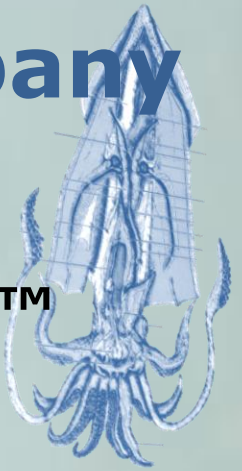


Carolina Biological Supply Company

Carolina's Young Scientist™ Dissections



#carolinaNSTA

CAROLINA®
www.carolina.com

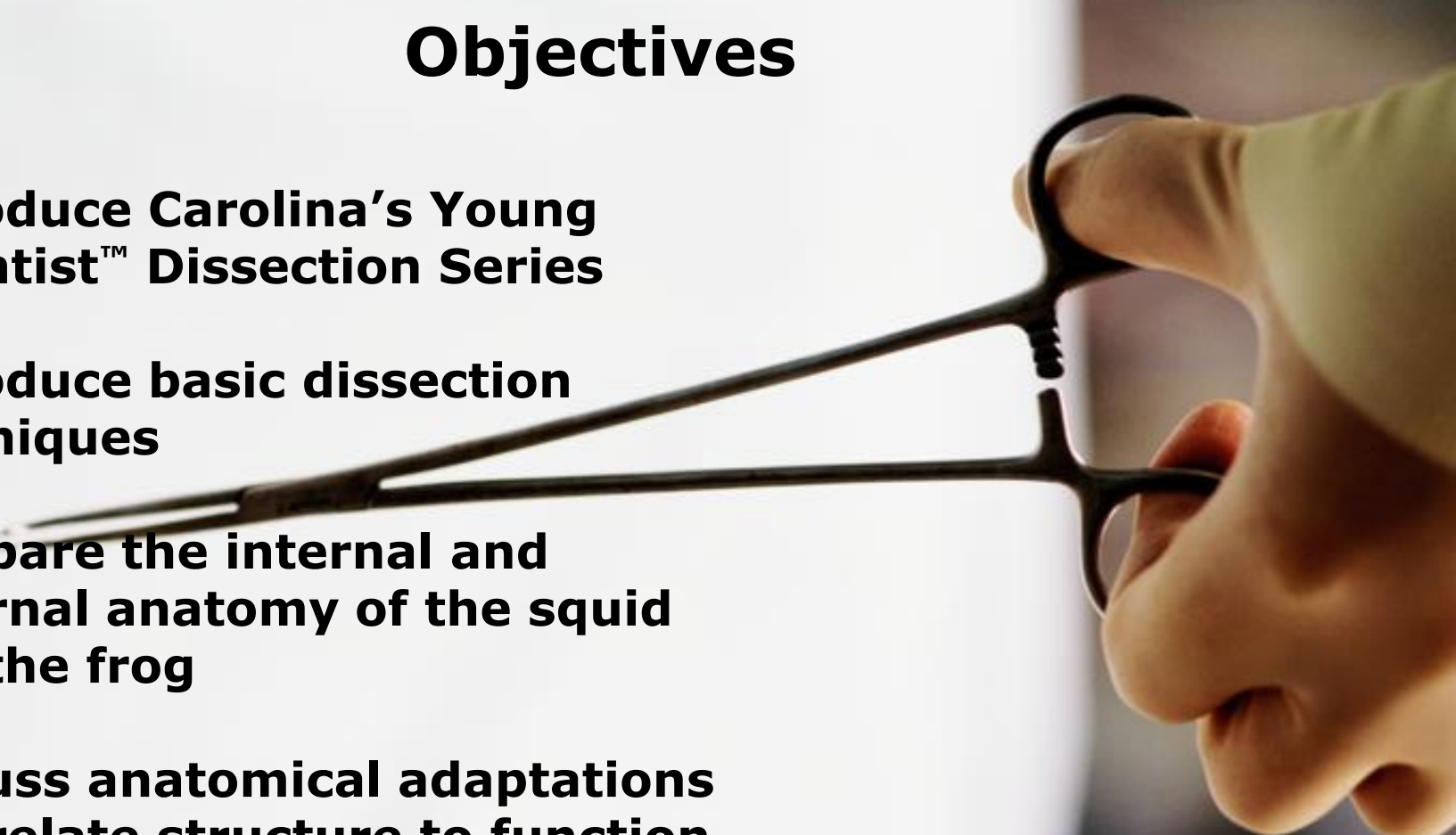
Wear Your Tee and Enter to Win a **FREE** Kit of **YOUR** Choice!



- To be eligible, you **MUST** wear your “Perfect” T-shirt to the Carolina booth.
- Turn in your completed entry form to a staff member from **PRESERVED MATERIALS**.
- One winner will be chosen after the show. (You need not be present to win.)

Objectives

- **Introduce Carolina's Young Scientist™ Dissection Series**
- **Introduce basic dissection techniques**
- **Compare the internal and external anatomy of the squid and the frog**
- **Discuss anatomical adaptations and relate structure to function**
- **Experience the quality of Carolina's Perfect Solution® specimens**



Correlation to Next Generation Science Standards* (NGSS)

Scientific and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Developing and using models</p> <ul style="list-style-type: none">• Develop a model for conducting a dissection on a variety of species.	<p>LS 1: From molecules to organisms: Structures and processes</p> <ul style="list-style-type: none">• The process of a dissection preserves organ and tissue structure for comparison and analysis.	<p>Structure and function</p> <ul style="list-style-type: none">• Examine the structures of different components and their interconnections to reveal a systems function.

*Next Generation Science Standards® is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of, and do not endorse, these products.

