SEA OTTER JEOPARDY

FOR THE TEACHER

Discipline
Biology

Themes
Evolution, Systems & Interactions

Key Concept
Sea otters have many special adaptations which help them to be successful in their habitat and in their interactions with other organisms sharing their kelp forest home.

Synopsis
Students work cooperatively to teach each other about sea otter adaptations and their ecological relationships in the kelp forest and then participate in a "gameshow" to check for understanding.

Science Process Skills
communicating, comparing, organizing

Social Skills
encouraging, checking for understanding

Vocabulary
adaptation, benthic, ecological, herbivore, metabolism, predation

MATERIALS
Into the Activities
"World of the Sea Otter" video from the Marine Mammal Fund or other sea otter visuals including some of the following:
videotape, slide show, pictures, postcards, posters, models, puppets or books

(Per Group)
poster paper
colored markers
one 8 1/2" x 11" sheet of paper

(Per Student)
Anticipatory Chart Worksheet (attached)

Through the Activities
Sea Otter Jigsaw Cards (make two copies of each set of Adaptation and Ecological Relationship cards attached)
cut out each information "bit" or paragraph and glue onto 3 x 5 cards OR onto pictures, postcards, or student drawings graphically representing the information "bits"
poster paper and colored markers (per group)
8 1/2" x 11" sheet of blank paper for Mini-book (per student)
paper quilt square (one per student), glue, book-binding tape (two colors), construction paper (various colors) for Class Quilt
numbered slips of paper (from 1 to half the number of your class)

INTRODUCTION
Sea otters were once very plentiful all along most of the North Pacific from Japan, across the Bering Sea to Alaska, and south as far as Baja California. However, the hunter's quest for the sea otter's luxurious furs greatly reduced their number and they were brought close to extinction. In California the intense hunting pressure started in 1786 and by the time it ended less than 100 years later, nearly 200,000 otters had been killed throughout their range. Before the start of the sea otter fur trade, the California sea otter population was estimated at about 16,000. Today, there are considered to be only about 1700 sea otters in California and those can only be found from Monterey to Point Conception near Santa Barbara. In the north, the sea otter range is limited to shallow waters off Alaska, the Aleutian Islands and the Commander Islands. The northern sea otter population is now estimated at approximately 150,000 animals.

Biologists are concerned about the possible extinction of this small group of California sea otters in the event of a large oil spill off the coast. A group of sea otters was moved from the central California coast to San Nicolas Island off southern California to try to avert such a catastrophe. This translocation project was begun in 1987 and by 1990, a total of 137 sea otters had been flown out to the island. As of 1993, only 14 otters remain at the island, 27 otters swam all the way back home, some otters are known to have died and as many as 78 have disappeared without a trace. These results are discouraging, but some biologists feel it is still too early to tell whether the experiment will ultimately be successful or not.

All marine mammals, including sea otters, are descended from land mammals that returned to the ocean. Sea otters are related to the river otter, weasel and skunk of the Family Mustelidae. The sea otters' ancestors began their aquatic lifestyle much later than the ancestors of the whales, seals, sea lions or sea cows and therefore are not as completely adapted to the marine environment. For example, sea otters have not evolved the thick layers of blubber that insulate the other marine mammals. Instead their fur has developed into the thickest coat of any mammal, extremely efficient at trapping warm air and keeping cold water away from the skin.

In California, sea otters spend their whole life in the kelp forest, only rarely coming ashore. The kelp forest is their home, providing a safe haven from land predators where they can mate, give birth and even wrap their young in the kelp fronds to keep them from floating away while they hunt for their food on the sea floor below. Sea otters prey include abalone, sea urchins, shellfish and other organisms which share this kelp forest habitat.

INTO
THE ACTIVITIES
Sea Otter Images
Have students form cooperative groups to watch a sea otter videotape such as "World of the Sea Otter" with the sound **off.** (Alternatively, show a sea otter slide show, read them a story about sea otters, or use puppets, models, and posters to illustrate a talk on sea otters.)

While watching the videotape, have students discuss with their group what they observe and together sketch a picture of the sea otter in its habitat. Have them share their drawings and observations with the class.

Tape Recorders
See the Teaching Strategies section for how to present this activity.

Use the following two prompts:
1) Tell your tape recorder everything you know about sea otters.
Partners switch roles.
2) Tell your tape recorder everything you know about the kelp forest.

