SECTION 22-2

Shellfish Basics

KEY TERMS

- mollusks
- univalve
- bivalve
- cephalopod
- shucked
- crustaceans
- devein
- calamari
- escargot
- surimi

OBJECTIVES

After reading this chapter, you will be able to:

- Explain how fish and shellfish are inspected and graded.
- Describe the structure and composition of shellfish.
- Identify market forms of shellfish.
- Describe proper handling procedures for shellfish.

SHELLFISH are often considered a luxury food. Because much of the body is not used in preparing special dishes, shellfish meat is expensive. However, shellfish appear in many places on the menu: as appetizers, in soups, and as entrées. Knowing how to prepare shellfish is an important skill for every foodservice professional.

INSPECTION & GRADING OF FISH & SHELLFISH

The inspection of fish and shellfish is required, just like it is for meat and poultry. Although grading is not required, the U.S. Department of Commerce (USDC) will inspect and grade fresh fish and shellfish for a fee. The inspection of frozen and canned fish is mandatory.

Fish are inspected for accurate labeling, safety and cleanliness in preparation, and wholesomeness. Grading is done to be sure that the fish meet standards for flavor and appearance. Because there are so many kinds of fish, the USDC has set criteria for only the most common types of fish.

Inspection

The USDC inspects fish and shellfish in one of the following three ways:

- **Type 1** inspection covers processing methods and the processing plant itself. The product receives a PUFI mark—Packed Under Federal Inspection—if it is safe, clean, accurately labeled, and has a good flavor and odor. See Fig. 22-5.
- **Type 2** inspection covers criteria such as labeling, weight, and packaging.
- **Type 3** inspection is for sanitary conditions only.

Fig. 22-5.

Grading

Fish are graded based on standards for flavor and appearance. Only fish inspected under Type 1 criteria can be graded. Fish may be judged A, B, or C. Processed or canned products are either B or C quality.

- **Grade A**—Highest quality, no physical defects, good odor and flavor.
- **Grade B**—Good quality.
- **Grade C**—Fairly good quality.

STRUCTURE OF SHELLFISH

Unlike fish, shellfish have no bones. They have hard shells covering their bodies. Shellfish are found in both freshwater and saltwater. Two types of shellfish are mollusks (MAH-luhsks) and crustaceans (CRUS-tae-shuns).

Fig. 22-6. Cephalopods and bivalves are two forms of shellfish. Contrast their differences.

People eat many different parts of shellfish. Muscles, legs, tails, claws, and tentacles are all used in various dishes. Sometimes the shellfish are eaten whole, with or without the shell. Most shellfish are lean and composed primarily of water, vitamins, minerals, protein, and fats.

Learning to prepare shellfish takes time and practice. Each species has special physical characteristics that must be taken into account. For example, some need to be removed from the shell before cooking, while others are cooked in the shell.

MOLLUSKS

Mollusks have no internal skeletal structure. They have shells covering their soft bodies. Mollusks are classified in three major groups. The groups are divided according to the kind of shell the mollusk has.

Univalves (YOO-nih-valvs), such as conch, have a single shell. **Bivalves** (BY-valvs), such as mussels, oysters, and clams, have two shells that are hinged together. Instead of an outer shell, **cephalopods** (SEHF-uh-luh-pods), such as squid or octopus, have a thin internal shell. Cephalopods have tentacles, or false legs, attached to the head near the mouth. See Fig. 22-6.

Oysters

Oysters can be purchased any time during the year, but they are best to eat in fall, winter, and spring. Oyster meat is very delicate with a high percentage of water. Because the salts, nutrients, and minerals of the water flavor the meat, oysters within the same species may taste different, depending on where each was harvested.

■ **Market forms.** Oysters may be purchased live, shucked, or canned. Whole oysters are often served "on-the-half-shell." A **shucked** oyster has had the meat removed from the shell. Shucked oysters, either fresh or frozen, range from very small to extra large. They are graded by size, as shown in Fig. 22-7. Canned oysters are rarely used in commercial kitchens.

Fig. 22-7.