Learning Context



- **High School and Middle School Life Science**—Body structure and functions
- **Anatomy and Physiology**—Comparative anatomy structure and function
- **Marine Science/Oceanography**—Comparative anatomy, structure and function
- **Animal Science**—Comparative anatomy structure and function

Carolina's Perfect Solution[®] Specimens

Quality

**Superior
preservation**

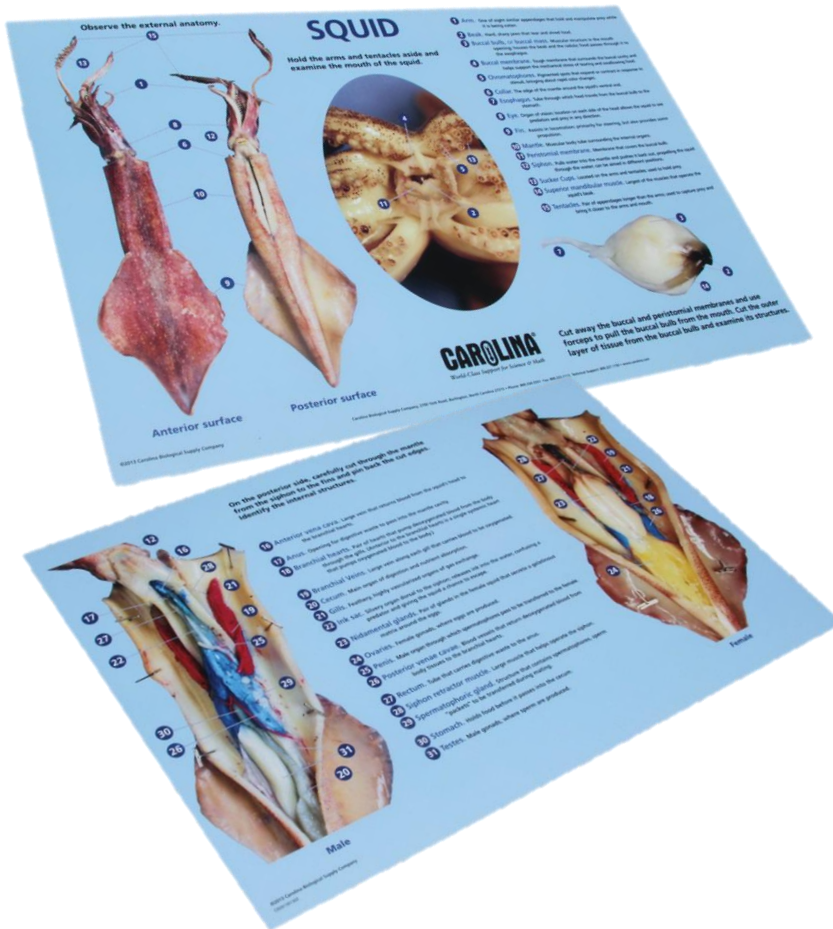
**Superior
tissue color
and texture**

Safety

**No
dangerous
off-gassing**

**No formalin
odor**

Carolina® Dissection Mats



- Clear, concise dissection instructions
- Detailed color photographs
- Labeled internal and external structures with definitions
- Cost-effective
- Reusable—wipe clean

Dissection Preparation Tips

- **Organize your dissection area:**

- Take out your dissection trays
 - Large tray—squid
 - Small tray—frog
- Lay out your instruments
 - Scissors
 - Probe
 - Forceps



- **Use appropriate personal protective equipment:**

- Apron
- Gloves
- Glasses



Safety Issues

- **Personal Protective Equipment**

Gloves, goggles, and lab aprons

- **Dissection Tools**

Be diligent with sharp tools



- **Safety Tip**

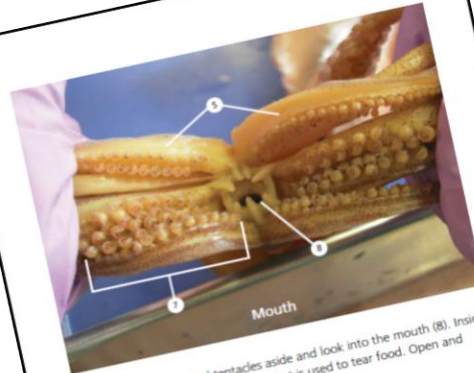
If you are not using an instrument, set it down

Squid Dissection



Young Scientist's Squid Dissection Kit

STUDENT INSTRUCTIONS



8. Move the arms and tentacles aside and look into the mouth (8). Inside the mouth is a two-part beak that is used to tear food. Open and close the beak, and notice how sharp it is.

Mouth

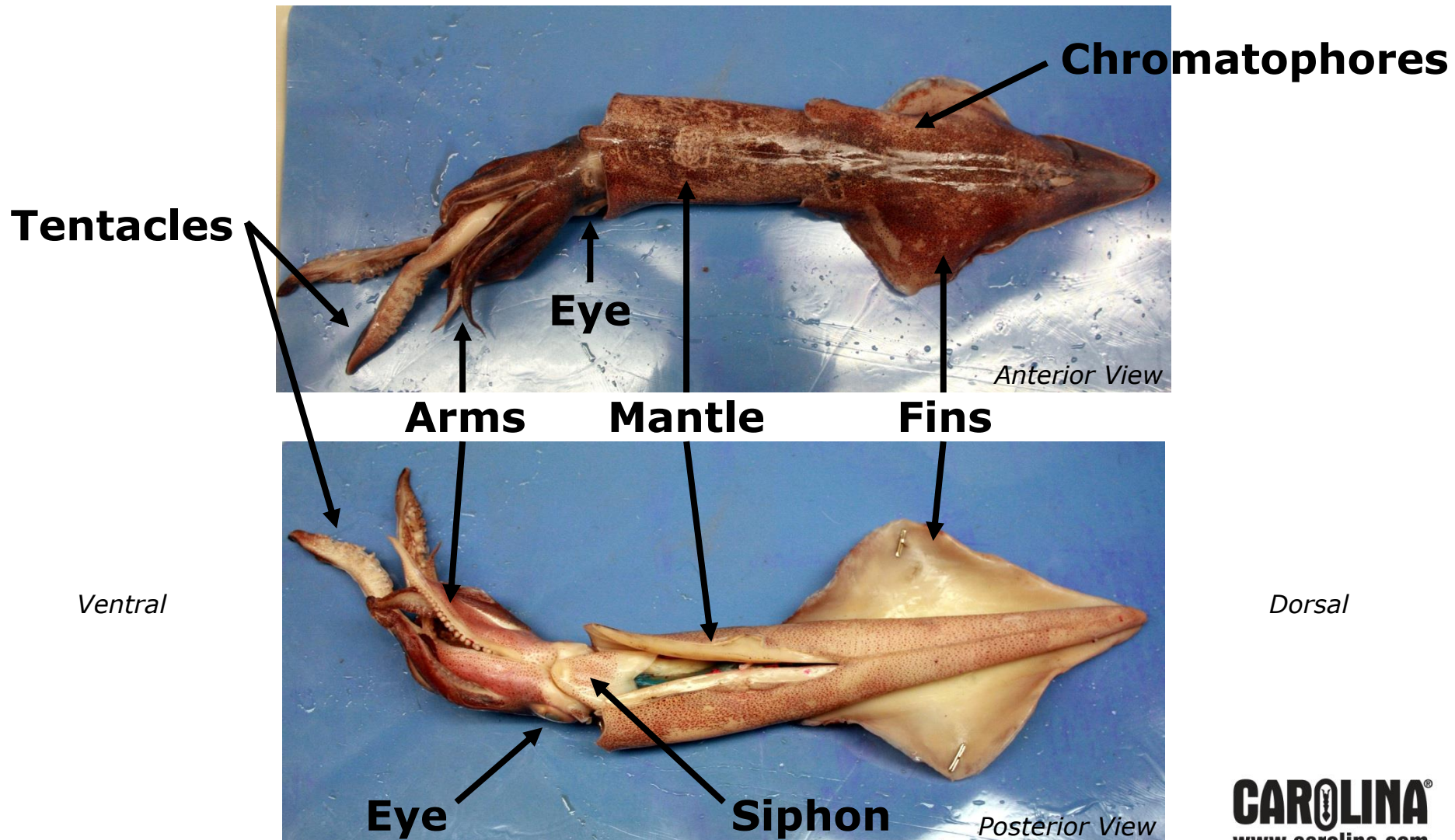
9. In your lab journal, draw a detailed picture of your squid specimen. Title your drawing "External Squid Anatomy." Label the structures that you have observed.