Group Brainstorm
Have cooperative groups fold a piece of 8 1/2" x 11" sheet of paper into three columns and label each as in the chart below. Have them work together to complete the first two columns as one student acts as the recorder..
What we already know about sea otters
What we want to find out about sea otters
What we learned about sea otters

Have each group share their lists with the class as you record their ideas on the board or large sheet of butcher paper. Display them on the walls for future reference.

Video Revisited and ANTICIPATORY CHART
Have students work in their groups to complete the questions below (see student worksheet attached) in the **Before** box before showing the video a second time. Lead a class discussion about their "predictions". Now have them watch the videotape and fill in the **After** box. Did their answers change? Did it help to watch the video again with some questions in mind? ***These questions pertain to the "World of the Sea Otter" video. Make sure the questions chosen for your students reflect what is actually being shown in your particular sea otter images or as told in your sea otter story.***

1. What PLANTS and ANIMALS share the sea otters home?
2. What ADAPTATIONS can you observe which help the sea otters to survive in the kelp forest?
3. How do sea otters SWIM?
4. What and how do sea otters EAT?
5. What did you see that you DID NOT EXPECT?
6. Add your favorite question from the brainstorm WHAT WE WANT TO FIND OUT ABOUT SEA OTTERS.

THROUGH
THE ACTIVITIES
Part 1: The Jigsaw
Assign cooperative groups of five students to learn about either Adaptations of sea otters or Ecological Relationships in the kelp forest. There are 10 cards in each set (20 cards total) and so some groups will have the same "bits" of information. Pass out five cards of the appropriate set of "Adaptation" or of "Ecological Relationships" to each cooperative group. Try to have the same number of students studying each of the two subjects.

Have each student take one card and silently read it, individually learning the information. If they don't understand what they are reading, they can ask the members of their group to help them. If they still don't understand, have them raise their hand to get the teacher's help. Give them about 10 to 15 minutes to learn their card and decide how to teach it to their group.

Each student will then teach what was on their card to the rest of their group. They can teach it in a number of different ways including draw a picture, act it out or describe the information in their own words. The only things they can't do are read the card verbatim or pass it around for the other students to read it.

Emphasize how the gameshow will work so that students will really teach their information bits to one another and help each other to actually learn what was on each card. Tell students you will also be looking for and awarding points for social skills of encouraging and checking for understanding. These points will be added to the gameshow tally.

Give groups about 30- 40 minutes to teach each other their jigsawed bits of information. Tell the students that after they have finished sharing, they will participate as contestants in a GAMESHOW. By that time, all the bits of information should have been shared with other members of their group. Each student should then be able to describe either a number of adaptations or ecological relationships (not just the bit on their card), depending on which set of cards they were using.

Portfolio Assessments

Mini-book

Have individual students create a mini-book which includes words and pictures about what they have learned about sea otter adaptations and ecological relationships in the kelp forest. Have students fold an 8 1/2" x 11" sheet of plain paper lengthwise and then into thirds. Open it up again so that it is only folded in half lengthwise with the fold at the top. On one half only, cut along the two small folds, to form three flaps that open vertically. (See the pattern attached.)

Fold the right third to the center, and the left third on top of it. With the book folded shut and only the "cover" showing, have students write a name for their book on the cover and illustrate it. Open the cover (from right to left) and on the first "page" write the author's name. Turn the title page (from left to right) and label one section or chapter Sea Otter Adaptations, one Ecological Relationships, and one The Kelp Forest. Now have students flip up each chapter and draw a picture in one subsection and write text in the other about what they have learned. For the third chapter "The Kelp Forest", give students a synthesis question to address such as: Discuss two ways in which sea otters and kelp forests are dependent on one another. Do you think each of them could survive without the other? The Scoring Rubric follows the last page of this activity.

Class Quilt

Have each student make a quilt square about the information on their card. This can then be used as their graphic to teach from as they describe their "bit" of information to the rest of their group. It can also be used to determine how much of the information they understood on their card. The Scoring Rubric follows the last page of this activity.

Distribute a blank paper quilt square to each student, and colored construction paper and glue to the group. Instruct them to graphically represent their "bit" of information on the square using only torn pieces of construction paper. Have them leave a one inch border around the outside so each students square can be pieced together into a class quilt. Once all the squares have been used to teach from, designate some "master quilters" to piece them together using different colors of book binding tape to form the lattice strips and the border.

