

Squid Dissection Guide

Observe • Identify • Explain

A squid's body is built for an active life in the sea. Follow the external structures first, then open the mantle to explore the organs that power movement, feeding, and gas exchange.



Use with the Mr. E Science squid dissection video and your separate squid pre-lab and write-up.

Meet the squid

Classification

Kingdom Animalia • Phylum Mollusca • Class Cephalopoda. Squid are mollusks with a prominent head, muscular arms, and an internal supporting shell called the pen.

Habitat and native range

Squid live in marine waters worldwide, from coastal habitats to the open ocean. Species differ in range, size, and depth. The species of this preserved specimen has not been confirmed, so do not assign it a species name or a specific native range without its supplier label.

An active predator

The squid is described as a decapod. The Greek roots “deca” and “pod” refer to “ten” and “foot.” It has eight arms and two tentacles rather than ten legs. Two long tentacles seize prey and bring it toward the eight arms. The arms hold food near the mouth, where a hard beak cuts it into smaller pieces. Squid are predators and eat animals such as small fish and crustaceans and are themselves prey (food) for many marine predators.

Movement and defense

Mantle muscles move water through the mantle cavity and out the funnel for jet propulsion. Fins help control directional movement. Pigment cells called chromatophores change the animal’s appearance in life, and ink can help it escape a predator.

Look for evidence

How do a streamlined mantle, large eyes, grasping appendages, and a beak fit the squid’s way of life? Preserved specimens may have faded colors, broken appendages, or collapsed organs.

Prepare for the dissection

Materials

Preserved squid; dissecting tray; scissors; scalpel; blunt probe; 10–15 pins; gloves; eye protection; colored pencils; paper towels; Use only the tools and specimen provided.

Before you begin

Read this guide and complete the squid pre-lab. Watch the Mr. E Science squid dissection video. Review what type of drawing and labels will be required in the write-up so you know what to locate before cutting.

Work safely

Follow the teacher's directions and proceed through each step of the dissection. Wear gloves and eye protection; keep your hands away from your face. Never taste tissue or bring food or drinks to the work area. Report splashes, cuts, or damaged equipment immediately.

Handle tools carefully

Use shallow cuts with the scissor tips lifted away from organs. Keep fingers away from the cutting path. Use a blunt probe to separate tissue. Point pins away from hands and use the pin shaft to hold down the mantle as you open the specimen. Account for every pin during cleanup. Do not force the sharp beak out toward your fingers.

Keep the specimen useful

Identify structures before removing them. Ask before cutting into the eye or head. Place removed pieces in the tray so they can be examined and disposed of together.

1 • External Examination

Video: 0:00–6:32. Use the facing diagram before making any incision.

Orient the animal

Identify anatomical directions dorsal, ventral, anterior and posterior. The **external landmark** is **funnel**; it is **ventral** on the squid. Place the funnel side up. The fin-bearing tip is **posterior**; the mouth and arm crown are **anterior**. The **dorsal** surface is side opposite the funnel and is usually the darker side on the preserved specimen.

Find the three regions

Identify the **trunk**, **neck**, and **head**. The muscular **mantle** surrounds the trunk. Find its open edge, the mantle collar, above the head. Locate the **fins** near the posterior end and the **funnel** between the mantle opening and the head.

Compare the appendages

Count eight **arms** and two longer **tentacles** when the specimen is intact. Suckers extend along the entire arm; whereas on the tentacles they are concentrated on the expanded clubs/tips. Examine a **sucker** with the probe without tearing it away. The sucker consists of the sucker itself along with a ring of “teeth” and the stalk. Octopus and squid have individual control of each of these suckers.