Internal Anatomy

1. Place your forceps inside the squid's mouth. Firmly but carefully pull the muscular buccal mass (9) out through the mouth. The esophagus (10), a long string-like object, may be also be pulled out. After being torn and shredded by the beak, food travels through the buccal mass to the esophagus before moving into the stomach.

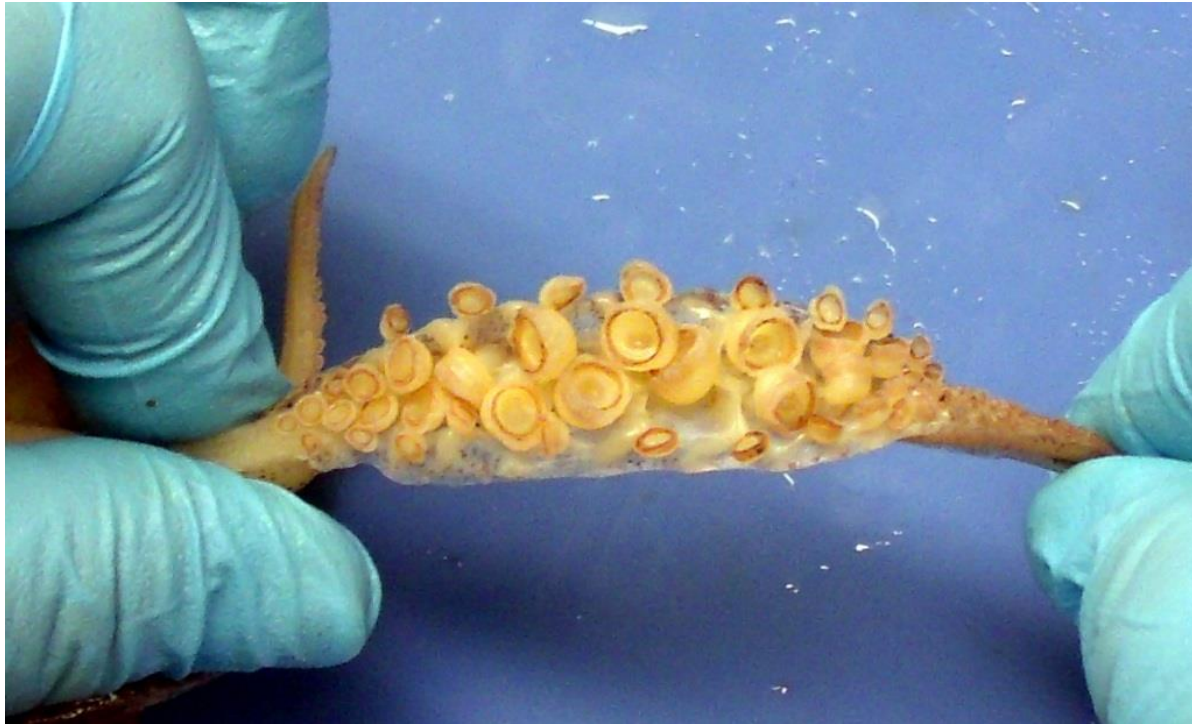
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Squid External Anatomy

