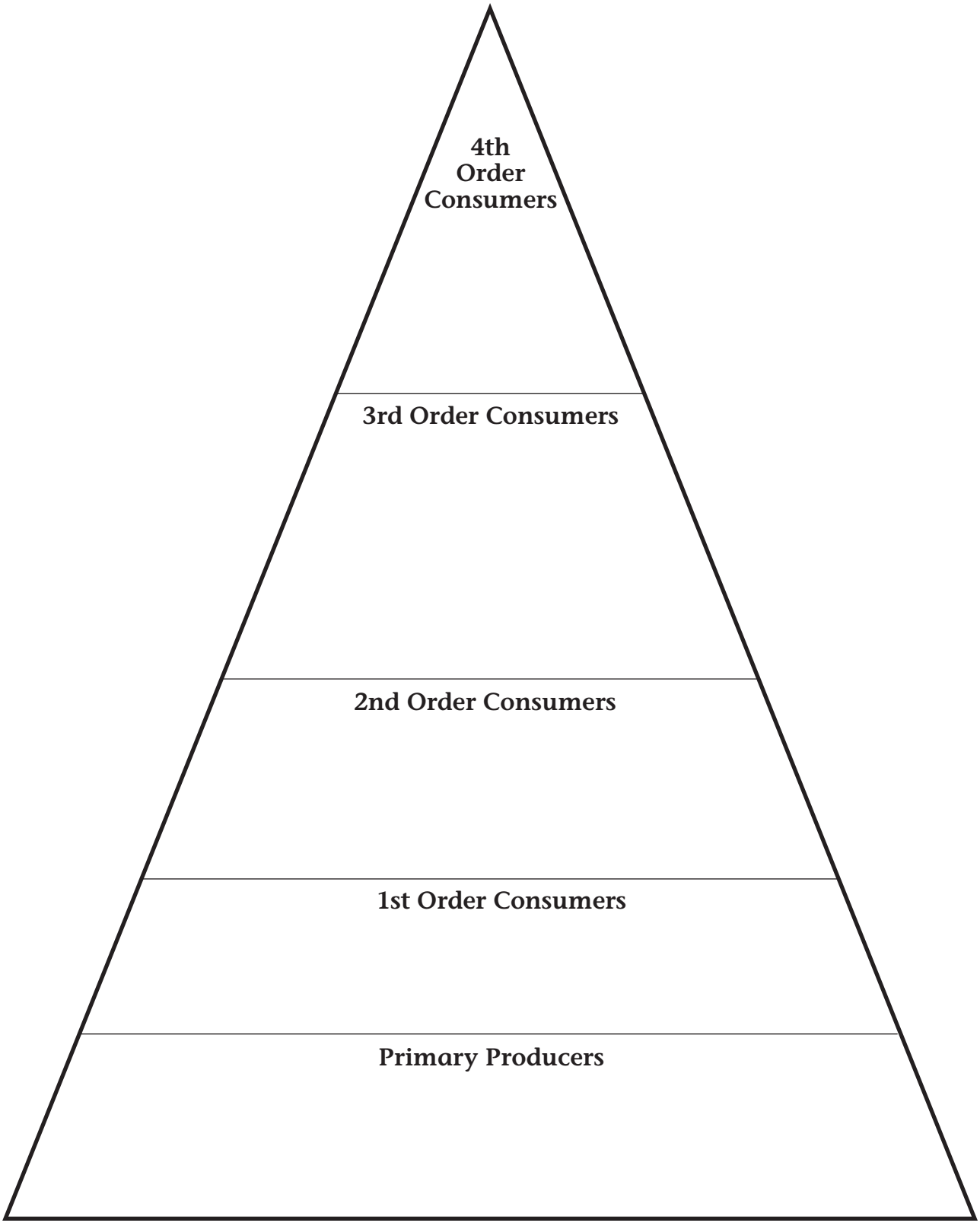
Marine Food Pyramid



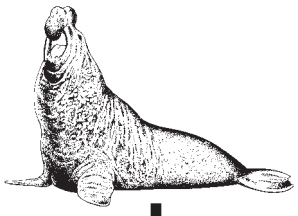
Marine Food Pyramid

Activity Sheet

Use this page to construct a food pyramid for elephant seals. If time allows, draw pictures of the organisms.



What Can We Expect On Our Field Trip to Observe Elephant Seals?



Students will prepare for upcoming field visit by constructing and reviewing personal field journal expectations. It is imperative that students become familiar with their field journals prior to their visit to insure a focused and satisfying experience.

Time required: 1 hour

Location: classroom

Suggested group size: all

Subject(s): science, math, writing

Concept(s) covered: elephant seal identification and behaviors

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 12/05/00

Student Outcomes

At the end of this activity, the students will be able to:

- Utilize field journals while viewing elephant seals.

California Science Standards Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade
- 5a- food webs
- 5e- the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors, such as quantity of light and water, range of temperatures, and soil composition
- 7b- appropriate tools and technology to perform tests, collect/display data
- 7h- identify changes in natural phenomenon over time without manipulation the phenomenon (e.g., a tree limb, a grove of trees, a stream, a hill slope)

7th grade
- 7a- appropriate tolls and technology to perform tests, collect and display data

8th grade
- 9b- evaluate the accuracy and reproducibility of data

Pre-Visit Lesson Plan

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A – Use appropriate tools and techniques to gather, analyze, and interpret data; understanding about scientific inquiry.
- Content Standard G – Science as a human endeavor; nature of science: students formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models

Materials

To be photocopied from this guide:

- Field journals for each student and chaperone (located in first onsite lesson plan)
  (NOTE: there are four journal sheets that need to be copied twice for each journal: Field Census, Behavior Survey, Behavior Field Notes, and Habitat Survey. All other journal sheets only need to be copied once for each journal.)
- Optional journal sheets (see on-site lesson "How Can I Capture My Experience in a Poem or a Drawing?")

Available for checkout at Bear Valley Visitor Center or use at Clem Miller:

- Elephant Seal Kit

Vocabulary

carrying capacity, habitat, subadult, weaner

Procedures

1. **Construct Field Journals**
   Have the students construct their field journals. See the attached sheet for **Tips for Constructing Field Journals**. Hand out photocopies of field journal sheets and have students assemble their field journals.

   Journals should be in the following order:
   Things to Remember while on Elephant Seal Field Trip
   Field Identification of Elephant Seals
   Elephant Seal Overlook Observation Sheet
   Lifeboat Station Observation Sheet
   Field Census (for Elephant Seal Overlook)
   Behavior Survey (for Elephant Seal Overlook)
   Behavior Field Notes (for Elephant Seal Overlook)
   Habitat Survey (for Elephant Seal Overlook)
   Lifeboat Station Observation Sheet
   Field Census (for Lifeboat Station)
   Behavior Survey (for Lifeboat Station)
   Behavior Field Notes (for Lifeboat Station)
   Habitat Survey (for Lifeboat Station)
   Scar Card
   Tagging and Marking of Pinnipeds
   Tag Colors and Locations
   Other Marine Species Sighting Log
   Vocabulary

2. **Review Field Trip Logistics**
   Upon arrival at Point Reyes National Seashore one group will travel to Elephant Seal Overlook and the other to Historic Lifeboat Station. After a predetermined amount of time, the two groups will switch locations. The on-site lesson explains this in more detail.
3. **Review Field Journals**
   Once journals are completed, review field activities by having students turn to appropriate pages in their journals as you review expectations and directions. Students should also record their names and school name at the top of each sheet.

   - **Things to Remember while on Elephant Seal Field Trip**
     This sheet will be used as part of the next lesson Safety and Stewardship Challenge.
   - **Field Identification of Elephant Seals**
     Review the different ages and sexes of elephant seals prior to field trip so students will be able to tell individuals apart. (Males have long noses and a dark round opening on their belly that looks like a "belly button." This is the penile opening.)
   - **Elephant Seal Overlook Observation Sheet**
     Students will be standing at the Elephant Seal Overlook to complete this sheet along with Field Census, Behavior Survey, Behavior Field Notes, and Habitat Survey. Students will be marking the locations of elephant seals along the map and noting presence of alpha males or pups.
   - **Lifeboat Station Observation Sheet**
     Students will be standing at the end of the pavement behind the Lifeboat Station to complete this sheet along with Field Census, Behavior Survey, Behavior Field Notes, and Habitat Survey. Students will be marking the locations of elephant seals along the map and noting presence of alpha males or pups.
   - **Field Census**
     A field census will be completed at both locations: Elephant Seal Overlook and Lifeboat Station. Students should start with the first column differentiating "Over one year old", "Under one year old", and "Visitors". A check mark or number should be placed in the boxes to indicate number observed. Once students complete the first column, they may then differentiate the "Over one year old" into males and females in the second column. Each column gets more difficult to differentiate, as some students may then be able to break the males into alphas and subadults.
   - **Behavior Survey**
     A behavior survey will be completed at both locations, Elephant Seal Overlook and Lifeboat Station. Students should observe elephant seals for a predetermined amount of time and place check marks in the appropriate column.
   - **Behavior Field Notes**
     A behavior field notes sheet will be completed at both locations, Elephant Seal Overlook and Lifeboat Station. Students should observe elephant seals for a predetermined amount of time and describe three behaviors observed in narrative format.

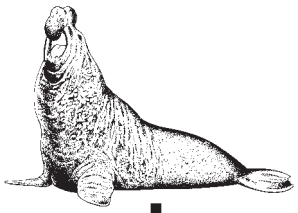
- **Habitat Survey**
  A habitat survey will be completed at both locations, Elephant Seal Overlook and Lifeboat Station. Students should fill out information and answer questions to the best of their ability.
- **Scar Card**
  If students notice an individual elephant seal that stands out because of unusual markings, scars, shark bites, or other wounds, they should record their observations on this sheet. Instruct students to draw what they see in the right location on the seals' body.
- **Tagging and Marking of Pinnipeds**
  If students notice that some seals or sea lions have tags or other research devices on their body, instruct students to record their observations on this sheet. If students can read the numbers on the tags, they should record that information and report it to the Seashore.
- **Tag Colors and Locations**
  If students notice the color of a tag or other research tool, this chart will indicate at which location the seal or sea lion was tagged.
- **Other Marine Species Sighting Log**
  If students see other marine species, such as other pinnipeds, birds, or whales, their observations may be recorded here. Field guides in the teacher backpack (which may be checked out from Bear Valley Visitor Center) will aid in identification.
- **Vocabulary**
  Students should note any words and/or definitions they may forget while on field trip. This last sheet will then serve as a reference guide.

4. **Field trip preparation**
   Review list of what students should bring on field visit.

Extension ideas

1. Research other laws written to protect mammals, plants and amphibians in Point Reyes National Seashore, California, and the United States. What happens if a protected animal leaves the area affording protection?
2. Research the role of a marine biologist. What is done with information biologists collect in the field, and how does it help the organism being studied?
3. Have students assume the role of aliens coming to study humans and their pets. What type of field journal would they need?