Part 2: The Gameshow

Have the students pass in the cards and stop sharing information. Arrange the class so that all the groups with Adaptation cards are on one side of the room and those with Ecological Relationships on the other. For the Gameshow, all the Adaptation groups will now work together on the same team, and so will the Ecological Relationships groups. **Have each team number off**. Anyone in the Adaptation group should be able to describe sea otter adaptations and likewise anyone in the Ecological Relationship group should be able to describe information "bits" from that set.

Make a chart on the board with two columns, one labeled adaptations and the other ecological relationships. As answers are given, write them down on the board or have the student write them along with the awarded points. Alternatively, instead of writing the answers, a sketch can be made.

Ask one team at a time a question about adaptations or ecological relationships, depending on which set of cards they had. (See sample questions attached.) The entire team can discuss the question and decide on an answer. Then after you again repeat the question, use Numbered Heads Together to choose a student to answer. Pick a number out of a "hat", announce it to the class, and the student with that number then stands and gives the answer.

a. If that student gives a "complete" answer (it is up to the teacher to decide what a complete answer is), their team gets five points.

b. If that student isn't able to respond or gives only an incomplete answer, pick another number and call on a different member of that team. If the second student adds to the first students answer, their team may still get five points.

c. If the second student is unable to answer, pick another number and call on another member of that team. If that student can give an answer, then the team may still receive their five points.

d. If the third student is unable to answer, give the team its partial (or zero) points. It is now the other team's turn.

Each side gets three chances to get a total of five points per round and then it is the other side's turn.

Assessment
Instead of randomly picking students by drawing numbers, give each student at least one opportunity to answer one question so you can assess what they have learned. The Scoring Rubric follows the last page of this activity.

The Bonus Round
At the end of the gameshow, play a "BONUS ROUND". Put all the Adaptation and Ecological Relationship "bits" together in a hat. Volunteer students can draw one and act it out as a charade for their teammates. If they guess correctly within two minutes, they are awarded another six points.

Remember to add in the points for social skills. You might want to provide the "winning" side of the room with a special reward or prize--e.g., 10 extra minutes of recess. Or tell both teams that if they score over a certain amount they will get a reward and that if the two teams combined score is above 2X that amount, they will get an additional reward.

Part 3: Alternative to gameshow
1. Tell students that at the end of the period, they will take a sea otter quiz individually, but that their scores will be added together to get a "group score". If their group scores 90%-100% no one in the group has to take the quiz again. If their group score is less than 90% or better, provide some special prize--e.g., 10 extra minutes of recess.

2. Give the following quiz to check individuals: Adaptation group describes 7-10 adaptations, Ecological Relationship group describes 7-10 relationships. Answers can be in words or pictures.

3. Have students switch and correct each other's papers. Add up group scores; if the group score is over 90% correct they are finished. If lower than 90%, have them return to their groups for more group teaching.

4. Have students switch card sets and do the activity again so that every group studies both adaptation and ecological relationships.

Student Posters
Have each group select one of the following topics to represent graphically on a poster. Have the groups share their poster with the rest of the class. Topics: Sea otters have several ways to keep warm. What are these adaptations? How do these differ from how whales keep warm? (Sea otters have a very high metabolic rate which generates body heat, and their fur traps warm air and keeps their skin dry. Other marine mammals have blubber or large size to conserve heat and keep them warm.)

What would happen to a sea otter if its coat got covered with oil? (The fur would no longer be able to trap air; the skin of the sea otter would get wet and

cold; the sea otter would probably freeze to death. Also, otters clean their fur constantly and often die of poisoning from ingesting oil.)

What does the kelp forest food web look like? Who are the predators and what are their prey? Where does the sea otter fit into this web? Show the herbivore and carnivore connections in the food web.

Sea otters protect the structure and diversity of the kelp forest by controlling the numbers of sea urchins which feed upon kelp. Illustrate these ecological relationships. What might happen if hunters or pollution decreased the numbers of sea otters?

Sea otters have a number of adaptations besides their thick fur that help them to be successful in their kelp forest habitat. What are some of these adaptations to help them swim, take care of their young, and find and eat their food?

Brainstorm Completion
Have students complete the last column "What We Learned About Sea Otters" from the INTO Group Brainstorm. Have the groups review "What We Already Know" and "What We Want to Find Out" columns to make changes and determine if all their questions have been answered.