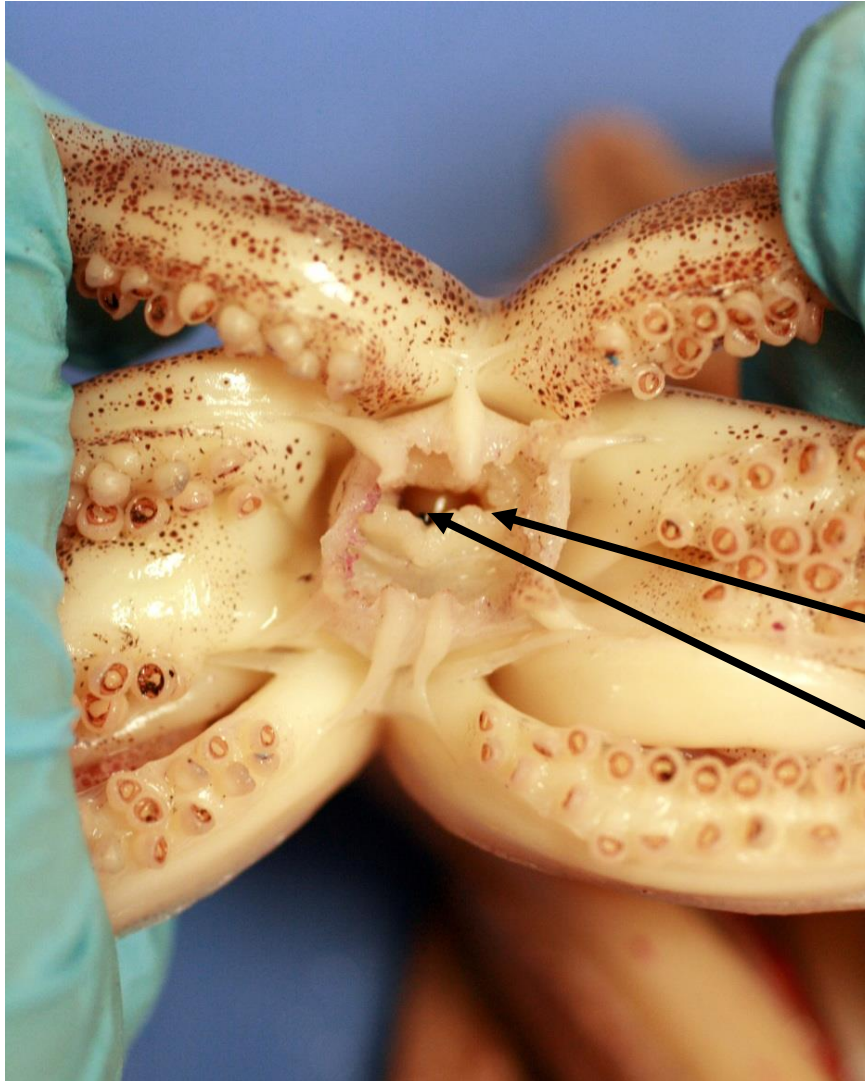


Take a Closer Look!

Sucker Cups



Open Wide!

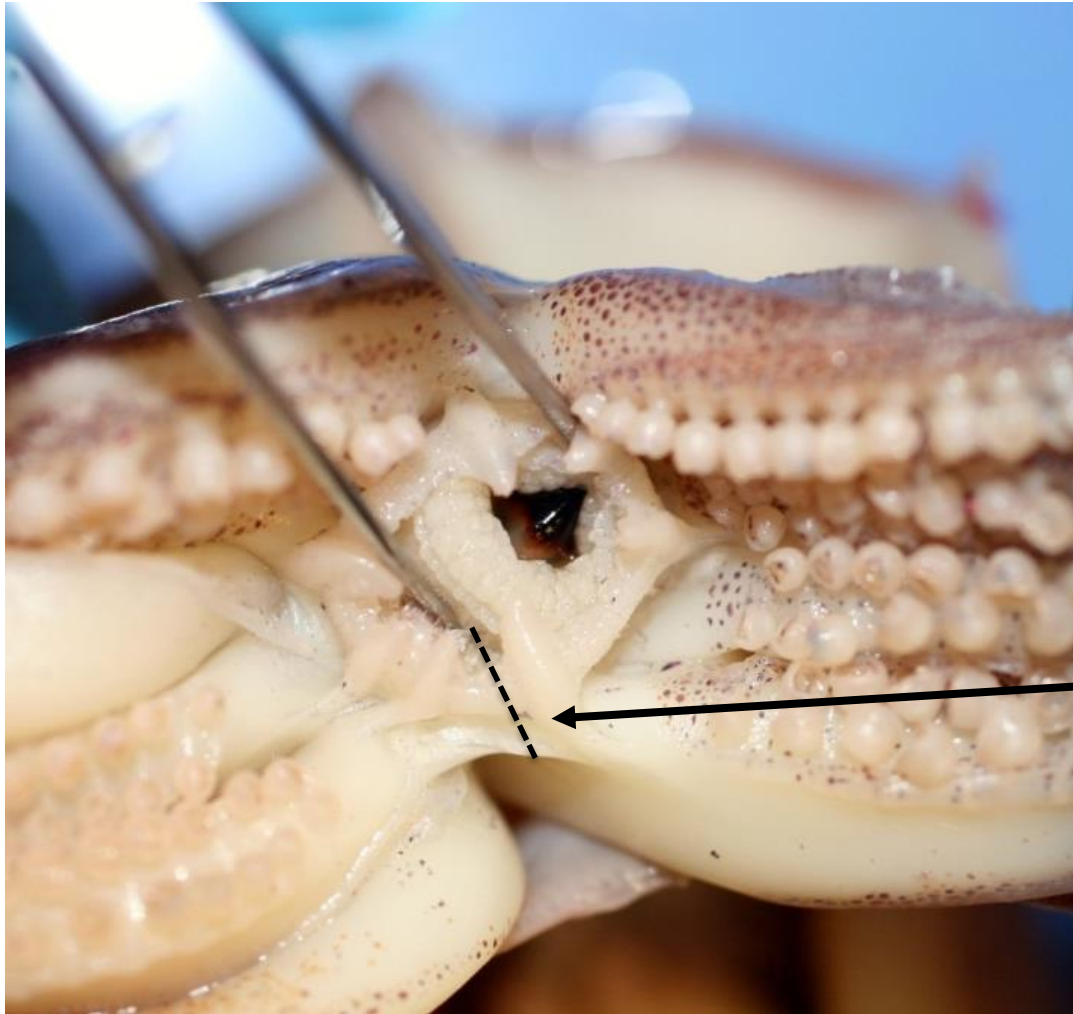


Move arms and tentacles aside and examine the mouth.

Mouth

Beak

Open Wide!



Use forceps to grab the fleshy mass like in the image and gently pull.