Tips for Creating Field Journals



Materials

- ❑ Field Journal Sheets for each student, teacher, and chaperone
- ❑ One package blank paper and one package lined paper
- ❑ colored paper, card stock, or cardboard for journal covers
- ❑ magic markers or colored pencils for decorating covers
- ❑ 3-hole punch
- ❑ string, binding tape, or twigs and rubber bands for binding
- ❑ pencil on a string for each student
- ❑ two plastic pencil sharpeners and extra pencils for field trip
- ❑ one box of large ziplock bags to rainproof journals

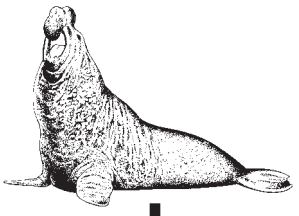
Procedures

1. Photocopy all of the unit handouts and provide each student with double-sided copies. Use recycled paper if it is available.
2. Provide five additional blank sheets of paper and five lined sheets of paper to each student.
3. Have students create front and back covers for their journals using blank sheets of paper.
4. Have students bind their journals using binding tape, hole punches and string, cardboard, or twigs bound by rubber bands threaded through holes. If they do not bind their journals, it is essential that students use a clipboard on the field trip.
5. Once journals are bound, have them decorate the covers.
6. Have each student attach a sharpened pencil on a long string through a hole in the journal binding.
7. Have students use magic markers to write their names on the front covers of their journals.
8. Students will need a sturdy writing surface behind their field journals. Incorporate cardboard as the last page or have clipboards available for each student.

Extension ideas

1. Create a journal that is used throughout the year.
2. Share student journals with parents at open houses and/or to educate others.
3. Students may choose to use their journals to create a class newsletter, resource newspaper, or a class website.

Safety and Stewardship Challenge



Students will learn methods for observing elephant seals and understand proper behaviors in a National Park. This will be accomplished by simulating a group "game show" and completing the first page of their field journals.

Time required: 1 hour or more

Location: classroom

Suggested group size: any

Subject(s): science

Concept(s) covered: low impact use of natural areas, visitor behaviors in a National Park, safety

Written by: Christie Denzel Anastasia and Lynne Dominy, National Park Service

Last updated: 05/21/00

Student Outcomes

At the end of this activity, the students will be able to:

- List three safety precautions for upcoming field trip.
- List three proper behaviors for viewing elephant seals.
- Understand the concepts of the National Park Service and stewardship.

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following area:

- Content Standard F – Personal health: injury prevention; populations, resources, and environment

Materials

To be provided by the teacher:

- Desk bell (or other device to indicate which team can answer question first)

To be photocopied from this guide:

- **Challenge Questions** (one set)

Vocabulary

stewardship

Procedures

1. **Divide class into teams.**
   Option A: If class can work as large teams, divide the class into two teams. Each team will need a spokesperson and team name. Answers will come from the entire group. Spokesperson can change throughout the game.
   Option B: If class gets too loud, students can still be divided into teams, but answers will come from individuals on each team. One person from each team will be assigned a number. Team A and Team B will each have a #1, #2, etc. Randomly choose a number from hat. The student with that specific number from each team will be responsible for answering the question. Random choice of numbers will help students pay attention if they aren't quite sure when their turn will occur.
2. **Draw Challenge Grid and Scorecard on blackboard**
   There are four categories with questions of varying value. As a finale, there is a final challenge question. Draw this grid on the chalkboard:

<table>
<tr><td colspan="4">Safety and Stewardship Challenge</td></tr>
<tr><td>Category #1
Take Care of Yourself</td><td>Category #2
Minimize Your Impact</td><td>Category #3
Elephant Seal Etiquette</td><td>Category #4
The National Park Service</td></tr>
<tr><td>1 point</td><td>1 point</td><td>1 point</td><td>1 point</td></tr>
<tr><td>2 points</td><td rowspan="2">2 points</td><td>2 points</td><td rowspan="2">2 points</td></tr>
<tr><td>3 points</td><td>3 points</td></tr>
<tr><td rowspan="2">4 points</td><td rowspan="2">3 points</td><td>4 points</td><td rowspan="2">3 points</td></tr>
<tr><td>5 points</td></tr>
<tr><td colspan="4">Final Challenge</td></tr>
</table>

3. **Choose Game Show Hosts**
   Option A: Teacher is responsible for asking all of the questions.
   Option B: Four students will become "Challenge Hosts". Each student receives questions for a specific category and will ask appropriate questions according to point value.

4. **Rules of the Game**
   - A coin flip will determine which team goes first.
   - The challenge will end when a predetermined time runs out or when all questions have been answered.
   - Team will decide which category and value of question will be asked.
   - Spokesperson or individuals will poise themselves on either side of the desk bell with one hand behind their back.
   - After the question is asked, the first team to have an answer will ring the bell and respond. If they are correct, the team receives the full point value.
   - If they are incorrect, the other team gets a chance. If they also get it wrong, the first team can try again for one less point.
   - When brainstorming answers, students should whisper, or the other team might hear their answers.
   - When all of the categories are complete (or 5 minutes before a predetermined "game-over" time), class will go into "Final Challenge". Each team decides on amount of wager, listens to question, and writes down answer on a sheet of paper. Each team will then reveal answer.
   - At the end of the challenge, the team with the most points "wins", but everyone wins if your visit to Point Reyes National Seashore will be safe for themselves and the resources.
5. **Complete first page of field journal:**
   Using the information gained in this "game show", have students list at least three items under each category on the first page of their journal ("Things to Remember While on Field Trip"). Use the **Safety Issues: Elephant Seal Unit** at the end of this lesson as a guide.

Safety and Stewardship Challenge Questions

CATEGORY #1: Take Care of Yourself

1 point

Bring a water bottle and drink plenty of water because . . .

A . . . you will not be able to speak well with a dry throat.

B ***. . . not drinking enough water can give you a headache and cause you to make bad decisions.***

C . . . a heavy water bottle will slow you down as you are walking.

D all of the above.

2 points

If the sun feels warm, you should . . .

A . . . try to get a tan.

B ***. . . use sunglasses, sunscreen, and/or a hat.***

C . . . take off your shoes and walk barefoot.

D all of the above.

3 points

Cliff edges in Point Reyes National Seashore are . . .

A . . . made of granite and are safe as long as you have one foot flat on the ground at all times.

B ***. . . sandy, loose, and slippery; be careful at all times.***

C . . . safe if you have good balance.

D . . . the best places for a good view.

4 points

The best way to dress for a field trip:

A comfortable closed-toed shoes.

B a T-shirt and a heavy, waterproof jacket.

C "like an onion"—many thin layers with a waterproof one on the outside.

D ***A and C.***

Safety and Stewardship Challenge Questions

CATEGORY #2: Minimize Your Impact

1 point

When visiting Point Reyes National Seashore, you should stay on trails because . . .

A . . . you are more likely to pick up a tick in grassy areas.

B . . . you can damage plants.

C . . . when you travel off-trail you are speeding up erosion.

D ***All of the above.***

2 points

It's okay to take home just one rock from Point Reyes National Seashore.

A Sure; it's just one, but let your teacher know.

B No; every rock is home to many bugs and plants.

C No; with 2.5 million visitors, the Seashore would be rockless if every visitor collected just one.

D ***B and C.***

3 points

Trash is . . .

A . . . okay to hide behind bushes in a National Park because it will eventually break down.

B . . . not a good source of food for hungry animals.

C ***. . . not a part of the Point Reyes National Seashore ecosystem and should be properly disposed of whether it's your trash, or trash that someone else has left behind.***

D . . . only the responsibility of the maintenance staff, wherever it is.

Safety and Stewardship Challenge Questions

CATEGORY #3: Elephant Seal Etiquette

1 point

If an elephant seal is close, you should try to . . .

A . . . feed it some of your lunch.

B ***. . . leave it alone, if it reacts to your presence in any way, you are disturbing the seal and breaking the law.***

C . . . make alpha bull noises so it will look your way.

D . . . yell really loud to your entire group so everyone sees it, even if it may scare the elephant seal away.

2 points

Stay at least . . .

A 1 foot from a marine mammal.

B 10 feet from a marine mammal.

C ***100 feet from a marine mammal.***

D Get as close as you can.

3 points

The best way to observe elephant seals is to . . .

A watch quietly from a safe distance of at least 100 feet.

B whisper.

C move slowly.

D ***all of the above***

4 points

Feeding wildlife will . . .

A . . . bring them closer for a good look and great photo.

B . . . put you in danger of being bitten.

C . . . accustom them to humans and possibly create behaviors harmful to the animal's survival.

D ***B and C above.***

5 points

If you come across wildlife appearing sick or injured, you should . . .

A try to capture the animal and seek medical attention.

B ***report the location, species, and your observations to someone responsible for its management (Park Rangers in National Parks, Humane Society in urban areas).***

C harass it to see just how sick it really is.

D get as close as possible to observe what is happening.

Safety and Stewardship Challenge Questions

CATEGORY #4: The National Park Service

1 point

Which of the following is not in the National Park Service?

A Grand Canyon National Park, AZ.

B Keweenaw National Historical Park, MI.

C ***Monterey Bay Aquarium, CA.***

D Golden Gate National Recreation Area, CA.

E Yosemite National Park, CA.

2 points

I should treat Point Reyes National Seashore with respect because . . .

A . . . it belongs to everyone in the entire United States.

B . . . it preserves a part of the ecosystem you live in and depend on.

C . . . it's one of the few places natural processes can happen with little intervention from human society.

D ***all of the above.***

3 points

Which of the following is the mission of the National Park Service?

A preserve natural and cultural resources.

B provide for the enjoyment, education, and inspiration of this generation.

C to care for special places saved by the American people so that all may experience our heritage.

D cooperate with other resource-conservation and outdoor-recreation organizations in our country and the world.

E ***all of the above.***

FINAL CHALLENGE

This question is worth the amount that each team agrees to wager.

What does stewardship mean?

Teacher is the final judge on this answer.

Safety Issues: Elephant Seal Unit

Personal Safety

- Watch where you are walking; the ground may be rocky, slippery, and uneven.
- Stay with your group.
- Drink plenty of water to avoid dehydration.
- Protect yourself from the sun's rays; use sunscreen and/or a hat.
- Stay on paths and in picnic areas. Grassy areas may have ticks known to transmit Lyme disease.
- Be aware of personal allergies or conditions that may cause concern on the trail.

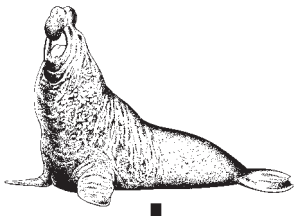
Elephant Seal Watching Tips

- For your own safety, always observe elephant seals from a distance.
- Use binoculars and spotting scopes. If a seal becomes alert or nervous and begins to move away, you are too close.
- Stay at least 100 feet from any marine mammal.
- Do not come between a cow and pup, a bull and a group of cows, or two bulls challenging each other.
- Watch quietly and whisper. Move slowly.

Remember: You are in a part of the National Park System

- Point Reyes National Seashore is a natural area set aside to protect living and nonliving components of ecosystems. Treat everything with respect.
- Allow plants and rocks and everything to continue their existence as part of an ecosystem: leave things as they are found.
- Stay on established trails, pack out trash or use garbage cans.
- Enjoy your visit and know this is your National Seashore!

How Do I Use Binoculars?



Being able to clearly see elephant seals is vital to the success of your students' field trip. Students prepare for upcoming field trip by becoming familiar with binocular structure and use.