GRADE OF OYSTERS	NUMBER PER GALLON
Very Small	over 500
Small or Standards	301-500
Medium or Selects	211-300
Large or Extra Selects	161-210
Extra Large or Counts	160 or fewer

■ **Handling and Storage.** When purchasing live oysters, check that the shells are tightly closed or that they close quickly when tapped. They should have a clear appearance and be plump. Both shucked and live oysters should have a sweet, mild smell.

Store live oysters in cardboard containers in the cooler. They should be draped with seaweed or damp towels. Check oysters daily, and throw out any dead ones. If the oysters have already been shucked, treat them like fish fillets and keep them in containers surrounded by ice on all sides. Fresh oysters should keep a week in the refrigerator.

Before opening oysters, scrub the shells. Then place them on a sheet pan in a hot oven until the shells open. The oysters can be removed from the shell and prepared for serving. If a shell does not open, throw the oyster away.

Clams

Clams from the East Coast are known by their shells—soft shell or hard shell. Soft-shell clams may be called steamers or longnecks. Hard-shell clams are also called quahogs (KWAH-hahgs) and are classified according to size. Chowders are the largest clams, then cherrystones, which are most common. The smallest clams are called littlenecks. See Fig. 22-8:

■ **Market forms.** Like oysters, clams should be purchased live for greatest freshness. They should smell fresh and sweet. Clams may be purchased in three forms:

- Whole, in the shell.
- Shucked, either frozen or fresh.
- Canned, either chopped or whole.

■ **Handling and Storage.** Treat clams carefully so their shells do not break. Store live clams in cardboard containers in the refrigerator for up to one week. Like oysters, they must be kept damp.

Scrub clams before opening them. If a clam is sandy inside, put cornmeal in water and refrigerate the clams for 24 hours. After the clams eat the cornmeal, they will expel the sand. Be sure to rinse the clams with fresh water before using them.

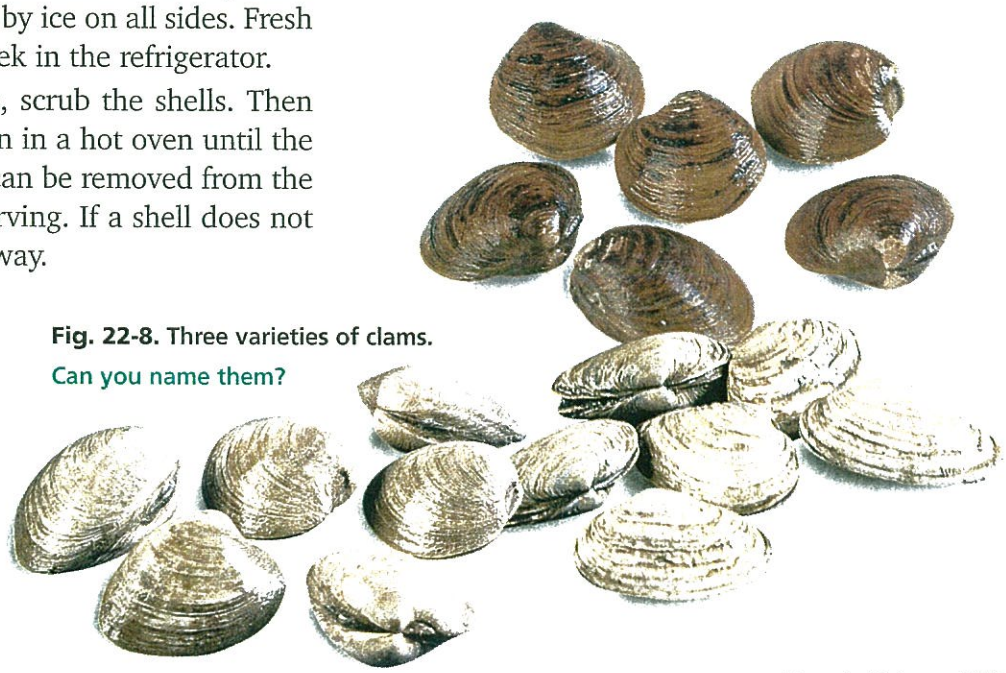


Fig. 22-8. Three varieties of clams.
Can you name them?