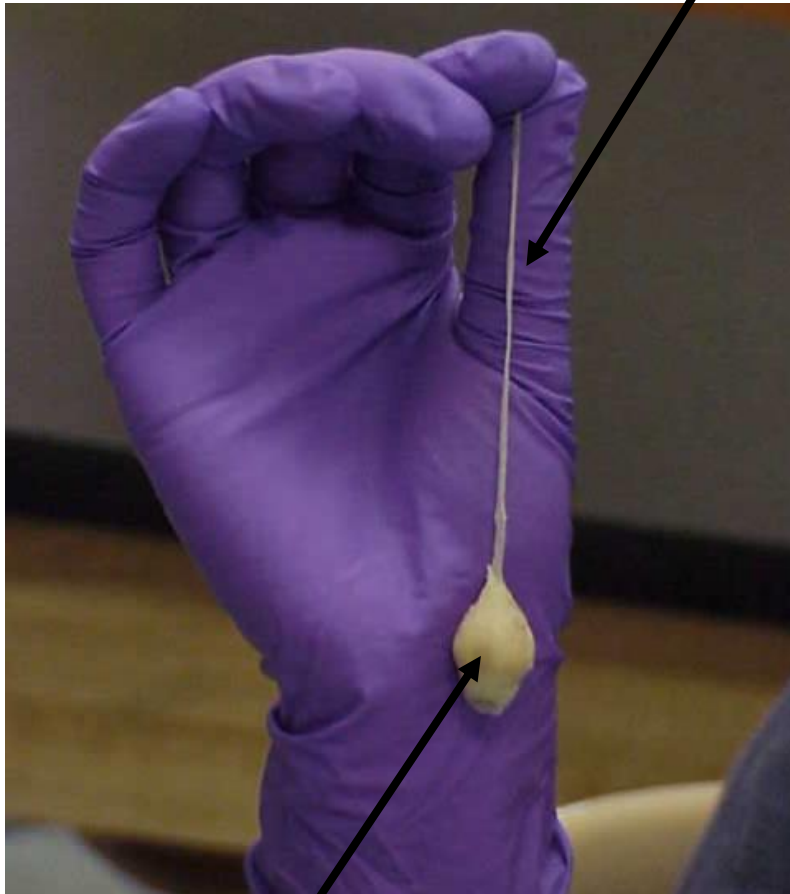
Hint: Don't pull the black structure (beak)—it will break!

OR

Use scissors and make the cut indicated by the dotted line. Then use your fingers to gently pull the fleshy mass.

Open Wide!

Esophagus



Buccal
Mass

Hint: Once you have hold of the buccal mass, pull carefully to remove as much of the esophagus as possible!

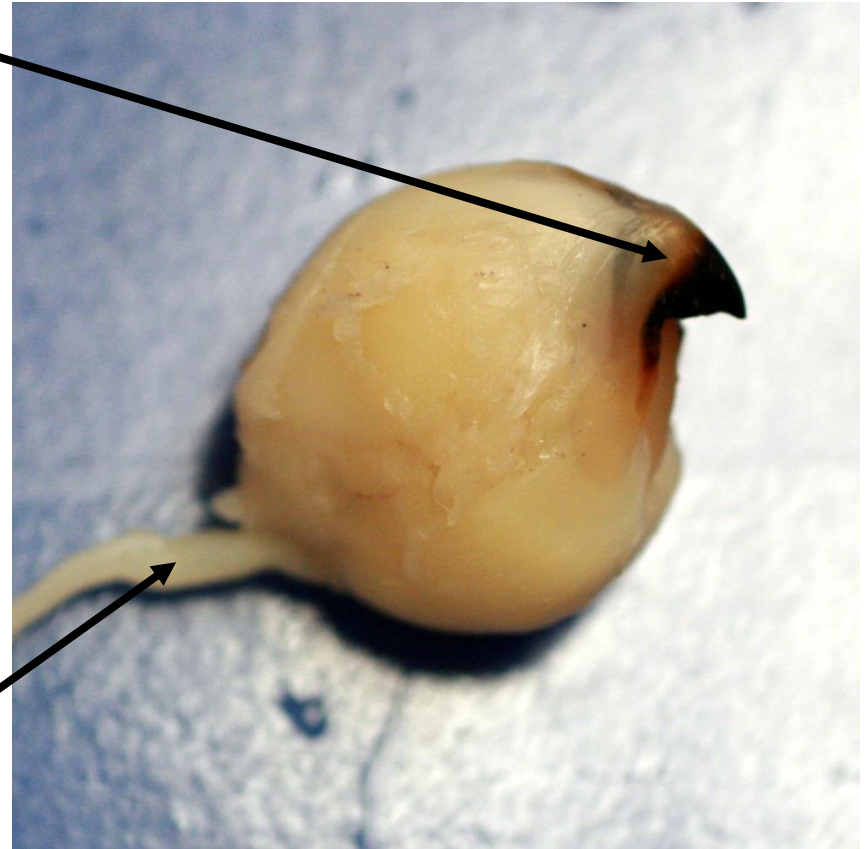
Take a Closer Look!

The Beak

Cut the outer layer of tissue from the buccal mass and examine the squid's beak.

