Unit Three
Marine Mammals

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Objectives:

To enable students to:

- Orally identify and appreciate some Alaskan marine mammals (Activities 1-4).
- Make a whale mobile (Activity 1).
- Compare whales to humans (Activity 1).
- Hear the voices of the whales (Activity 1).
- Draw a life sized humpback whale on the school grounds or at the beach (Activity 2).
- Make flippers and masks and participate in a sea lion/seal play (Activity 3).
- Listen to sea otter, seal and sea lion poems (Activities 3 and 4).
- Role play a sea otter eating clams, crabs and fish (Activity 4).
Marine mammals are an important part of Alaska's ocean environment. Whales, porpoises, walruses, and seals all live in Alaskan waters. Children usually are more attracted to the marine mammals than to any other sea creatures. Most Alaskan youngsters have seen at least a few of them; and the eyes of those who haven't are guaranteed to light up at the opportunity.

Like such land dwellers as horses, cows, deer, dogs, cats, and man, these marine animals all share the distinctive characteristics of mammals. They are warm-blooded, breathe air (coming to the surface), have true hair at some stage in life, give birth to live young, and suckle young with milk the mother produces.

**Activity 1**

**Whales**

Background:

Whales are the largest animals in the world. Their sleek, streamlined shape helps them to move easily through water. They have lost almost all body hair—something which further helps reduce water friction. Instead of having legs, whales have one pair of paddle-shaped flippers, or forelimbs, that are used for maneuvering in water. The powerful tail is broadened into two fleshy extensions called flukes which the whale flexes up and down to propel itself forward.

To breathe, a whale must rise to the water surface. Its nose, called a blow-hole, is not on the front of its snout but rather is on the top of the head so the whale can breathe whenever it breaks the surface.

Whales have some amazing qualities. They are intelligent and social animals. They court, fight, and defend and train their young. They have a keen sense of hearing and can make sounds with which they communicate, often over distances of many miles.
There are two major types of whales - baleen whales and toothed whales. Baleen whales have no teeth in the usual sense. Thus they can feed only on food that they can swallow whole. Toothed whales do have teeth and thus are hunters that can consume larger prey. Baleen whales have a two-hole blow-hole, while toothed whales have a one-hole blow-hole.

Baleen Whales:

Instead of teeth as we know them, baleen whales have feathery horn-like plates (baleen) that hang from the roofs of their mouths like combs. The whales suck in plankton and krill, then squeeze the water from their mouths with their tongues, retaining the food, which is then swallowed. Most of their food is found near the surface. A usual dive lasts from 10 to 15 minutes.

Baleen whales roam the oceans, some species migrating from polar regions to the equator in regular patterns. They feed in northern waters during the summer when food is abundant there, and also wean their young at that time. Then they migrate to warm waters, where they mate or give birth. There is little food in the warmer regions, but the calves don't need it because they are nursing, and the adults have stored fat—or blubber—from the previous summer.

Calves nurse underwater, but they do not suckle; rather, the mothers squirt milk down the calves’ throats.

Common Alaskan baleen whales include the gray whale, which travels up to 10,000 miles in its annual migration, the longest migration of any mammal. Other Alaskan baleen whales include the humpback, bowhead, minke, fin, and - largest of all - the blue whale. Newborn blue whales weigh two tons, are 25 feet long, gain about 100 pounds a day, and grow two and a half inches a day!

Toothed Whales:

The only huge member of the toothed whale group is the sperm whale. It has teeth in its lower jaw only. While it is a toothed whale, it is in a family by itself, and is sometimes considered separately. Sperm whales have huge, box-like heads, with narrow lower jaws that can open downward to 90 degrees. Sperm whales dive deeper than any other whale. They can stay down one and one-half hours. Squid is their
major source of food. The beluga, narwhal, and beaked whales are other, smaller, Alaskan toothed whales

Dolphins and porpoises are toothed whales (cetaceans), too. Porpoises and dolphins travel in schools. They travel up to 20 miles per hour or more, eat fish, are playful, "talkative," and very intelligent. Their brains are larger for their body size than human brains are, and have more convolutions.

Dolphins’ hearing is second only to that of bats. Dolphins seem to have awareness of individuality. They will help each other, for instance, by such acts as supporting an injured member of their group on the surface to prevent its drowning. Young dolphins are "parented;" calves are nursed for about one year.

The harbor and Dall’s porpoises are commonly seen in Alaska. The Dall’s porpoise travels in groups, playfully diving and jumping in motions that create a characteristic roostertail. Dall porpoises are black with white markings. They often swim in the bow-wake of boats. The harbor porpoise is solid black. It is more solitary than the dall porpoise, and often is seen closer to shore, its fin barely out of the water.

Vocabulary:

- whale
- toothed
- porpoise
- baleen
- fluke
- fin
- blowhole
- blubber

Materials:

- Alaskan whale cutouts
- paper bag
- lumination machine or clear contact paper
- driftwood (or sticks or wire

Killer whales are members of the dolphin family also. Killer whales eat fish, seals and birds, and even will attack larger whales. They travel in packs. Males may be 30 feet long and weigh eight tons.
coat hangers)
- string, yarn or ribbon
- whale record
- worksheet:
  ...Alaskan Whales (3A)

Procedure:

1. Photocopy several copies of the drawings of the Alaskan Whales, then cut out the pictures. Print the name of each whale on the back of one set and laminate those.

2. Put the other cut-up sets of the whole drawings in a paper bag. Have each child pull out one whale, color it, and match their whale with your set. They can then write its name (and their own name) on the back. Laminate their whales and tape them to their desks. The classroom set can be turned into a mobile, along with driftwood, string, yarn or ribbon.

3. Ask the children what they would like to find out about whales. Research the answers. Also encourage each child to find out more about his or her whale. Read some of the teacher background material to your class. Have each "whale" stand up when its name is mentioned.

Additional Activities:

1. Art: Draw and cut out the outline of a whale on two large sheets of butcher paper. Staple it together and stuff it with newspaper. Have the children paint it and glue popcorn "barnacles" to its back and sides. Hang your whale from the ceiling.

2. Language arts: Listen to a record of whale sounds (see bibliography). Have the children close their eyes and imagine what it would be like to float in the ocean like a whale. Compare the whales to humans. What if we didn't have toes or fingers? Have the children move their "flippers" and their "flukes." What if our noses were on top of our heads? Have the children breathe through their "blowholes." What if we had to guide ourselves by hearing rather than by sight? What if we had to eat under water? Whales are very smart, too. If a whale came to your school, it would have a lot to teach everyone - both students and teachers. What do you think the whale would say?