BEYOND THE ACTIVITIES

Good Ideas, Bad Ideas, or Just Plain Interesting
Assign each cooperative group an IDEA (such as the one below) or have them choose one of their own. Have each group think of three reasons why this would be a good idea, a bad idea and an Interesting idea. Have students record their ideas on butcher paper and share them with the class.

Sea otters should not be allowed to increase their population size or have part of their population moved to other areas. ***(Remember: the enormous appetite of the sea otter for abalone and other shellfish puts it at odds with shellfish harvesters.)***

Also have each group share with the class if they thought it was hard to come up with these opposing or differing interpretations and ideas.

Extended Activities/Projects
1. Hat Mask Theater. Have students write and act out a day in the life of the sea otter. Students can make hat masks or full costumes and then put on a performance for another class.

2. Have students draw a large mural illustrating sea otter life in the Kelp Forest and include the Kelp Forest food web.
3. Make life-size three-dimensional representatives of sea otters using cardboard cutouts or butcher paper stuffed with crumpled newspaper and poster paint. Female sea otters are 55" in length and weigh about 80 pounds, males are 58" in length and weigh about 100 pounds.
4. Recommended books about sea otters: **Sea Otters** by Marianne Riedman, **Sea Otters: A Natural History and Guide** by Roy Nickerson, **The California Sea Otter: Saved or Doomed?** by John Woolfenden, **Sea Otters** by Evelyn Shaw, **A Raft of Sea Otters** by Blake Publishing.
5. Have students continue learning about the sea otter by researching the mating habits, family and social structure of the sea otter.
6. Name and discuss other animals that use tools. (People of course, use many different kinds of tools. Chimpanzees have been known to insert a twig into an ant hole and lick the ants off that cling to the twig. The Egyptian vulture will drop a rock on an ostrich egg to break it open. The woodpecker finch in the Galapagos Islands uses a twig or thorn to poke grubs out of their holes).
7. Write to Friends of the Sea Otter, Box 221220, Carmel, CA 93922, for current information on the status of the sea otter or to find out how you can help in the recovery of the sea otter.

Field Trips
Visit Monterey Bay Aquarium to see sea otters in captivity and Point Lobos in Carmel, CA to see them in the wild.

Debriefing
1. Have cooperative groups discuss what helped them accomplish their tasks successfully and what were roadblocks to their progress. Did attentive listening help?

ADAPTATION CARDS

TOOL USE
Many sea otters love to eat abalone, but abalone is not very easy to find and it is becoming scarcer all the time. Sea otters get this favorite food by whacking it with a rock until its shell breaks and its tight grip is broken. Sea otters can also reach the soft bodies of other hard-shelled mollusks like clams or knock the spines off sea urchins by banging them against a rock placed on its chest. Individual otters have their favorite tools and ways of using them. Some otters even use pieces of wood or old shells and glass bottles. Only a very small group of animals including people, chimpanzees and some birds have this ability to use tools.

Thick Fur
Sea otters have the thickest fur of any animal on earth. A sea otter has about 1 billion hairs covering its body! This means it has up to 1 million hairs for

every 1 square inch of its body. In fact, the fur coat of one sea otter has as many hairs as the fur on 6 cats. Most people have only about 100,000 hairs on their head. Sea otters don't have blubber like whales, so it depends on its thick, water-resistant fur to keep it warm. The sea otter's beautiful, thick fur almost led to its extinction as hunters took advantage of its curious, friendly nature and shot at it when it came to investigate the hunters and their boats.

Trapped Air

Watching a sea otter constantly somersaulting and combing its paws through its fur may give us the impression that it must be very itchy or trying to remove parasites from its body. Actually, the sea otter is constantly preening and fluffing up its fur in order to clean it and trap air bubbles. This trapped air creates an insulating bubble barrier that keeps the skin dry and conserves the body heat. The trapped air also gives the otter buoyancy to raise its body high enough in the water to keep its paws and feet from getting wet and cold.

Teeth

A sea otter is born with a full set of 32 teeth and can eat solid food by the time it is 4 months old. It has very sharp canine teeth to tear its food and hold slippery prey like squid. Otters also have flattened molars to crush hard-shelled prey like shellfish, sea stars, and sea urchins. The lower teeth stick out further than the upper teeth so it can use the lower teeth as a scoop to remove clams, abalones and snails from their shells. Old otters often have very well-worn teeth.