Time required: time varies

Location: in class and/or sections at Bear Valley Visitor Center

Suggested group size: entire class

Subject(s): physics

Concept(s) covered: binocular structure and use

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 09/31/00

Student Outcomes

At the end of this activity, the students will be able to:

- Understand the structure of binoculars.
- Practice focusing on moving images with binoculars

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade: 7b- appropriate tools/technology to perform tests, collect/display data

7th grade: 6b- to see an object, light emitted/scattered must enter eyes
6d- simple lenses used in optics
7a- appropriate tools/technology to perform tests, collect/display data

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following area:

- Content Standard A – Abilities necessary to do scientific inquiry: use appropriate tools and techniques to gather, analyze, and interpret data.

Materials

To be provided by the teacher:

- 1–15 pairs of binoculars

Available for checkout at Bear Valley Visitor Center or use at Clem Miller:

- Elephant Seal Kit

Procedures

Note: This lesson can be done in various stages depending on whether or not students have access to binoculars in class.

- If students can ***bring in a pair*** of binoculars to use in class:
  This entire lesson can be conducted in class.
- If students can ***share a pair*** of binoculars to use in class:
  Procedure 1 and 2 taught to entire class. Student teams can experiment with binoculars in 10-minute intervals throughout day.
- If students ***do not have access*** to binoculars:
  Procedures 1 and 2 can be conducted in class, Procedure 3 at Bear Valley Visitor Center when students receive individual binoculars from the Elephant Seal Kit.

1. How do binoculars work?

In Theory: Before prisms were available, lens barrels had to be very long to increase the distance between eyepiece lens and objective lens to achieve magnification. These are the traditional "pirate scopes". With the introduction of prisms, the light could be bent and barrels made shorter. Binocular vision allows two images to become one for depth perception. Monoculars are like binoculars, but made for one eye and provide no depth perception.

In Structure: There are four main components of binoculars. Power is a function of these components. A 6 × 30 binocular has 6× magnification and a 30-millimeter lens. A larger lens lets in more light.

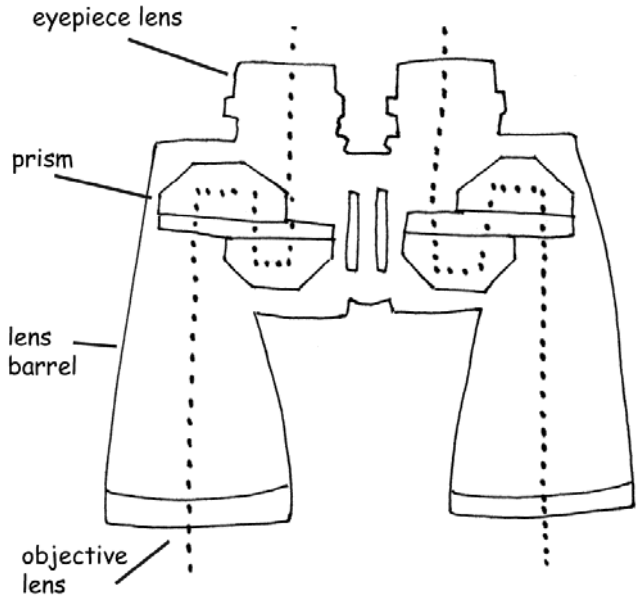
Eyepiece lens: there are several convex lenses here for magnification. This is the lens closest to your eyes.

Prism: Bends light rays and returns reverse image to normal.

Lens barrel: Keeps distance between eyepiece lens and objective lens; blocks side lighting and protects from dirt.

Objective lens: Gathers light in a convex lens. This is the lens that has a millimeter measurement (i.e., 6 × 30).

Diagram of Binocular Design



2. **How do I get binoculars to work specifically for me?**
   Taking care of binoculars:
   - Always keep them attached around your neck so they aren't accidentally dropped.
   - While you are focusing binoculars, stand still. It would be easy to fall while focusing and walking.
   - Clean binoculars properly.

   If you wear eyeglasses:
   - Keep your eyeglasses on.
   - There is usually an "eye cup" rubber piece that folds back where your eyeglasses meet the eyepiece lens.

   Things you adjust once:
   - Barrel distance: The two barrels can be moved closer or further apart depending on the distance between you eyes.
   - Right eyepiece focus: There is a knob on the right eye piece that corrects for visual differences between your two eyes. If you are seeing more than one image, adjust the right eyepiece until there is one image.

   Things you need to adjust with each observation:
   - Center focus: Adjust the center focus with each observation to bring image into view.

   Focusing on an image:
   - Adjust barrel distance and right eyepiece
   - Locate the image with your eyes. Are there any landmarks or reference points next to the image? These may help you find the image using the binoculars.

- Focus your eyes on the image. Without looking down, place the binoculars directly in front of your eyes. The rubber cup surrounding the eyepiece lens should rest against your eyebrow (unless you are wearing eyeglasses).
- Focus image into view with center focus.
- Keep elbows tucked in close to your body and both hands on binoculars to avoid a shaky image.

3. **Practice using binoculars.**

Focus on a stationary object.
Pick an object that doesn't move. Choose one near and one more distant. Use center focus.

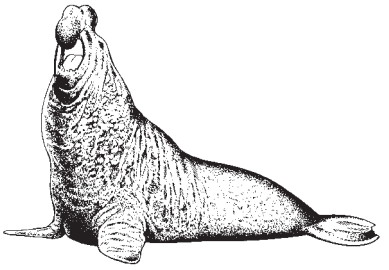
Focus on moving objects in class.
Right/left: Have a student walk slowly across the classroom while students use binoculars to keep in view. Speed up student walker to add a challenge.

Away/toward: Choose a student to move toward and away binoculars. Discuss range that binoculars will work. At some point, the object is too close to focus.

Focus on multiple moving objects at school.
Attend a sporting event or practice at a lunch session in the cafeteria. Place a wildlife poster on a piece of cardboard and stick. Have a student move around the classroom with the posterboard: slow, fast, up, down, toward, away.

Focus on wildlife.
Bring class outside in an area where they are likely to view moving wildlife such as birds.

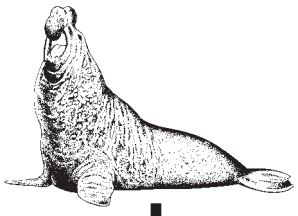
Creating
Coastal Stewardship
through Science



Discovering Northern Elephant Seals

On-Site Activities

How Can Teachers, Chaperones, and Students Make the Most of Their Field Trip?



The following lesson plan is a suggestion of how to utilize the resources, locations, and the field guide contained in this curriculum to the benefit of students while visiting Point Reyes National Seashore.

Time required: 3 hours

Location: Point Reyes National Seashore

Suggested group size: consult with Education Coordinator

Subject(s): reading, language arts, science

Concept(s) covered: stewardship education

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 12/07/00

Student Outcomes

At the end of this activity, the students will be able to:

- Correctly identify different sexes and age classes of elephant seals.
- Accurately map colony populations from an aerial view.
- Observe and categorize social behaviors.
- Survey a habitat and determine its suitability for elephant seals.

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade: 5a- food webs
5b- organisms and the physical environment
5e- the number and types of organisms an ecosystem can support depends on the resources available and abiotic factors
7b- select and use appropriate tools and technology to perform tests, collect and display data
7f- interpret a simple scale map
7h- interpret changes in natural phenomena over time

7th grade: 3e- extinction and environment
7a- select and use appropriate tools and technology
7c- communicate logical connections

8th grade: 9b- evaluate the accuracy and reproducibility of data

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A – Identify questions that can be answered through scientific investigation; Use appropriate tools and techniques to gather, analyze, and interpret data; Think critically and logically to make the relationships between evidence and explanations; Communicate scientific procedures and explanations.
- Content Standard C – Structure and function in living systems; Reproduction and heredity; Regulation and behavior; Populations and ecosystems; Diversity and adaptations of organisms.
- Content Standard F – Populations, resources, and environments

Procedures

1. **Reservations**
   Please use the reservation form provided in this unit to contact the Seashore of your plans to do a self-guided, curriculum-based field trip to Point Reyes National Seashore. If you do not make reservations, you may find multiple school groups at the Elephant Seal Overlook and too many other students to effectively focus on the reason for your visit. Let the Education Coordinator know if you would also like to reserve the Elephant Seal Kit (see Teacher Preparation for kit contents.)
2. **Prepare chaperones**
   Advise chaperones that they will need to take an active role in this field trip. Each chaperone should have a copy of the field journal and be aware of what is expected of students on each page. Provide maps of the Chimney Rock area to each chaperone (see attachments in Teacher Preparation)
3. **Travel to Bear Valley Visitor Center**
   Bear Valley Visitor Center has modern bathroom facilities and running water if your students need a break from the bus. This is also the location to pick up your Elephant Seal Kit or clarify directions to the Elephant Seal Overlook.
4. **Travel to Elephant Seal Overlook**
   There are pit toilets at the overlook and a current tide chart on the bulletin board.
5. **Form Groups**
   Student and chaperones should be formed into two groups. After a set amount of time the two groups will swap locations. The first group will travel to the Lifeboat Station and the second group to the Elephant Seal Overlook. Chaperones in each group should know at which time they should start heading toward the other location. Budget in about a fifteen-minute walk between the two locations.

6. **Things to keep in mind while walking with groups**
   - There can be limited traffic on the paved road to the Historic Lifeboat Station. Be prepared to instruct your group to one side of road should a car approach.
   - The trail to the Elephant Seal Overlook is narrow and requires students to walk single-file. Also, there may be muddy and/or slippery conditions.
   - Returning from the Historic Lifeboat Station requires walking up a steep paved hill. Designate a halfway stop to facilitate group staying together.
   - Designate lunchtime. There are three picnic tables behind Historic Lifeboat Station and grassy areas near parking lot. There are no covered areas available in windy, rainy weather other than inside personal vehicles.
   - Restrooms are only located in the Chimney Rock Parking Lot.
   - There are no sources of potable water at this location.
   - Carry a first aid kit.
7. **Field Journal Sheets**
   Students will complete the same set of journal sheets at each location (Observation Sheet, Field Census, Behavior Survey, Behavior Field Notes, Habitat Survey). Chaperones can designate a set amount of time for each journal sheet to keep students progressing through the variety of observations. The Scar Card, Tagging and Marking of Pinnipeds, and Other Marine Species Sighting Log can be completed at either location, depending on time and observations.
8. **How Can I Capture My Experience in a Poem or Drawing?**
   If these optional journal activities (third on-site lesson) are included in your students' journals, allow time for completion. You may choose to have students sit quietly apart from each other to encourage contemplation and creativity.