Beak

Esophagus

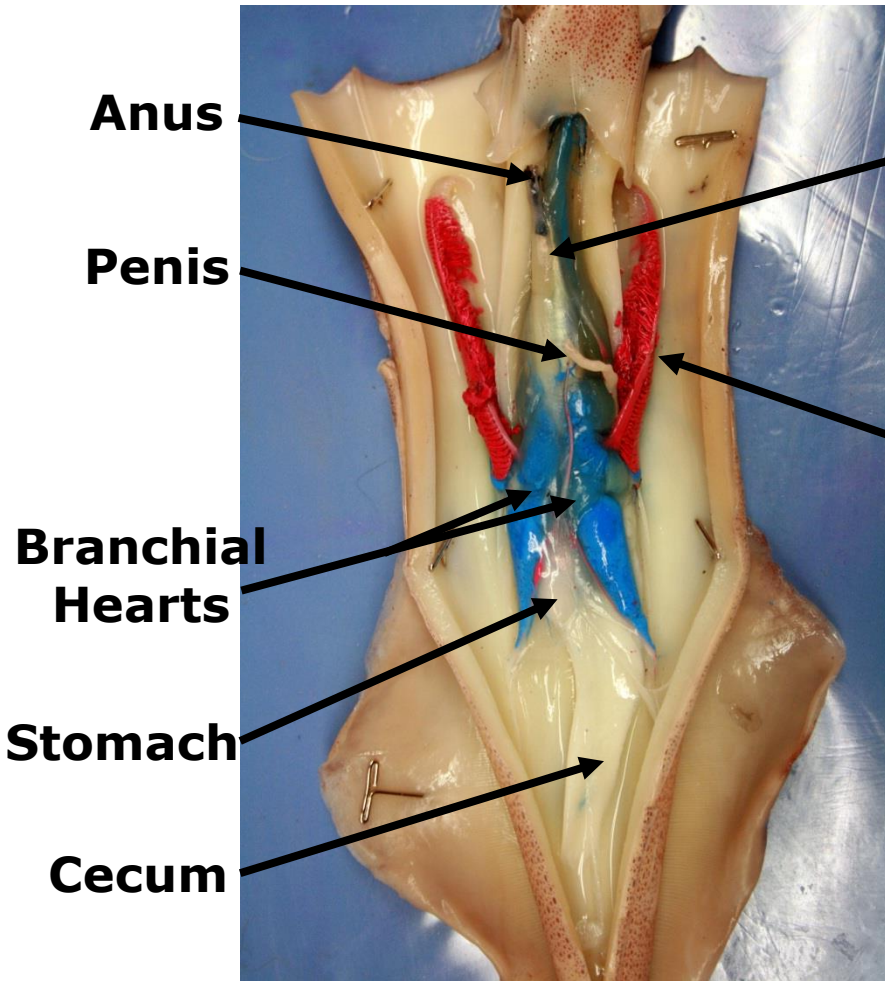


Making the Cut

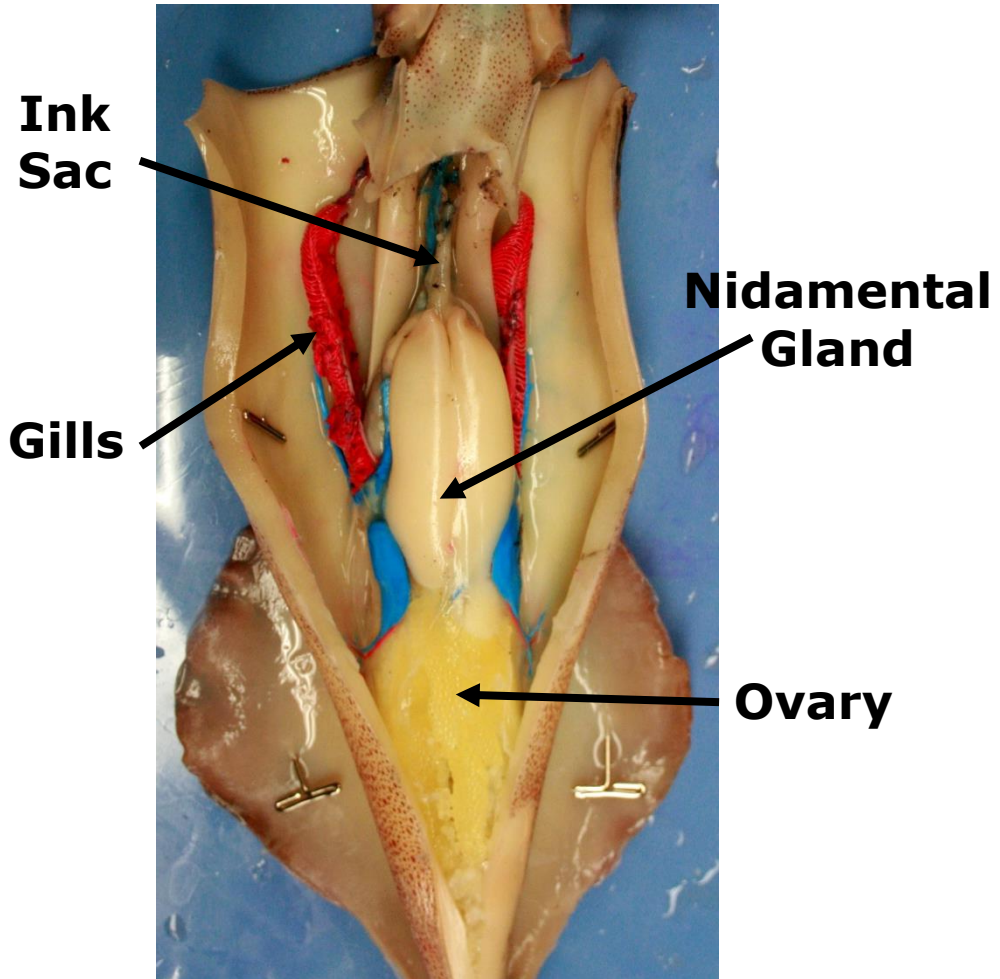


With the ventral side up, cut through the mantle toward the fins.

Internal Anatomy



Male



Female

Removing the "Pen"

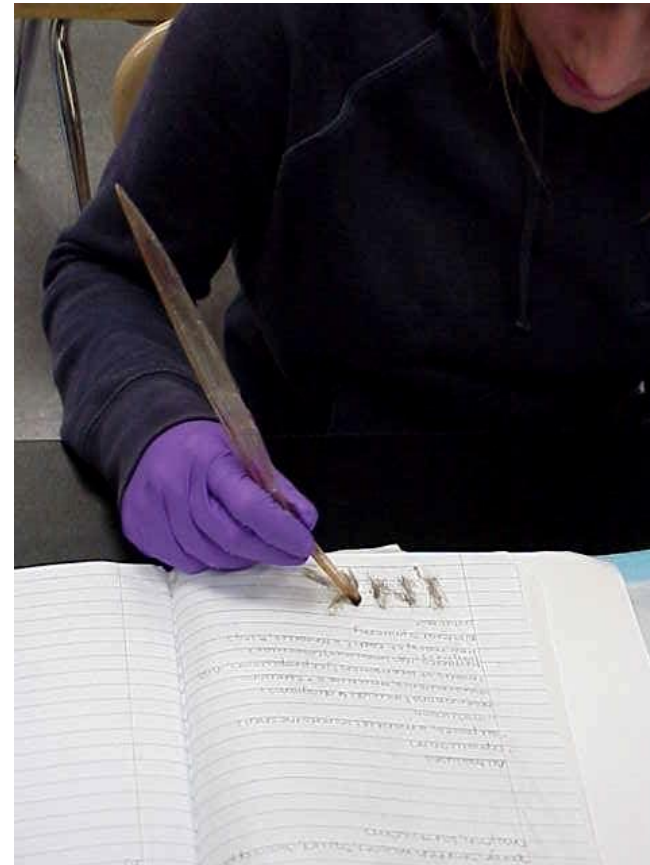


The pen is an internal shell made of chitin.