Swimming Speed and Style

Sea otters are the slowest-swimming and least streamlined group of marine mammals. Sea otters can only swim about 2-3 miles per hour, about the same speed as an average human swimmer. This means that otters can't chase and capture most fish, but in Alaska where their favorite foods are more scarce, otters do eat many bottom-living fish. Otters usually swim belly-up on their backs by paddling with their hind flippers, pumping up and down as if they were riding a bicycle. When they need to swim fast, they swim on their stomach and use their whole body like an eel moving under water.

Breath Holding

A sea otter finds most of its food on the floor of the kelp forest. A sea otter needs to be able to hold its breath long enough to swim to the bottom, search out its prey, remove it from the rocks to which it may be very tightly attached and then swim back up to the surface. A sea otter does have large lungs for the size of its body. Their lungs are almost 2 1/2x larger than the lungs of similar sized land mammals. Their large lungs help store oxygen for diving and also help them float on the surface. Otters usually dive for 1-2 minutes, but can remain underwater for up to 4-5 minutes. A human can only hold their breath for 3 minutes.

Amount of Food Eaten
Sea otters have to eat a huge amount of food everyday in order to get enough energy to live and stay warm in the cold water. Sea otters need to eat about 1/4 of its weight in food everyday to get the 5000 calories a day it needs to survive. This is about twice the calories that a human adult needs. This means that a 60-pound sea otter would need to eat about 15 pounds of food everyday. If you weighed 100 pounds and had to eat 1/4 of your weight everyday, you would have to eat 25 pounds of food or 100 quarter-pounder hamburgers in one day.

Hind Feet
A sea otter's hind feet are specially adapted to help it swim on its back very efficiently while it is at the surface. The hind feet are flipper-like with each toe longer than the next leading out to the longest toe on the outside of its foot. This means that what we call our "big toe" is actually the smallest of the sea otters toes. What would be our "little toe" on the outside of our foot, is the sea otters longest toe. Another adaptation for great swimming ability is the webbing between its toes which makes the hind feet appear twice as large while they are swimming as when they are resting.

Front Paws
The front paws of a sea otter have short toes which are better suited for grooming fur and using tools than for swimming. The otters front paws are very much like a land animal and its claws can be extended like a cats. A sea otter uses its front paws to groom its fur and the fur of its pup and to hold onto the pup at the surface. While underwater it holds onto a rock with its front paws and uses it to whack abalones loose from the bottom. Sea otters often place several prickly sea urchins in loose pouches of skin located under its armpits while it searches for more food.

Loose Skin
While grooming, an otter can twist, somersault and bend as if its skin were many sizes too big. A sea otter's hide is actually about 50% bigger than its body. A sea otter is also very flexible because its skeleton is loosely connected and it doesn't have a collarbone. These adaptations are important so that all parts of its fur can be brought within reach to be kept well-groomed and fluffed up with air. In order to reach the lower back area, a sea otter pulls the coat's backside up between its legs and then wrings the water out.

ECOLOGICAL RELATIONSHIPS

The Sea Otter Home
In California sea otters spend their whole life in the kelp forest and only rarely come ashore. Even though otters are the most recently evolved group of marine mammals, they have no ties to land. Seals still must return to land to breed and molt. The sea otter uses the kelp canopy as a floating raft for taking

naps. It is also used as an anchor for wrapping the pup in to keep it from floating away while mom hunts for food on the sea floor below. Sea otters mate and give birth among the kelp canopy, far from the threat of land predators.

The Kelp Forest Habitat

Many different species of fish find food and shelter among the kelp forest. At least 30 species of fish live in the kelp forest and many other species pass through. Snails and kelp crabs climb up the kelp and feed on other invertebrates they find or actually eat the kelp itself. On the bottom, among the holdfasts, hundreds of species of animals can be found, all dependent upon the kelp in some way. Even after kelp breaks off and floats away from the kelp forest, it is considered to be an important source of food for many animals living in other habitats. A kelp forest is one of the most productive habitats on earth. It supports three times as many fish as can live in other ocean habitats.

Sea Urchins

Sea urchins are the greatest natural threat to the kelp forest because of their huge appetite for kelp. If the sea urchins natural predators are absent, the sea urchins may have a population explosion. In some areas, urchins reach densities greater than 300 per square yard. When the population gets this large, the urchins start to march through the kelp forest eating every kelp holdfast in its path. The entire forest may be set adrift as each of the holdfasts are eaten and barren rock may be all that is left of the forest.