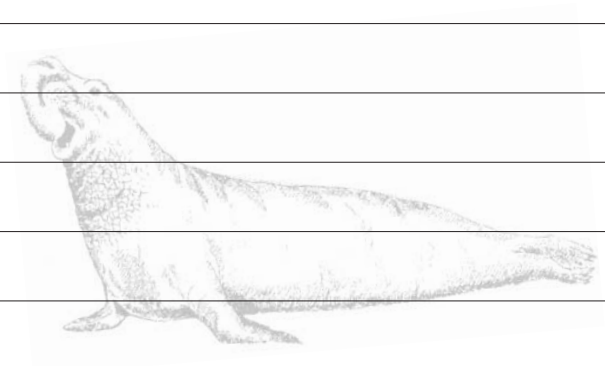
Things to Remember While on Creek Field Trip

Three Safety Precautions:

1. _____

2. _____

3. _____



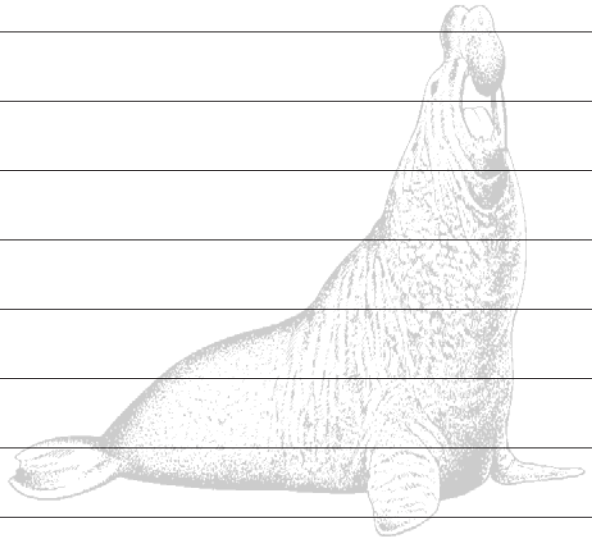
Four Resource Protection Behaviors:

1. _____

2. _____

3. _____

4. _____



Three Things to Keep in Mind When Visiting Any part of the National Park System:

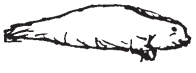
1. _____

2. _____

3. _____

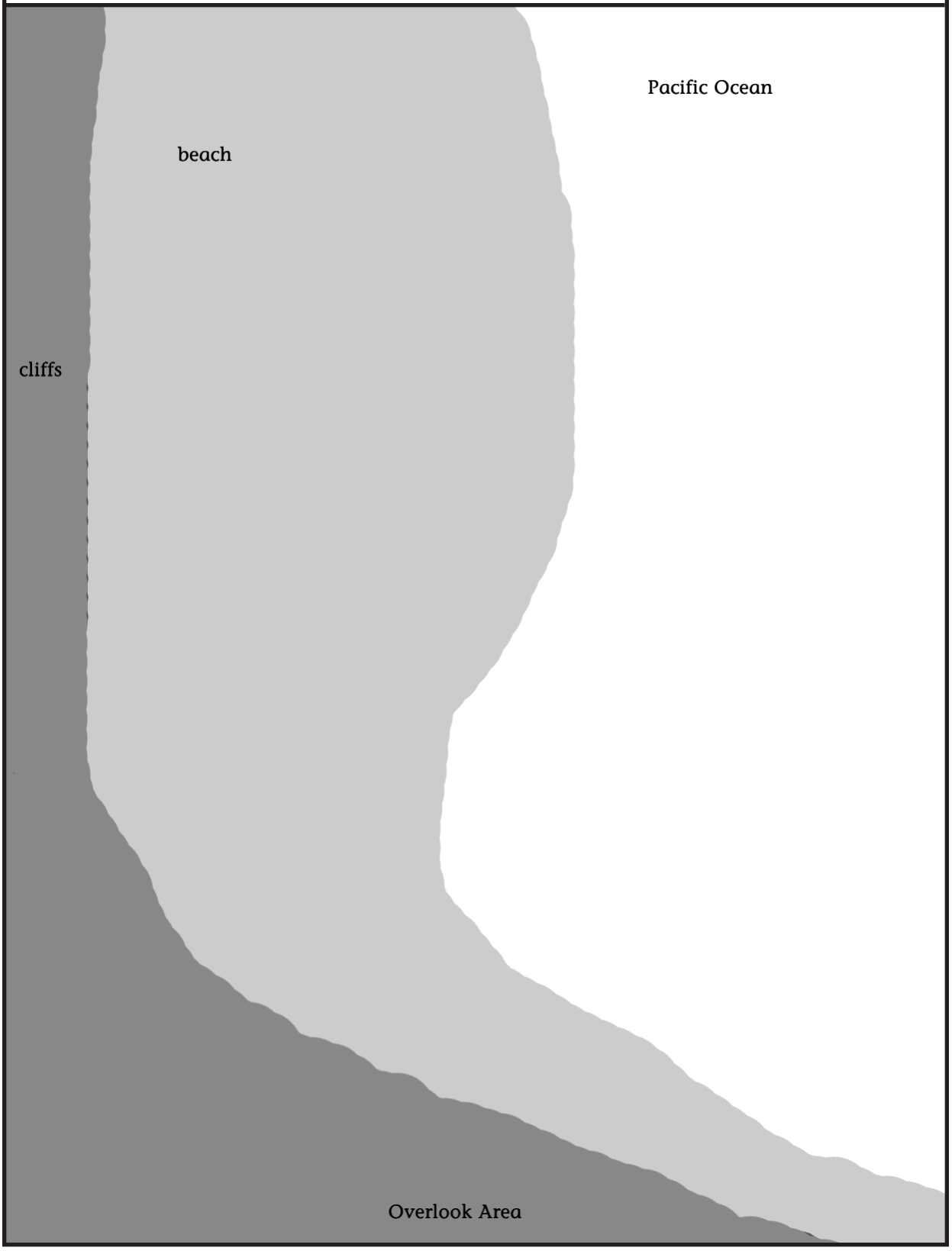
Field Journal Sheet

Field Identification of Elephant Seals

Bull 	– heavy pink scarring – chest sheild rises above eyes – big heavy nose with notch across top
Sub-adult 4 	– less scar tissue on chest – chest shield does not rise above eyes – less of a notch
Sub-adult 3 	– light scarring – while lying on sand, nose will touch ground – wrinkles on chest
Sub-adult 2 	– while lying on sand,nose will not touch ground – no chest shield – definite male nose
Cow 	– often seen with pup – can see nipples when lying on back – no big nose
Yearling 	– harbor seal size – blonder, lighter fur – smaller than other adults
Weaner 	– not associated with a female – silver coat, patchy black fur on some
Pup 	– black fur – close to a female – wrinkly when first born – nursing
	

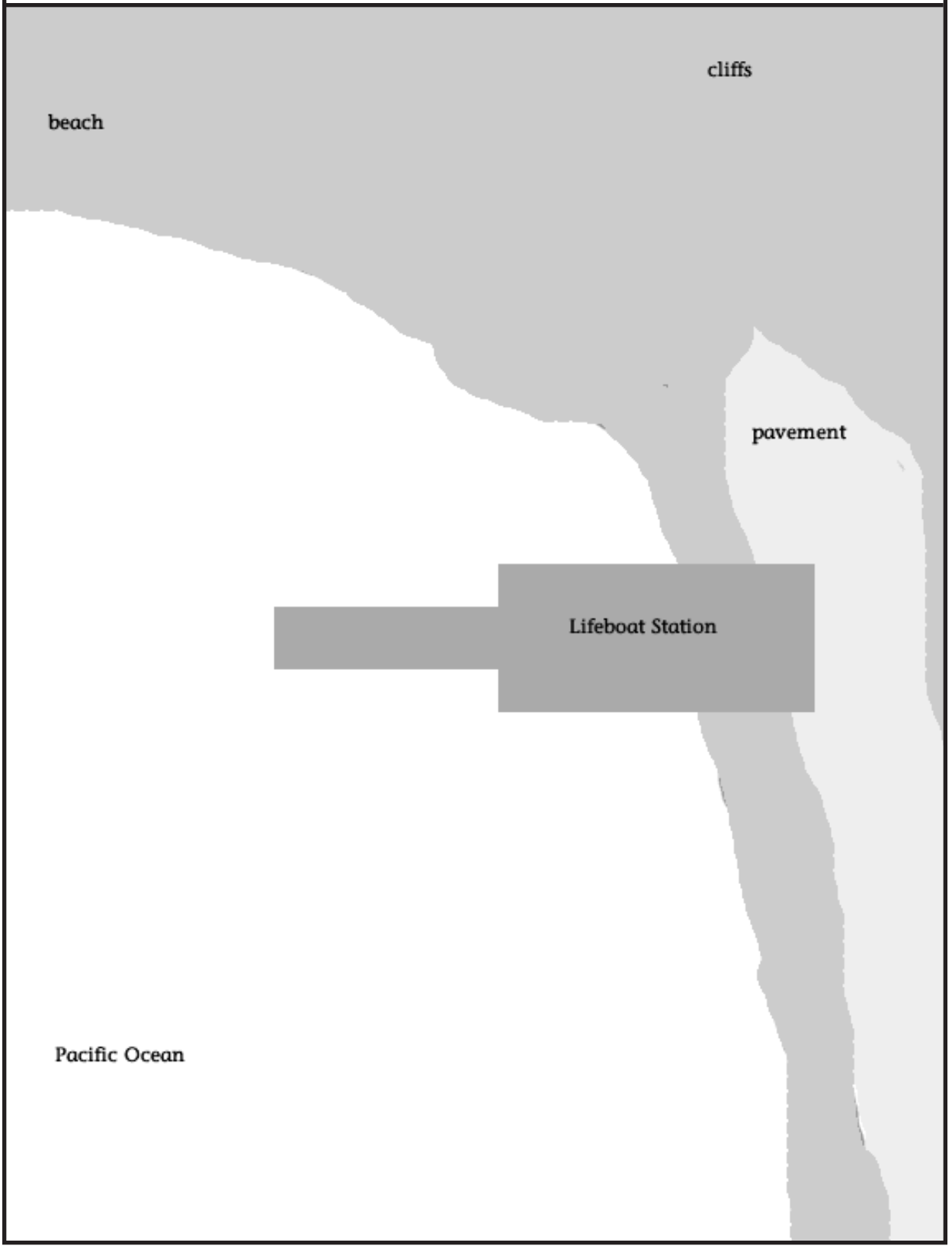
Elephant Seal Overlook Observation Sheet

Place an "X" on the map below for every elephant seal you see. Try your best to show their locations on the beach or in the water. Place an "O" if you see an alpha male, an "X" if you see a pup.



Lifeboat Station Observation Sheet

Place an "X" on the map below for every elephant seal you see. Try your best to show their locations on the beach or in the water. Place an "O" if you see an alpha male, an "X" if you see a pup.



Field Census			
Location: Elephant Seal Overlook Lifeboat Station			
OVER ONE YEAR OLD	male	alpha	
		bull	
		Sub-adult 4	
		Sub-adult 3	
		Sub-adult 2	
	female	cow with pup	
		cow without pup	
UNDER ONE YEAR OLD	yearling		
	weaner		
	pup		
VISITORS:	Describe visitor activities below:		

Field Journal Sheet

Behavior Survey				
Location: Elephant Seal Overlook Lifeboat Station				
	male	female	pup	comments
approach				
avoid				
bite				
chase				
fight				
flip sand				
float in water				
follow				
give birth				
lie alert				
lift head				
mate				
move				
nurse				
open mouth				
scratch				
shove				
sleep or rest				
sniff				
swim in water				
vocalize				

Behavior Field Notes

Use the space below to record three separate behaviors you are observing in either elephant seal colony.

Location: Elephant Seal Overlook Lifeboat Station

Location: Elephant Seal Overlook Lifeboat Station

Location: Elephant Seal Overlook Lifeboat Station

Field Journal Sheet

Habitat Survey

Take a moment to observe everything surrounding the area where elephant seals are or could be located. Use what you see and know to answer the following questions.

Location: Elephant Seal Overlook Lifeboat Station

time	tide	weather	wind	clouds
	high/low		light medium strong	none some all

What would attract elephant seals to this particular location?

Identify five human impacts on this area:

1.

2.

3.

4.

5.

List three changes to this habitat that would make it more desirable for elephant seals:

1.

2.

