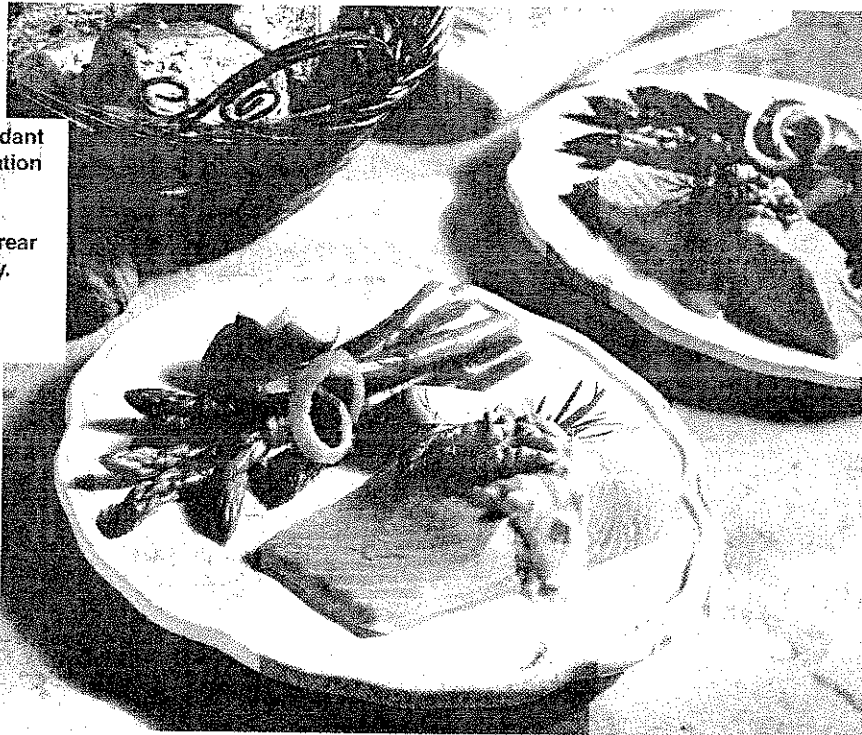


Fish and Shellfish

Raw Shellfish Preparer
Cleans and prepares shellfish for serving to customers.

Fish Hatchery Attendant
Performs a combination of tasks to trap and spawn game fish, incubate eggs, and rear fry in a fish hatchery.

Net Fisher
Catches finfish, shellfish, and other marine life alone or as a crewmember on shore or aboard fishing vessels using a variety of equipment.



California Asparagus Commission

Career Path
Have students use the *Dictionary of Occupational Titles* or visit oalj.dol.gov/libdot.htm on the Web to look up the occupations of raw shellfish preparer, fish hatchery attendant, and net fisher. Ask students to find out more about the specific tasks associated with each career.

Vocabulary Builder
After reading the definitions for the *Terms to Know* in the glossary, have students give a specific example of each term that consumers might find in the marketplace.

Terms to Know

finfish
shellfish
lean fish
fat fish
mollusk

crustacean
drawn fish
dressed fish
fish steak
fish fillet

Objectives

- After studying this chapter, you will be able to
- list factors affecting the selection of fish and shellfish.
 - describe how to properly store fish to maintain its quality.
 - describe the principles and methods for cooking fish and shellfish.
 - prepare fish by moist and dry cooking methods.

Meeting Special Needs

- Challenge academically gifted students in your class to attain the following higher-order objectives as they study the chapter:
- write a consumer brochure that discusses factors to consider when selecting fish and shellfish.
 - demonstrate how to properly store fish to maintain its quality.
 - apply principles for cooking fish and shellfish as they prepare these foods by a variety of methods.
 - evaluate fish prepared by moist and dry cooking methods.

Vocabulary Builder

Have students compare the terms *finfish* and *shellfish*. Also have them compare the terms *lean fish* and *fat fish*.

FYI

- Alaska is the largest producer of shellfish in the United States, harvesting crab and shrimp in the greatest quantities.
- A 3-ounce cooked serving of broiled orange roughy, pollock, sole, or steamed blue crab has only 1 gram of fat.

Break It Down

Have students review the meanings of the terms *finfish*, *shellfish*, *lean fish*, *fat fish*, *mollusks*, and *crustaceans*. Have students answer questions 1–3 under *Review What You Have Read* and complete activity 1 under *Build Your Basic Skills* at the end of the chapter.

Commercial fishers in the United States catch several billion fish each year for food, 21-1. However, the U.S. is a small consumer of fish and fish products compared with other countries.