KEY Math SKILLS

SAVING IN BULK

Items such as shellfish are typically sold in bulk. Before placing an order to buy large quantities of shellfish, check if the vendor offers quantity discounts. A quantity discount is used to encourage purchasers to buy in large quantities. For example, a discount of 5% off the total price may be given if a purchaser buys at least 10 gallons of oysters, 10% for 15 gallons, 20% for 20 gallons, and so on.

For instance, one gallon of medium oysters sells for $75.00. You need to buy 15 gallons. Determine the cost with and without the quantity discount.

$75/gallon × 15 gallons = $1125.00

$75/gallon × 15 gallons × 0.10 discount = $112.50

Math Tip: To change the percent to a decimal, write the number without the percentage sign, and move the decimal point two places to the left.

Without the quantity discount, your cost is $1125.00. With the 10% discount, your cost is $1125.00 − $112.50 = $1012.50. So you save $112.50 by taking advantage of the quantity discount.

TRY IT!

1. A seafood vendor offers a 20% discount off the total price if you purchase 25 gallons of oysters. Each gallon sells for $70.00. If you bought 25 gallons of oysters, what would be your price without the discount?
2. What would be your price with the discount?

Mussels

Mussels are farmed and harvested around the world. Mussels look like small, dark blue or black clams. Their meat ranges from yellow to orange in color and is tender but firm when cooked. Mussels from Southeast Asia and New Zealand are green, with a green edge to their tan or light gray shells. These mussels are generally more expensive. See Fig. 22-9.

- **Market forms.** Mussels may be sold live, shucked, vacuum packed, or frozen in the shell. The shells of live mussels should be closed or should close when tapped lightly. Throw out any mussels that seem hollow or are very lightweight. If the mussels are too heavy, they are most likely filled with sand, and should also be thrown away. If mussels have been shucked, they are generally packed in brine to preserve them.
- **Handling and storage.** When preparing mussels, scrub the shells under cold running water. Use a clam knife to scrape off any barnacles (BAR-ni-kuhls) that have attached themselves to the shells. Just before cooking, pull off the mussel's "beard," which sticks out between the two shells. If the mussel is sandy, treat it as you would a clam by soaking it in water and cornmeal to get rid of the sand.

Keep mussels in the refrigerator and away from light. Store them in the paper sack or cardboard box they arrive in, and keep the container damp.

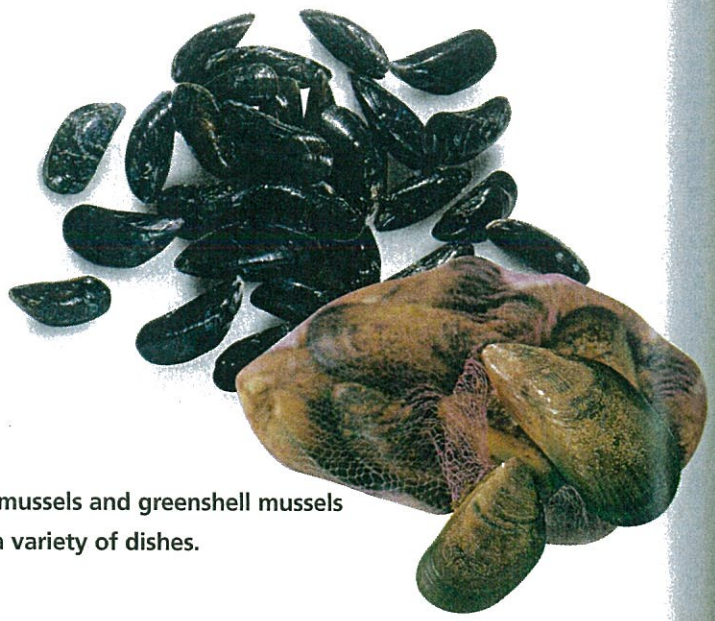


Fig. 22-9. Blue mussels and greenshell mussels can be used in a variety of dishes.