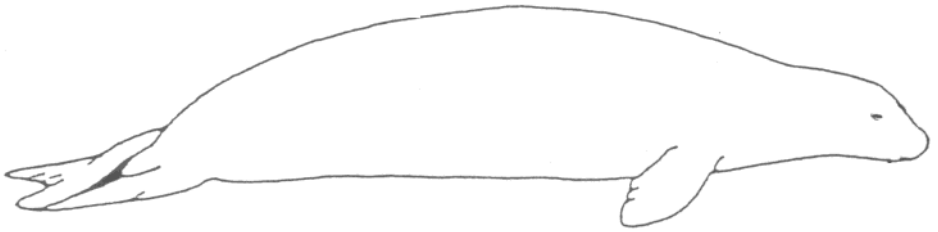
3.

Carrying capacity is the maximum number of individuals of a population that a habitat can support. What limits the carrying capacity for elephant seals in this location?

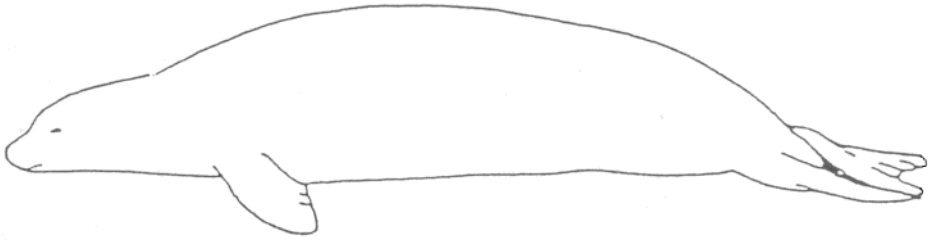
Female Scar Card

Use this scar card to note any characteristics of individual elephant seals that could be used to identify this elephant seal in the future. Mark scars, shark bites, or unusual coloration.

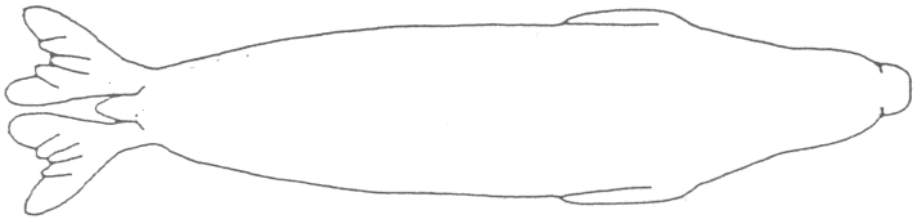
Right side view



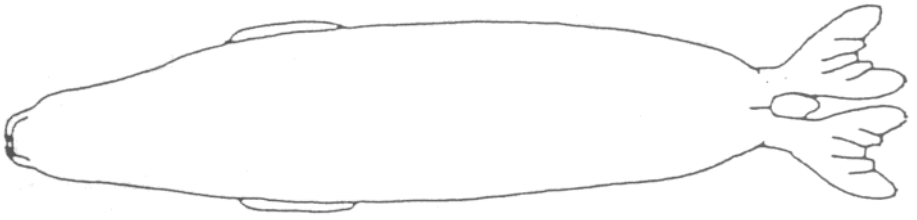
Left side view



Top side view



Bottom view



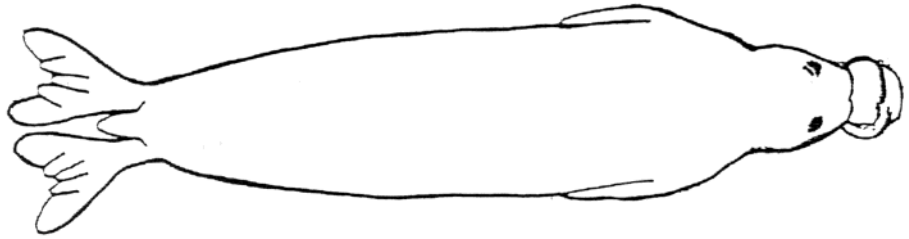
Male Scar Card

Use this scar card to note any characteristics of individual elephant seals that could be used to identify this elephant seal in the future. Mark scars, shark bites, or unusual coloration.

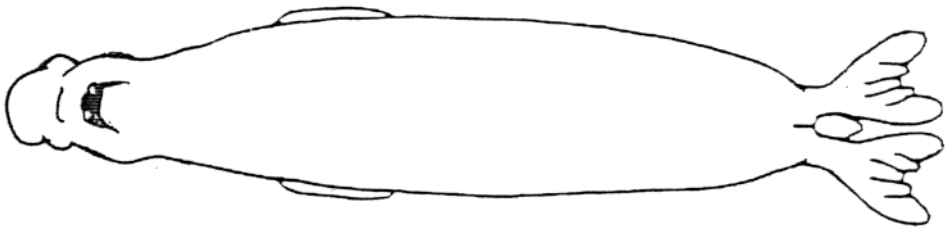
Right side view

Left side view

Top side view



Bottom view



Field Journal Sheet

Tagging and Marking of Pinnipeds				
	what it looks like:	**where to look:**	**observations:**	
flipper tag	colored plastic tag	seal lions: front flippers seals: webbing between digits on hind flippers		
brand	similar to a brand used on cows	on mammals back or side		
dye mark	hair dyed number	anywhere on fur		
radio/ satellite tag	small transmitter with battery, sometimes antenna sticks up	attatched to flipper or glued to head or back		
time depth recorder	set in a white plaster-like base	glued to seal's back		
IF YOU CAN CLEARLY SEE A <u>NUMBER</u>....				
Number	tag color	type of pinniped	where is tag located? *right, left front or hind flipper*	condition of individual *live, sick, dead, injured*

Field Journal Sheet

Tag Colors and Locations

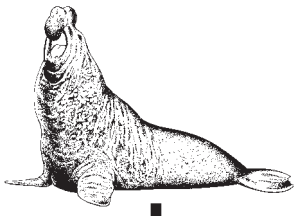
TAG COLOR	SPECIES	LOCATION
white	California Sea Lion	San Clemente Island, CA Playa Atyla Island, MX Angel de la Guarda, MX
	Northern Elephant Seal	San Clemente Island, CA Cedros Island, MX San Benito Island, MX Sand Island, OR San Simeon/Gorda, CA Piedras Blancas, CA
	Harbor Seal	Santa Rosa Island, CA
yellow	California Sea Lion	San Miguel Island, CA
	Harbor Seal	San Miguel Island, CA Puget Sound, WA Gray's Harbor, WA (females only)
	Northern Elephant Seal	San Miguel Island, CA
orange	all species	Rehabilitation Centers-California and Northwest Marine Mammal Stranding Networks
pink	Northern Elephant Seal	Farallon Islands, CA **Point Reyes, CA**
red	California Sea Lion	San Nicolas Island, CA
	Northern Elephant Seal	
dark green	Northern Elephant Seal	Año Nuevo, CA
	Steller Sea Lion	
	California Sea Lion	
lime green	California Sea Lion	Morro Bay, CA
	Harbor Seal	Morro Bay, CA **Point Reyes, CA**
light blue	Northern Elephant Seal	Mexico
	California Sea Lion	Monterey Bay, CA
	Harbor Seal	
blue-green	California Sea Lion	Santa Barbara Island, CA
	Northern Elephant Seal	
	Harbor Seal	Puget Sound, WA Gray's Harbor, WA (males only)
purple	Northern Elephant Seal	Cape San Martin, CA
metal	Northern Fur Seal	Alaska
NUMBER BRAND	California Sea Lion	San Miguel Island, CA Seattle, WA
	Northern Elephant Seal	Año Nuevo, CA
HAIR DYE	California Sea Lion	San Miguel Island, CA Seattle, WA
	Northern Elephant Seal	San Miguel Island, CA San Nicolas Island, CA Año Nuevo, CA Farallon Islands, CA **Point Reyes, CA**
	Northern Fur Seal	San Miguel Island, CA

Other Marine Species Sighting Log		
type	behavior	observations

Field Journal Sheet

Vocabulary	
word	definition

How Can We Inspire Others to Protect Elephant Seals and Their Habitat?



Students will videotape elephant seals on their field visit and use the video to foster stewardship with elementary classes or via local programming.

Time required: 15 minutes on field visit, various amounts of time depending on strategy

Location: Point Reyes National Seashore/classroom

Suggested group size: small groups

Subject(s): language arts

Concept(s) covered: stewardship education

Written by: Trudie Behr-Scott, Hill Middle School, Novato

Last updated: 12/12/00

Student Outcomes:

At the end of this activity, the students will be able to:

- Formalize a presentation on elephant seals that will impart stewardship values to other audiences.

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following area:

- Content Standard F – Populations, Resources, and Environments: Causes of environmental degradation and resource depletion vary from region to region and from country to country; Risks and Benefits: Important personal and social decisions are made based on perceptions of benefits and risks.

Materials

To be provided by the teacher:

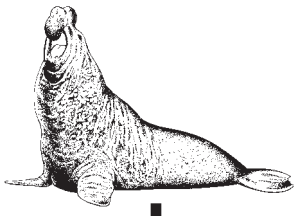
- Camcorder and video tape to be used on visit

Procedures

1. **Identify audience**
   Research local public access channels. Most are required to show 20 minutes/ month local programming. Or, identify other elementary classes that would be interested in viewing a presentation on Elephant Seals created by your class.

2. **Secure camcorder/tape for day of field visit**
   One adult chaperone could rotate the camcorder to each of the two groups for 5-10 minutes of videotaping. (If you have access to editing equipment, students may tape longer segments.)
3. **Finalize video**
   Back at school, have students create a script (to go along with video images) discussing some of the following points.
   - Why are elephant seals at Point Reyes National Seashore?
   - What are some threats to elephant seals and their habitat?
   - What can we do to protect elephant seals right to exist?
   - What was the most enjoyable aspect of viewing elephant seals?
   - What do we mean by stewardship?
   - What have we done already to help elephant seals?
   - What would we like to be able to do in the future?

How Can I Capture My Experiences in a Story, Poem or Drawing?



After visiting an elephant seal colony, students will use their experiences to create a story, poem, or drawing. Several activity options are provided. Students or teachers choose which activity will be completed.

Time required: time varies

Location: on-site/classroom/homework

Suggested group size: entire class

Subject(s): creative writing; science, language arts

Concept(s) covered: poetry, creative writing

Written by: Melinda Repko, National Park Service

Last updated: 12/08/00

Student Outcomes

At the end of this activity, students will be able to:

- Reflect on their experiences by sharing a poem, story, or drawing.
- Make emotional connections to the resources.

Materials:

To be supplied by teacher:

- Extra paper included into field journal

To be photocopied from this guide:

- **How Can I Capture My Experiences in a Story, Poem, or Drawing?** field journal sheet

Procedures

1. Include a copy of the **How Can I Capture My Experience in a Story, Poem, or Drawing?** field journal sheet in each students journal.
2. Either choose an activity for students to complete or have students decide which they would like to complete.
3. Allow a defined amount of time to complete this activity in the field. Students may refine their work once back in class.

Extension Ideas

1. Have students complete a variety of the activities, creating a booklet of their creative work.
2. Using canvas material and tempera paint, have students create a mural of their experiences at the Elephant Seal Overlook.

Name _____ Date _____

Field Journal Sheet

How Can I Capture My Experiences in a Story, Poem or Drawing?

Choose one of the following activities. Use extra paper to complete your work.