Classification of Fish and Shellfish

Two kinds of water animals are eaten as food: finfish (often called *fish*) and shellfish. **Finfish** have fins and backbones. **Shellfish** have shells instead of backbones. Both finfish and shellfish can be divided into further classes. Finfish can be lean or fatty. **Lean fish** have very little fat in their flesh. Because their flesh is

white, they are often called *white fish*. Swordfish, haddock, and cod are lean fish. **Fat fish** have flesh that is fattier than that of lean fish. Their flesh is usually pink, yellow, or gray. Mackerel, catfish, and salmon are fat fish.

You can divide shellfish into two groups: mollusks and crustaceans. **Mollusks** have soft bodies that are partially or fully covered by hard shells. Oysters, clams, and scallops are mollusks. **Crustaceans** are covered by firm shells and have segmented (divided into sections) bodies. Shrimp, lobsters, and crabs are crustaceans.

Nutritional Value of Fish and Shellfish

Fish and shellfish are in the meat and beans group of the Food Guide Pyramid. Most people need the equivalent of 5 to 7 ounces (140 to 196 g) of lean, cooked meat, poultry, or fish each day.

Both fish and shellfish are excellent sources of complete protein. In some parts of the world, people use fish flour (concentrated fish protein) to increase the protein level of the diet.

Fat content varies with the kind of fish. Lean fish have fewer calories than fat fish. Most fish have fewer calories and less saturated fat and cholesterol than moderately fat red meat. Including fish in your diet can help you follow the Dietary Guideline about moderating your total fat intake.

Overall, fish is slightly higher in minerals than red meat. Shellfish have even more minerals than finfish. Fish provide fair amounts of iron. Canned salmon and sardines prepared with their bones are especially good sources of calcium. Saltwater fish are one of the most important sources of iodine.

Fish and shellfish contribute the same vitamins as red meat. Fat fish have higher amounts of vitamins A and D.



21-1 Commercial fishing is an important industry in coastal regions.

Selecting and Purchasing Fish and Shellfish

When selecting fish and shellfish, use inspection seals and grade shields to help you

Interdisciplinary Connections

Coordinate your study of fish and shellfish with the social studies department. As you discuss selecting and purchasing, encourage the teachers in the social studies department to identify lakes, rivers, and oceans that are significant sources of various types of fish and shellfish. Social studies teachers might also emphasize the role the commercial and/or sport fishing industry plays in the economies of the regions where these bodies of water are located.

determine quality. The appearance and form of fish and shellfish can also guide your purchases.

Inspection and Grading of Fish and Shellfish

The National Marine Fisheries Service provides a voluntary inspection program for the fish industry. All fish products that have passed inspection carry a round inspection seal.

A grade shield appears on fish that have been voluntarily graded. Appearance, odor, flavor, and lack of defects determine quality grades. Most fish at retail markets is U.S. Grade A. These top quality fish are uniform in size and have good flavor and few defects.

Forms of Finfish

A fresh fish should have a stiff body, tight scales, and firm flesh. The gills should be red, and the eyes bright and bulging. A finger pushed into the flesh should leave no indentation. The outside should have little or no slime, and the fish should smell fresh.

You can purchase fresh fish whole, drawn, dressed, or as steaks or fillets. A *whole (round) fish* is marketed as it comes from the water. You

must clean it before cooking. A *drawn fish* has the entrails (insides) removed. A *dressed fish* has the entrails, head, fins, and scales

removed. It is ready for cooking. *Fish steaks* are cross-sectional slices taken from a dressed fish. *Fish fillets* are the sides of the fish cut lengthwise away from the backbone. Fillets have few, if any, bones. See 21-2.

Drawn and dressed fish, as well as fish steaks and fillets, can be purchased frozen. Frozen fish should be solidly frozen in moistureproof and vapor-

proof wrapping. There should be no discoloration and little or no odor.

Types of Shellfish

Shellfish available in most markets include shrimp, oysters, crabs, lobsters, clams, and scallops. See 21-3. Shrimp and oysters are the most important shellfish in the United States in terms of the amount eaten.

Shrimp

You can buy several varieties of shrimp. They differ in color and size when they are raw.

Most shrimp are sold without the head and thorax (middle division of the body). You may have to peel the shell off shrimp. You may also have to remove the intestinal tract before preparing canned or bulk cooked shrimp. The intestinal tract appears as a dark streak that runs along one side of the shrimp. Shrimp sold without the intestinal tract are labeled as *deveined* shrimp.

Shrimp are marketed by sizes such as jumbo, large, medium, and small. Sizes are based on the number needed to weigh 1 pound (0.45 kg). Frozen shrimp may be purchased uncooked, either peeled or unpeeled. Frozen shrimp are also available cooked and peeled or peeled, cleaned, and breaded. When buying fresh shrimp, look for those that are odorless with firmly attached shells.

Healthy Living

Some nutrition experts suggest including fish in your diet two to three times a week. They believe the omega-3 fatty acids in fish may reduce your risk of heart attack or stroke. Although many experts favor eating fish, most caution against the use of fish oil supplements. These supplements do not contain the other nutrients found in fish. In addition, their use may have some negative side effects.