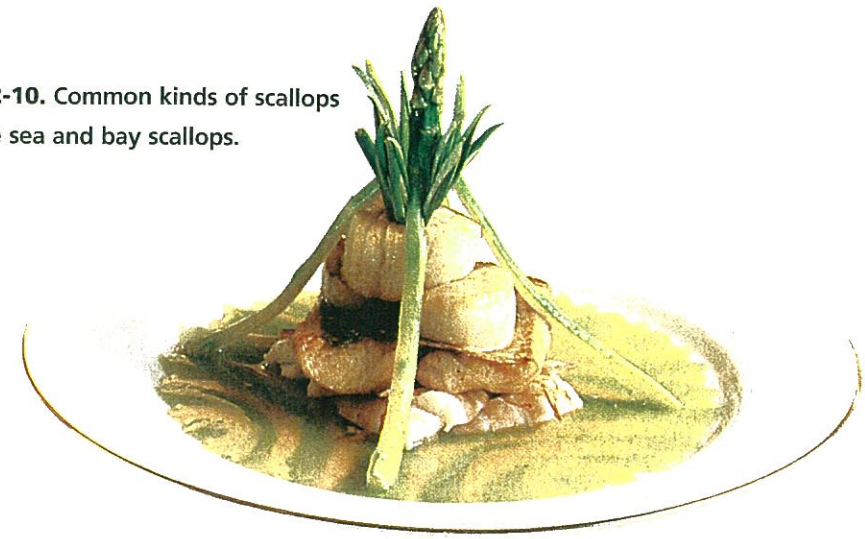


Fig. 22-10. Common kinds of scallops include sea and bay scallops.

Scallops

Scallops are available year-round and are sweet in flavor and white in color. They generally are sold already shucked. The muscle that closes the shell is the only edible part. If scallops smell fishy or strong, they have spoiled or aged. Scallops should smell clean and sweet.

Sea scallops and bay scallops are the two most common kinds of scallops. Sea scallops are the largest, with about 10–15 per pound. Bay scallops are small and more delicately flavored, with about 32–40 per pound. See Fig. 22-10.

- **Market forms.** Scallops are sold fresh and shucked by the pound or the gallon. They may also be sold frozen, in 5-pound blocks, or IQF (individually quick frozen).

CULINARY TIP

IQF—IQF fish or shellfish have been quickly frozen piece by piece. Because the freezing happens so fast, few ice crystals form, which improves the quality.

- **Handling and storage.** Remove the tough adductor muscle on the sides of scallops. This is the muscle that opens and closes the valves on a bivalve mollusk. Although scallops can be prepared with this muscle attached, they will taste better without it. Cover and refrigerate scallops. Do not place them directly on ice or they will become watery and lose their flavor. Sometimes large sea scallops are cut into smaller pieces before cooking.

CRUSTACEANS

Crustaceans have a hard outer shell and jointed skeletons. Examples include lobster, shrimp, crab, and crayfish. Crustaceans tend to be expensive because so much work is needed to produce a small amount of meat. Restaurants often purchase these animals already processed to save preparation time. Crustaceans can be prepared in almost any fashion, as long as they are not overcooked. Overcooking makes them tough.

Lobsters

Northern lobsters may be considered the most valued seafood delicacy. This animal has two large claws, four pairs of legs, and a flexible, large tail. The lobster shell, which turns red when cooked, is actually bluish green or dark green. Lobster meat from the tail, legs, and claws is sweet and white. Lobsters can weigh up to about 20 pounds. Rock, or spiny, lobsters are warm-water lobsters. They are only sold as IQF lobster tails.

Fig. 22-11. Lobsters are a seafood delicacy. Name three ways lobster can be served to customers.

Cooked lobster meat smells sweet and fresh. If the lobsters are in the process of dying, they are called "sleepers." Sleepers should be cooked at once so the meat will still be good. Once lobster meat has been cooked, cover and refrigerate it. The meat will only keep a day or two. See Fig. 22-11.