1. Create a Haiku

Haiku: A three-line, nonrhyming poem originating in Japan, based on syllables.

Line 1: Five syllables
Line 2: Seven syllables
Line 3: Five syllables

2. Create a Diamante

Diamante: This-five line poem is displayed in the shape of a diamond.

Line 1: noun
Line 2: adjective adjective
Line 3: participle participle participle participle
Line 4: noun noun noun noun
Line 5: noun

3. Freestyle Poem

A poem can rhyme or not rhyme. It can be many words or few. The only limitation is your imagination!

4. Create an Outline-Creation

Draw the outline of an elephant seal in pencil. Use the outline as a guide to write your words on or use the outline as a guide to write your words in. Use words or sentences that describe its characteristics.

Hint: if you draw in pencil and write in pen, you can carefully erase the pencil when the ink dries.

5. Create a Comic Strip

Think about the different events that took place while you were visiting the elephant seal colony. Create a comic strip depicting one of these events. Don't forget to give your comic strip a title.

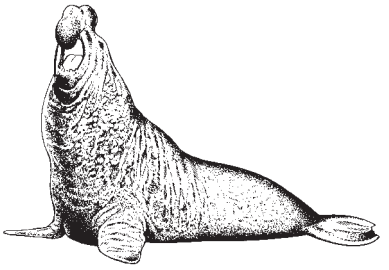
6. Create a Story

Write a short story from the view point of an elephant seal, describing your experiences at the overlook colony. What is it like to be at Point Reyes National Seashore? How was your journey this year out at sea? Have you been in any battles? What do you think of all the people who come to visit?

7. Create an Essay

What would be missing from your life if elephant seals had gone extinct and you never had the chance to see them?

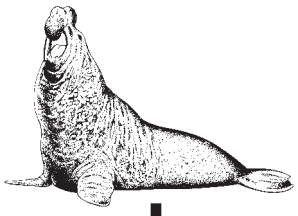
Creating
Coastal Stewardship
through Science



Discovering Northern Elephant Seals

Post-Visit Activities

What Can We Learn From Our Field Journals?



Students review their field journals to bridge what they have learned prior to their visit and what they have experienced at Point Reyes.

Time required: 2 hours

Location: classroom

Suggested group size: entire class

Subject(s): science, language arts, math

Concept(s) covered: science, math

Written by: Christie Denzel Anastasia, National Park Service

Last updated: 12/03/00

Student Outcomes

At the end of this activity, the students will be able to:

- Draw conclusions based about elephant seals and their habitat from first-hand observation.
- Understand how scientists begin to process field observations.
- Contemplate future career choices

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade
- 5a- food webs
- 5b- organisms and the physical environment
- 5e- the number and types of organisms an ecosystem can support dependson the resources available and abiotic factors
- 7d- communicate the steps and results from an investigation
- 7e- recognize whether evidence is consistent with a proposed explanation
- 7f- interpret a simple scale map
- 7h- identify changes in natural phenomena over time

7th grade
- 7c- communicate the logical connection among hypothesis, science concepts, tests conducted, data collected, and conclusions drawn from scientific evidence.

8th grade
- 9b- evaluate the accuracy and reproducibility of data

Optional Extension

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard A – Use appropriate tools and techniques to gather, analyze, and interpret data; think critically and logically to make the relationship between evidence and explanations; recognize and analyze alternative explanations and predictions; communicate scientific procedures and explanations; use mathematics in all aspects of scientific inquiry; understandings about science and technology.
- Content Standard C – Populations and ecosystems

Materials

To be provided by the teacher:

- **Pre- and Post-evaluation** activity sheets (see Procedure 11 in this lesson)

Vocabulary

Review unit vocabulary list

Procedures

1. **Field Journal review**
   Students should have their field journals on their desks to answer and think about the following processing questions for each journal sheet. The goal is for students to notice patterns, relate the elephant seal to its' habitat, and compare/contrast the two locations.
2. **Elephant Seal Overlook and Lifeboat Station Observation Sheets**
   - What do students notice about the arrangement of elephant seals on the beach?
   - Does their arrangement have anything to do with weather, tides, or landscape?
   - Were any students able to identify an alpha male?
3. **Field Census for both locations**
   - What were the total numbers of elephant seals at each location?
   - How did numbers of the different classes (such as male/female) compare at both locations?
   - What was the most difficult part about telling the different types of elephant seals apart?
   - What visitor activities did you notice?
   - Were visitors respectful of the rules/regulations of the Marine Mammal Protection Act?
4. **Behavior Survey for both locations**
   - What activities did males engage in most?
   - What activities did females engage in most?
   - Did activities vary significantly between the two sites?
   - What do these behaviors tell you about the time of your visit and the timing of the elephant seal life cycle?

4. **Behavior Survey for both locations**
   - What activities did males engage in most?
   - What activities did females engage in most?
   - Did activities vary significantly between the two sites?
   - What do these behaviors tell you about the time of your visit and the timing of the elephant seal life cycle?
5. **Behavior Field Notes for both locations**
   Ask students if they would like to share an interesting observation from either location. Why do they think the elephant seal was performing that particular behavior?
6. **Habitat Survey for both locations**
   Using the blackboard, create two lists: one list should detail what makes a suitable habitat for elephant seals, and the other should detail what makes a habitat less suitable for elephant seals. Compare and contrast the Elephant Seal Overlook to the Lifeboat Station.
7. **Scar Card**
   - What were some of the marks that students were able to notice and draw? Were there any shark bites or scars?
   - Are all of the marks permanent, or will they change with time?
   - Why would scientists record this type of information? (to monitor locations of individuals annually)
8. **Tagging and Marking of Pinnipeds**
   - Did anyone notice tags or marks on any of the pinnipeds in the area?
   - Were any of the numbers on the tags legible? If so, please report to Resource Management at Point Reyes National Seashore.
9. **Other Marine Species Sighting Log**
   - What other species were sighted on the day of your visit?
   - How do these other organisms relate to elephant seals?
10. **Wrap-up**
    - What questions do students have about elephant seals that haven't been answered yet? Develop a list of questions and encourage students to continue further research.
    - What types of careers are available if you want to do this type of work when you finish high school/college?
    - What type of training or education would you need?
11. **Pre- and Post-evaluation**
    If you saved the **Pre- and Post- evaluation** activity sheets from the first pre-visit lesson, redistribute them to the original students. Explain that students may change their answers based on what they have learned in class and on their field trip. If you choose this option, have students write in a different color pen or pencil with the date written in that color.
    If you did not choose to save the original activity sheets, make copies for each student of the **Pre- and Post-evaluation** (located in the first pre-visit activity: "How Can I Learn About the Secret Lives of Elephant Seals?"). We would like

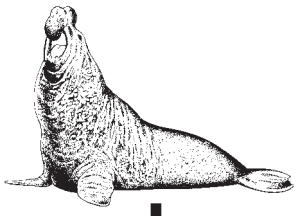
to see the results of these evaluations! Please consider mailing completed **Pre- and Post- evaluation** activity sheets back to Point Reyes National Seashore. We would like to measure the success of your use of this curriculum in changing knowledge, skills, and abilities.

Mail to: National Park Service
Point Reyes National Seashore
attn: Education Specialist
Point Reyes Station, CA 94956

Extension ideas

1. Exchange and compare information with other school groups who visited Point Reyes National Seashore for an Elephant Seal field trip. This may be possible through email, electronic bulletin board, or newsletter exchange. Contact the Education Coordinator of Point Reyes National Seashore for more information.
2. Formalize the results as a mock "Scientific Paper". Include title, abstract, introduction, method, results, discussion, acknowledgements, and references.

How Are Decisions Made for Elephant Seals?



Students will role-play various interest groups involved in making decisions for elephant seals. Through cooperative discussion and reflection on the Marine Mammal Protection Act, students will create a management plan for the future of Limantour Beach in Point Reyes National Seashore.

Time required: 2 hours

Location: classroom

Suggested group size: entire class

Subject(s): science

Concept(s) covered: compromise, negotiations, interest groups

Written by: Erin Blackwood, Marine Mammal Center

Last updated: 12/03/00

Student Outcomes

At the end of this activity, the students will be able to:

- Represent a specific opinion on a complex issue.
- Negotiate a group management decision.

California Science Standard Links (grades 6–8)

This activity is linked to the California Science Standards in the following areas:

6th grade 5b- organisms and the physical environment
5e- the number and type of organisms an ecosystem can support depends on the resources available and abiotic factors

7th grade 3e- extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient for its survival

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following area:

- Content Standard F – Populations, Resources, and Environments: when an area becomes overpopulated, the environment will become degraded due to the increased use of resources; causes of environmental

degradation and resource depletion vary from region to region and from country to country. Risks and benefits: Important personal and social decisions are made based on perceptions of benefits and risks.

Materials

To be photocopied from this guide:

- **Elephant Seal Interest Groups** activity sheet
- **Marine Mammal Protection Act** activity sheet
- **Proposed Management Plan for Limantour Beach** activity sheet

Vocabulary

Generated by student inquiry

Procedures

1. **Present scenario**
   It is the year 2020. Within Point Reyes National Seashore lies Limantour Beach. Elephant seal populations have been steadily growing. Negative interactions between elephant seals, humans, dogs, and horses have been increasing. The National Park Service Park Rangers will be holding a town meeting to hear different viewpoints expressed and create a management plan for the area.
2. **Designate interest groups**
   Based on the scenario described above, ask students who will want to voice their opinions at the town meeting. Students can use the **Elephant Seal Newspaper** to generate a list of interest groups. Record their ideas on the blackboard. These responses should be compared to those listed on the Elephant Seal Interest Groups activity sheet (such as Bird Watchers, Park Rangers, Western Snowy Plovers). If students have an idea for a group not listed on the activity sheet, form another group to let them represent that opinion.
3. **Form student teams**
   Group students, or allow students to choose which viewpoint they will represent. Each team should receive either the entire **Elephant Seal Interest Groups** activity sheet or only the paragraph relevant to their position. Teams will nominate a spokesperson and prepare a 3-minute presentation of their viewpoint. The Park Ranger group will receive the entire sheet and devise at least three questions they would like to ask each interest group. Students should record any vocabulary needing clarification.
4. **Town meeting**
   Have Park Rangers sit in front of classroom. Each interest group will have 3-minutes to present their case. Park Rangers can ask three clarifying questions. No decision is made at this point.

5. **Form new student groups for collaborative decisions**
   Create several small groups composed of several interest group types. Hand out the **Marine Mammal Protection Act**. Assign each group a set amount of time to come up with a sample management plan for Limantour Beach with this Act and their various roles in mind.
6. **Present ideas**
   Each group will present their idea to manage multiple groups at Limantour Beach. Allow time for discussion of these scenarios. Who benefits most? Who benefits least? Park Rangers and various groups decide on one management plan.

Extension Ideas

Identify a scenario in your immediate community with complexity and several interest groups. Students can interview community members, write a class viewpoint, and take action in some form expressing their opinion.

Name _____ Date _____

Elephant Seal Interest Groups

Activity Sheet

Bird Watchers
We visit Limantour Beach to watch and enjoy the many types of birds found on this beach. The increase in elephant seals has made it an attraction for tourists. These tourists scare the birds away and make it hard to find a parking spot. Sometimes the beach can be closed if too many elephant seals are hauled out.