Resources

- *Selecting Fish and Shellfish*, Activity A, SAG. Students are to complete exercises about selecting fish and shellfish.
- *Criteria for Selecting Fish*, transparency master 21-1, TR. Use the master to illustrate for students signs of quality they should use when selecting fresh fish.
- *Forms of Finfish*, color transparency CT-21, TR. Use the transparency to illustrate the various forms in which finfish can be purchased.

Vocabulary Builder

Have students compare the terms *drawn fish* and *dressed fish*. Also have them compare *steak* and *fillet*.

For Example...

Show students a sample of a shrimp with the intestinal tract intact. Then demonstrate how to devein a shrimp.

Q: Can drawn fish be cooked without further trimming?

A: You can cook drawn fish if you shield the fins with foil. However, many people do not care for the presentation of cooked fish with the head still attached.

Think Outside the Box

Ask students what nutrients fish provide in addition to omega-3 fatty acids. They may wish to refer to Appendix B, *Nutritive Values of Foods*, in the back of the text. They may also consult library resources such as medical or health journals.

FYI

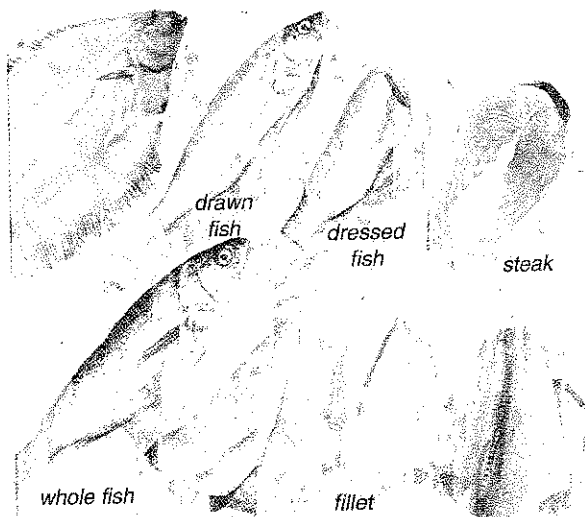
The record king crab weighed nearly 25 pounds and measured 6 feet from claw to claw.

For Example...

Other types of crustaceans include prawns and crawfish. Other types of mollusks include cockles, mussels, and abalone.

Activity

Have students contact a seafood restaurant to find out what seafood specialties they offer on their menu.



21-2 Fresh fish can be purchased in several forms.

Oysters

You can purchase oysters live in the shell, fresh or frozen shucked (removed from shell), and canned. Like shrimp, they are packed according to size. Live oysters should have tightly closed shells or the shells should close when you touch them. Shucked oysters should be plump, creamy in color, and odorless.

Crabs

The blue crab and Dungeness crab are the two most common species sold in the United States. You can buy them live in the shell, cooked frozen whole, and as frozen or canned cooked meat.

Lobster

Lobster shells are dark blue green when removed from the water. They become red when cooked. You can buy cooked, frozen whole lobsters or lobster tails. You can also purchase lobster as cooked meat taken from the shell and frozen or canned. When buying live lobsters, look for those with tails that snap back quickly after being flattened.

Clams

Several kinds of clams are eaten in the United States. These are available live in the

shell, fresh or frozen shucked, and canned. Like shucked oysters, shucked clams should be plump and odorless and have a creamy color. The shells of live clams should be tightly closed or they should close when you touch them.

Scallops

Both tiny bay scallops and the larger deep-sea scallops are available on the market. A fresh bay scallop is creamy white or pink. A fresh deep-sea scallop is white. The whole bodies of these mollusks are edible. However, the large muscle used to close the shell is the only part commonly eaten in the United States. Unlike clams and oysters, you cannot buy scallops in the shell. Scallops are available fresh or frozen.



21-3 Both mollusks and crustaceans are available in most markets that sell shellfish.

Interdisciplinary Connections

As you cover selection and purchasing fish and shellfish, ask a biology teacher to explain the functions of anatomical features of finfish, mollusks, and crustaceans.

Canned Fish and Shellfish

Tuna, salmon, sardines, shrimp, crab, lobster, and clams are often canned. Many varieties are available. Read the label carefully to be sure you know what you are buying. To reduce fat in your diet, you should choose tuna packed in water instead of oil. If you are making shrimp cocktail, you might want the large, fancy shrimp rather than the small shrimp.