- **Market forms.** Lobsters are sold live, frozen, or as fresh-cooked meat. Uncooked lobster tails are also available IQF.
- **Handling and storage.** The lobster must be split and cut for certain food preparations, such as broiling or cubing for use in stews or sautés. When cooking lobster live, plunge it head first into boiling water.

Live lobsters should be stored in special saltwater tanks. They can also be kept in a cool location, wrapped in seaweed or heavy, wet paper.

Shrimp

Shrimp are classified by the count per pound—the smaller the shrimp, the higher the count. It takes less work to peel and devein large shrimp, but they are more expensive. To **devein** (dee-VANE) a shrimp means to remove its intestinal tract, located along the back. Deveined shrimp cost more and are sold either raw or cooked. It takes about a pound of raw shrimp to make a half pound of peeled and cooked shrimp.

Here are the steps to use in peeling and deveining shrimp:

1. First, use your forefinger to remove the legs.
2. Peel and remove the shell.
3. Leave the tail on if the shrimp will be broiled or deep-fried. Remove the tail for most other preparations.
4. Cut down the back of the shrimp with a paring knife and remove the vein just below the surface.
5. Make the cut deeper to butterfly the shrimp.

- **Market forms.** Shrimp may be purchased raw in the shell, either fresh or frozen. These are called "green" shrimp. They may also be P/D, an abbreviation for peeled and deveined. The third form available is PDC—peeled, deveined, and cooked. Both P/D and PDC shrimp are usually individually quick frozen (IQF) with a glaze of ice on them.
- **Handling and storage.** Keep already frozen shrimp frozen until they need to be used. To thaw shrimp, place them in the refrigerator. Keep thawed or fresh shrimp wrapped and on crushed ice, as unwrapped shrimp will lose flavor and nutrients.

If shrimp are being served cold, they can be peeled after they are cooked. If shrimp are to be served hot, they should be peeled and deveined before cooking. Shrimp can also be butterflied to make them seem larger and reduce their thickness so they cook faster.

Crab

Popular in casseroles, curries, and chowders, crab are plentiful along North America's coasts. Crab may be shipped canned, fresh, or frozen. See Fig. 22-12. The following types of crab are used in restaurants:

- **Blue crab.** A small, 4–6 oz. crab from the East Coast. Most frozen crabmeat comes from this type.
- **Soft-shell crab.** A blue crab that has just molted, or shed its shell. Because the shell hasn't had time to harden, it is eaten as well as the meat. Only the head and the gills must be removed before frying or sautéing the crab.
- **Alaskan king crab**. The largest crab. They can weigh between 6 and 20 pounds. Even though they are expensive, this type is popular in restaurants because large chunks of meat can be removed.
- **Alaskan snow crab.** Also called spider crab. Snow crab can be used as a less expensive substitute for king crab.
- **Dungeness (duhn-juh-nes) crab.** Found along the West Coast, they range from 1½–4 lbs. and have very sweet meat.
- **Stone crab.** The claws of stone crab are popular in the southeast. To protect the species, people fishing can harvest only one claw per stone crab. They twist off the claw and put the crab back in the sea. The crab will grow a new claw within 18 months.

■ **Market forms.** Although crab taste best fresh, picking the meat is an involved and lengthy process. Most crab are purchased in the shell, already cooked and frozen. Soft-shell crab are sold whole, while king crab legs are sold both split and whole. Snow and stone crab claws are also sold whole.

■ **Handling and storage.** Frozen crabmeat spoils rapidly when defrosted. It should be kept frozen until ready to be used. Keep live crab cool and packed in damp seaweed until ready to be cooked.

Fig. 22-12.