It is located on the posterior side of the mantle.

Carefully remove the pen.

The Squid Pen and Ink



Frog Dissection



22-1521 Student Instructions

Young Scientist's Frog Dissection Kit

Observing External Anatomy

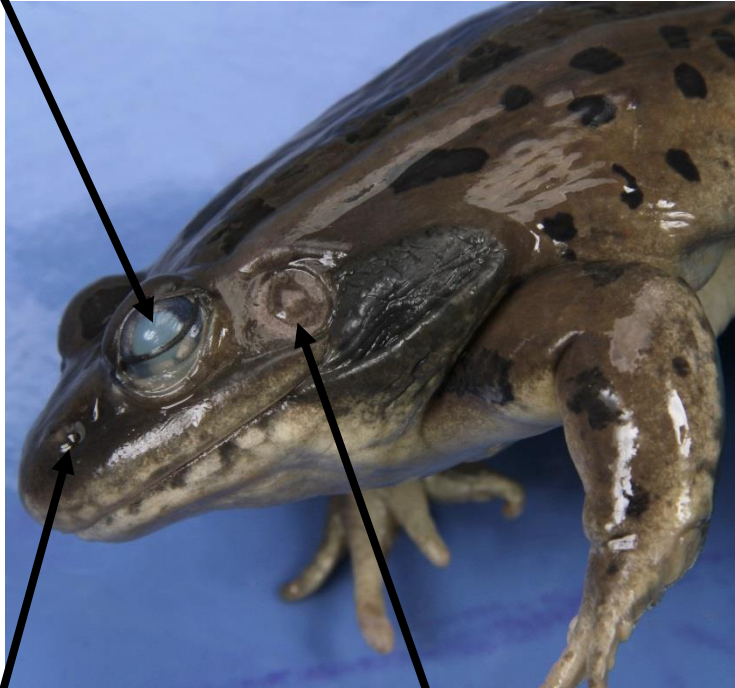
1. To examine your frog, rinse it under running water and place it on the dissecting tray. Place it on its **ventral** surface (its underside), so that you are looking at its **dorsal** surface (its back).
2. Observe the frog's **skin**. How does it feel? Compare the frog's skin with your own skin. What are some differences? Turn the frog over and look at the skin on the ventral surface. Does it look different from the skin on the frog's back? Place the frog dorsal side up again. Can you think how the color of the skin can be helpful to a frog?
3. Observe the nose and eyes of the frog. The nostrils have flaps, which may be visible. Examine the eyes closely. The hand lens might help. Rather than just an upper and lower lid, a frog's eye has a third eyelid that is transparent. See if you can find the third eyelid on the frog (it may look milky on a preserved frog). While swimming underwater, frogs close this transparent lid, enabling them to protect their eyes but still see.
4. Just behind the eyes are large circles, the eardrums or tympanic membranes of the frog. A person also has **tympanic membranes** but ours are inside, in the ear canal.
5. Observe the upper extremities (the "arms") of the frog. Compare the frog's upper extremity with your arm. Both humans and frogs have an upper arm, forearm, and hand as well as the joints—shoulder



Frog External Anatomy

Eye

(with nictitating membrane)



External Nares

Tympanic Membrane



Note coloration differences on the dorsal and ventral surfaces.

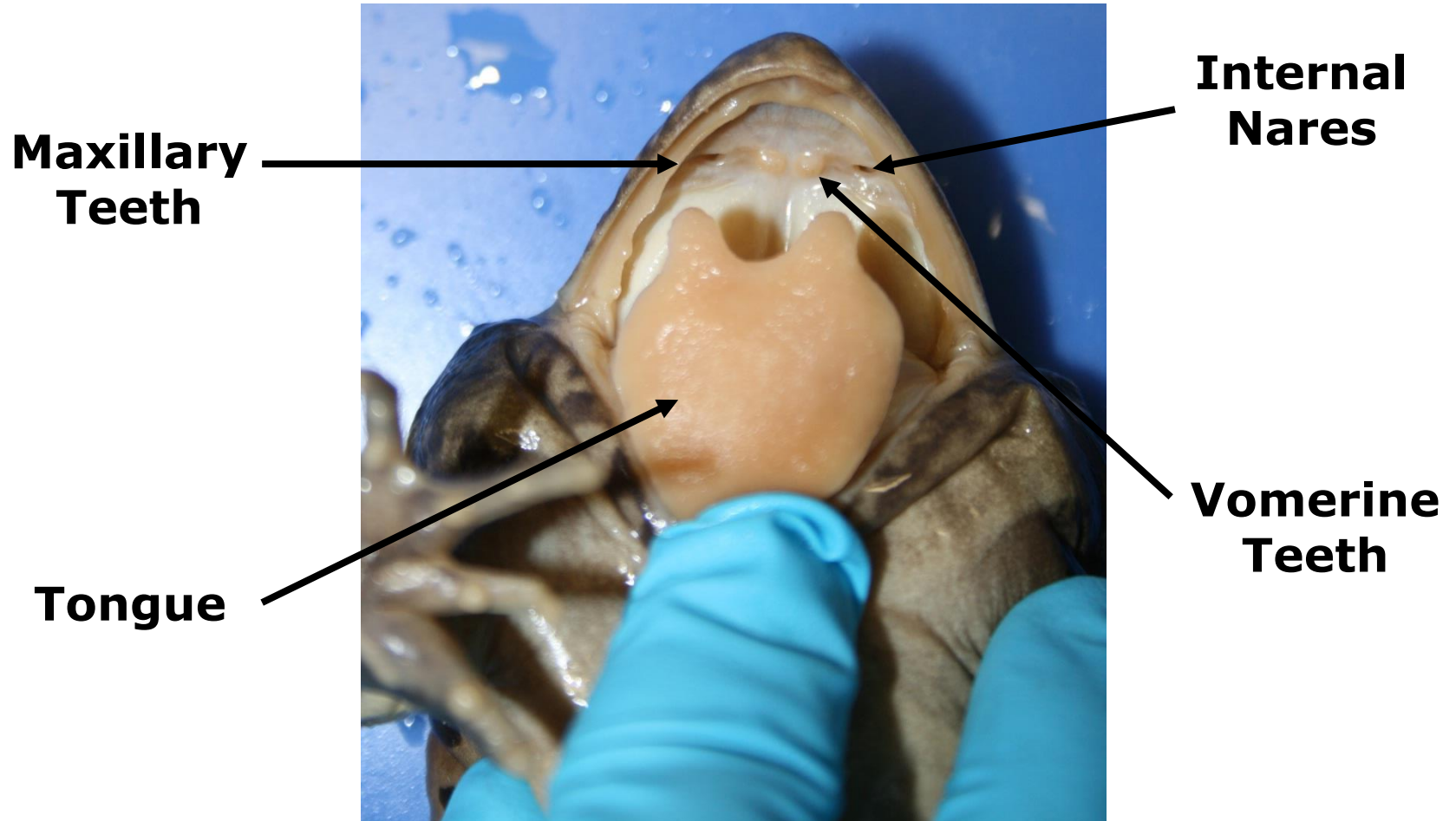
Open Wide!