Buying Fish and Shellfish

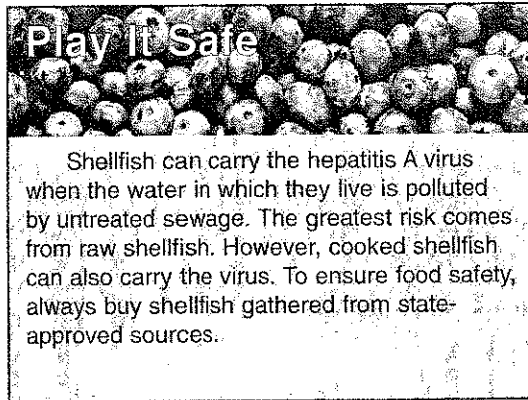
Fresh seafood can be a source of bacteria that cause foodborne illness. To ensure the safety of the fish and shellfish you buy, deal only with reputable sellers. Look for the signs of quality described earlier. Be sure the market is clean and the fish is properly stored on beds of ice, preferably under a cover. The employees should be practicing safe food handling procedures, including wearing disposable gloves when handling your seafood.

The amount of fish you will need to buy depends on the kind and form. Fish, as a rule, have a large amount of waste. Dressed fish have less waste than whole and drawn fish. Fillets and steaks have even less waste, 21-4.

The cost of seafood depends on the form and the region of the country. Fish fillets generally cost more than whole fish because they require more handling. You can often save money by buying dressed fish and filleting it yourself. Fresh fish purchased where it is taken from the water will be less expensive than fish that must be shipped inland. Most shellfish, except for small oysters, is expensive regardless of location.

Storing Fish and Shellfish

Fish is very perishable, so you must store it with care. Wrap fresh fish tightly in waxed paper or foil. Place it in a tightly covered container in the coldest part of the refrigerator. Use stored fish within a day or two. For freezer storage, wrap fish in moistureproof and vaporproof



Shellfish can carry the hepatitis A virus when the water in which they live is polluted by untreated sewage. The greatest risk comes from raw shellfish. However, cooked shellfish can also carry the virus. To ensure food safety, always buy shellfish gathered from state-approved sources.

material. Store it in the coldest part of the freezer.

Keep frozen fish in its original package. Place it in the freezer as soon as possible after purchase.

Store canned fish in a cool, dry place. Refrigerate any unused portions in a tightly covered container. Use it within a day or two.



Cooking Finfish

Preparing seafood with care can help you avoid foodborne illness. You need to practice the same precautions when handling seafood that you use when handling meat and poultry. Be sure to wash your hands thoroughly before



21-4 Fish steaks have less waste than many other forms of fish, so you can get more servings to the pound (450 g).

Discuss

Ask students why they think consumption of seafood in the United States has been increasing in recent years. (because of increased concern about saturated fat content of red meat)

Enrich

Have students survey three homemakers about the types and quantities of fish and shellfish they have bought within the last three months. Have students share their findings in class.

Resource

Filleting Fish, transparency master 21-3, TR. Use the transparency to explain to students the steps for filleting fish. If possible, allow students to practice the technique for some of the recipes to be prepared in strategy 21.

Break It Down

Have students review the meanings of the terms *drawn fish*, *dressed fish*, *fish steak*, and *fish fillet*. Have students answer questions 4-8 under *Review What You Have Read* at the end of the chapter.

Think Outside the Box

Ask students what groups of people are at greatest risk from foodborne illness. Have them research one group to find why they are at higher risk than others and present their findings in class.

FYI

Raw or undercooked seafood is a primary source of the bacteria that cause vibrio infection. This foodborne illness causes chills, fever, and/or prostration.

Resource

Cooking Finfish, Activity B, SAG. Students are to answer questions about cooking finfish.

Food Science

Comparing Cooking Methods for Fish, food science master 21-2, TR.

Have lab groups complete the experiment as directed on the master. Students will be comparing dry and moist heat cooking methods for preparing lean and fat fish. For each lab group, you will need to purchase two lean fish fillets and two fat fish fillets from the options on the supply list. All four fillets for each group should be of similar thickness. Tell students what varieties of fish they are preparing. However, allow them to use their reading and observations to determine which is fat and which is lean.

and after you handle fish and shellfish. Do not thaw frozen products at room temperature. Keep cooked food from touching anything, such as utensils or marinades, that came in contact with raw seafood. Use an instant-read thermometer to be sure the internal temperature of cooked seafood has reached 145°F (63°C). Refrigerate leftover portions promptly.

Q: Is it safe to eat sushi?

A: Sushi contains raw fish. It is safe to eat if purchased from a reputable restaurant where it has been prepared by qualified chefs. However, people in high-risk groups, such as children, pregnant women, and those with immune disorders should avoid eating sushi.

Food Science Principles of Cooking Finfish

Finfish contain tender muscle fibers and little connective tissue. For this reason, tenderizing is not a goal when cooking fish as it is when cooking some meats. You need to cook finfish for only a short time. You must watch them carefully to keep them from becoming dry and overcooked.

You should neither undercook nor overcook fish. Undercooked fish can have an unpleasant flavor and may contain harmful bacteria. Overcooked fish is tough and dry. Some varieties become rubbery; others fall apart.