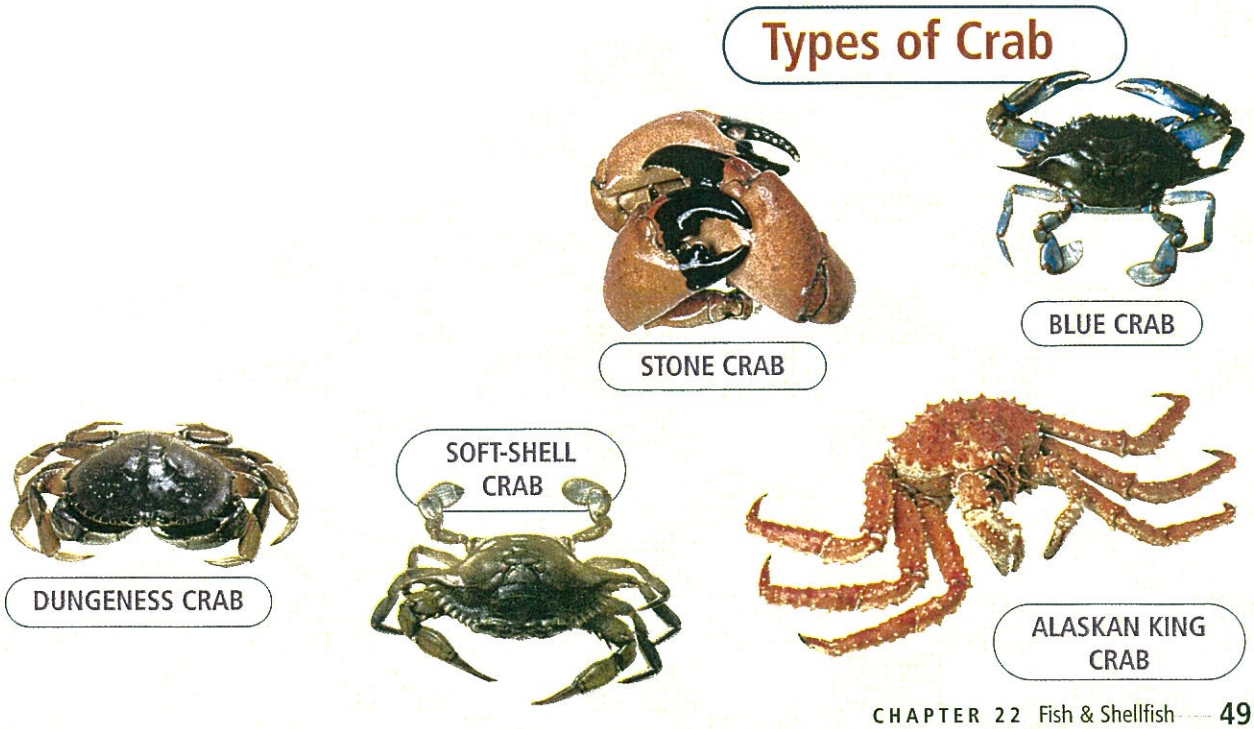


Fig. 22-13. Crayfish are commonly used in Creole and Cajun cooking.

Crayfish

Crayfish are freshwater crustaceans that look like miniature lobsters from 3½–7 inches in length. Crayfish are called crawfish and crawdads in the Southern U.S. Their tail meat is lean, sweet, and tender. Whole crayfish and peeled tail meat are both marketed live and frozen. They are available year round. See Fig. 22-13.

Crayfish are served in French restaurants and used in Cajun and Creole cooking. Whole crayfish are often boiled and served on top of rice. Crayfish tail meat is usually deep-fried and used in soups and sauces.

OTHER SEAFOOD

Some types of seafood, such as frogs and snails, spend part of their lives on land, but are still classified as seafood. These seafood products are often sold smoked, pickled, or in brine. The processing preserves, but more importantly, it adds flavor. These products need to be refrigerated. See Fig. 22-14.

Squid

On some menus, squid goes by its Italian name, **calamari** (kah-lah-MAH-ree). Squid have ten tentacles and look somewhat like an octopus. It is these tentacles and the hollowed-out body that are eaten. Squid is cut into small pieces, which may be either simmered in a seasoned sauce or liquid, or quickly fried.