3. Language arts: Read the children a whale story. Check your local library or order some of the books in the bibliography.

4. Science: Take a trip to the beach to look for whales and other marine mammals. If the children see one, it probably will be the highlight of the year. Otherwise, you may need to construct one on the beach. (See next activity.) This might be a good time to talk about why there aren't very many whales and why they are still being chased by large factory ships. Modern whaling can be contrasted with the Eskimo way of hunting.
Activity 2
The Size of a Humpback Whale

Materials:
- tape measure
- playground area or unobstructed space at least 50 feet by 20 feet
- stick, chalk, rocks or dry tempera paint for marking lines in the dirt, snow, gravel or pavement
- rake
- worksheet

...Humpback and Killer Whales (3B)

Procedure:
1. Choose a sunny day. With the help of the students measure out a distance of 50 feet. Then using the diagram below, measure and mark off the other dimensions with a stick, chalk, dry tempera paint, or even playground rocks.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>50' or 12 students</th>
<th>7' or 2 students</th>
<th>14' or 4 students</th>
<th>8' or 2 students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
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<tr>
<td>Greatest width</td>
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<tr>
<td>Length of forelimb</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Width of flukes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

While looking at the sample picture, try giving the children an idea of a humpback whale's size. It might help to note that baby humpbacks gain about 10 pounds per hour, or 240 pounds per day! After looking at the picture, have children outline the body, flukes, and fore-limbs of the whale. Perhaps let older students help or do some advance preparation, such as measuring and rough outlining. With the rake, roughen the animal's body so that it stands out better from the surrounding background.

2. Take some student measurements:

How many students can fit within the fluke outline of the whale?

Holding hands with arms outstretched, how many children fit from snout to flukes?

How many arm lengths long are the flukes?

3. Give your whale a name. Make up a class story about the whale you outlined.

4. Use the Humpback and Killer Whales worksheet as a review of the differences between baleen (the humpback) and toothed (the killer) whales.
Activity 3
Seals, Sea Lions, and Walrus

Seals, sea lions, and walrus belong to the order pinnipedia, meaning "fin-feet."

True seals don't have the external ear structures known as "pinnae" that most mammals have. They appear to have holes in their heads where the internal ear is located. True seals have hind flippers that extend backward. True seals are awkward on land, but more streamlined and well-adapted to deep diving than sea lions. Pups are born singly, not in litters, and they are weaned after about a month. Ringed, ribbon and spotted seals are born with white coats. Bearded seals and harbor seals are not, though all seals have "puppy coats" at birth. True seals will haul themselves up on rocks or beaches, but remain close to the water's edge. Some migrate, others do not. The ringed, ribbon, Oogruk (bearded) and harbor seal are the ones found here in Alaska.

Sea lions have small, external ears, and their flippers are larger—the rear flippers can be rotated forward. One-third of their lives are spent on land. The gray pups are not weaned until about one year! Bull sea lions have harems.

The California sea lion is best known as the circus "trained seal." The Steller, or Great Northern Sea Lion which we have in Alaska is the largest, and is less "tameable." Stellers are near-sighted on land, but have keen eyesight in water. Steller sea lions often surface with their food (fish, squid, octopus) and gulp it down. This allows them to shake large food items apart. There is a high mortality rate (about 50 percent) among pups. Sea lions have escaped commercial exploitation because their hide is not considered desirable.
The walrus is the largest pinniped in arctic and subarctic seas, usually found in relatively shallow water areas, close to ice and land. Both males and females have tusks which are used for fighting and for climbing out on the ice. The walrus feeds primarily on clams and whelks which it sucks up with its mouth after brushing the sea bottom with its broad, flat muzzle. Walrus also eat snails, crabs, shrimp, worms, and occasionally seals.

Currently, all marine mammals are protected under the Marine Mammal Protection Act of 1972. Eskimos and Indians who take marine mammals for food and clothing are exempt. But in general, this act makes it a federal crime to kill, capture, or harass any marine mammal, or retain any part of that animal. Exceptions are made for scientists, aquaria, and commercial fishermen by special permit.

Schools can get permits to salvage hides, skulls or bones. Legally you should leave everything on the beach until you have a permit from the National Marine Fisheries Service (P.O. Box 1668, Juneau, AK, 99811).

Vocabulary:
- seal
- sea lion
- walrus
- flippers
- fur

Materials:
- seal, sea lion or walrus bones and hides, which can be borrowed from the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, National Marine Fisheries or from someone in your community
- tan, brown and grey construction paper
- black magic markers
- string
- worksheet

...Seal and Sea Lion (3C)
...Seal Mask (3D)

Procedure:

1. Show the students pictures, skulls, hides and bones of seals, walrus or sea lions. Let them touch and feel. Use the worksheet and the artifacts to explain "flippers," "fur," and the differences between "seals" and "sea lions" (Seal flippers angle backward and are smaller than the forward-facing sea lion).

2. Ahead of time cut four flippers and one face per student, using the Seal Mask worksheet. Make the sea lion flippers just a little longer. Punch string holes and tie pieces five inches long in each hole. Use a black magic marker and draw one seal face and one sea lion face as examples. Draw lines in one set of small and one set of
large flippers as indications of where the webbing is.

3. Show the students your sets of flippers and faces. Have them color their own. Then tie them on, the larger sea lion flippers backward and the seal flippers forward. The tying takes a while. You might want to recruit some help. Put on the masks and swim around the room. Make a pile of imaginary rocks in one corner of the room for the pinnapeds to climb out on and sun themselves. Let them talk to one another—"Arf, arf."

4. Make your own class play. What would happen if a humpback whale came along? Would you frolic with it? Pretend that you're a sea lion that suddenly discovers a school of herring. After you've feasted on these, haul out. Generally, you wouldn't find seals and sea lions together. So make a sand, mud, or ice floe "haul out" place on the other side of the room for the seals. Now some gulls fly by. Spread out after you've rested to try to find a fish. What would happen if you saw a walrus? Would you be scared? Here comes a killer whale; swim for your life!

5. Cut out a large tag-board sea lion or seal. Make herring or salmon from construction paper and have children put glitter (silver) on the sides of the fish. Tape a sack to the backside of the seal or sea lion as a receptacle into which the students can "feed" their fish to the animal. Count the herring or salmon as they're "eaten." Or make a walrus and count the clams it eats.

6. Construct sweet potato or clay sea lions. Have children bring in potatoes. Pin on raisin eyes. Make pin holes at sides for whiskers and insert broom straws, stiff grass or porcupine quills. Prop the front up with toothpicks. Arrange "herd" on a rock pile and you have a rookery.