When you cook a finfish to the proper degree of doneness, the flesh will be firm, and it will flake easily with a fork. (When you gently insert the tines of a fork into the flesh and lift slightly, the flesh will separate into distinct layers.) The flesh of a properly cooked fish will have lost its translucent appearance and will look opaque.

Methods of Cooking Finfish

All finfish are naturally tender, so you can use both dry and moist heat cooking methods.

The fat content of the fish usually determines the cooking method. Generally, you should cook fat fish by dry heat and lean fish by moist heat.

Fat fish, such as mackerel, catfish, salmon, and trout, are delicious when broiled, grilled, or baked. Their fat keeps them from drying out during cooking.

Lean fish, like swordfish, halibut, flounder, haddock, and red snapper, are usually fried, poached, or steamed, 21-5. You can cook lean fish by dry heat if you brush them with fat or cook them in a sauce. Likewise, you can poach or steam fat fish if you handle them gently. (Fat fish can fall apart more easily when cooked in liquid.)

Cooking methods used for fish include broiling, grilling, baking, frying, poaching,



USA Rice Council

21-5 Steaming is a suitable method for cooking lean varieties of fish.

Online Resource

Have students visit the Alaska Seafood Marketing Institute Web site at alaskaseafood.org. Ask students to review information about seafood quality and handling guidelines provided for food handlers, retailers, and the foodservice industry. Discuss how these guidelines differ from guidelines given to consumers.

steaming, and microwaving. You can use a general guide to time fish cooked by all these methods, except deep-frying and microwaving. Measure fish, including stuffed and rolled fish, at its thickest point. You should cook it about 10 minutes for every inch (2.5 cm) of thickness. Turn thick pieces of fish once during cooking. You do not need to turn fish that is less than ½ inch (1.25 cm) thick. If you wrap fish in foil or cover it with a sauce, you should add 5 extra minutes to the cooking time. Fish cooked from the frozen state will require twice as much time to cook. Test fish for doneness by flaking with a fork.

Broiling Finfish

For broiling, select fish that are at least 1 inch (2.5 cm) thick. You can broil steaks, fillets, and dressed fish. Place the fish on a cold broiler pan and brush the fish with oil if it is lean. Broil until the fish flakes easily with a fork. You can cook thinner fish closer to the heat source than thicker fish. You will need to turn thick pieces once during broiling.

Grilling Finfish

The grilling method used for fish depends on the form of fish you are preparing. Grill steaks and fillets by placing them directly over hot coals. Turn over thick pieces halfway through the grilling time. Use indirect heat to grill dressed fish. Test steaks and fillets with a fork for doneness. Use an instant-read thermometer to check the internal temperature of dressed fish.

Baking Finfish

For baking, select steaks, fillets, and dressed fish. To prevent fish from drying out, brush the pieces with oil or with a sauce. You can stuff dressed fish and fillets just before baking. Bake fish at 400°F to 450°F (200°C to 230°C).

Frying Finfish

You can panfry, oven-fry, or deep-fry fish. You can panfry fillets, steaks, and small dressed fish. Coat fish to be panfried with crumbs or with a batter. Then fry them in a small amount of fat until browned. See 21-6.

Cut fish to be oven-fried into serving-sized pieces and coat them with milk and crumbs. Then drizzle them lightly with oil and place them on a greased baking sheet. To get a crispy texture that resembles fried, bake fish in a 500°F

(260°C) oven. At this high temperature, use caution around the oven and watch fish closely as it will cook very quickly. The breading keeps the fish from becoming dry.

Cut fish for deep-frying into serving-sized pieces. Bread them or dip them in batter. Then fry them in 375°F (190°C) fat. If the fat is too hot, the outside of the fish will burn before the inside is cooked. If the fat is too cool, the fish will be soggy and greasy.

Poaching Finfish

Poaching is cooking in simmering liquid. You can use lightly salted water, milk, or water seasoned with spices or herbs as the poaching liquid. You can use any container that is large and deep enough to hold the fish for poaching. It should have a tightly fitting cover.

To poach fish, place the fish in a suitable container. Add enough liquid to barely cover the fish. (If you wrap a dressed fish in cheesecloth or parchment paper or place it on a rack before cooking, it will better retain its shape.) Tightly cover the pan. Poach the fish over low heat until it flakes easily with a fork. After the fish is cooked, you can reduce the volume of the



Del Monte Corporation

21-6 These fish cakes are made with precooked fish and then panfried until golden.

Integrating Math Concepts

Give students examples of several fish dishes, noting the thickness of the fish and whether it will be covered with a sauce. Have students calculate the cooking time for each dish.

Reflect

Ask students what their favorite type of fish or shellfish is and how they like it to be prepared.