Examine the head

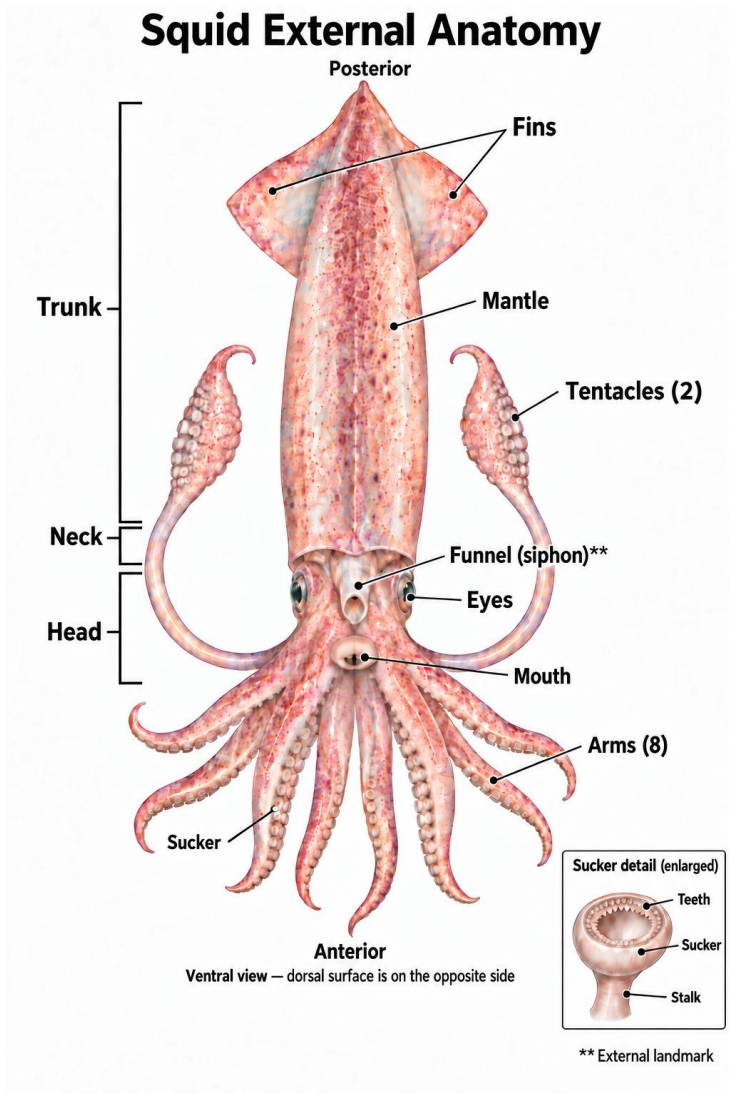
Locate the **eyes** and the **mouth** at the center of the arm crown. The **beak** lies inside the muscular **buccal mass**. Do not remove the beak until later in the examination. An eye or lens examination is optional and requires teacher direction.

Record your observations

Begin the external drawing in the write-up. Label what you can actually locate. Explain any missing or damaged structures beside the drawing rather than inventing them.

External anatomy

POSTERIOR • fin-bearing tip



ANTERIOR • mouth and arm crown

Ventral view: funnel facing you; dorsal surface away. Mr. E Science external squid illustration. The labeled drawing includes an enlarged sucker detail.

2 • Internal Examination

Open the mantle

Video: 6:50–12:40. Use the facing diagram as a map, coloring is not an accurate representation; your specimen will look different.

Make a shallow opening

Keep the funnel side up. Lift the **mantle** edge above the **funnel**. Snip through the ventral mantle wall, then continue toward the posterior tip. Keep the lower scissor tip close to the mantle by lifting up and away from the organs.

Reflect and pin

Gently open the two mantle flaps. Use the probe to loosen attachments when needed. On preserved “flattened” specimens you may need to make a scalpel cut along the inside folds of the mantle. Pin the flaps to the tray with the shaft of the pins angled low so they hold mantle tissue down onto the tray. Do not pierce the organs.

Locate these organs

The **internal landmark** is the pair of **gills**. Find the two featherlike gills. Locate the dark **ink sac** and the **esophagus**, a long digestive tube near the midline connecting the mouth and stomach. The esophagus leads posteriorly to the oval-shaped **stomach**. The posterior **gonad** is a granular organ, and the gel-like gastric **cecum** is also posterior to the stomach. Compare position and connections, not color alone.