7. Share this poem with your students.

Sea Lions

The satin sea lions
Nudge each other
Toward the edge
Of the pool until
They fall like
Soft boulders
Into the water.

-Valerie Worth
Seal Lullaby

Oh! hush thee, my baby,
the night is behind us.
And black are the waters
that sparkle so green.
The moon, o'er the combers,
Look downward to find us
At rest in the hollow
that rustle between
Where billow meets billow
there soft be thy pillow,
Ah, weary wee flipper ling,
curl at thy ease!
The storm shall not wake thee,
nor shark over take thee,
Asleep in the arms of the
slow-swinging seas.

-Rudyard Kipling
Activity 4
Sea Otter

Background:
A sea otter may grow to about three feet long and can weigh as much as 85 pounds. It has a thick, glossy coat with white-tipped hairs that give it a frosted look.

The sea otter comes out of the water to rest on rocky shores, but spends most of its life in the sea, usually in beds of large kelp. There it swims, floats on its back or plays. It dives to the sea floor to find food and then returns to the surface, turns onto its back, and rests in the water while eating. It is a mammal which uses "tools" and may bring a rock up from the sea floor to use to break open an urchin or a clam, holding everything on its chest as if it were a table.

Sea otters once were abundant along Alaskan coasts but were extensively hunted for their fur during the days of Russian influence. Now they are protected, and today again there are many sea otters in the Aleutian Islands, the Gulf of Alaska and Prince William Sound, and they have been re-introduced in other coastal areas of the state.

Sea otters should not be confused with river otters. The latter, which are common in many rivers and coastal areas of Alaska, live primarily in freshwater environments but enter the ocean to feed on fishes and other marine animals. A river otter may be seen swimming along, parallel to shore, diving and showing its long, slender tail, but it never turns on its back and lies in the water feeding the way a sea otter does.

Vocabulary:
- protected
- sea otter

Materials:
- crayons
- construction paper
- glue
- clamshell
- worksheet

...Sea Otter (3E)

Procedure:
1. Pass out the Sea Otter worksheet. Discuss with them what a sea otter is. (Discuss the differences between a river and a sea otter if relevant in your community.) Cut out construction paper sea otters. The children can draw the faces and glue on a clamshell.

2. Have the students role-play sea otters. Tell them to lie on their backs, feeding. First they may have to swim down and get a rock to crack their clams or crabs on.
Additional Activities:

1. History, Science: Show the film Warm Coat, which describes the transport of sea otters from the Aleutians to other areas of Alaska in the early 1960s. This operation has been very successful and the otter population is now just about as high as when the Russians arrived to exploit the animals, and almost drove them to extinction. There is good footage of the animals playing and eating. After the viewing, students might want to try role playing the otters again.

2. Share this poem with your students.

Sea Otter Lullaby

Snuggled in kelp,
Anchored deep
Mother and daughter
Sea otter sleep.

Crescent moon
Sinking low
Waves rock you gently
To and fro.

Star-fish below
Your watery bed,
Stars shining brightly
Over your head.

--courtesy of Paul Wallina
and Kay Goines

Otters

Oftentimes, sea otters winter in coastal harbors. If otters are common in your area, take a harbor field trip to see one. You may want to take a spotting scope and some extra adult help. Have students hold hands and stay near the center of the dock. Discuss what should be done if someone falls in. (Yell for help, extend an oar, toss a rope or life ring.) If you see an otter, have the children watch what it does. How many times does it dive? What is the last thing you see as it goes under? This contrasts to a seal, who just sort of sinks under like a submarine. Can you tell what it's eating? Otters need to eat a quarter to one-third of their body weight each day. They have hardly any fat (blubber). Whales have lots of blubber and no fur. Seals and sea lions have some fat and some fur; and otters have no fat and lots of fur. They will die if they don't eat for three days. Contrast that to your students. How much would they have to eat each day?
Marine Mammals Bibliography

Children's Literature:


Describes the life of a sea otter and her pup.


Follows the life of a female walrus and her calf. Good for sharing with the class.


Describes the life of a humpback whale from birth to adulthood. Includes a glossary of whale words, a note about the danger of whale extinction. Attractive blue, green, and light brown illustrations.


An I Can Read, Beginner Book about the life and life history of a grey whale.


Describes whales and dolphins with a simple text and color illustrations.


An I Can Read book on how a mother sea otter takes care of her baby pup and teaches him to be independent. Includes eating, sleeping, and protection.


Facts and color illustrations for sharing with students.

Teacher's Reference:

All these books (except the Alaska Geographic book and Alaska Wildlife Notebook Series), the chart, and records are available from Whale Gifts, Center for Environmental Education, 624 9th Street, N.W., Washington, D.C. 20001.

Species by species accounts of Alaska whales and whaling history. Photographs, drawings, and range maps complement the text.


Excellent comprehensive coverage of whales species worldwide. Big picture book format with line drawings and color paintings.


A great synopsis of whale species and their status.

Chart and Records:


Marine mammal chart with full color scale drawings of whales, dolphins, and seals.

Callings. Produced by Paul Winter. Two records and booklet of photos, narrative, and background on each species.

Traces the mythic journey of a sea lion pup who encounters other marine mammals. The animal's voices mingle with Winter's music.

Deep Voices: The Second Whale Record.

Includes two entirely new humpback songs plus Right and Blue Whale sounds.

Ocean of Song: Whale Voices.

Features a variety of unique songs: Orca in Puget Sound, humpback whales near Maui, ocean waves, sea birds and more.


Classic recording of the great range and variety of humpback communications.
Unit Four
Seashore Animals

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Objectives:

To help students:
• Discover and examine beach treasures (Activity 1).
• Enjoy poetry about the beach (Activity 1).
• Draw a beach on butcher paper (Activity 1).
• Recognize that sea stars vary in color, size and texture (Activity 2).
• Participate in making sandpaper sea stars, and in cutting out and coloring sea stars (Activity 2).
• Make model sea urchins out of clay or bread crumbs and glue (Activity 3).
• Play seashell tic-tac-toe (Activity 5).
• Learn that a seashell protects a soft animal from predators and from drying out in the air (Activity 5).
• Create a classroom aquarium for hermit crab (Activity 6).
• Feed crabs with bits of mollusk or frozen shrimp (Activity 6).
• Recognize that barnacles live in the ocean attached to hard surfaces (Activity 7).
• Look at barnacles under a magnifying tripod (Activity 7).
• Identify, role play, and look for sea anemones at the beach (Activity 8).
• Complete worksheets of seashore animals (Activities 2, 8 and 11).
• Draw or paint a giant litterbug and its effects on the classroom and beach.
• Learn a Sea Week song and make up additional verses (Activity 11).
• Make a beach treasure collage (Activity 11).
Seashore animals: clockwise from upper left: starfish, hermit crab, sand dollar, seaweed (laminaria), anemone (two with tentacles extended, one with tentacles retracted), sponge, U. tenuck and softshell clams (cicled), urchin, snails, barnacles, limpets, chitons, mussels, rockweed, starfish.
To children as well as adults, seashore animals are an endless fascination. Any study of marine life should include a field trip to the beach if possible. Such a trip should be one of discovery, exploration and excitement. To prepare children for this experience, teachers should involve them in classroom activities which will help them better understand what they will see at the shore.