FYI

More detail about direct and indirect grilling can be found in Chapter 19.

Discuss

Ask students if they have seen special fish poachers. These are long, deep, narrow containers usually used for poaching dressed fish.

Resource

Finfish Recipes, reproducible master 21-4, TR. Have students use the recipe master to plan a finfish lab using several varieties of fish. Have each lab group complete a *Market Order Sheet* (TR) and a *Time-Work Schedule* (TR). After preparing their recipes and sampling their finfish product, have each group complete a *Lab Evaluation Sheet* (TR).

Strengthening Family Ties

Have students write eight menus including fish or shellfish. Ask students to encourage their family meal managers to use the menus to incorporate seafood in the family diet at least twice a week for the next month. Have students write an evaluation of their families' responses to the menus.

Resources

- *The Fish Market, Activity C, SAG.* Students are to describe how they would respond to questions from customers in a fish market.
- *Investigating Shellfish, Activity D, SAG.* Students are to use library resources and supermarket research to write a brief report about one type of shellfish on the form provided.

Break It Down

Have students answer questions 9–13 under *Review What You Have Read*. Have them complete activity 2 under *Build Your Basic Skills* and activities 1 and 2 under *Build Your Thinking Skills* at the end of the chapter.

poaching liquid by simmering it in an uncovered pan. Then you can thicken it and serve it as a sauce.

Steaming Finfish

Steaming differs from poaching only in the amount of liquid used. You can use less liquid because the steam that forms inside the covered cooking utensil will cook the fish. To steam fish, place dressed fish, steaks, or fillets on a rack over simmering liquid. Cover the pan tightly and steam until the fish flakes easily. (You should never allow the water to boil.) You can also steam fish in the oven in a covered pan or wrapped in aluminum foil. The cover or foil holds in the steam that forms so the steam can cook the fish.

Q: Isn't eating fish supposed to make me smart?

A: You need a complete nutritious diet for proper brain development. No single food can improve your intelligence.

Microwaving Finfish

Fish cooked in a microwave oven is tender, moist, and flaky. Fish cooks very quickly in a microwave oven, so you must watch it carefully to avoid overcooking. Do not forget to allow for standing time. Test fish steaks and fillets with a fork. See 21-7.

Remove fish from the microwave oven when it just begins to flake. Rotate dressed fish one-quarter turn several times during the microwave cooking period. This helps to ensure even cooking of the oddly shaped body.

Cooking Frozen Finfish

You can cook frozen fish either frozen or thawed. If you thaw the fish, you can cook it like fresh fish. If you do not thaw it, you must cook it at a lower temperature and for a longer time than fresh fish.

Community Interactions

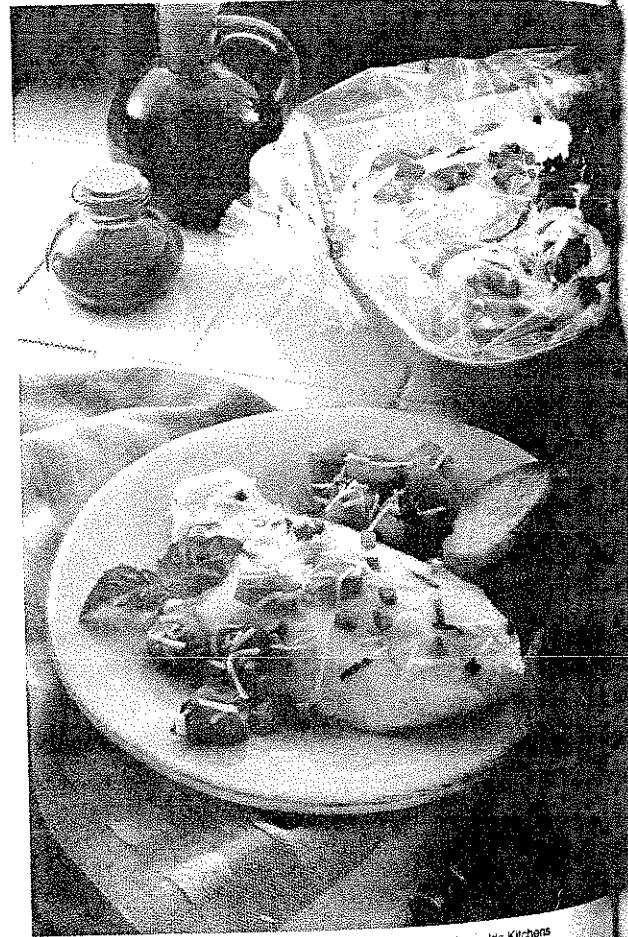
Have students organize a community fish fry or clambake. Encourage students to visit the Simply Seafood, Inc. Web site at www.simplyseafood.com to read articles and review recipes in preparation for this event.

