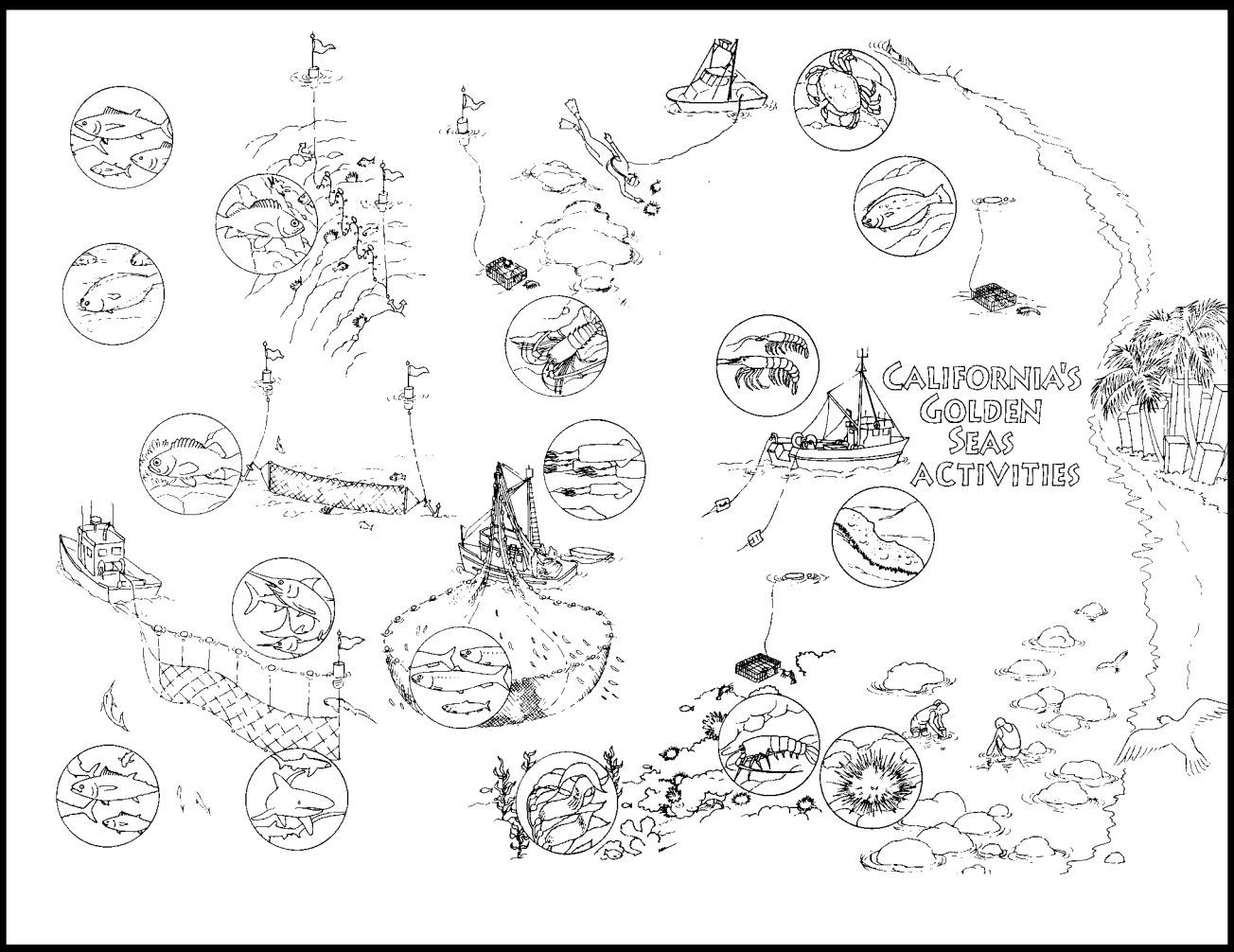
California's Golden Seas Activities



California Seafood – Taste The Tradition

California Seafood Council

P.O. Box 91540 Santa Barbara California 93190 805•569-8050
e-mail seafood@ca-seafood.org

Dear Educator:

We are pleased to present you with an integrated, comprehensive learning packet that helps chidren learn about and care for one of our vital environments — the sea.

This packet of 27 activities is designed to be easy-to-use and integrate into California State Board of Education's curriculum frameworks. The activities are divided into three age groups: 9-year olds, 10-year olds, and 11-year olds. Each activity lists the materials needed for the activity. The format is Get set, Go catch, and Sailing.

Get set	lists the advance preparation and set up activities;
Go catch	lists the implementation steps;
Sailing	offers extended learning activities that often involve families, communities and school child nutrition and food service personnel.

The poster and stickers that complement the Golden Seas Activity Kit are included in several activities. (For information on how to order these elements, refer to the order form or contact the California Seafood Council.) The Appendix includes background information and "further reading" about California's Golden Seas.

We would appreciate your taking a minute to complete and return the enclosed Feedback and Evaluation Form once you have had an opportunity to review and try some of the activities. Your feedback is important to us.

We hope that you and your students will enjoy learning about California's Golden Seas.

Sincerely,

Diane Pleschner, Manager
California Seafood Council

California's Golden Seas

Acknowledgements

California's Golden Seas, integrated curriculum for ages 9, 10, and 11, was developed by the California Seafood Council with support from the Local Marine Fisheries Impact Program, California Department of Fish and Game Marine Resources Division, under Contract #FG3366MR.

Many people contributed a great deal of time and effort to create and develop this program. Grateful thanks go to the CSC's fishing advisors, who provided insight and much of the technical information contained herein. Many thanks also to the men and women who donated their time, fuel, and expertise, sharing via videotape their knowledge and love of the ocean: Vince Aliotti, Tim Athens, Craig Barbre and Marlisse Battistella, Phil Beguhl, Ken Bortolazzo, Travis Evans, Rick Gutierrez, Fred Hepp, Brian Jenison, Allison McCeney, Mike McCorkle, Cathy Novak, Pietro and Joan Parravano, Mike Ricketts, Bruce Steele, John and Moreen Szostak, Frank Vuoso, Tony West and any others whose names have been missed inadvertently.

Thanks to Tom Ancona for his original gear diagrams, which were the inspiration for the fishing artwork. We also extend thanks and appreciation to Dr. Milton Love, who consulted with the CSC on this project, and to Dr. Craig Fusaro, who critiqued the major iterations. Many thanks also to the CSC Education Committee for their long hours of review and comment throughout the process of development: Chair Aiden Coburn, Carol Noelting, Marciel Klenk, Cathy Novak, Travis Evans, Cathy Cordero, and Pietro Parravano.

Very special thanks to Deborah Lane Beall, of Lane Beall Associates, for her enthusiasm and creativity in developing activities that will inspire children to learn about and care for the ocean.

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California's Golden Seas Poster

California's Golden Seas Stickers

California's Golden Seas

Curriculum Framework Connections

Lesson	Sci.	Math	Soc.Sci.	Lang.Arts	Health	Vis.Arts	Type of Activity Group	Indiv.
Age 9								
Gone Fishing	X			X	X		X	
Personal Pyramid	X	X		X	X	X		X
Seafood Safety Head.	X		X	X	X	X	X	X
Fact Finders	X		X	X	X	X	X	X
Golden Treasures	X	X	X	X	X	X	X	X
Sealore			X	X		X	X	X
Seastyle	X	X		X	X	X	X	X
Journey Game	X	X	X	X			X	
Balance and Care	X		X	X		X	X	X
Age 10								
Building Blocks	X	X		X	X		X	
Seaward Bound P.port	X	X		X	X	X	X	X
Hooked on Quality	X			X	X	X	X	X
Track Me on Land/Sea		X	X	X				X
Chart the Harvest	X	X	X	X			X	X
Current Event	X			X			X	X
Net (Web) of Life	X		X		X		X	
On Course	X	X		X			X	X
SAVE Project	X		X	X			X	
Age 11								
Seafood Health Scr.	X			X	X		X	
Solving the Label Puzzle	X	X			X		X	X
Eye on Quality	X		X	X	X		X	X
Detective Cal C.Food			X	X	X		X	X
Mark My Channel	X		X	X	X		X	X
Gear-Up Sit. Solvers	X	X	X	X		X	X	X
Creating a Seascape	X		X			X	X	
Mystery of El Niño	X		X	X			X	
Crossword	X	X	X	X	X		X	X

Feedback and Evaluation Form

Please help us evaluate and improve the effectiveness of the *California's Golden Seas* integrated, collaborative learning packet of activities. THANK YOU.