Most animals in this unit can be most easily found in rocky habitat at low tide. However, these animals also are found offshore from sand and mud beaches and occasionally will drift in. Fishermen often find such animals in their nets, and often are willing to save some for classroom study. The Sea Week Source Book details how to obtain and maintain a saltwater aquarium. To keep specimens alive for short periods before releasing them, keep them in gallon containers of sea water. Store in refrigerator. For Interior Alaskan students, such aquarium specimens can make this unit particularly exciting.

Activity 1
Beach Treasures

Background:

"Treasure" is an ideal concept with which to introduce children to seashore animals. The transition between nonliving beach treasures and the living jewels of the seashore is an easy one to make. The treasure theme establishes a sense of value which the teacher can explain in natural and aesthetic terms as well as monetary ones. And the treasure theme is easy to maintain, from this activity's opening of a treasure chest in the classroom to having a treasure hunt during your class field trip to the beach.

Vocabulary:

- treasure
- gems
- jewels
- net floats
- mermaid
- merman
- tide (review)
- seashore (review)

Materials:

- large sheet of butcher paper
- felt-tip markers or crayons
- magnifying lenses
poem:
  ...Treasures
  - beach treasures (suggestions):
    ...driftwood
    ...shells
    ...sand
    ...glass net floats
    ...cork net floats
    ...old rope
    ...dried seaweed
    ...surf-sculpted rocks
  - one surfworn colorful pebble for each student (dry, so the colors are subdued)
  - glass jar half filled with water

Procedure:

1. Bring an old sea trunk to class, or decorate a cardboard box as a "treasure chest," and fill it with beachcombing treasures, putting the surfworn pebbles at the bottom. Before showing the children what's in the chest, ask them what they think it might contain. Tell them all the items are beach treasures. What might they find on the beach? Make a class list. Then one by one remove the items from the chest. Discuss each item as you take it out. Why is it a treasure? Do treasures have to be worth money? Pass each item around as you discuss it so the children can feel and see the textures and patterns.

2. Remove the surfworn pebbles from the chest and give one to each child. As you're passing them out, talk about how people sometimes find diamonds, rubies, pearls, silver and gold pieces on beaches. The currents, tides and surf have washed them ashore from shipwrecks. And here in Alaska, people "struck it rich" when they found gold on the beaches of Nome. Can any of the students describe a ruby? A diamond? A pearl? Silver? Gold? What about these pebbles that have been worn smooth by being rolled by the surf along the seashore? Are they as bright as rubies? As sparkly as diamonds? As shiny as pearls? No? Set the jar half full of water on a centrally located table so the students can gather round, and have them drop their stones into the water one by one. Do the stones look different in the water? Are the colors brighter? What colors do they see now?

3. Have the children look again at the other treasures from the chest. Let them put some of the seashells in the water jar to see if dryness has hidden any of the shells' beauty. Have them look at dry sand through a magnifying lens, then dampen the sand and let them look again. Do the grains of sand look like jewels now? Do they see any of the same colors in the sand that they see in the jar of pebbles? What about seashore animals? Are they
brighter and more colorful treasures when they're in the water?

4. Make a beach out of butcher paper. Have the children add crayon or felt-tip marker drawings of the animals they expect to see when they go to the beach (and add additional drawings as your class studies the animals in depth). Review the definition of tides (Unit 1, Activity 3). Explain that many animals live in the area between the highest tide and the lowest tide. These animals have to be ready for anything - hot sun, rain, snow, and bigger animals from both the land and the sea that like to eat them! The area between the high tide and the low tide is called the intertidal zone - the area we'll be exploring during our upcoming field trip to the beach!

5. Whether you read the following poem without comment or discuss some of its imagery, your students probably are better able to visualize its contents now than before you began this activity.

TREASURES

Down on the beach when the tide is out
Beautiful things lie all about -
Rubies and diamonds and shells and pearls,
Starfish, oysters, and mermaids' curls;
Slabs of black marble cut in the sand,
Veined and smoothed and polished by hand;
And whipped-up foam that I think must be
What mermen use for cream in tea.
These and a million treasures I know
Strew the beach when the tide is low -
But very few people seem to care
For such gems scattered everywhere.
Lots of these jewels I hide away
In an old box I found one day.
And if a beggar asks me for bread
I will give him diamonds instead.

-Mary Dixon Thayer
Activity 2

Sea Stars

Background:

Sea stars belong to the group of animals called Echinoderms, a reference to their spiny skin. The term "sea star" is used rather than "star fish" so that they're not thought of as fish. As with their relatives the sea urchins, spines are an important part of the sea star body structure. Each sea star has a central area called a discace and from five to 50 rays that extend from it. The "under-side" of the animal includes a mouth in the center of the central disc and, extending the length of each ray, a groove bearing the tube feet on which the sea star moves. Each tube foot in most species acts like a tiny suction cup which the star can cause to attach to any surface or cause to release. This suction and release of suction is accomplished by controlling the water pressure in a system of internal, water-filled canals.

The upper surface of the sea star bears elaborate microscopic structures, spines, tiny pincers for protection, and "fingers" or "gills" through which the animal takes in oxygen and disposes of carbon dioxide and other metabolic wastes. The most obvious structure on most sea stars is a roughly circular, bare area that is like a sieve plate through which water enters the canal system to maintain the proper pressure in the tube feet.

On Alaskan seashores there are several common sea star species. Most have long, scientific names such as Evasterias troschelii, but no easy common names. Thus, having children learn the specie name is not practical. What can be done, however, is to look at the sea stars carefully and decide by thinking about color, size and texture how many different kinds are found. (HINT: One species may be several different colors.)

Sea stars are active, but slow-moving animals that spend most of their lives searching for food. The diet of animals of a particular species may include only one or a few kinds of food; but taken as a whole, sea stars feed on a wide variety of marine animals including other sea stars. Some stars are capable of extruding the stomach outside the mouth so that they can surround a food object with it and feed on something too big to be drawn through the small mouth opening.