Follow the circulatory system

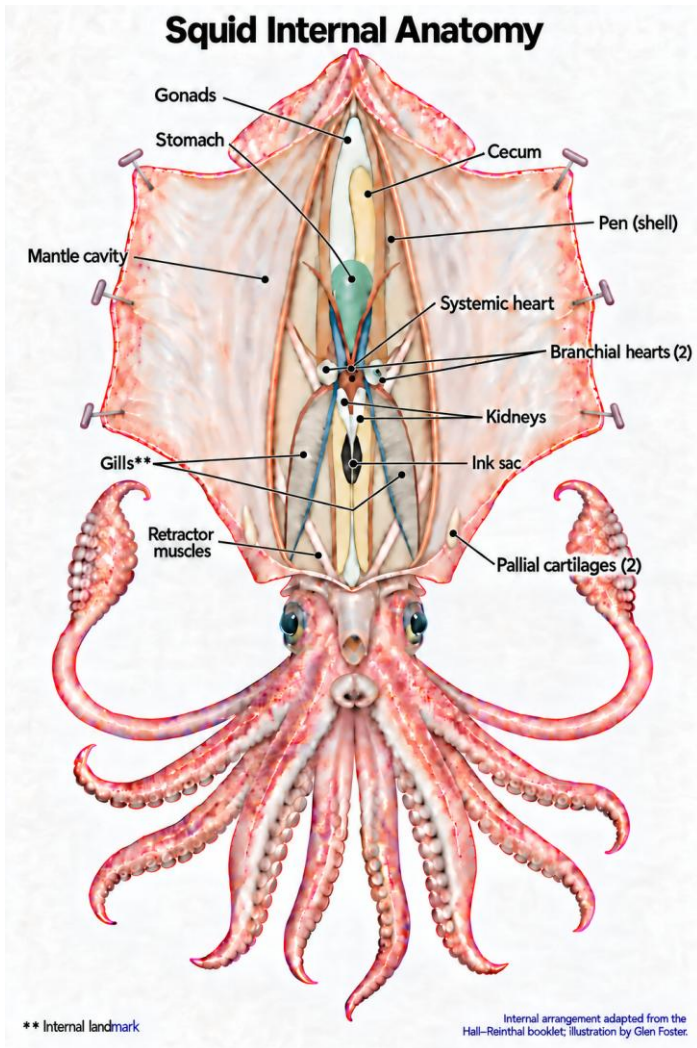
Look for a **branchial heart** at the posterior base of each gill and the **systemic heart** between them. **Kidneys** and fine vessels may be difficult to distinguish. Ask for help before separating fragile tissues.

Examine the pen

After identifying the organs, follow the teacher or video to free the pen from the dorsal mantle. Structurally, it consists of chitin and aids in structural support. Notice its long, thin shape. It supports the body while allowing flexibility. Keep it for your internal drawing.

Internal anatomy

POSTERIOR • fin-bearing tip



ANTERIOR • mouth and arm crown

Opened ventral view. Internal arrangement adapted from the Hall–Reinthal booklet, illustrated by Glen Foster, and incorporated into the Mr. E Science squid drawing. Organ appearance varies among specimens.

3 • Connect organs and functions

Respiration

Water passes over the gills in the mantle cavity. Oxygen moves into the blood and carbon dioxide moves out. A gill's many thin surfaces provide a large surface area for gas exchange.

Circulation

Squid have a closed circulatory system. Two branchial hearts move blood toward and through the gills; a systemic heart sends oxygenated blood to the body. This system supports an active predator.

Digestion

The beak cuts food. The esophagus carries it toward the stomach, where digestion continues. The cecum and digestive gland help process food and nutrients. The intestine continues to digest and absorb nutrients and undigested material passes through and out the anus into the mantle cavity.