I am a _____ from _____
(title) (organization)

1. What were the ages of the children involved with these activities? (Please circle one or more)

   under 9 9 10 11 over 11 mixed ages (from___to___)

2. Please comment on the following about this learning packet:

Age-appropriateness	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Ease of use	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Augments frameworks	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Children's interest level	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Format of activities	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Handouts/other materials	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Number of activities	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Readability	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Encourage cooperative learning	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Culturally sensitive	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Information useful	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Easy-to-find activities	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Poster	( ) Excellent	( ) Good	( ) Fair	( ) Poor
Stickers	( ) Excellent	( ) Good	( ) Fair	( ) Poor

   Comments:

3. Please give us feedback on the activities you used: (If more space is needed, please use separate sheet of paper.)

   Name of activity Comments

Feedback and Evaluation Form – 2

4. Which activities did you feel were the best? Why?

5. What activities and/or handouts do you recommend for a Spanish-language version of the learning packet?

6. What were the strong points of this learning packet?

7. Did you use this learning packet for specific subject matter (science, health etc.)?

   Yes _____ No _____

   If yes, what was/were the subject(s)?

8. What do you think is the best way for us to make this learning packet available to teachers?

9. How can this learning packet be improved?

PLEASE RETURN YOUR FEEDBACK AND EVALUATION FORM TO:

CALIFORNIA'S GOLDEN SEAS
c/o California Seafood Council
PO Box 91540
Santa Barbara, CA 93190

or e-mail your comments to: seafood @ ca–seafood.org

THANK YOU for your help.

Seafood Health Scramble

Age 11, group or independent

45 minutes, indoors or outdoors

Objective:

Reinforce the important nutrients in seafood and the importance of eating seafood for good health and growth.

Materials:

Seafood scramble, pencils

Get set

√ Duplicate and distribute the seafood scramble.

Go catch

√ Each statement is a clue for solving the word scramble. Read the statement and try to solve the scramble.

Sailing

√ Provide the seafood scramble to the school foodservice director to be duplicated as a tray liner or on the back of the school lunch menu.

Name _____

Seafood Health Scramble

1. Eating nutritious foods and physical activity are good for your

   (LTEAHH) _ _ _ _ _ _ .

2. An animal that swims in the sea and has fins is a

   (SHIF) _ _ _ _ .

3. Protein, carbohydrates, fat, vitamins, minerals and water are all

   (TRETSNUIN) _ _ _ _ _ _ _ _ _ _ .

4. Vitamin A is necessary for healthy

   (TEEGYISH) _ _ _ _ _ _ _ _ .

5. Fish and (SHSEFHILL) _ _ _ _ _ _ _ _ _ _ are seafood.

6. Calcium, a mineral found in some seafood, is necessary for healthy

   (SNOBE) _ _ _ _ _ .

7. Sodium is a (AIMNRLE) _ _ _ _ _ _ _ found in ocean water.

8. (REAWT) _ _ _ _ _ is a nutrient. It also is necessary for sealife.

9. Seafood contains B (STIIVMAN) _ _ _ _ _ _ _ _ .

10. Seafood is a source of (RENTIOP) _ _ _ _ _ _ _ .

California's Golden Seas

Seafood health scramble – 2

Name _____

11. Protein helps build (SMECULS) _ _ _ _ _ _ _ _ .

12. A quick source of energy is found in foods that contain

    (ARABCDEHORSTY) _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ .

13. Seafood contains (GMEOA-3) _ _ _ _ _ _ - _ fatty acids that are good for our health.

14. (AFT) _ _ _ is a nutrient that we should only eat in small quantities.

15. (LORSICAE) _ _ _ _ _ _ _ _ _ are a measure of energy in foods.

16. A large amount of (THEELLOOSCR) _ _ _ _ _ _ _ _ _ _ _ _ _ in our bodies is unhealthy for our heart and circulatory system.

17. Vitamin D is in some seafood and is necessary for strong bones and

    (HEETE) _ _ _ _ _ _ .

18. Seafood in our diet can help us (WORG) _ _ _ _ and stay healthy.

Seafood Health Scramble

Answers

1. HEALTH
2. FISH
3. NUTRIENT
4. EYESIGHT
5. SHELLFISH
6. BONES
7. MINERAL
8. WATER
9. VITAMINS
10. PROTEIN
11. MUSCLES
12. CARBOHYDRATES
13. OMEGA-3
14. FAT
15. CALORIES
16. CHOLESTEROL
17. TEETH
18. GROW

Solving The Label Puzzle

Age 11, group or independent

45 minutes, plus optional market visit

indoors, with supermarket option

Objective:

Compare the nutrient contents of foods in the meat group (meat poultry, fish, beans, eggs, nuts)

Materials:

Solution sheet, label sheet, pencils

Get set

√ Duplicate the label sheet, with or without the nutrition information (depends on whether local supermarkets have nutrition information readily available for seafood, poultry and other meats)

Go catch

√ Ask each individual to either

1) go to a supermarket and find nutrition information for seafood (fish or shell fish) and one other meat (poultry, beef, lamb, pork) and complete the labels, OR
2) use the label sheet with the nutrition facts to complete the solution sheet.

√ Complete the solution sheet and discuss as a group.

√ Compare the nutrients. The serving size should be the same for each of the foods compared (for example, 3 ounces of fish, poultry or meat).

Sailing

√ Make a puzzle by pasting the label to lightweight cardboard and cutting out jigsaw puzzle pieces.

√ Show a family member or friend how to read the label.

Name _____

Solving the label puzzle

Solution sheet

What two foods are you comparing?

What food has the most calories for a 3-ounce serving?

How many calories does 1 ounce of each have?

What food has the most fat for a 3-ounce serving?

How much fat does each food have in it?

What food has the highest carbohydrate content for a 3-ounce serving?

How much does the protein content differ between the two foods?

If a gram of protein provides 4 calories, how many calories are coming from fish protein?

How does the saturated fat differ between the two foods?

Does the food with the most calories have the most fat?

What food has the most vitamin A?

What food has the most vitamin C?

Do you think either of these foods is a good source of vitamin C?

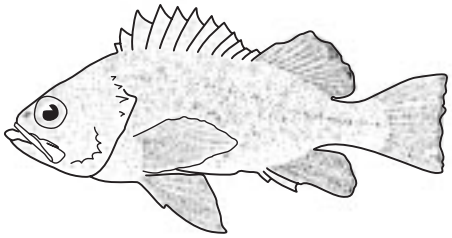
These foods are a good source of what nutrient?

Which food has the most calcium?

What are the nutrient benefits of eating fish?

Be sure to attach your labels of the foods you compared.

Nutrition Facts



FISH

Rockfish, baked, skinless

Nutrition Facts

Serving size 3oz., cooked
Servings per pound: 4

Amount Per Serving
Calories 100 Calories from Fat 18

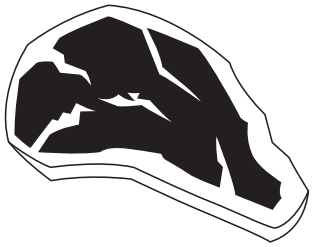
	%Daily Value*
Total Fat 2g	4%
Saturated Fat 0g	0%
Cholesterol 40mg	13%
Sodium 65mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0	0%
Sugars	
Protein 20g	

Vitamin A	4%	•	Vitamin C	1%
Calcium	1%	•	Iron	3%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate	300g	375g	
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4



BEEF

Sirloin Steak, broiled, trimmed

Nutrition Facts

Serving size 3oz., cooked
Servings per pound: 4

Amount Per Serving
Calories 178 Calories from Fat 63

	%Daily Value*
Total Fat 7g	10%
Saturated Fat 3g	15%
Cholesterol 76mg	25%
Sodium 56mg	2%
Total Carbohydrate 0g	0%
Dietary Fiber 0	0%
Sugars	
Protein 26g	

Vitamin A	0%	•	Vitamin C	0%
Calcium	1%	•	Iron	16%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000	2500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate	300g	375g	
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Eye on Quality

Age 11, group or independent

45 minutes, supermarket

Objective:

Investigate a supermarket seafood section for quality control and report findings.