Materials:

- books or magazines with sea star illustrations
- worksheet:
  ...Sea Stars (4A)

Procedure:

1. Show students the variety among sea stars. Then follow up with one or more of the following art projects:
Sea Star Mosaic: Use dried beans, seed pods, small stones, wood or construction paper, and glue. Let each child design his or her own sea star by creating a star-shaped design of small objects glued to a background.

Sand Paper Sea Star: Use rough sandpaper, crayons, scissors, and cookie sheet. Let each child cut a sea star shape out of sandpaper, and heavily crayon on a design. Then place finished sea stars on a cookie sheet. Bake in 250°F oven for 10 to 15 seconds, until crayon melts.

Coloring Sea Stars: Using the Sea Star worksheet, have children create their own color design for a sea star.

Mural: Use various media - tissue paper collage, wet chalk, melted crayon, water colors, crayon resist. Depict a variety of sea stars and glue them to your beach mural (Activity 1, Procedure 4).

Sea Stars

Have the children look for sea stars. When they find one, ask them:

- Where did you find this sea star? Is it close to the water or high up on the beach?
- Was it attached? To what? How tightly?
- Does the sea star live by itself or in a group?
- What other animals are nearby?
- How does a sea star move?
- Touch a sea star. How does it feel? Do sea stars that look different from each other feel different?
- Is it alive or dead? How can you tell?

Have children compare sizes, number of rays, colors of several individuals.
Activity 3
Sea Urchins

Background:

Sea urchins, like sea stars, are spiny members of the Echino-dermata. Each has a rounded internal skeleton called a "test." On the test are many knobs to which the spines are attached and on which the urchin pivots. An urchin’s spines are mainly protective, but also help in locomotion. Like sea stars, urchins have tube feet. These are on long, slender "stalks," that can be stretched out to extend beyond the tips of the spines. The tube feet help the urchin move, help it keep itself clean, and sometimes help it move food to its mouth. The mouth, which is located within an elaborate structure that because of its shape is called Aristotle's Lantern, is in the center of the underside of the body. Urchins often feed by scraping algae or tiny particles of food from rocks. They also feed on large algae and on dead organisms. Three kinds of sea urchins are commonly found in Alaska: the green sea urchin, the purple sea urchin, and the red sea urchin. A fourth kind, the heart urchin, is present (but rare) in Alaskan waters below the low tideline.

Sand dollars are flattened relatives of sea urchins. But their spines, instead of being up to three or four inches long, are only about one-sixteenth of an inch long and so closely packed that the animal looks and feels like a velvet pancake. Sand dollars live buried partly or entirely in subtidal sand or mud, feeding off organic matter that is caught in their spines as it drifts in the ocean currents. In Alaska, most sand dollars are a light fleshy color. But in several areas – particularly in Bristol Bay waters – they become bright green. Scientists don’t yet know what causes the color phenomenon. Most of the sand dollars students find washed up on the beach actually are bleached sand dollar skeletons from which the spines have fallen.

Materials:

- tempera
- transparencies or pictures of sea urchins
- baker’s clay or bread crumbs and glue
- worksheet:
  ...Sea Urchin (4B)

Procedure:

1. Show children the urchin pictures and discuss with them the animal’s shape and habits. Use the Sea Urchin worksheet. Have students color the urchin green or purple. (The red sea urchin
has much longer spines.) Suggest that they draw additional baby urchins on the sheet. Count them aloud. The left side of the worksheet is an urchin test or skeleton which, when you find one on the beach, usually has been bleached white by the sun.

2. Have each student design his or her own sea urchin using clay (baker's clay) or bread crumbs and glue with toothpicks imbedded for the spines. Bake in 350°F oven until hard. Let children paint the urchins with tempera paint. To make Baker's clay, use: 1 c. flour; 1 c. salt; and 1 rounded tsp. powdered alum. Mix these ingredients. Add water slowly and knead until the texture of clay. Store wrapped in wet cloth and plastic.

For the bread and glue variety, use: fresh white bread and Elmer's or white glue. Crumble bread. Mix with it enough glue to form a dough. Shape into desired form and let dry. When models are dry, spray with clear sealer or coat with nail polish before coloring with water colors or other paints.

3. Field Trip Activity Card:

Sea Urchins

Have the children look for sea urchins. When they've found some, ask them:

- What sizes and colors of urchins did you find?

- Where did you find them? Are they low on the beach or high?

- Who lives nearby?

- Are any of the urchins in large groups?

With the children:

- Compare sea urchin tests (skeletons) with a live urchin.

- Look at the knobs on which the spines turn and the holes in the test through which the tube feet extend.

- Examine the delicate bones of the complex mouth structure (Aristotle's lantern).

- Feel and describe the textures and pattern of the test.

Have the children carefully hold a sea urchin. (Very carefully. Spines can cause infection if they penetrate the skin.)

Have them hold still and concentrate on thinking about how the spines and tube feet feel as the urchin moves them.
Activity 4
Sea Shells

Background:

Seashells belong to a very large group of animals called mollusks. This group includes limpets, chitons, snails, nudibranchs, clams, mussels, and even the octopus and squid. The most commonly seen seashells on Alaskan beaches are the shells of snails and clam-like mollusks.

Snails are univalves because their shells have only one part or valve. Many univalves have shells that spiral around a central column, but the cap-shaped limpets are univalves too. Inside the hard, protective shell of a univalve lives a soft animal that has one broad muscular foot on which it moves, and a head that is equipped with eyes (in most snails), sensory antenna, and a mouth. The mouth includes a "radula," which is a ribbon-like structure equipped with rows of teeth that are used to scrape up food. Part of the soft animal called the mantle produces the shell; and as the animal ages, both the soft animal and its shell grow larger.

In addition to a shell, many univalves are equipped with an operculum. The operculum is a tough, horny "door" that can be used to seal up the aperture of the shell. The soft animal will draw inside to protect itself from a predator or from drying out in the air if it is left exposed when the tide goes out.

Clams, cockles and mussels are bivalves, or animals with shells of two parts or valves. In general, bivalves are less active than univalves. They are often found burrowed beneath the surface, completely hidden except for the tip of a tube-like siphon they use to bring them food and oxygen. Exceptions are the mussels, which usually live above the surface.

Seashell designs are almost endless in their variety and it is hard to resist picking up a pretty shell. Remind children, however, that if the animal inside the shell is alive,
it cannot survive long away from its natural home. If a specific activity has been planned, collecting a few empty shells is fine, but try to encourage students to enjoy the beach and its creatures but to leave it as nearly as possible the way they found it.