Frog Legs

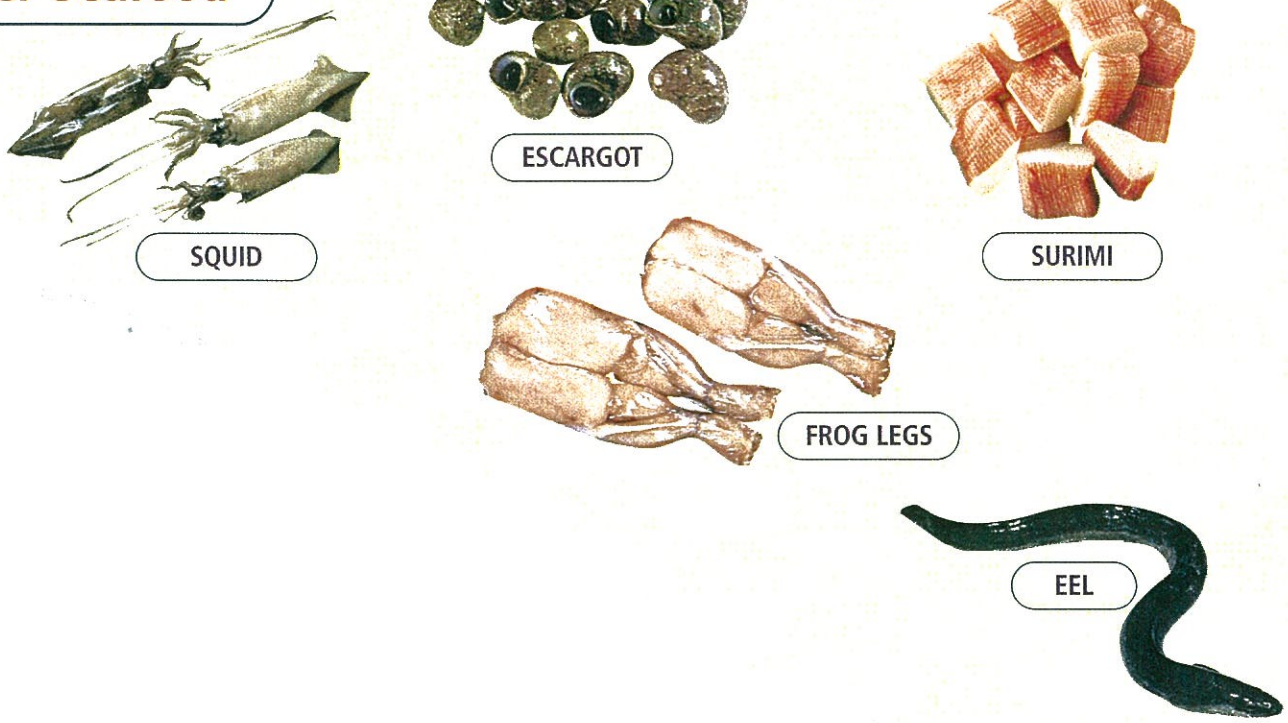
Frog legs are from frogs that are farm raised. Frog legs are only sold in pairs. Foodservice operations use only the rear legs. They can be served poached with a sauce, deep-fried, or sautéed.

Escargot

Imported from France, where they are called **escargot** (ess-kahr-go), snails are generally served as appetizers in the shell, with a garlic butter. It takes about 32 snails to make a pound of meat. Commercial farming of snails in the United States is becoming more popular, since fresh snails taste better than canned snails.

Fig. 22-14.

Other Seafood



Surimi

Surimi (soo-REE-mee) is a combination of different kinds of white fish and flavoring, formed into different shapes. Crab and lobster are two popular forms. To make these imitations seem more real, color is added. Surimi is a widely used substitute for lobster and crab in North America due to its lower cost.

Eel

Eels are long, thin fish with a sweet, mild flavor. They are very popular in Europe and in some ethnic communities in the United States. They are sold fresh, smoked, and pickled.

SECTION 22-2 Knowledge Check

1. Explain Type 1 inspection and the grading procedures for fish and shellfish.
2. Compare mollusks and crustaceans. How are they different?
3. Explain how live oysters, clams, and mussels are stored.

MINI LAB

Working in teams, prepare different forms of shellfish to serve as appetizers. For example, one team might peel, devein, and cook shrimp. Another team could prepare oysters or clams. Be sure to follow safety and sanitation guidelines.