Materials:

The Seafood Review (see appendix), Cal C. Food investigative notes, IQ certificate, parent/guardian letter, pencils

Get set

√ Duplicate and distribute materials.
√ Review *The Seafood Review.*
√ Send parent/guardian letter.

Go catch

√ Announce that everyone is a Cal C. Food reporter, checking localmarkets for seafood quality and safety.
√ Assign each individual or group to go to the supermarket and complete the Cal C. Food investigative notes. Be sure that they get the supermarket manager's name and the supermarket's address.
√ Discuss findings.

OR tour the seafood section of a local supermarket.

√ Arrange for the tour 2 to 3 weeks in advance. Emphasize that the focus of the trip will be to see how seafood quality is maintained in the supermarket.

Sailing

√ Ask individuals or group to report findings to their supermarket.
√ If the supermarket had excellent seafood quality and safety conditions, provide the department with a certificate signed by the student.
√ Individuals who complete the assignments should receive a certificate signed by the teacher.
√ Share findings with family.

Certificate of Completion

This Certificate is Presented to

_____

For successfully completing ***Eye on Quality***

Given this_____day of_____, 19_____

Student or Teacher_____

School_____ Class_____

California's Golden Seas

Name _____

Cal C. Food's investigative notes

DATE OF INVESTIGATION:

STORE MANAGER'S NAME:

SUPERMARKET'S NAME:

SUPERMARKET'S ADDRESS:

Quality notes (*Check all that apply.)*

( ) Seafood is kept under 40 degrees Fahrenheit.

( ) Refrigerated seafood case has a thermometer, or temperature is monitored daily.

( ) Seafood department clerks inspect deliveries for odor, appearance and temperature.

( ) Suppliers furnish temperature records and time-temperature monitors (temperature sensitive badges, recording thermometers) with their shipments.

( ) Whole fish have clear eyes.

( ) There is no "fishy" odor in the seafood department.

( ) The refrigerated seafood case is clean.

( ) The seafood clerk does not handle seafood with unprotected hands.

( ) Fresh and frozen seafoods are not mixed in the same case.

( ) Cooked seafood is separated from raw seafood.

( ) Fillets and steaks are arranged nicely and are stacked no higher than 3" to 4" above the ice.

( ) Seafood case is fully enclosed.

( ) If seafood is packaged, individual trays are wrapped securely.

Comments:

California's Golden Seas

_____
(date)

DEAR PARENT OR GUARDIAN:

Our _____ is reporting on the quality of
(class or organization)

seafood at local supermarket seafood sections. Your child needs to go to the supermarket with you to complete his/her assignment.

Thank you for your help.

Sincerely,

_____

Detective Cal C. Food

Age 11, group or independent

30 minutes, plus restaurant visit indoors or outdoors

Objective:

Explore the availability of California seafood species in local restaurants.

Materials:

Detective CAL C. FOOD notes, parent/guardian letter

Get set

√ Review *California's Golden Seas* booklet (see appendix).

Go catch

√ Send home parent/guardian letter.

√ Ask each individual or small group to complete the Detective CAL C. FOOD notes on a restaurant that serves seafood. (Include only fast food restaurants that serve predominantly seafood.)

√ Discuss the results.

Sailing

√ Write a letter to the school foodservice/child nutrition director asking them to feature a Native California Fish on the menu each month. Perhaps one week could be dedicated to a Native California Foods menu.

√ Work with the school youth advisory council to facilitate this new school lunch menu idea.

√ Invite the foodservice manager or a local restaurant manager to discuss California seafood species.

√ Ask the guest to feature one of the species on the menu as a "California Catch of the Week." Suggest which species would be available during that time of year.

√ Follow up to see if a "California Catch of the Week" was promoted.

Name _____

Cal C. Food's investigative notes

DATE OF INVESTIGATION:

RESTAURANT MANAGER'S NAME:

RESTAURANT NAME:

RESTAURANT ADDRESS:

Seafood menu items	CA seafood species (yes or no)	Preparation (sautéed, fried, baked etc)

_____
(date)

DEAR PARENT OR GUARDIAN:

Our _____ is investigating the availability of
(class or organization)

seafood at local restaurants.

Your child needs to visit one restaurant to complete his/her assignment. It can be a fast food restaurant that serves predominantly seafood. No purchase is required, but your child will need to ask the wait person, cashier or manager questions.

Thank you for your help.

Sincerely,

_____

Mark My Channel

Age 11, group or independent

45 minutes, indoors or outdoors

Objective:

Examine how seafood moves from the sea to our dinner tables and discuss career opportunities in various marketing channels.

Materials:

Grow Series video, fishing line, yarn or string, tacks or tape, five 5" X 7" index cards, paper punch, channel challenge cases, scissors

Get set

√ View "Grow Series" video.
√ Brainstorm how seafood moves from the sea to our tables.
√ Duplicate and distribute materials.
√ Punch holes in the left and right edges of the 5" sides of the index cards.
√ String the cards by passing the yarn through both holes of each card.
√ Tack or tape the ends of the yarn on a bulletin board or wall.

Go catch

√ Review how seafood moves from the sea to our homes, markets and restaurants.
√ Use cards to illustrate marketing channels. For example, card 1 would be fisher folk, card 2 the processor, card 3 the wholesaler or distributor, card 4 a supermarket or restaurant, and card 5 the consumer.
√ Display the channels.
√ Review the care given at each step of the marketing channel to assure quality.
√ Read the channel challenge cases.
√ Review problems that slow or prevent the market channel from flowing smoothly and the ways these problems affect seafood supply.

Sailing

√ Invite a guest involved in some aspect of seafood marketing, such as fisher folk, manager of a seafood restaurant, or seafood merchandiser of a retail market, to speak about his/her job and the marketing channel it represents.
√ Tour the school foodservice kitchen or a local seafood restaurant's kitchen. If possible, compare a facility that only purchases frozen seafood (i.e. school lunch program or fast food seafood restaurant) to one that purchases fresh seafood.
√ Find out what fish or shellfish they receive, how it has been processed (whole, fillets, steaks, breaded, canned etc.), and how it arrives (fresh, frozen, canned)

Channel Challenge Cases

Case 1

During El Nino, warm water decreases the amount of plankton for such fish as anchovies and sardines to eat. Anchovies and other small fish that feed on plankton are known as bait fish because larger fish eat them. As a result of El Nino, the anchovies and sardines swim farther north than usual to find cooler waters. California halibut also swim farther north to feed on the bait fish. In the waters off southern California, halibut numbers decline.

In past years, most California halibut were caught with gillnets. Gillnets are not allowed in nearshore waters of northern California, and in 1994 a new law prohibits the use of coastal gillnets within three miles of the mainland in southern California. Most of the halibut live within three miles of shore. Therefore, fisherfolk are unable to catch many halibut in northern or southern California.

How will fisherfolk be affected? What will they likely do? How is the processor affected? What happens to restaurants that have California halibut on the menu? What about the availability and/or price of local halibut in the supermarket?

Case 2

A severe storm hits southern California. Big ocean swells pound the shoreline and make the surf rough. The winds are strong. The turbulent weather causes mud, sand and silt to cover lobster traps that were set on the ocean floor in shallow water. Usually Toby, a lobster fisherman, is able to check his traps every 48 hours. The storm continues for a week. Toby is unable to go back to sea to check on his traps. Meanwhile, the lobsters move to deep water to escape the pounding surf, away from the area where Toby's traps were set.

How does the increase of sand and silt in the water affect Toby's ability to catch lobster? How does the decrease in the amount of lobster near the traps affect the catch? What effect does the stormy weather have on Toby's business? How does the storm affect the market and market price for lobster?

Channel Challenge cases - 2

Case 3

In 1992 a volcano erupted in Alaska. So much volcanic ash filled the air that jet airplanes flying over Anchorage had engine problems. The major air freight company between the U.S. and Japan stopped flying, and other airlines were afraid to go near the area for several weeks. Seafood exporters were placed on strict shipping limits.

Sea urchins harvested by divers off the California coast are shipped by air to Japan, the world's largest market for sea urchin roe. California is one of the largest urchin exporters in the U.S.; the export value of California's sea urchin harvest is estimated at more than $80 million a year.