Vocabulary:

- snail
- clam
- limpet
- chiton
- shell
- bivalve
- univalve
- octopus
- mollusk

Materials:

- masking tape
- empty shells
- pictures or drawings of shells, clams, snails
- worksheets:
  ...Feed the Octopus (4C)
  ...Bivalves and Univalves (4D)

Procedure:

1. Ask children to bring to class shells they might have at home. Set up a group of shells for the students to handle and examine. Divide the shells by size, then by shape, then by whether they are bivalves or univalves. Use the Bivalves and Univalves worksheet. What does the living animal look like? Discuss the importance of not taking a live animal away from the beach.

2. Make tic-tac-toe lines on the floor with masking tape. Have children play the game using shells as markers.

3. With the class or individuals, discuss how it would feel to be a shell, an animal's home. What kinds of things would you see, feel, think about? Write a story after brainstorming these ideas.

Additional Activities:

1. Art: Have students draw pictures of several shells and make a shell book.

2. Science: Invite older students who are studying shells to come to the class to show shells to the younger students and talk about them.

3. Mathematics: Number the compartments of a muffin tin 0-11. Give the child 66 shells and ask him or her to place the correct number of these in each compartment.

4. Language Arts: Read poetry about shells.

5. Mathematics: Glue small shells onto numbered tongue depressors for counting practice.

6. Home Economics: Make clam chowder for the children to taste, using fresh or canned
clams. BE CAREFUL ABOUT USING CLAMS YOU HAVE COLLECTED ON THE BEACH. ALASKAN CLAMS MAY CONTAIN A TOXIN (PARALYTIC SHELLFISH POISONING). If in doubt, contact local Fish and Game authorities.

7. Art, Science: Explaining that octopuses sometimes eat clams, mussels and other bivalves by prying them open, pass out the Feed the Octopus worksheet. After the students work its maze, maybe they'd like to color the octopus. Explain that octopuses can change color to match their surroundings. What color would the children color their octopus to match their desk? Their clothes? The floor?

8. Field Trip Activity Card:

**Shells**

Leader: Encourage children to find as many different kinds of shells as they can - both snails and clams. Lead them to discover whether the shells are empty or contain living animals. If a shell is still home to a live animal, discuss with the child the need to leave it just as it was found.

Locate a shell containing a live mollusk and watch it with the children for several minutes. Can the children see it moving its foot, eyes or antennae? If the animal is moving over algae or other growth, it is likely to be grazing, much like a cow. Remind students that the food is scraped into the animal's mouth (radula) by rows of teeth usually too small to see. Ask the children why they think such animals need shells.

Find an empty shell. Have the children hold it to their ears. Can they hear the ocean?

Have the children find a univalve (one valve or shell).

Have them find a bivalve (two shells).

See who can find the biggest shell, then the smallest.

See if the children can find a shell with a small hole in it. Explain that the hole probably was drilled by another animal such as the moon snail so it could suck out the animal for its dinner.
Mussels

Have the children look at the mussels. Ask:

- Are they living creatures?
- How are they attached to the rocks? (Let kids discover the byssal threads. Test the strength of the threads.)
- Why are the threads so strong? (So the mussels can hang onto the rocks and protect themselves from waves.)
- Do you think mussels can move if they want to? (They can, with a foot like a clam's.)
- Why might a mussel want to move? (If it becomes too crowded against its neighbors, or can't get enough food.)

Locate mussels in the water with their shells open. Ask the children what they think the open-shelled mussels are doing (feeding).

Find mussels out of the water with closed shells. Why are the shells closed? (So the animals inside won't dry out.)

Count the number of mussels you see in one group.

Remind the children that mussels are good to eat, but people need to be careful because mussels often are the first mollusks on a beach to become contaminated with the tiny, too-small-to-see animals (dinoflagellates) that cause paralytic shellfish poisoning. So mussels shouldn't be eaten unless the Alaska Department of Fish and Game has certified the beach as safe.
Activity 5
Hermit Crabs

Background:

Hermit crabs are crustaceans, related to shrimp, other crabs, lobsters, and barnacles. They are adapted to living with their abdomens tucked into empty shells or other protective structures. They do not have a shell of their own. Thus, while the walking legs and forward part of the animal have a hard protective outer skeleton, the animal’s abdomen is soft. Because most hermit crabs live within coiled snail shells, their abdomens are curved and end in a hook-like structure that helps anchor the animal firmly in the shell house.

Like all other crustaceans, hermit crabs can grow only by shedding their tough external skeleton and replacing it with a new, larger skeleton. As a hermit crab grows, it must also find a larger snail shell for itself. Thus, periodically, a hermit seeks out a new, larger empty shell, quickly releases his grip on his old home, and takes up residency in the new home of his choice. The crabs don't attack snails; rather, they select their new homes from among empty shells. The crabs often are observed trying on shell after shell for size, until they’re satisfied with one that fits.

For the most part, hermit crabs are scavengers, feeding on whatever bits of animal material they can find.

Most hermit crabs found on Alaskan beaches are small, often living in the small cone-shaped shells of periwinkle snails. Occasionally a large, sometimes bright red, hermit crab may be found above the water level, but in general, the larger hermit crabs live in deeper water.

Vocabulary:

- hermit crab
- periwinkle

Materials:

- a flat glass, plastic or enamel pan
- several hermit crabs from a local beach
- dead mollusks or shrimp. (for crab food)
- clean sea water
- worksheet:
  ...Hermit Crab (4E)

Procedure:

1. Place clean sea water and hermit crabs in the pan. (Don't use a metal pan. Metals released into the water by corrosion will kill the crabs.) Either tip the pan so that there is a dry end or put a rock or pebbles in the pan so that the hermits can get out of the water. Put the pan and crabs in the coolest location in your room. Use a thermometer to help keep track of the temperature. In order for the crabs to survive, the salt water
should be as cool as possible and should be changed every few days so it will be clean and not depleted of oxygen. Use saltwater ice cubes during the day and refrigerate periodically throughout the day and at night.

2. Feed the crabs bits of recently dead mollusk or small pieces of frozen shrimp. Remove food pieces that are not eaten.

Name your crabs. Encourage children to observe and talk about the appearance and behavior of the hermits. Try some experiments. Place extra empty shells in the pan and see if any of the hermit crabs switch shells. Cover one half of the pan with a piece of cardboard and see to which side the crabs go.

Check food preferences. Do the crabs spend more time in or out of water? How do they eat? Take the crabs back to the sea after your study.

3. Field Trip Activity Card:

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**Hermit Crabs**

While the children are observing hermit crabs, ask them:

- How can you tell this is a hermit crab and not a snail?

- Where was it found? In the dark, in the sun, where it is warm, or cool under a rock, in a crevice, on sand, mud?

