



# Squid Dissection Workshop

In order to preserve them overnight, the squid can be frozen and thawed the next morning. Frozen squid can easily be obtained at Chinese markets and from local supermarkets, often in the frozen food section. If obtaining them from the local supermarket and/or if the package is marked "Calamari" make sure that they are whole squid and not just "tubes and tentacles."

On the day of the workshop, organize the dissection tools for each group. Set up the cooking corner. Crack the eggs into a bowl and stir. Pour the seasoned flour mixture into the plate.

## Workshop:

### Introduction

Organize the students into groups of 2 or 3.

Who has ever heard of a squid? What do you know about squid? Take answers from the students.

Hand out the squid diagrams.

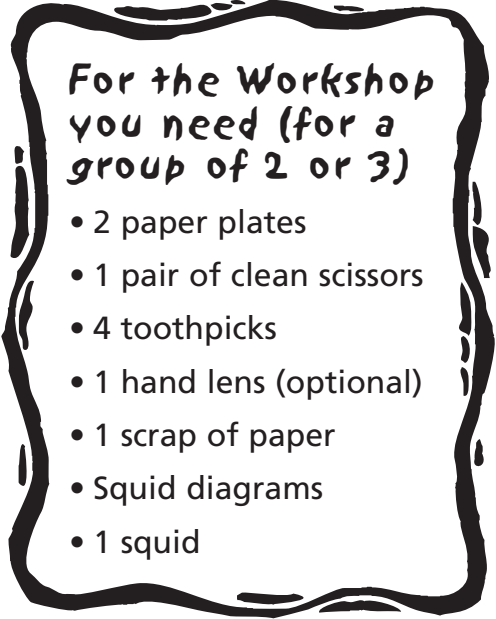
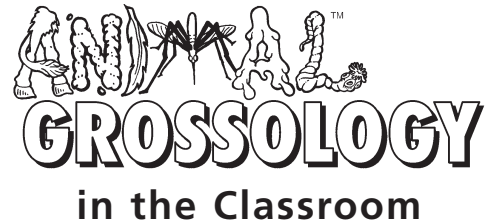
Everybody needs clean hands for this because we are going to eat the squid at the end of the class!

As the students wash their hands, place the dissecting materials on the tables.

### External anatomy:

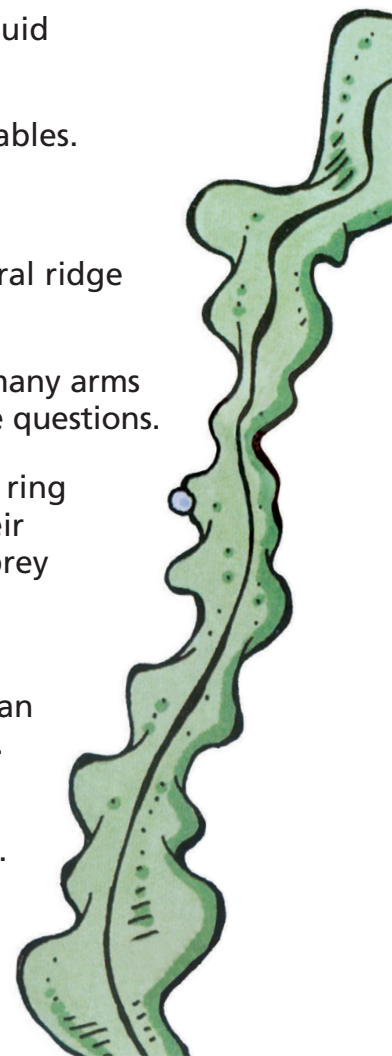
Place the squid right side up on the plate. You should have the mid-ventral ridge facing you with the tentacles at the top.

1. Arms and tentacles. Are they the same size? Do they look alike? How many arms are there? How many tentacles are there? Take answers for each of the questions.
2. Look at the suckers with the hand lens. Notice all the small teeth in a ring around the suckers. They are used to hold the prey. Squid capture their prey with the tentacles and bring it to the arms to be held until the prey stops struggling.
3. Look inside the circle of the arms and tentacles. The small black dot is the beak. Use a toothpick to push the tissue back from around it. Can you see the 2 halves? It looks like a parrot beak, and is very powerful. It is used to tear pieces from the prey.
4. The eyes are much like our own, but the lens is shaped like a football. What is the shape of our eyes? Squid can tell the difference between light and dark, blue and yellow.

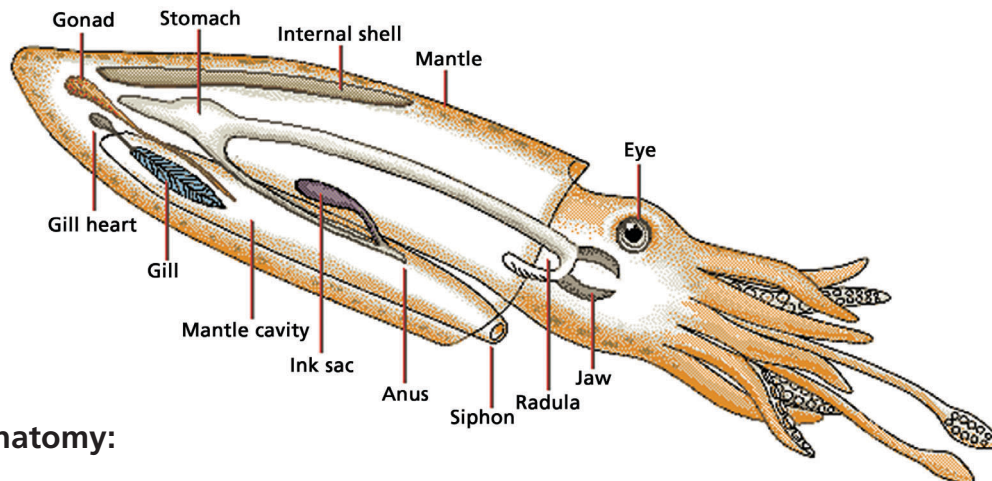
A blackboard with a thick black border and a small eraser at the top. It contains text about workshop materials.