Sea urchins are important to Santa Barbara's economy. Processors clean and pack the roe into trays for sale to domestic and Japanese markets. More than 75 percent of the harvest is exported to Japan, and close to 25 percent is sold to restaurants in California and other states.

ShellAir is a small cargo airline that exports fresh seafood to Asia. Sea urchin roe represents 75 percent of ShellAir's business.

What impact did the volcano in Alaska have on

(1) the diver and his/her business?
(2) the sea urchin processor?
(3) the transportation industry and ShellAir?
(4) local restaurants?

Case 4

Gary owns and operates a 60-foot boat, the *Darlene*, which he runs up to 200 miles out to sea to catch swordfish with a drift gillnet. He and his two-man crew live on the open ocean for a week at a time. Every day they look at the satellite weather chart on their onboard computer to monitor water temperatures and locate temperature fronts where swordfish might be abundant. Every night they set their net, pulling the catch by daybreak.

On this trip the *Darlene* has to steam for 18 hours to find a temperature break offshore of San Francisco. The crew sets the net each night and pulls at dawn, but fishing is slow, only one or two fish each day. On the fourth day, fishing picks up and Gary catches 15 fish, each 100 pounds or more. Gary cleans each fish as soon as possible and stores it on ice in his refrigerated fish hold, taking

Channel Challenge cases - 3

(Case 4 continued)

special care to prevent bruising. On the fifth day the weather gets nasty and Gary runs for port with 19 swordfish aboard, totaling 2,600 pounds of fish. When he left on the trip, the market price for swordfish was $4 a pound. The amount he would make from this load would be enough to pay all his trip expenses, plus his house mortgage and boat payment, and leave a little profit.

When Gary reaches the dock, however, he learns that the market is oversupplied with swordfish. A lot of fishermen came in to unload at the same time because of the storm, and in addition, fish buyers have imported large supplies of swordfish from Chile and Hawaii at lower prices. When Gary finally sells his fish, he receives only $2.25 a pound for it, just over half of the price he was expecting. He barely covers the cost of the trip.

Why did the price of swordfish drop? What effect did the price drop have on Gary's business? What can he do to avoid such surprises? How did this situation affect restaurants and supermarkets?

Gear Up Situation Solvers

Age 11, group or independent

45 minutes, indoors or outdoors

Objective:

Use problem-solving questions to simulate the decisions that fisher folk make about gear used for fishing.

Materials:

Gear-Up situation solvers, pencils, calculators (optional)

Get set

√ Decide whether this will be anindividual or small grou activity. (Six decision-making situations are described.)

√ Duplicate and distribute the gear-up situation solvers, pencils and calculators.

√ Advise everyone that the process for obtaining the answers is more important than the correct answer. (This activity is excellent for brainstorming and collaborative effort. However, check the correct answer because in many instances the answer to the next question builds on the previous answer.)

Go catch

√ Read the scenarios for each gear type.

√ Answer the questions.

√ Review the answers as a group.

√ Discuss the problem-solving technique used, and relate it to how fisher folk make their decisions.

Sailing

√ Provide family and friends at home the gear-up situation solver sheets and help them make decisions similar to those that fishermen and fisherwomen make daily.

Gear-Up Situation Solvers

Decision 1

From May through September, fisher folk in northern and central California fish for king salmon with hook and line gear. The gear is towed by boats at a speed of about two miles per hour. This fishing method is called trolling. The boats and fisher folk are commonly referred to as trollers. Trollers tow 4 to 6 fishing lines at one time. Hooks tied to leaders (short pieces of clear line) are clipped onto the fishing lines at 3-fathom intervals (18 feet). Maria is a fisherwoman from Bodega Bay. She and her crew are getting ready to troll for king salmon.

1. If the boat has 6 lines and the crew has 6 dozen hooks to attach to the lines, 1 dozen for each line, what is the maximum depth in feet and fathoms that Maria's crew can catch king salmon?
   (Hint: one fathom = 6 feet; one dozen = 12)
2. Maria pays $5.00 a dozen for her fishing hooks. If she buys new hooks for all of her fishing lines, how much will the hooks cost her?

After salmon season is over, Maria takes her boat and her crew to San Diego to troll for Albacore tuna. Albacore congregate on the warm (blue water) side of upwelling fronts, often great distances from shore. To catch albacore, Maria uses hooks with feathers attached to them, called jigs. She attaches a jig to each of her 6 fishing lines and lets them out to trail behind the boat, skimming the water surface. Maria trolls for albacore at a speed of 5 miles per hour. She and her two crew members spend 15 hours each day fishing, and they fish for a total of 6 days. For their work each crew member earns 15% of the gross value of the catch.

3. How many miles did Maria and her crew travel while trolling for albacore this trip?
4. How many albacore did Maria's crew catch if they averaged catching 5 per hour over the course of the 6-day trip?
5. The albacore tuna in Maria's catch weigh an average of 15 pounds each. How many pounds does Maria have to sell to the tuna cannery?
6. If the cannery pays Maria $1.20 a pound for her tuna ($2,400 per ton), how much money does Maria receive for her catch?
7. How much does each crew member receive from Maria as payment?

Discussion: 1. What other operating expenses besides wages does Maria have to pay to maintain her business?
(Possible answers: fuel, groceries for the trip; boat payment; boat insurance)
2. What other living expenses must she pay for out of her profit?
(Possible answers: normal living expenses such as mortgage, utilities, groceries, medical and dental bills etc.)

Gear Up Situation Solvers - 2

Decision 2

Frank is a round-haul fisherman from San Pedro. He fishes mostly for squid, mackerel, and sardines. Frank's boat is a 70-foot wooden seiner that he operates with a crew of eight. He needs a large crew to restack his purse seine net on the deck after each set.

When Frank fishes every day, he uses 3,000 gallons of fuel per month at $.75/gal. Groceries for his crew cost $1,080 a month. Health insurance costs for the crew are $480 per man per month. Fish spotters, who fly over the fishing grounds and can see schools of fish from the airplane, earn 6% (6/100ths) of the total value of the catch on each fishing trip. The crew earns 55% (55/100ths) of the total value, less trip expenses and their share of the cost of groceries.

Trip expenses that are deducted before figuring the crew's share are fuel, health insurance, and the fish spotter's share.
The cost of groceries is divided by the number of crew plus the captain, and that amount is deducted from each crew share.

Frank is ready to go fishing, and he has to consider the following options:
Should he fish for sardines? He would have a 30-ton limit at $90 per ton because that is all the cannery can handle on this day. Or should he fish for mackerel at $140 a ton? Or should he catch squid at $160 a ton?

Frank studies the weather to determine the best place to fish and where the fish might be. Squid are often found on the back side of Catalina Island, but a storm is brewing, and crossing the Channel to get to Catalina would be dangerous. The ocean would be too rough. His spotter pilot tells him that schools of mackerel also were near Catalina, but a dense school of sardines was just outside San Pedro harbor. Frank decides to go fishing for sardines.

He leaves the harbor at nightfall, around 7 PM. It takes him one hour to find the fish the airplane spotter had located earlier. He makes one set and catches his 30-ton limit. He is back in the harbor by midnight and offloads his catch at 5 AM the next morning.

1. How much money did Frank receive for his sardine catch?
2. What were the trip expenses for this trip?
   (Hint: figure the monthly cost for each trip expense, divide each by 30, then add average daily costs together.)
3. What was the average cost of groceries for this trip?
4. How much should be deducted from each crew member's share for groceries?
5. How much did each crew member earn for the night's fishing?
   (Hint: don't forget to deduct the cost of groceries.)
6. How much did the spotter pilot earn?
7. How much did Frank earn for his night of fishing after paying all his fishing expenses?

Gear Up Situation Solvers - 3

Decision 3

Abe has fished for the past 70 years off the southern California coast. Many fisher folk go to Abe for advice on the ocean and fishing gear. Marci has just decided to enter the fishing business. She meets with Abe to discuss the fishing gear she should buy to maximize her production and profit. Marci wants to fish around the Channel Islands so she does not have to spend too many nights away from her family. Abe talks to Marci about the different species harvested in the area. These include prawns, sea cucumbers, halibut, California spiny lobster, squid, rockfish, swordfish, tuna and sea urchins. Abe shows Marci the different types of gear used to harvest these species and makes her a list that looks like the one below.