- What other kinds of animals or plants were living nearby?

- How does the hermit use its claws? Are the claws different sizes? Why?

- How does it move?

**Leader:** If two or more hermit crabs are found, compare sizes, colors, types of shell "homes."

Watch for this behavior: Hermit crabs often cling to the sides of bedrock tidepools (or on algae in these pools) in large numbers, and when a shadow looms over the pool (as that of a person peering in) many of them will curl up defensively and tumble down the sides of the pool to rest on the bottom. Discuss with the children how this escape behavior helps the crabs survive?
4. Do the Hermit Crab worksheet and the following finger play:

I'm a little hermit crab
(Fingers of one hand creep across the table.)

Looking for a hermit shell
(Cup the opposite hand a short distance in front of the creeping fingers.)

I see one.

Here I come
(The creeping fingers jump inside the cupped hand.)

This one suits me very well.

Additional Activities:

1. Language Arts: Read or paraphrase A Shell for Sam (see Bibliography).
Activity 6
Barnacles

Background:

Barnacles are crustaceans, closely related to crabs and shrimps. When they are very small, barnacle larvae live in the open water and (in most cases) look like shrimp or crab of the same size.

When the larva has reached a certain size and stage, the barnacle settles to the bottom of the sea, attaches to a hard surface by its head, and begins to grow a hard shell around itself. Its legs become feeding structures.

The six-sided barnacle has a trap door made up of four plates. When it chooses, the barnacle can slide the plates of the trap door open, extend its legs and sweep them through the water to catch the tiny plants and animals called plankton, which are its food.

Once it settles to the sea floor and grows its hard covering, a barnacle never moves. It may live for three to five years.

Materials:

- live barnacles in a plastic pan of salt water
- pictures of barnacles
- worksheet: ...Barnacle (4F)

Procedure:

1. Show the children the live barnacles. A barnacle is a tiny, soft animal, like a crab or shrimp, that has built a hard house around itself for protection. The barnacle is actually standing on its head, pushing its feet out to get food. Use the magnifying tripod so students see the animals feeding. Then do the Barnacle worksheet.

2. Have the children role play barnacles by standing on their heads, sticking their feet out to get food (plankton).

3. Field Trip Activity Card:
Barnacles

Have the children:

- Look for different sizes of barnacles. Different sizes means different ages.
- Feel the texture of a barnacle-covered rock.

Ask youngsters:

- Do barnacles settle on other things besides rocks? Algae maybe? Other animals? Wood?
- What happens when they grow larger and crowd tightly together? (This is fairly common.)
- What do you think might eat barnacles? (Gulls, which open them by dropping them from heights, starfish which pry them open, sea otters which pound them open with rocks.)
Activity 7
Sea Anemones

Background:

Anemones belong to a group called the Cnidaria which also includes jellyfishes and corals. The body of an anemone consists of a thick column, the top of which bears numerous tentacles. The tentacles capture food for the animal and convey it to the mouth which is located in the middle of the tentacles on the top of the column.

Anemones depend on the water for support. When they are stranded by a receding tide, they look like gelatinous masses. When the tide returns and covers them, however, they can again expand into an upright position, in which they once more look like lovely sea flowers.

No one knows how old an anemone may get to be, but people who have studied them believe that they may live to be more than 100 years old, living just as long as they have food and are left alone. Anemones do not move very fast, but they can creep over the sea floor very, very slowly, using the base of the column as a foot.

Vocabulary:

- anemone
- tentacle

Materials:

- pictures of an anemone
- worksheet:
  - Anemone (4G)

Procedure:

1. Share the anemone pictures with the students. Have the children think about what the animals look like and the kinds of movements they might make. Using the Anemone worksheet, encourage youngsters to express their own concepts of the animal.

2. Look up anemone in the encyclopedia. Point out differences and similarities between flowers and sea anemones.

3. Have a group of students stand back to back in a tight circle with arms waving in the air to portray an anemone. Show reactions to tide ebb and flow, food passing by, threat of danger. Then have each student individually imitate an anemone. Here comes a school of little fishes! Grab them and pull them in and zooph (swallow them)!

4. Field Trip Activity Card:
Sea Anemones

Encourage children to feel the anemone and describe how it feels.

Ask:

- Where did you find the sea anemone?
- Does it live alone or with other anemones?
- Is the anemone attached to anything?
- Find an anemone under water and gently place bread crumbs, cheese, or meat from your lunch on its tentacles. What happens?

Remind the children that anemones - if left undisturbed - will live to be very old - probably older than the children themselves will ever be!
Activity 8
Litterbugs

Background:
At all grade levels in the Sea Week curriculum students should develop their abilities to reason and to consider the man-made problems related to marine, wetland and river environments. The problem of litter can be presented graphically to kindergarteners either in the classroom or outdoors. Through example and discussion, encourage students to achieve an understanding of littering and its negative and positive effects on the environment.

Vocabulary:
- litterbug

Materials:
- paper
- crayons or finger paints

Procedure:
1. Let's pretend! Involve students in the following flight of fancy:

   Look around the room. Is it neat? Could you find your table? Your crayons? Your coat in it?

   Now pretend there is a giant litterbug. What does this bug look like? The litterbug keeps walking through our room and each time it does, it drops another piece of litter. First, it drops a soda pop can as big as an oil drum. Then it drops a kleenex as big as a bed sheet. What else does the litterbug drop in our classroom?

   After the litterbug has been at work for a week or a month, do you think you could still find your coat or desk or crayons? Would it be a help or a trouble, or both, if a giant litterbug were at work in the classroom?

2. Encourage children to draw or paint a picture of a litterbug.

3. On a succeeding day, ask students to think about the sizes of animals that live on the beach. Use hands and classroom objects to demonstrate size. How big is each child compared to a sea star, hermit crab, barnacle, duckling or fish? Might a child seem like a giant to a snail? If the child-giant were a litterbug and dropped pop cans, candy wrappers or lunch bags on the beach, how would the animals be affected? Would it make their world better or worse? How?
4. Encourage students to realize that littering the natural environment can have negative and positive effects. (Litter is unsightly, may alter the environment of living organisms in a detrimental way - sometimes even making it impossible for the inhabitants to continue living there - though it may provide new places for some animals or plants to live. If we care about our natural environment, though, it is important to keep our shores, rivers and wetlands as natural as we can.) In the discussion, use specific examples:

- Pretend you are a snail and a plastic bag lands on top of you. How would you feel? What might happen to you?
- How would it feel to be a tiny fish when someone pours a can of soda into the water?
- What would happen to a sea star that is looking for food and finds its way blocked by pop cans?