Principles and Methods of Cooking Shellfish

Like finfish, all kinds of shellfish are naturally tender. As a result, you should cook them for a short time at moderate temperatures. Overcooking will cause the proteins to overcoagulate and make the fish tough.

You can simmer, bake, broil, grill, panfry (saute), deep-fry, or microwave shellfish. The cooking method used depends on the kind of shellfish and whether you purchased it live, frozen, or canned.

If you live in an area where fresh shellfish is available, you may purchase your shellfish live. Shellfish purchased in the shell must be alive



photograph courtesy of The Reynolds Kitchens

21-7 Fish cooked in a microwave oven should be covered to hold in steam, which speeds cooking and keeps fish moist.

when cooked. (Fresh, uncooked shellfish deteriorates very rapidly.)

Parboil live lobster, shrimp, and crab by plunging the shellfish into boiling, salted water until it is partially cooked. (Plunge lobster into the water headfirst.) Shellfish then should be simmered, not boiled. After parboiling, you can broil, grill, bake, panfry, or deep-fry shrimp. You may bake or broil lobster and crab. You may combine all three with other ingredients to make such seafood specialties as Lobster Thermidor, Shrimp Scampi, and Crab Newburg. See 21-8.

The shells of live oysters and clams should be tightly closed. You should discard oysters and clams if their shells are open. When you drop live oysters or clams into simmering water, the shells will open. You can then remove the edible part of the shellfish from the shell. After removal, you can simmer, deep-fry, or saute oysters and clams.

Shellfish cooked in a microwave oven require the same timing whether cooked in or out of the shell. Refer to a microwave cookbook for exact cooking times and methods.

Good Manners Are Good Business

Being served shellfish at a business dinner may make you rather nervous if you are unfamiliar with how to eat them. Clams and oysters often are served in open shells. Use one hand to hold the shell in place on your plate. With your other hand, use a seafood fork to lift the oyster or clam out of the shell. If you wish, dip the shellfish in the accompanying cocktail sauce before eating it in one bite.

Remember to place thicker portions of shellfish toward the outside of the dish. This will promote more even microwave cooking.

In inland areas, most of the available shellfish is frozen or canned. Cook uncooked frozen shrimp in salted simmering water until pink. Frozen lobster tails are partially cooked. You may thaw and broil them, or you may cook them in simmering liquid

like uncooked frozen shrimp. You may bake, broil, or fry cooked frozen shrimp, crab, or scallops.

You may serve canned shellfish without further cooking. You may also combine them with other foods in salads and main dishes.

Resource

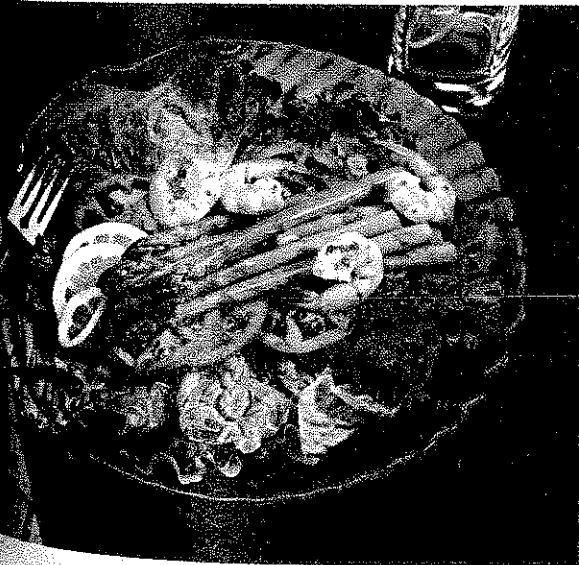
Shellfish Recipes, reproducible master 21-5, TR. Have students use the recipe master to plan a shellfish lab. Have each lab group complete a *Market Order Sheet* (TR) and a *Time-Work Schedule* (TR). After preparing their recipes and sampling their shellfish product, have each group complete a *Lab Evaluation Sheet* (TR).

FYI

You might have students practice the "Good Manners Are Good Business" guideline as they sample food products made in a shellfish lab. For additional practice, fill empty shells with pieces of clay to represent clams and oysters.

Break It Down

Have students answer question 14 under *Review What You Have Read* at the end of the chapter.



California Asparagus Commission

21-8 Shrimp that have been simmered, chilled, and peeled make a tasty addition to a cool, main dish salad.

Think Outside the Box

Ask students how they would distinguish a seafood fork to be used with an appetizer from one to be used with an entree. Bring samples to class for display. Ask students why they think an appetizer fork has only two prongs.

Resources

• **Chapter 21 Study Sheet**, reproducible master 21-6, TR. Have students complete the statements as they read the chapter.

• **Chapter Review Games CD**. Have students play the chapter review game according to the instructions that appear on the screen.