Tourists
Let the elephant seals stay, but allow us to get a closer look. The National Park Service should make the parking lot bigger, sell more types of food at the café, and provide viewing areas in the shade.

Dune Vegetation
The increase in elephant seals has meant we get more and more trampled every year. If it isn't the elephant seals trampling us, it's the humans trying to get close any way they can. Some of us are endangered, threatened, or rare. When we're gone, we are gone forever.

Elephant Seals
It isn't the easiest thing to find a place to haul out on the California coast. Humans have developed most of the sandy coastal areas in this state. Limantour Beach is just right for us if dogs, people, and horses are kept away from our space. Let elephant seals come first in management decisions in some natural areas, we don't stand a chance in other places.

Dog Owners
The beach is the perfect place to let my dog run wild. I can keep him in view and bird chasing is great "doggie entertainment". Now that the elephant seals have been "hogging" the beach, there is pressure to keep my dogs out of the area.

Docents
Elephant Seals belong here. As a docent, I can help visitors see and understand these amazing seals. While I'm out here, I can also collect field data for resource management.

Law Enforcers
We have signs all over the place letting visitors know when they get too close to the seals. Most people respect the signs, but some ignore them and get too close. I've seen a pup crushed under another seal because a human approached too closely.

Wildlife Photographers
It's great there are more elephant seals in the area, but can't we just get a little closer? We don't want everyone to get close, just the professional photographers.

Activity Sheet

Name _____ **Date** _____

Western Snowy Plover
I build my nest on the ground, in the beach dunes, and I am afraid for the future of all western snowy plovers. There are many reasons to be afraid, but sometimes visitors take shortcuts across the dunes to view elephant seals and my eggs are crushed. I am an endangered species trying to survive.

Marine Mammal Biologist
Elephant Seals are fascinating. We almost lost them forever. At several points in time they were considered extinct. There is so much to learn about them and how they fit into the ecosystem. The more we know about them, the more we can protect them and everything in their habitat.

Park Rangers
Elephant seals have the right to use this beach. People also have the right to use this beach and view elephant seals. But, if there are no more elephant seals here, some people may not want to come anymore. We must balance this use with resource protection as our highest priority. We also can't ignore federal laws that were written to protect Marine Mammals.

Name _____ **Date** _____

Marine Mammal Protection Act

Activity Sheet

Read the following information before creating your Proposed Management Plan for Limantour Beach in the year 2020.

The Marine Mammal Protection Act (MMPA) was passed by Congress in 1972 and was a milestone for marine protection. The MMPA makes it illegal for anyone to kill, injure, or bother any and all species of marine mammals; these animals include dolphins, seals, sea otters, whales, and polar bears.

The Marine Mammal Protection Act also makes it illegal to import marine mammals or related products to the United States. Exceptions to the Marine Mammal Protection Act include subsistence hunting and incidental catching by commercial fishermen.

Alaskan Aleuts, Indians, and Eskimos who reside in Alaska are permitted to take marine mammals for subsistence purposes or for use in the manufacture and sale of native handcrafts.

The Secretaries of Interior and Commerce may grant permits for importation of marine mammals for scientific research or public display purposes.

Two federal agencies are in charge of administration of the Marine Mammal Protection Act. The National Marine Fisheries Service (NMFS) under the Commerce Department is responsible for whales, dolphins, and seals. The Fish and Wildlife Service under the Department of Interior is responsible for all other marine mammals.

It is illegal to:

- Take any marine mammal on the high seas or in waters or on lands under U.S. jurisdiction.
- Import any marine mammal or marine mammal product into the United States.
- Use any port or harbor under U.S. jurisdiction for any purpose connected with unlawful taking or importation of any marine mammal.
- Possess any unlawfully taken marine mammal, including parts and products.
- Transport, purchase, sell, or offer to purchase or sell any marine mammal, including parts and products.

It is also illegal to harass marine mammals:

- There are two levels of harassment.

  Level A Harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal in the wild.

  Level B Harassment is defined as harassment having the potential to disturb a marine mammal or marine mammal in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Name _____ Date _____

Activity Sheet

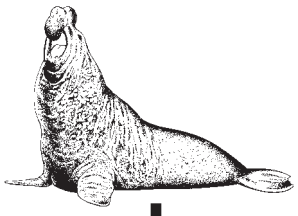
Proposed Management Plan for Limantour Beach

Based on the opinions voiced by various interest groups and your understanding of the Marine Mammal Protection Act, create a management plan for Point Reyes National Seashore.

Consider the following:

- What are you trying to protect?
- How are you going to protect it?
- What will need to be done for others to understand your decisions?

What Happens at the Marine Mammal Center?



Students tour the Marine Mammal Center's rehabilitation hospital to view elephant seal and sea lion patients. Upon returning to class, students can participate in a discussion revolving around human relationships to elephant seal survival. As a follow-up activity, students can take individual or class action to increase elephant seal survival.

Time required: one hour and travel time

Location: Golden Gate National Recreation Area/Marin Headlands

Suggested group size: 30 students

Subject(s): science

Concept(s) covered: rehabilitation

Written by: Erin Blackwood, Marine Mammal Center

Last updated: 12/11/00

Student Outcomes

At the end of this activity, the students will be able to:

- Examine human impacts on elephant seal survival.

National Science Standard Links (grades 5–8)

This activity is linked to the National Science Standards in the following areas:

- Content Standard C – Structure and function in living systems; Regulation and behavior; Populations and ecosystems; Diversity and adaptations of organisms.
- Content Standard E – Science and technology in society
- Content Standard F – Risks and benefits: important personal and social decisions are made based on perceptions of benefits and risks

Vocabulary

Conservation, rehabilitate

Post-Visit Lesson Plan

Procedures

1. **Arrange visit**
   Read through the Teacher Information Sheet provided at the end of this lesson to arrange your visit.

2. **Prepare students for visit**
   Have students write down some or all of the following focus questions to use on their visit. Explain the role of the Marine Mammal Center and what students can expect on their field trip.
   - Why are these animals here?
   - Where did they come from?
   - How is this environment different from their wild habitat?
   - How is their behavior different from that in their natural habitat?
   - How can humans learn from rehabilitating elephant seals?
   - How does rehabilitating elephant seals help their conservation?
   - How might rehabilitating elephant seals hinder their conservation?
   - What are some other ways to help elephant seals and other marine organisms?

3. **Visit**
   Have students bring a notebook and their focus questions to answer.

4. **Back in Class: Debate**
   Back in the class, have students form teams to debate the pros and cons of rehabilitation to conserve marine mammal populations. Consider the following arguments:

   Pro
   - Humans have caused harm and are still causing harm to marine mammals. Rehabilitation can "make up" for this.
   - An individual animal has intrinsic value.

   Con
   - Rehabilitation may interfere with natural selection, releasing unfit animals into the population.
   - Humans should not interfere with wild animals.

5. **Stewardship project**
   Use the follow-up lesson plan **How do I Choose and Complete the Best Stewardship Project?** Students write a stewardship action plan and complete a stewardship project that best fits their skills.

Visiting the Marine Mammal Center

Who to contact:

Marin Headlands
1065 Fort Cronkhite
Sausalito, CA 94965
Phone: (415) 289-7330
Fax: (415) 289-7753
www.tmmc.org

Mission Statement for Marine Mammal Center:

"We recognize our interdependence with marine mammals, their importance as sentinels of the ocean environment, and our responsibility to use our awareness, compassion and intelligence to ensure their survival and the conservation of their habitat."

Education Programs Options:

Call for fee and logistics information

Pinniped Patients
Visit the Marine Mammal Center's hospital, which works with up to 800 marine mammals each year. The students will observe and learn about our seal and sea lion (pinniped) patients. We will explore the natural history and conservation of both pinnipeds and sea otters. Students study and handle tanned pelts and bones.

Best season: March – November

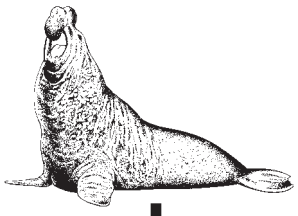
In Our Marine Science Classroom
Enhance your visit to the hospital by bringing your students to our classroom for a more in-depth study of whales, otters, or to explore other topics and see more marine mammal specimens. Topics for classroom presentations are the same as those for the Whale Bus, listed below. Classroom program does not automatically include a visit to the hospital; that must be scheduled separately.

Best season: all year

The Whale Bus Outreach Programs
Let the Marine Mammal Center bring the world of marine mammals to your group. Topics range from the natural history of pinnipeds, otters, or whales to the work of the Marine Mammal Center and marine science careers. Hands-on activities and/or marine mammal specimens, such as bones, pelts, and baleen are included in each program.

Best season: all year

How Do I Choose and Complete the Best Stewardship Project?



Post-Visit **Lesson Plan**

The final lesson for this unit synthesizes all previous learning experiences. Students have gained an understanding of elephant seals, ocean ecology and some of the threats to their sustainability. Now it's time to take action in making beaches and oceans healthier places for the variety of living things that depend on them, from microscopic plankton to humans.

Time required: time varies

Location: classroom, community, or Point Reyes National Seashore

Suggested group size: entire class

Subject(s): biology, art, computer skills, community service

Concept(s) covered: stewardship, educating others, environmental responsibility

Written by: Lynne Dominy and Christie Denzel Anastasia, National Park Service

Last updated: 11/26/00

Student Outcomes

At the end of this activity, the students will be able to:

- Synthesize all other pre-visit, on-site, and post-visit lessons from this unit.
- Plan and implement an environmental stewardship activity to benefit the ecosystem they live in and depend upon.

National Science Standard Links

As a result of this activity, all students in grades 6-8 should develop:

- Content Standard F – Science in Personal and Social Perspectives; Populations, Resources, and Environments.

Materials

To be provided by the teacher:

- Varies by project, see teacher information sheet **Discovering Northern Elephant Seals: Environmental Stewardship Projects**

Vocabulary

stewardship

Creating Coastal Stewardship *through Science*

Post-Visit Lesson Plan

Procedures

1. **Decide on lesson approach based on time limitations**
   Review the teacher information sheet **Discovering Northern Elephant Seals: Environmental Stewardship Projects** following this lesson. This sheet explores the range of Stewardship Projects your class can complete according to time constraints. There are many possibilities ranging from short lessons to more in-depth, interdisciplinary projects that may fulfill educational standards for other subject areas.
2. **Prior to any lesson, introduce concept of environmental stewardship**
   Begin a discussion of who has responsibilities for natural resources. There are federal agencies such as the National Park Service, United States Forest Service, state agencies such as California Fish and Game, and local organizations. Introduce the concept that organizations such as schools and individuals such as students also have responsibility.

   Every day we decide on an individual level what our impact will be on the environment based on our actions. It's usually positive or negative, rarely neutral.
3. **Review teacher resource *Discovering Northern Elephant Seals: Environmental Stewardship Projects* for the following lesson options**
   - How to Positively Effect Species and Their Habitats (activity sheet)
   - Create Tools to Educate Others
   - Implement a Community Project
   - Participate in Volunteer Programs at Point Reyes National Seashore
   - Support Stewardship Organizations and Be an Advocate for Your Beliefs

4. **Assist with evaluation of *Creating Coastal Stewardship through Science***
   Please share your project ideas and results! If you develop a website, host a "Coastal Stewardship Day", or participate in a beach clean-up, let us know by sending photos, stories, or student materials. Call (415) 464-5139 to leave a message with the Education Coordinator of Point Reyes National Seashore.