5. Before taking a field trip to the shore, tell children that you or helpers will have bags into which children may deposit litter. Encourage students to try to leave the area free of material that may have been left by the "giant litterbug." Make sure children are careful not to be "giant litterbugs" themselves.
Activity 9
Beach Field Trip

Background:
The field trip is the highlight of Sea Week, as well as the culmina-
tion of much that your class has learned. Field trips do take more
organization than most other Sea Week activities, but are well worth
the effort.

Materials:
- garbage bags for litter
- task cards from throughout the book

Procedure:
1. Select a date and location for your field trip. A trip coinciding with a low tide
would be best in southern portions of Alaska, where much more intertidal zone life
is exposed when the tide is out. In northern Alaska the timing isn't as crucial because
the tide is barely noticeable.

If you're not thoroughly familiar with the intertidal life of your local beaches, you
might consider taking along an expert. But if one isn't available, don't hesitate to go
anyway, and learn along with the children.

2. Arrange transportation. Consider several short trips if the beaches are nearby.

3. Send notes to parents inviting them along as group leaders; or arrange for high school
students or bilingual or special education staff to assist you. In the notes, include information on cloth-
ing, snacks and lunch.

4. Include lots of discovery time in your field trip. Review this volume's introductory
section, "How to Use This Book" for suggestions on planning the details of your trip.

5. Prepare students for the trip by previewing what they'll be doing, and by developing observation skills and conser-
vation rules.

6. Check through the field trip activity cards contained in each unit, and photocopy
those you'd like to distribute to trip leaders.

Here are two more that might prove valuable:
Beach Intertidal Zones

Help the children find the different beach zones and their inhabitants. On sloping mud or sand beaches, the zones are spread out over much greater distances than they are on steep rocky beaches.

Walk slowly from the upper beach to the water and back. Have the children keep track of what they see. As they look back over where they've walked, can they see any color changes? (Perhaps a dark green band of seaweed, dark blue bands of mussels, a white line of barnacles, the driftline on the upper beach where the last high tide reached - and the storm tideline at the top of the beach where there are large pieces of driftwood.)

Each beach is different. Have the children close their eyes and tell you where they saw each of the different animals as they walked toward the water. Walk the zones one more time. On the back of this card, draw a rough map of the zones and their animal inhabitants.

Beach Critters

At low tide, the chief chore of most beach inhabitants is to avoid drying out. Encourage children to discover ways and places animals use to keep damp.

When the water level begins to rise with the incoming tide, animals that once again are submerged become increasingly active. Ask children to look for the increased activity and explain what the animals are doing (feeding).

Point out where beach animals make their homes: on rocks, shells, driftwood. Observe them carefully for several minutes, but leave them where they are.

Look for telltale signs (holdes, tracks, mounds) of animals that live beneath soft sand or mud. By these signs, have the children count the number of animals that are hiding.
Activity 10
Home from the Beach

Background:

Capitalize on the momentum of the beach field trip by using it as an impetus to learning in all subjects. Remembrances of the sea can add zest to your class for the rest of the year!

Materials:

- crayons or finger paints
- drawing paper
- beach treasures
- Sea Week Song
- worksheets:
  - Beach Matching (4H)
  - Beach Animals (4L)
  - Sea Week Song (4J)

Procedure:

1. Review the field trip events. Add pictures to your beach mural.

2. Learn the Sea Week Song and make up additional verses.

3. Write a class story to go with your mural, or make a book about the field trip.

4. Have the students make a collage with their beach treasures (empty shells, pieces of crab shell, driftwood, pebbles, dried sea week, sand). Make bases for the collage with flat pieces of driftwood, a board covered with burlap, or stiff cardboard. Have the children arrange the treasures on the base, then glue everything in pace as an individual or group project.

5. Use the Beach Mating and Beach Animals worksheets for review, and for introducing the children to two echinoderms that haven't been covered in this unit: the brittle star and the sea cucumber. Brittle stars have arms that fall off easily, making it easy for them to escape from predators. The sea cucumber is very soft. It sometimes regurgitates its entire digestive system to escape from animals that chase it. But it can grow the system right back!
Sea Week Song

Autoharp chords

1. One day I went down to the sea And what I saw I'll tell.
2. One day I went down to the sea And what I saw I'll tell.

I saw a little hermit crab In an old old snail shell.
I saw a little tanner crab With eight legs on its shell.

Chorus

Heigh ho to the sea, Come and look with me.

Heigh ho to the sea see what we can see.

Other Verses:
Children create, repeating line one, creating line two (using information they’ve gained about the sea).
Examples:
I saw a silver salmon Swimming all around.
I saw a big gray whale And it was spouting water.
I saw a lot of seaweed And most of it was green.
Seashore Animals Bibliography

Children's Literature:


A gentle, lyrical book showing and describing a day at the beach. Children discover waves, tides, tide pools, shells, crabs, boats, buoys and foghorn. Beautiful watercolor illustrations.


A Let's Read and Find Out Series with a brief explanation of life cycles, feeding habits, regeneration. Attractive illustrations.


Filled with ideas on crafts, identification of collections, recipes, and identification of common shells and seaweed.


Combines humor and facts in portraying the seashore environment.


A Science I Can Read Book. A child's story about securing and caring for goldfish.


A Science I Can Read Book about octopus.

Teacher's Reference:


Describes shell species with color drawings. Includes general background information on shells. One of the Golden Field Guide series.


Stresses ecological relationships with color photos and line drawings. One of the Our Living World of Nature series developed in cooperation with The World Book Encyclopedia.

Specific to Alaskan waters, this book is the perfect complement to the Sea Week Curriculum Series. Its excellent underwater photos are supplemented by descriptive text that includes species descriptions, ranges and natural history.


In-depth descriptions of various shore types and their invertebrate inhabitants. Photographs and line drawings.


Includes a variety of information on seashore animals, including birds and fish. Illustrated by line drawings.


Discusses ecological relationships. Color photos and drawings.


Species by species descriptions of seashore animals. Black and white photographs of almost every species make it easy to use as a field guide.


Tide pool animal descriptions, beautiful color photographs.


Discusses tides, currents, sand, and beach geology. Line drawings.


Descriptions of the different groups of seashore animals illustrated by color photographs and line drawings.

Brief shell descriptions, color photographs.


Descriptions of a variety of seashore animals by habitat. Includes birds and fish. Illustrated by line drawings and color photographs.


Features a sea photo on each page together with a couplet such as, "B is for Beluga, one kind of whales, that's all white and smooth from its head to its tail."

Charts:


Mollusk and crustacean chart with color drawings of these underwater inhabitants.


Marine fishes chart with color drawings of the various fishes.