Sea Otters and Sea Urchins

Sea otters are the major predator of sea urchins. The otters are such efficient predators and eat so many urchins that they keep the urchin population in control. In fact, otters eat so many urchins that their teeth, skull and bones may actually turn a light purple color. Damage to the kelp forest by sea urchins usually doesn't happen in areas where sea otters have lived for a long time. The control of the urchin by the otter allows the kelp forest to grow quickly and expand in size. The larger the kelp forest, the more species can find food and shelter within this habitat. More invertebrates can live on the kelp, supporting more fish which attract more fish-eating birds, sea lions and seals.

People and Sea Urchins

Sea urchins are a very popular food item for many people, especially in Japan. People are most fond of the red sea urchin, but as the numbers of red urchins are decreased through overfishing, more and more purple urchins are being taken. The only part of the sea urchin eaten by people is the gonads or reproductive organs which is called the roe. In sushi restaurants here in America you can find sea urchin roe listed as "uni". Sea urchins are harvested by skin divers wearing wet suits and large gloves so they won't be poked by the long, sharp spines of the red urchin.

Competition Between People and Sea Otters

Sea otters compete with people for shellfish, leading to conflicts between what's best for each. Most shellfisheries cannot make a profit where sea otters are numerous because otters reduce the numbers of abalones, clams and sea urchins. Most shellfisheries started in 1900 when otters were rare. Without otters, the shellfish flourished and commercial shellfisheries took advantage of this artificial overabundance of large shellfish. Over the past century, shellfish resources have declined due to more sea otters, but also because of overfishing and poor management.

Predators on Sea Otters

Sea otters do not have very many natural predators. In California, besides humans the only other predator on otters is the great white shark. Sharks kill about 10-15% of the sea otters that die each year. In Alaska where sea otters haul out on land, they are killed by coyotes and brown bears. Also, bald eagles have been known to prey on sea otter pups; and as the number of bald eagles have increased so has the otter pup predation. However, today the greatest threat to the number of sea otters are people.

Sea Otter Hunters

People have hunted sea otters for their warm fur for thousands of years. Sea otters lived from Baja California north to Alaska and across the North Pacific to Japan. The otters coexisted with Native Americans for many thousands of years. But two hundred years ago fur hunters from Europe, Russia and America began to kill sea otters. These hunters killed nearly half a million otters. In 1911 sea otters finally became a protected species even though it was thought that there were few if any animals left to protect. Their population is making a very slow comeback and there are now about 1700 sea otters living off the California coast.

Oil Spills and Sea Otters

Sea otter fur makes them the most vulnerable of all marine mammals to the effects of oil spills. Spilled oil coats the sea otter's fur so that it cannot be cleaned. The oil destroys the protective bubble barrier and warm air cannot be trapped in the fur. Cold water reaches the skin and the sea otter freezes to death. Even a small amount of oil may cause the otter to sicken and die as it licks its coat to get it clean and the toxins are swallowed. Other threats include pollution from untreated sewage being dumped in the ocean and becoming tangled-up in plastic debris.

The Sea Otter Diet

Many sea otters have been tagged so that researchers can determine their individual behavior. Otters have been shown to have strong individual preferences for certain foods. From over 50 available food items, an otter tends to eat only one, two or three types of prey. Some otters don't eat sea urchins at

all. Some only eat abalone or turban snails, crabs, octopus or squid. Pups seem to learn food preferences from their mom and this may reduce competition for food since each otter searches for different prey.

SAMPLE QUESTIONS FOR THE GAMESHOW

ADAPTATION QUESTIONS:

1. Give two reasons sea otters continually preen (or comb) their fur.
2. What are two interesting things you learned about diving in sea otters?
3. Describe two adaptations that give sea otters their great swimming abilities.
4. What are the special adaptations of sea otter teeth and how do they use them to eat their food?

ECOLOGICAL RELATIONSHIP QUESTIONS

1. Describe the relationship between sea otters, kelp and sea urchins.
2. Do people and sea otters compete for food? If so, how do they compete and who is concerned about it? What do you think?
3. What are three ways sea otters depend on their kelp forest habitat?
4. What are two predators on sea otters and which predator is the greatest threat today?