Species	Gear Type					
	Trawl	*Round-haul*	*H&L*	*Diving*	*Gillnet*	*Trap*
Prawns	x					x
Lobster						x
Squid		x				
Rockfish	x		x		x	
Swordfish			(harpoon)		x	
Tuna		x	x			
Urchins				x		
Cucumbers	x			x		
Halibut	x		x		x	

Marci notices that trawl gear is used to catch more species than any other gear type on the list. She decides to buy trawl gear and fish for California halibut, prawns, and sea cucumbers.

Abe tells Marci that she needs a bottom trawl. That is a net that skims the ocean floor in depths from 18 to 40 fathoms for halibut, 18 to 120 fathoms sea cucumbers, and 90 to 170 fathoms for spot prawns. Marci decides to fish for halibut and spot prawns from June through October and mainly for sea cucumbers during the winter. Marci knows that trawl gear usually catches a larger volume of fish per trip than other types of gear.

Abe tells Marci that she needs a single rig shrimp trawl with a 1.5-inch mesh in the catching bag (also called a codend) to catch spot prawns. For halibut and cucumbers, Marci's trawl net must be made of 7.5 inch mesh in the codend if she wants to fish in the halibut trawl grounds, from 1 to 3 miles offshore in an area extending from Pt. Arguello to Pt. Mugu. Otherwise, trawling must be done 3 miles or more from the mainland. Abe reminds her of other trawl regulations in southern California: No fishing is allowed in the halibut trawl grounds between March 16 and June 14 to protect halibut when they are spawning. To fish prawns, Marci must fish 3 miles or more from shore, or deeper than 25 fathoms. The season for spot prawns runs February through October between Point Arguello and Point Dume. Outside that area fishermen can catch prawns all year long. And California halibut may be fished year-round outside 3 miles. He advises her to get a copy of the Fish and Game regulations, along with her fishing license and permits.

Gear Up Situation Solvers - 4

Decision 3 continued

1. Does Marci need different nets for halibut and spot prawns?
2. Fishing regulations enforced by the Department of Fish and Game prohibit Marci from selling halibut smaller than 22 inches long or weighing less than 4 pounds. The average halibut caught weighs 10 pounds, and the market price for California halibut is $2.25 per pound. If Marci catches 10 halibut at the average weight, how much money could she sell them for?
3. If Marci earns $.50 a pound for sea cucumbers, $6 a pound for prawns, and $2.25 a pound for halibut, which species can she get the most money for if she catches the same number of pounds of each species?
4. Marci goes fishing for sea cucumbers and catches 500 pounds in one day. The next week she fishes California halibut and catches 28 fish at an average of 12 pounds apiece. She has to put her boat in drydock for repairs. When the boat is fixed, she changes nets and fishes spot prawns, catching 250 pounds. How much does she earn for each species?
5. Which species earned her the most money?

Gear Up Situation Solvers - 5

Decision 4

Sea urchin diving is not like other forms of fishing: divers average less than 150 days of work in a year. Big ocean swells, strong winds, or both, make diving very dangerous both for the divers and for the crew responsible for loading the urchins on the boat. Since the ocean is not flat calm very often, divers must learn how to work in moderately rough weather in order to stay in business. That means they must learn how to read the weather patterns, then choose areas to work where they can reduce the effects of the weather.

Normally divers can work in winds of less than 20 knots. Then the wind chop (smaller waves coming at short intervals) does not pose a great hazard when moving from spot to spot or loading heavy bags of sea urchins on deck. When the wind blows more than 20 knots, or when the swell increases (large waves coming at long intervals, such as a 12-foot swell with 15 or 20 seconds between crests), divers must be very careful, if they go to work at all, to choose an area protected from wind and swell. This safe spot is called a lee. There are several lees around Santa Barbara and the Channel Islands, depending on the direction of wind and swell.

Bill has been an urchin diver for more than 20 years. He knows that when the wind blows from the northwest, or a big swell comes from the north, then the southern side of the islands or coast is in the lee. If a big swell or wind is coming from the south, then the northern side of the islands is in the lee. If the wind is blowing strong from the northwest, and a big swell is coming from the south, Bill knows that attempting to cross the Channel would be extremely dangerous and diving would be very difficult. On those days he goes hiking in the hills.

1. Bill wakes up early one morning and listens to the weather radio. The wind is blowing 22 knots northwesterly, but the swell is only 5 feet at 8 seconds (wind chop). Looking at the map (on page 12), where would Bill dive to escape the wind?
2. The wind is calm but the forecast reports a 10-foot south swell, generated from a tropical storm in Mexico. Hearing this, where does Bill decide to dive?
3. The wind is blowing 20 to 30 knots northwest and a south swell is reported at the mid-channel buoy at 8 feet at 20 seconds. What should Bill do?

Besides the weather, a diver must also watch the depth and time he dives to avoid getting the bends, a serious injury caused by spending too much time diving deeper than 33 feet underwater. The Navy dive tables tell Bill he can spend unlimited time underwater at depths less than 33 feet, and he can dive safely at a 60-foot depth for 60 minutes. Deeper than 60 feet, his time on the bottom decreases rapidly. For example, at 90 feet, he can spend only 30 minutes.

Gear Up Situation Solvers - 6

Decision 4 continued

4. If Bill can harvest 200 pounds per hour working at 60 feet, how many pounds of urchins can he harvest working at 90 feet?
5. The wind is blowing 18 knots northwest one morning and a south swell is reported to be 5 feet at 15 seconds. Bill knows 2 spots on the south side of the islands where there are sea urchins, one shallow and one deep. He also knows that the long period swell will make the shallow water dirty and will make diving difficult because of the surge. He surveys the deep spot and doesn't find many urchins. What should Bill do?
    a. Go to the shallow spot and work in difficult conditions.
    b. Move to the north side of the island and work in the wind.
    c. Go home.
6. Coastal sea urchins often bring $.15 more a pound than urchins harvested at the islands. The weather is marginal and Bill must decide whether to risk crossing the channel to pick urchins or to run up the coast. He could average 500 pounds a day at the islands, but the fuel to get there costs $90, plus the wear and tear on his boat. Or he could run up the coast but he will average only 300 pounds, although the fuel will only cost $25. The price of coastal urchins is $1 a pound. At which place will Bill earn the most money?
7. If you were Bill, what decision would you make?