Summary

Lean fish, fat fish, mollusks, and crustaceans are all good sources of protein, vitamins, and minerals. Finfish are available whole, drawn, dressed, or as steaks or fillets. Shrimp, oysters, crabs, lobsters, clams, and scallops are the most popular types of shellfish in the United States. You can buy both finfish and shellfish fresh, canned, and frozen. Shellfish usually tend to be rather costly. The cost of finfish depends on the form and where you buy it. Both fish and shellfish are quite perishable and should be used soon after purchase.

Both finfish and shellfish require short cooking periods and moderate temperatures. Properly cooked finfish have an opaque appearance and flake easily with a fork. You can use a number of cooking methods to prepare fish. Appropriate methods include broiling, grilling, baking, frying, poaching, steaming, and microwaving. However, fat fish are usually best prepared by dry heat and lean fish are usually best prepared by moist heat. The kind of shellfish, and whether you purchase it live, frozen, or canned, will help you decide how to cook it.

Review What You Have Read

Write your answers on a separate sheet of paper.

1. True or false. Finfish can be lean or fatty.
2. Shrimp, lobster, and crab are examples of _____.
3. Canned salmon and sardines (with bones) are especially good sources of what mineral?
4. List four signs of quality for purchasing fresh fish.

5. A fish that has the entrails removed is called a _____.
 - A. drawn fish
 - B. dressed fish
 - C. fish fillet
 - D. fish steak
6. What are deveined shrimp?
7. True or false. Fresh fish is usually less expensive in coastal regions than in inland areas.
8. Describe how to prepare fish for refrigerator storage.
9. What are two characteristics that indicate a finfish has been cooked to the proper degree of doneness?
10. What type of finfish is usually cooked by dry heat?
11. What can you do to prevent baked fish from drying out?
12. How can you help poached fish retain its shape?
13. True or false. Frozen fish is cooked for the same amount of time and at the same temperature as fresh fish.
14. True or false. Shellfish purchased in the shell must be alive when cooked.

Build Your Basic Skills

1. **Math.** Compare the cholesterol and fat content of several varieties of fish and shellfish with those of several cuts of meat. Use Appendix C, "Nutritive Values of Foods," to help you.
2. **Reading.** Find five recipes for broiling lean fish. In each recipe, identify how the fish is prevented from becoming dry.

Build Your Thinking Skills

1. **Predict.** With your foods lab group, examine an unknown type of fish fillet given to you by your teacher. Predict whether the fish would be best prepared by moist or dry heat. Cut the fillet in half. Prepare one half by a moist heat method and the other half by a dry heat method. Compare the flavor and appearance of the two cooked pieces. Write a brief report stating your reasons for your original prediction and an evaluation of whether your prediction was accurate.
2. **Compare.** Panfry, oven-fry, and deep-fry small, dressed fish or fish fillets using both batter and crumb coatings. Prepare a table to compare color, crispness, tenderness, and flavor.

Apply Technology

1. Investigate how commercial fishers use sonar to detect fish in the water.
2. Explore the development of aquaculture and its impact on the supply of fish in consumer retail outlets. Share your findings in an oral report.

Using Workplace Skills

Midori is a raw shellfish preparer at The Barrier Reef, an elegant seafood restaurant. She is responsible for shucking fresh clams, oysters, and scallops; deveining shrimp; cracking crab legs; and splitting lobster tails. The owner of the restaurant prides himself in the presentation of the food. He will not allow the staff to serve anything that looks imperfect. However, he becomes quite angry when food is wasted.

To be an effective worker, Midori needs skill in selecting equipment and tools. In a small group, answer the following questions about Midori's need for and use of this skill:

- A. How might the food be affected if Midori does not select the proper tools and equipment for each type of shellfish?
- B. How might Midori's customers react if she does not properly prepare each type of shellfish?
- C. How might Midori's employer react if she does not properly prepare each type of shellfish?
- D. What is another skill Midori would need in this job? Briefly explain why this skill would be important.

Career Path

Have students reread the career descriptions of a fish hatchery attendant and a net fisher that appear at the beginning of the chapter. Ask students why people working in these occupations might need skill in selecting equipment and tools.

Answer Key to Review What You Have Read questions

1. true
2. crustaceans (shellfish)
3. calcium
4. (List four:) scales firmly affixed; firm flesh; bright, clear eyes; shiny skin; internal body walls bright in color; no bones protruding; no strong odor
5. A
6. shrimp sold without the intestinal tract
7. true
8. Wrap fresh fish tightly in waxed paper or foil and place it in a tightly covered container.
9. (List two:) the flesh will be firm, it will flake easily with a fork, it will have lost its translucent appearance and will look opaque
10. fat fish
11. Brush the pieces of fish with melted butter or a sauce.
12. Wrap the fish in cheesecloth or parchment paper or place it on a rack before poaching.
13. false
14. true