### For the Workshop you need (for a group of 2 or 3)

- 2 paper plates
- 1 pair of clean scissors
- 4 toothpicks
- 1 hand lens (optional)
- 1 scrap of paper
- Squid diagrams
- 1 squid



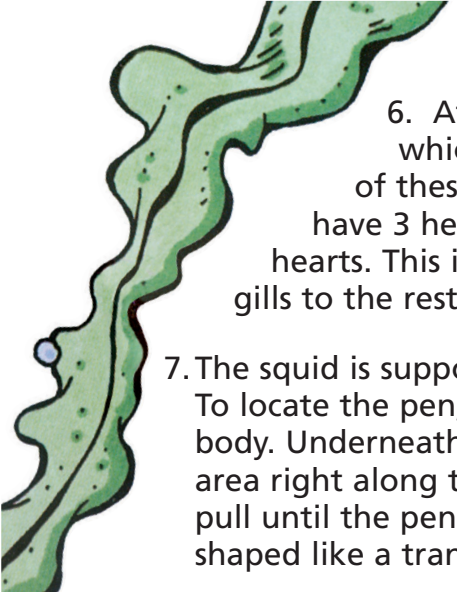
5. The main part of the body containing all the organs is called the mantle. It is the pocket of skin that covers the body. The mantle is covered in pigment cells called chromatophores. Squids can change color rapidly and they use this to camouflage themselves, to attract mates, and to communicate with each other.
6. The squid has two fins on the mantle near the pointed end of its body. The fins are used as stabilizers and to propel the squid.
7. The siphon is a short tube with one opening on the head between the eyes and the other end just under the mantle collar. The siphon propels the squid through the water in the opposite direction to which the siphon is pointing, much like jet propulsion. To use this jet propulsion, the squid takes in water through the large opening and then closes off the opening. The only way the water can escape is through the smaller siphon. The mantle muscles contract and the water comes out with enough force to propel the squid through the water at about 20 miles per hour!



### Internal Anatomy:

Make sure your squid is placed back on the plate with the mid-ventral ridge side up. We are now going to look inside.

1. Cut open the mantle of the squid directly down the midline starting at the mantle opening near the siphon and continuing down the length of the body to the tip. Spread back the sides of the mantle to expose the internal organs. Be sure to lift up with the scissors when cutting so as not to cut into the internal organs of the squid.
3. The yellowish liver is a long organ in the center of the body that runs up toward the head. The liver provides digestive enzymes.
4. The ink sac is located on the rectum and looks much like a small silver fish or thin black line depending on how full the sac is. Very carefully, snip the sac at both ends and place it on the plate next to your squid. After the ink sack is removed, dip the tip of a toothpick into the ink sac and try writing your name on the scrap paper. The ink is the pigment which artists call sepia ink. Squids squirt ink from the sac to protect themselves from attackers.
5. The gills are 2 white, feathery structures found within the mantle cavity. What is the purpose of the gills?



6. At the base of each gill is a branchial heart (also called the gill heart) which pumps blood from the body up to the gills to be oxygenated. Each of these hearts is quite small and slightly yellowish in color. Squid actually have 3 hearts! The third heart is larger and located between the two branchial hearts. This is called the systemic heart and pumps oxygenated blood from the gills to the rest of the body.

7. The squid is supported by a structure called a pen. This structure is the remnant shell. To locate the pen, lift up the head and place it down over the top of the organs of the body. Underneath where the head was lying on the plate, you will now notice a pointed area right along the midline of the body. This is the tip of the pen. Grasp this tip and pull until the pen comes free of the mantle. The pen is as long as the mantle and is shaped like a transparent feather.

### Now to prepare the squid for eating:

1. Remove the fins by grasping the mantle in one hand and the fins in the other and pulling to remove the fins.
2. The arms and tentacles are eaten. Cut them off the mouth and eye area, keeping all of the tentacle and arms joined in one large ring. Place the arms and tentacles onto your clean plate.
3. Grasp the squid's head in one hand and pull it down over the body toward the pointed end. This should pull most of the internal organs off in one piece. Remove the gills separately.
4. Now turn the mantle over and peel off all the colored skin. You should be left with cleaned white mantle. Place the cleaned mantle onto your plate with the arms and tentacles. Cut the mantle into strips, starting from the bottom of the mantle to the tip.
5. Discard all the internal organs.
6. Take the cleaned squid on the clean paper plate over to "cooking corner."

### Cooking Corner

1. Coat the squid strips and the tentacles with egg, and then roll them in the seasoned flour mix.
2. Preheat the pan with a tablespoon of oil
3. Add the seasoned squid and stir for about 1 minute or until the meat begins to curl
4. Remove from the oil and place onto paper towels
5. Garnish with lemon or cocktail sauce if desired

You may need to add more oil depending upon the amount of squid to be cooked.

### For the Cooking Corner you need

- Electric wok or hotplate and frying pan
- Spatula
- Knife
- 3 eggs
- 5 tablespoons olive oil
- 3 cups seasoned flour (such as Dixie Fry) or mix 1 cup of flour + 2 cups breadcrumbs + 1 teaspoon pepper
- 1 lemon or cocktail sauce (optional)
- Bowl
- Plate
- Paper towels



# Squid Diagram