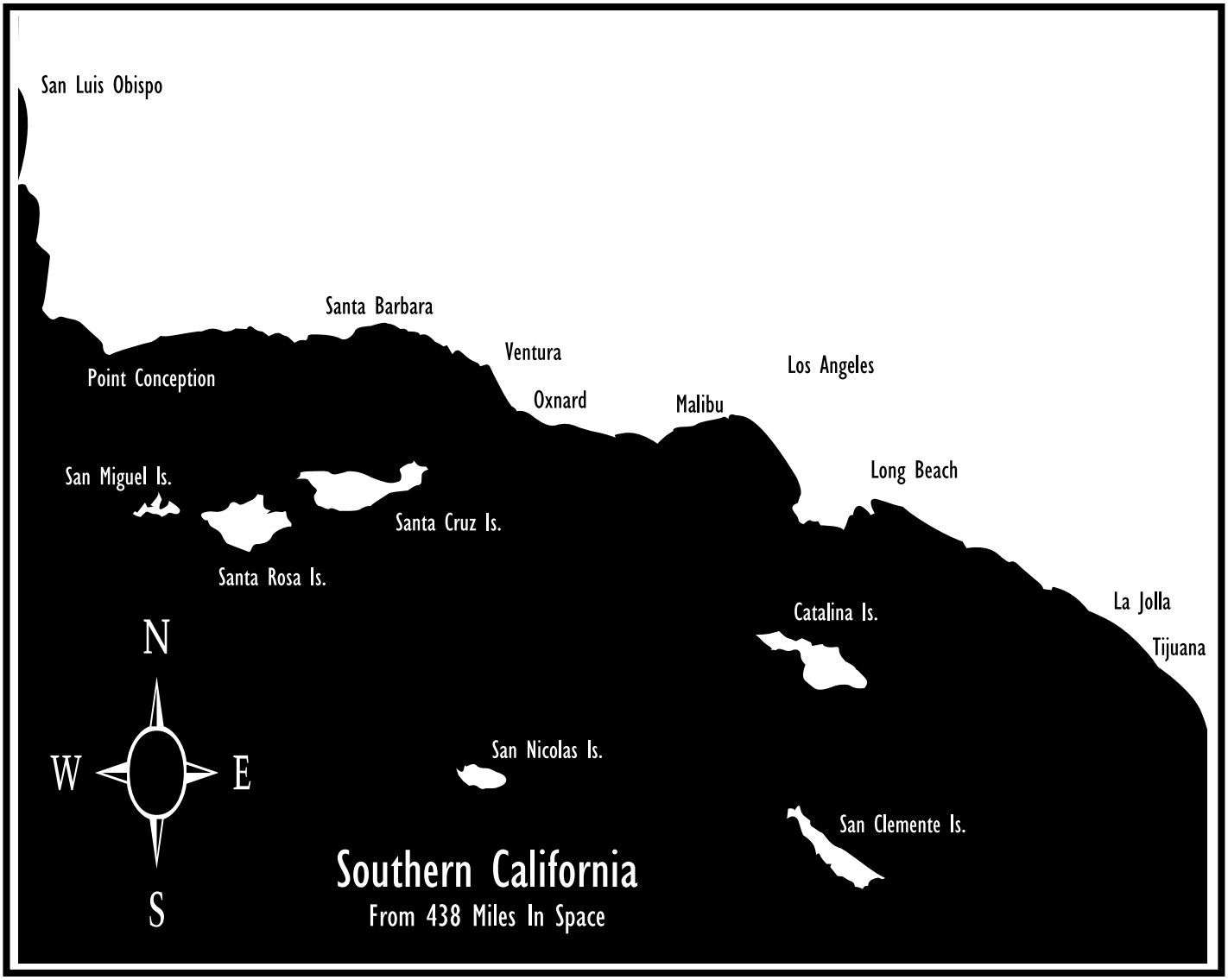
Gear Up Situation Solvers - 7

Decision 4 continued

Discussion:

Identify the areas around the Channel Islands that are in the lee when the wind blows from the northwest.

Which areas are protected when the swell comes from the south?



Gear Up Situation Solvers - 8

Decision 5

Joe is a gillnet fisherman from Morro Bay who fishes swordfish from September to January. He closely watches the weather and monitors water temperature breaks, places where cold and warm currents meet, because those areas have abundant nutrients in the water, and the nutrients attract bait fish and larger fish. Joe fishes swordfish from the Oregon border to Mexico and up to 200 miles out to sea, and his typical trip lasts 10 days.

1. On his first trip of the season, Joe spends the first 24 hours steaming out to the grounds and the 10th full day steaming in. Once on the grounds he looks for signs, such as birds diving into the water for food, to help him locate concentrations of bait. Each day he spends 6 hours surveying the ocean, motoring around looking for a likely place to set his net. He sets at dusk and drifts for most of the night. He spends 4 hours a day pulling the net, idling the engine to operate the hydraulic net reel. The rest of the time, the engine is off. Joe figures that he uses 6.5 gallons of fuel per hour steaming, 5 gallons per hour surveying, and 2 gallons per hour idling. How much fuel did Joe consume on his first 10-day swordfish trip?

2. Joe has been approached by Felix, a spotter pilot who wants to help Joe find fish. A spotter pilot usually receives 15% of the total value of the season's catch, whether he flies every day or not, and Joe must sign a contract with the pilot for the entire season. Usually a spotter pilot can increase an individual's swordfish catch by 50%. The season lasts for 5 months and about half of that time the weather is inclement (cloudy) and the pilot cannot fly to spot fish. A swordfish fisherman who does not use an airplane can gross $150,000 in 5 months, on average.
    a. Based on an average season's earnings, how much money will Joe make if he uses a spotter pilot?
    b. How much must Joe pay Felix?
    c. Should Joe hire Felix to spot for him, and why?

3. In late November Joe is ready to leave on another swordfish trip but he can't decide where to go. His last trip was productive, fishing 180 miles to the west. And the weather is not expected to change in the near future. For the past three years at this same time, however, an area 180 miles south had good fishing conditions — clear blue water, the proper current flow, and a good temperature break supporting abundant bait. A lot of swordfish were caught in that area, but now fishing in the south is slow. Should Joe go south on a hunch or back west?

4. It's two weeks before Christmas, a time when swordfish usually sell for a high price. But this December has been stormy, and it looks as though winter might be coming early. Joe's wife and children want him to come home before Christmas. Joe would like to make one last big trip and catch a lot of swordfish so he'll have enough money to carry his family through winter, when he can't fish. Joe's best friend has been making short, 2- to 3-day trips not too far from home and catching a few fish each time. What should Joe do? Why?
    a. Tie up the boat until after Christmas and enjoy being with his family.
    b. Go offshore for a long trip, hoping to catch a lot of fish.
    c. Fish locally, catch a few fish at the high price, and be home for the holidays.

Gear Up Situation Solvers - 9

Decision 6

Rick has trapped lobsters in southern California for 10 years and now wants to market his lobsters himself to earn more money. In order to market his lobsters, he needs to guarantee a consistent supply each week. He plans the amount of gear he fishes to satisfy the demand of his markets, taking into account the amount of gear he can service on an average day.

Working with a deckhand, a trapper can service 200 traps per day, on average, or 600 traps per week. This allows for unworkable weather and also allows 1/2 day traveling to and from the fishing grounds. The average catch per trap at the beginning of the season is 1.5 pounds. Later in the season, the average catch usually drops to .5 pound per trap.

1. It is the beginning of the season and Rick finds a buyer who wants 1,000 pounds of lobster per week.
   a. How many pounds of lobster can Rick catch in a week's time?
   b. How many more pounds does Rick need to fill the order?

2. To meet his market order, Rick contracts to sell the load of another trapper, who can produce as much as Rick does. Now Rick has more lobster than his order calls for, and he needs to find a market for the extra lobster produced by the second trapper. If he sells the extra lobster to a local market, he can earn $8.75 a pound wholesale. If he exports the lobster to Europe or Asia, where spiny lobster is highly prized, he can earn $10.50 a pound, but he also must pay for packaging, labor to box the lobsters, and transportation to the airport, all of which costs 5% of the wholesale price when exporting 1,000 pounds or more. Under 1,000 pounds, the shipping costs double.
   (The lobster buyer usually pays for airfreight and the tariff on the imported lobster.)
   a. How much can Rick make (gross) by selling the lobster left over from the first order in a local market?
   b. How much can Rick gross by exporting the leftover lobster?
   c. How much can he earn (net) on the second order after he pays the second trapper $7 a pound for his load:
      [1] If he sells to a local market?
      [2] If he exports?

3. Because Rick needs at least 200 pounds more on the second order to meet the 1,000-pound discount freight rate for the export market, he contracts with a third boat.
   a. How much can Rick gross by exporting 1,000 pounds of lobster?
   b. Now how how many pounds of lobster per week does Rick have to sell early in the season, subtracting the 1,000 pounds needed for the first order?
   c. How much does Rick earn, less shipping expenses, if he exports all the lobster except the 1,000 pounds reserved for his first order?

4. What is the shipping cost per pound:
   a. For the 800-pound export shipment?
   b. For a 1,000-pound shipment?
   c. For a 1,700-pound shipment?