Excretion and reproduction

Kidneys remove metabolic wastes from the blood. A gonad produces eggs or sperm. Squid are dioecious; males and females are separate animals. Reproductive organs vary with sex and maturity; identify the gonad by its location and appearance without assuming whether a specimen is male or female.

Defense and support

The ink sac stores ink that can be released into the outflowing water. The pen provides internal support. Mantle muscles and the funnel work together to move water for propulsion.

4 • Mouth, beak and head

Video: 12:41–16:20. Complete the required beak drawing; additional head work is teacher-directed.

Locate the buccal mass

Find the mouth at the center of the arm cluster/crown. The buccal mass is the muscular structure surrounding the beak. The esophagus extends from this feeding region toward the stomach.

Expose the beak

After the teacher approves, carefully separate the buccal mass from the surrounding tissue with a blunt probe. Keep the specimen supported in the tray and keep your fingers clear of the beak. Use a scalpel to free the upper and lower beak parts from the muscular buccal mass without breaking their tips.

Draw and label

Draw the beak structure in the write-up's beak area. Label the upper and lower portions. Observe their shape and how they fit together. Finish the external and internal drawings with colored pencils and clear label lines.

Optional: stomach, eye and nervous system

With teacher direction, use scissors to open the stomach revealing the squid's "last meal". You may find pieces of undigested fish, crab parts or entire sardines! Examine an eye by snipping a small hole in the eyeball with scissors then using a blunt probe to remove the spherical lens. A preserved lens will be cloudy. The video also exposes head cartilage, the brain region, and an optic nerve. These observations are optional; they are not additional required labels in the existing write-up.

Check your evidence

Use your specimen as the main record of what you observed. If a structure cannot be confidently identified, note that limitation and ask for assistance.

Finish and self-check

Cleanup

Place all squid tissue in the teacher's designated disposal bag. Remove and count the pins, then return them to their container. Rinse the scissors, probe, and tray as directed and dry them with paper towels. Clean the work area, remove gloves, and wash your hands with soap and water.

Before turning in the write-up

Check your name, period, and date. Confirm that the external drawing, internal drawing, and beak drawing are complete and labeled thoroughly. Use readable labels, colored pencils, and the guide's directional convention.

Guide self-check

1. Which end is posterior, and which side is ventral?
2. How can you distinguish an arm from a tentacle?
3. Why should you lift the mantle while cutting?
4. How do the three hearts divide the work of circulation?
5. How do the mantle and funnel work together?
6. What is the pen, and what does it do?

Try these questions before checking the answers on the next page.

Sources and booklet notes

Primary classroom resources

Mr. E Science corrected squid dissection video and its supplied transcript (September 13, 2026 direction correction). Times in this guide are approximate.

David H. Hall and Peter Reinthal, squid dissection booklet, RANACO, 1998; illustrations by Glen Foster. Supplied file: guide_squid(2).pdf. The external squid illustration was created for Mr. E Science. The internal illustration combines that body design with an organ arrangement adapted from the supplied Hall–Reinthal booklet. Labels and dissection details were reviewed and revised for this guide.

Mr. E Science, supplied Squid Dissection Write-up. Its established observation and drawing tasks guide this sequence.

Using this booklet

Print the 12-page PDF in booklet mode on letter-size paper. Keep pages 4–5 and 6–7 as facing spreads. Organ size, sex, preservation, and prior damage affect what can be seen. Ask your teacher about uncertain structures.

Guide self-check answers

1. The fin-bearing tip is posterior. The funnel side is ventral.
2. Arms have suckers along their length. The two longer tentacles have suckers concentrated on their clubs.
3. Lifting the mantle keeps the scissor tips away from delicate organs and helps preserve the structures you need to identify.
4. Two branchial hearts move blood toward the gills. The systemic heart pumps oxygenated blood to the body.
5. Mantle contractions drive water out through the funnel. Directing the funnel helps control movement.
6. The pen is a reduced internal shell made largely of chitin. It supports the squid's body.

These answers are for the guide self-check only. Your drawings should show your own specimen observations.