Discovering Northern Elephant Seals
Environmental Stewardship Projects

How to Positively Effect Species and Their Habitat

One to two lessons

Students use the **How to Positively Effect Species and Their Habitats** activity sheet to learn more about seals, sea lions, and their habitats. Based on that research, students devise action plans for which they assume responsibility for contributing toward a healthy habitat.

Create Tools to Educate Others

Arranged in order of possible time commitment, shortest to longest

Lead a class discussion to brainstorm ways students can educate others. Use the list below to help students generate ideas. Once there are a number of ideas, decide upon which project can be completed within a designated timeframe. The next step is to have students create a "plan of action". What are all the things that need to be done, in which order do they need to be done, who is going to do them, and what are the deadlines? How can students not only teach about the resource, but also impart stewardship values? Remind students to think about any safety issues and address these as a group.

Educational tool ideas:

- Develop a newsletter or newspaper to distribute to other students.
- Build an exhibit that is displayed for a parents' open house.
- Paint a mural, draw posters, or create a website that encourages Ocean and Beach Stewardship.
- Interview a researcher about a restoration project. Share the answers.
- Organize a Coastal Stewardship Contest. Have students define stewardship through writing essays or creating art, poetry or music.
- Videotape your field trip and stewardship activities. Have the students narrate this video and develop a presentation for other students sharing what they have learned and accomplished.
- Create a mentoring program that enables your students to teach younger students about resources and their stewardship.

Implement a Community/School Project

Arranged in order of possible time commitment, shortest to longest

Instruct students as a homework assignment to find at least one local environmental issue being discussed among community members. Students may gain this information by looking through newspapers, talking to their parents, watching the local news, or listening to a public radio station. The next day in class, all local environmental issues should be discussed to some extent. Choose one project.

around which students may design a stewardship project. What are the possible stewardship activities that can be completed by students, and/or their parents, and communities? Follow the ideas in the procedure above to create a "plan of action".

Community/ School Project Ideas:

- Adopt-A-Seal programs with Marine Mammal Center
- Create a green school: investigate recycling and composting facilities or water conservation. Have students write a plan about how to make your school more environmentally friendly. Have them take action and implement some of their ideas. Discuss how a green school inevitably benefits marine mammals.
- Organize a Beach Clean-Up Day.

Participate in Volunteer Programs at Point Reyes National Seashore

2 hours, full day, or regular commitment on weekly/monthly basis

Students may participate in programs such as restoration, rehabilitation, or research projects. Consult with the Volunteer Coordinator or Education Specialist for the most recent options as projects can change according to time of year and staffing availability. One example of participating in a restoration project would be to remove exotic plants from natural areas. There is also a Harbor Seal and Elephant Seal Docent program for adults who wish to volunteer with their children on weekends. To participate in these types of programs at Point Reyes National Seashore call (415) 464-5139.

Support Stewardship Organizations and Be an Advocate for Your Beliefs

One lesson to lifelong commitment

Introduce students to the concept of advocacy. Have them research and represent the missions of local and national stewardship organizations. Examples include: the National Park Service, the Marine Mammal Center, the Humane Society, the Sierra Club, the National Parks and Conservation Association, the Audubon Society. Have students write letters to their local, state and national government officials regarding stewardship issues or have them submit articles to local newspapers. Encourage students to form educated opinions and to voice them.

Name _____ **Date** _____

How to Positively Effect Species and Their Habitat

Activity Sheet

Choose one of the following species present at Point Reyes National Seashore to answer the questions below:

❑	Northern fur seal	*Callorhinus ursinus*
❑	California sea lion	*Zalophus californianus*
❑	Harbor seal	*Phoca vitulina*
❑	Northern elephant seal	*Mirounga angustirostris*
❑	Stellar's (Northern) sea lion	*Eumetopias jubatus* threatened/federal

Investigation

1. How have population numbers of this particular species changed over time?

2. What are the threats to this species as an individual?

3. What are specific threats to the habitat for this species?

4. What is the federal government doing to increase population numbers?

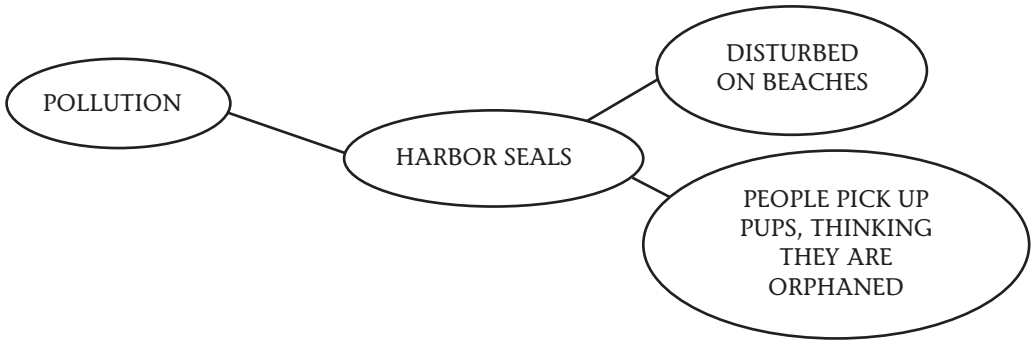
5. What would be different in your life if all seals and sea lions went extinct before you were born?

Activity Sheet

Name _____ **Date** _____

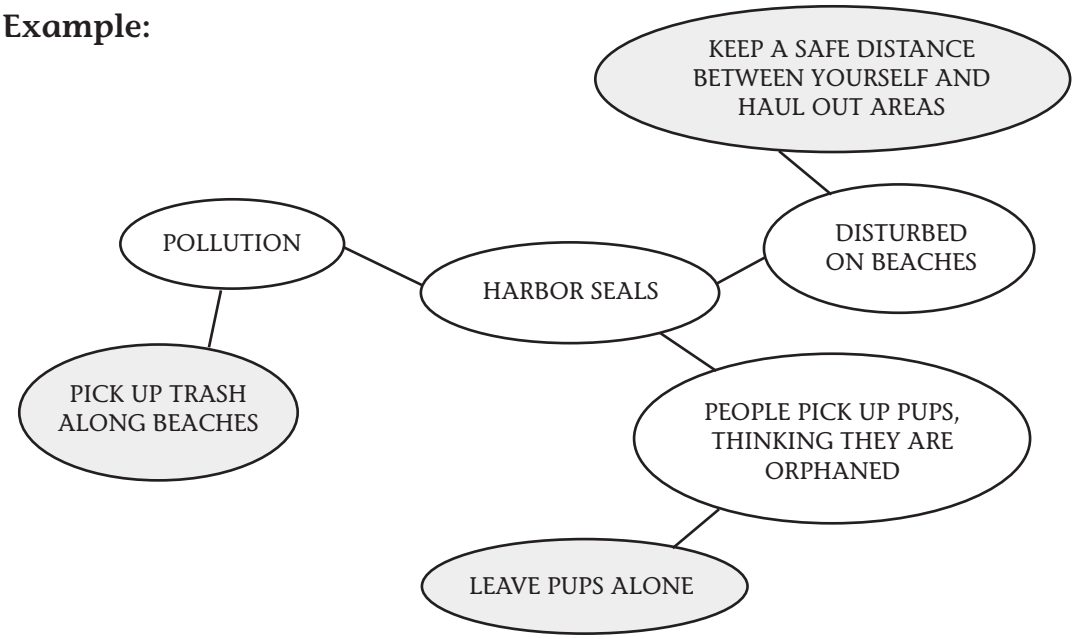
Problem Solving

Using a blank piece of paper, you will create a "mind-map".
Begin by writing the name of your species in the center of the paper and drawing a circle around it. Choose some of the threats to its survival and write those around the species name. Draw circles around each of the threats and connecting lines to the circle in the center. You should have something that looks like this:



Begin problem solving by thinking about actions that lessen the impact of specific threats. Write those actions in circles connected to the threat it seeks to solve.

Example:



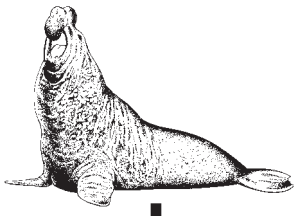
Resolution

Review your mind-map to determine what type of actions YOU can take that will positively affect these species and/or their habitat.

Place "*" next to actions you are already doing,
Place a "1" next to actions individuals can do,
Place a "2" next to actions groups can do, and
Place a "?" next to things you believe are not within your control.

Select an option and implement your plan.

This following list is incomplete, but is meant to provide ideas for additional teaching resources.



Education and Reference Materials

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Deans, Nora L., Project Manager. **Sea Searcher's Handbook**. Monterey Bay Aquarium. Boulder. Roberts Rinehart Publishers, 1996.

DuBosque, Doug. **Draw Ocean Animals.** Peel Productions, 1994.

Field, N., and Sally Machlis. **Discovering Marine Mammals: A Learning and Activity Book.** Dog-Eared Publications, 1987.

Howe, Sheri. **Mirounga: A Guide to Elephant Seals.** Frank S. Balthis. Davenport, CA, 1994.

King, Judith E. **Seals of the World.** British Museum and Cornell University Press, 1983

Reeves, Randall and Stewart. Brent and Leatherwood, Stephen. T**he Sierra Club Handbook for Seals and Sirenians.** Sierra Club Books. San Francisco, CA, 1992.

Reidman, Marianne. **The Pinnipeds.** University of California Press. Berkeley, CA, 1990.

Scheffer, Victor B. **A Natural History of Marine Mammals.** Scribner's Sons. New York, NY, 1976.

Talbot, Frank H. **The Nature Company's Discoveries Library: Under the Sea.** US Weldon Owen Inc., 1996.

Tom, Martha, et al. **Año Nuevo State Reserve Teacher's Guide.** San Mateo Coast Natural History Association.

Related Publications

"**Hydrosphere**"
Farallones Marine Sanctuary Association, The Presidio, P.O. Box 29386, San Francisco, CA 94129

Internet Addresses

Año Nuevo State Reserve
http://www.parks.ca.gov/DISTRICTS/bayarea/ansr228.htm

Birmingham Zoo
http://www.birminghamzoo.com/ao/marinmam.htm

Center for Marine Conservation
http://www.cmc-ocean.org

Elephant Seals
http://www.highlands.w-cook.k12.il.us/Staff/Kuntz/PAL/PAL4/Sarah.html

Elephant Seals of the Faulklands
http://web.tiscalinet.it/esrg/

Friends of the Elephant Seal
http://www.elephantseals.com

Marine Mammal Center
http://www.tmmc.org/elphntseal.html

Monterey Bay Aquarium
http://www.mbayaq.org/

Monterey Bay National Marine Sanctuary
URL http://bonita.mbnms.nos.noaa.gov/

Seal Conservation Society
http://www.greenchannel.com/tec/main.htm

Sounds of Science: Sound and Elephant Seal Behavior
http://beca.sfsu.edu/sos/esealhp.html

Workshops and Classes

Point Reyes Field Seminars offers naturalist classes. Please call for a calendar and registration form. PRNSA Field Seminars, Point Reyes Station, CA 94956 (415) 663-1200.

Videos

Elephant Seals of Piedras Blancas. Side-Off Videos. 1999. 70min. This new video chronicles a year in the life of the newest and fastest growing colony of northern elephant seals ever recorded; the Piedras Blancas colony. $19.95,(805) 927-8838, ***www.elephantseals.com***