Gear-Up Solvers Answer Page

Decision 1 Answers

1. 216 ft. (12 x 18 = 216); 36 fathoms (216 / 6)
2. $30 (6 dozen x $5.00 = $30)
3. 450 miles (5 mph x 15 hrs x 6 days)
4. 450 fish (5 fish per hr x 15 hrs x 6 days)
5. 6,750 pounds (450 x 15 lb average)
6. $8,100 (6,750 lbs x $1.20 lb)
7. $1,215 ($8,100 x .15)

Decision 2 Answers

1. $2,700 (30 tons x $90 per ton)
2. $365 (fuel = 3,000 gals x $.75 per gal = $2,250 / 30 = $75)
   (health insurance = $480 per crew member x 8 crew = $3,840 / 30 =$128)
   (spotter pilot = $2,700 x .06 (6%) = $162)
   ($75 + $128 + $162 = $365)
3. $36 ($1,080 / 30 = $36)
4. $4 ($36 / 9 men, including captain = $4 deduction)
5. $156.53
   ($2,700 - $365 = $2,335 x .55 = $1,284.25 / 8 = $160.53 - $4 - $156.53
6. $162 ($2,700 x .06 = $162)
7. $916.76
   ($2,700 gross - $365 trip expense = $2,335 - $162 spotter pilot - $1,252.24 crew wages - $4 groceries for captain = $916.76)

Decision 3 Answers

1. Yes. Minimum mesh size for California halibut is 7.5 inches in the California halibut trawl grounds; mesh size for prawns is 1.5 inches.
2. $225.00 (10 x 10 pounds x $2.25 = $225.00)
3. Prawns at $6 per pound.
4. $250 for cucumbers (500 lbs x $.50 = $250);
   $756 for halibut (28 x 12 x $2.25 = $756)
   $1,500 for prawns (250 x $6)
5. Prawns

Decision 4 Answers

1. On the southern side of the islands or coast.
2. On the northern side of the islands.
3. Stay home and take care of chores (or go hiking).
4. 100 pounds (he only has 1/2 hour of bottom time)
5. Bill may do option a. or option b. and still earn a living this day, although the diving will be difficult. If Bill follows option c, he loses the cost of the trip and doesn't earn any money. If he does this often, he will soon be out of business.
6. Islands
   (Island urchins = $335 profit (500 * $.85 - $90)
   (Coastal urchins = $275 profit (300 lbs * $1 - $25)

Discussion: 7. Is a hard day's work and a dangerous channel crossing worth the additional $60 profit?

Gear-Up Solvers Answer Page - 2

Decision 5 Answers

1. 616 gallons
   Steaming = 24 hrs x 2 = 6.5 gals/hr = 312 gals
   Surveying = 6 hrs/day x 8 days x 5 gals/hr = 240 gals
   Idling = 4 hrs/day x 8 days x 2 gals/hr = 64 gals
   (312 + 240 + 64 = 616)

2. a. $225,000 ($150,000 * 150% {1.5} = $225,000)
   b. $33,750 ($225,000 * 15% {.15} = $33,750)
   c. Yes, Joe should hire Felix.
   Joe would earn an average of $150,000 without a spotter pilot but would net $191,250 with a pilot, after paying the spotter 15% of the total value of the catch, because the spotter will help him increase his total earnings by 50%.

3. Joe should return to the west, a spot that has proven to be productive under the current weatherconditions. He should watch for signs that conditions are improving in the south, however, and be ready to go there as quickly as possible if conditions improve.

4. a. This is not a good alternative because the weather is changeable this time of year and a few good days might open up. With only one month of season left, a fisherman needs to maintain a "make hay while the sun shines" attitude.
   b. This alternative is too risky. A sudden storm could break the trip or put Joe in a dangerous position at sea.
   c. This is the best alternative, a compromise that gives Joe a chance to make some money during season, while the price is high, and to be home with his family for Christmas.

Decision 6 Answers

1.	a.	900 pounds		(600 traps per week * 1.5 lobsters/trap = 900 pounds)
	b.	100 pounds		(1,000 pounds/week - 900 pounds/week = 100 pounds)
2.	a.	$7,000		(800 pounds * $8.75/lb = $7,000)
	b.	$7,560		(800 pounds * $10.50/lb - 10% = $7,560)
	c.	[1]	$500	($7,000 - [900 * $7] = $700)
		[2]	$1,260	($7,560 - [900 * $7] = $1,260)
3.	a.	$9,975		(1,000 pounds * $10.50/lb - 5% = $9,975)
	b.	1,700 pounds/wk		(900 lbs * 3 trappers - 1,000 = 1,700)
	c.	$16,957.50		(1,700 pounds * $10.50/lb - 5% = $16,957.50)
4.	a.	$1.05 per pound		($8,400 * 10% = $840 / 800 pounds = $1.05)
	b.	$.53 per pound		($10,500 * 5% = $525 / 1,000 pounds = $.525 or $.53)
	c.	$.53 per pound		($17,850 * 5% = $892.50 / 1,700 pounds = $.525 or $.53)

Discussion:

1. What business expenses would Rick incur to fish lobsters?
   (Possible answers: fuel, bait, crew expense, boat maintenance and insurance)

2. What business expenses would Rick incur to sell lobster?
   (Possible answers: warehouse space, lobster storage/cooling tanks, workers, packaging materials, truck or other transportation, insurance)

Gear-Up Solvers Answer Page - 3

Decision 6 Answers continued

3. The wholesale price of seafood is set based on the ex-vessel price (the price paid to the boat), multiplied by 20-30% mark-up for the processor/first handler. The wholesale price may increase an additional 10% to 15% if the seafood is also handled by a distributor. The retailer marks up the wholesale price another 40%.

   Thus when Rick fishes for lobster and sells his catch to a processor, he receives $7 a pound. If he sells his own lobster, he can earn about 25% more, and if he exports his product directly, he can earn as much as 50% more.

4. If the ex-vessel price of lobster is $7, and the wholesale price of lobster to the local market is $8.75 per pound (marked up 25%), what is the retail price per pound of that lobster? (Answer: $12.25 per pound)

Creating a Seascape

Age 11, group

Five 45-minute periods, indoors or outdoors

Objective:

Create a California seafood undersea environment.

Materials:

California's Golden Seas booklet (see appendix), California's Golden Seas poster, paints, paint brushes, color markers, scissors, glue, lightweight cardboard or poster board. For background or surfaces: butcher paper, poster paper, plywood stand, side of a building, large glass window, shoe boxes. Optional: fishing line, kelp and other seaweed, shells, rocks, coral, sponges, diving equipment, treasure chest pattern (see Golden Treasures activity).

Get set

√ The seascape can be as large or small as the environment allows, from a miniature seascape in a shoe box to a large seascape display on a cafeteria wall, hallway or side of a building.

√ If a large seascape is planned, have each person responsible for a specific species.

√ Use the *California's Golden Seas* booklet and poster as guides for information about species and their habitats.

Go catch

√ Create the seascape background and surface first.

√ Cut seafood out of lightweight cardboard and decorate the seascape.

√ Hang the species from the ceiling or top of the shoe box with fishing line, if desired.

Sailing

√ Invite community and family members to view the seascape.

√ Display the seascapes at an open house, science fair or in a school or community library.

Mystery of El Niño

Age 11, group

45 minutes planning & preparing
20 minutes, presentation
20 minutes, question and answers

Objective: Explain El Niño and how it affects the seafood industry.

Materials: Access to a phone, phone book, library, treasure chest box, paper, pencils, scissors

Get set

√ Review "Effects of Water Movements and Other Parameters on Fish" (see appendix).
√ Divide into three groups.
√ Have groups draw their assignments from the treasure chest.

Go catch

√ Begin the investigation based on the assignment drawn.
√ The questions that should be answered during the investigation include:
- What is El Niño?
- How does El Niño occur?
- Why does it occur?
- When does it occur?
- Where does it occur?
- Who does El Niño affect?
- How does it affect the species the team is named after?

√ Report findings back to the group.

Sailing

√ Place the treasure chest in a prime location for others to pull out a question to answer. A sign should be attached to the treasure chest that reads, "Can you answer the El Niño mystery?" The cafeteria would be a good location to place the chest.
√ Ask foodservice personnel to create an El Niño menu at Christmas and winter holiday time featuring California seafood.

El Niño Investigative Assignments

Investigator Lobster and Cucumber

√ Locate a fisherman or fisherwoman to interview or to speak to the group about El Niño.
√ The interview or presentation could be conducted by phone if necessary.
√ Each group member should write two questions for the interview.
√ Report to the large group the ***Lobster and Cucumber*** team's findings.

Investigator Rockfish and Swordfish

√ Locate a meteorologist to interview about El Niño.
√ Develop five questions about El Niño and similar currents of the past.
√ Report to the large group the ***Rockfish and Swordfish*** team's findings.

Investigator Squid and Prawn

√ Go to the library and write a scientific brief on El Niño by checking a variety of references, including the encyclopedia. If an encyclopedia is available on a CD-ROM, it is a fun way to explore.
√ Share the brief with the group.

Putting It All Together Crossword

Age 11, group or independent

45 minutes , indoors or outdoors

Objective:

Summarize the California Golden Seas – a source of life, food and livelihood – by completing a crossword puzzle.

Materials:

Crossword puzzle and answer sheet, pencils OR transparency, marker and overhead projector

Get set

√ Duplicate and distribute crossword puzzle OR duplicate crosword puzzle onto an overhead transparency for a group activity.

Go catch

√ Complete the puzzle independently or as a group.

√ Review the answers.

Sailing

Seafood sampling puzzle

√ Choose five different species of seafood to sample as a group.

√ Prepare the seafood either sautéed or broiled in bite-sized pieces. A seafood kabob is an excellent recipe to use for this activity.

√ On a sheet of paper ask everyone to put, "What piece am I" on the top of the sheet and write 1 through 5 in a column.

√ Write in a random order the seafood items to be sampled.

√ As each species is sampled, ask everyone in the group to write down the type of seafood they think it is and how they liked it. Faces could describe their evaluations: a happy face for something they really like, a straight face for an item that they would try again, and an unhappy face for an item that they did not care for, perhaps because it needed a different type of preparation or seasoning.

√ Have individuals share the results with their families.

√ Develop a "catch of the week" to include in dinner menus at home.

Putting it All Together
Crossword Clues

Across

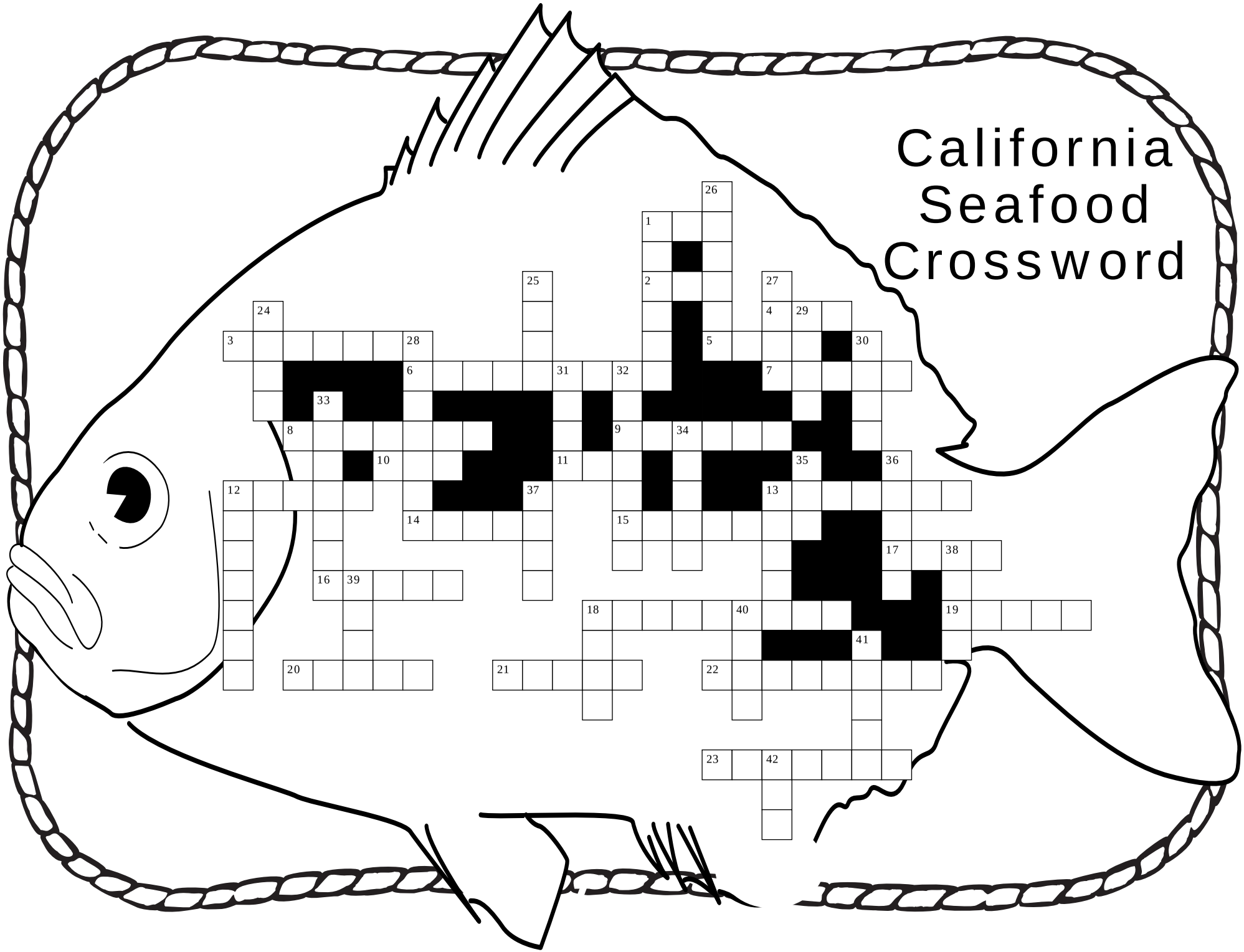
1. Another word for ocean.
2. A man-made barrier to hold water that affects the river habitat of salmon. Beavers build these too.
3. Divers catch these spiny marine animals near rocks.
4. One of the four methods of helping the environment: Recycle, Precycle, Reduce and Re_ _ _.
5. A warm current that fishermen and women refer to as El _ _ _ _. It affects marine life habitat and fishing areas.
6. The relationship between plants and animals and their environment.
7. A plant that is an important food source in the food chain (web).
8. The ocean that produces California seafood.
9. These marine animals have many legs.
10. A weight measurement that fisher folk use. It equals 2,000 pounds.
11. A snake-like marine animal whose name rhymes with meal.
12. Fisher folk use a purse seine net at night to catch this seafood.
13. A name for the delicious fish and shellfish that we eat.
14. What a fisherman or fisherwoman who uses hookah gear is called.
15. Fisher folk catch rockfish using this type of net.
16. Fisher folk catch rockfish and sea cucumbers using this type of gear.
17. The world's largest plant grows in the sea. It is giant _ _ _ _ .
18. Sea _ _ _ _ _ _ _ _ _ look like a long, green vegetable with warts.
19. Fisher folk use a purse seine net and lights to fish for market squid at _ _ _ _ _ .
20. Seafood is divided into two categories: fish and _ _ _ _ _ fish.
21. Fisher folk sometimes harpoon this fish that gets its name from the _ _ _ _ _ that it sometimes uses to catch its food.
22. Fisher folk catch this fish with a purse seine. It is often caught with sardines and squid.
23. Many fish eat this small fish. Humans often eat it pickled.

Putting it All Together Crossword Clues - 2

Down

1. Ocean water contains a lot of this mineral.
12. Fisher folk in the 1930's caught more of this fish than any other fish off the California coastline. Monterey has an area called Cannery Row because of all the canneries once located there to process this fish.
13. Fisher folk use a net called a purse _ _ _ _ _ to catch squid, mackerel and sardines.
18. A lot of _ _ _ _ is needed to keep California's Golden Seas healthy.
24. Fisher folk catch lobsters in a _ _ _ _ .
25. Fisher folk use this floating device to mark the placement of their nets.
26. Fisher folk use a troller with lines and hooks to catch this King of the sea.
27. Fisher folk look for this large fish in warm waters.
28. The _ _ _ _ _ _ _ industry catches, processes, packages, sells and prepares fish and shellfish for us to enjoy.
29. Fishermen and fisherwomen catch one species of this flatfish in very deep water. Its first name is Dover.
30. Fisher folk use this type of fishing gear to catch fish by circling the net around the fish. The gear is called a round _ _ _ _ net.
31. Fisher folk want a clean and _ _ _ _ ocean environment. That is why they pick up ocean garbage and take it back to land for proper disposal and work with the government to pass laws that protect marine life.
32. The relationship between ocean animals and plants.
33. This flatfish has both eyes on one side of its head. Fisherfolk look for it on the ocean bottom in a sandy area. Sometimes it is buried half way into the sand.
34. Fisher folk who use this type of fishing gear have hooks and lines.
35. Fisher folk _ _ _ traps and pots to catch lobsters and crabs.
36. Fisher folk gave rockfish their name because of their _ _ _ _ _ habitat.
37. In northern California, fisher folk set pots to catch this delicious ocean crustacean.
38. When fisher folk troll they attach hooks to a _ _ _ _ .
39. There are many different knots that fisher folk learn to tie using _ _ _ _ .
40. Fisher folk call this a vessel.
41. A large shrimp.
42. Divers harvest sea urchins for their _ _ _ , which is a delicacy, especially in Japan.

California Seafood Crossword



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