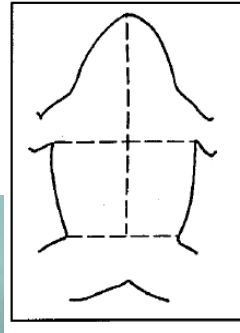
Cut through the jaw joints with your scissors.

Examine the internal structures of the mouth.

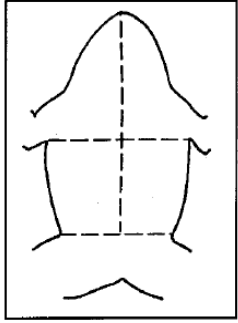
Open Wide!



Love the Skin You're In!



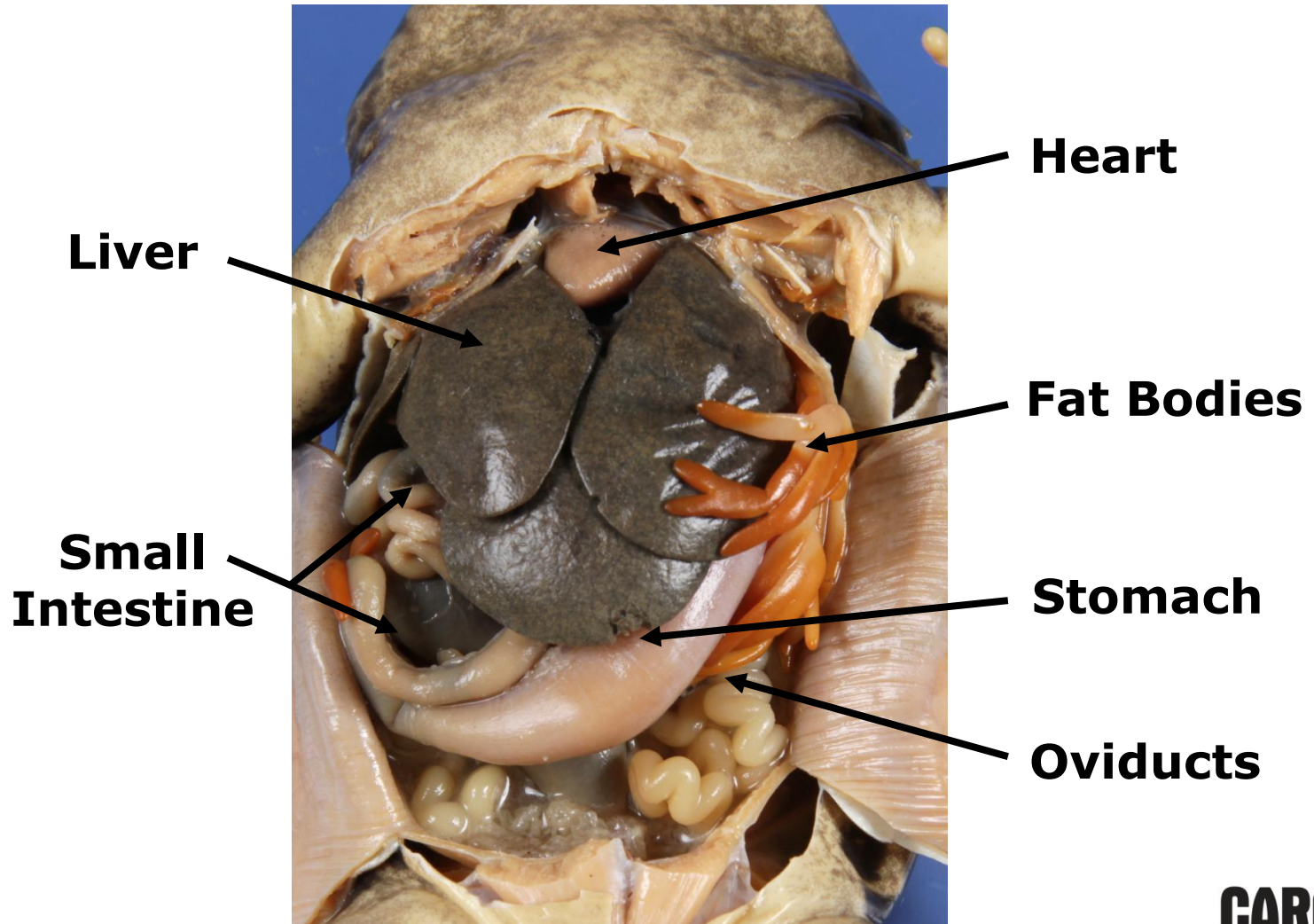
Love the Skin You're In!



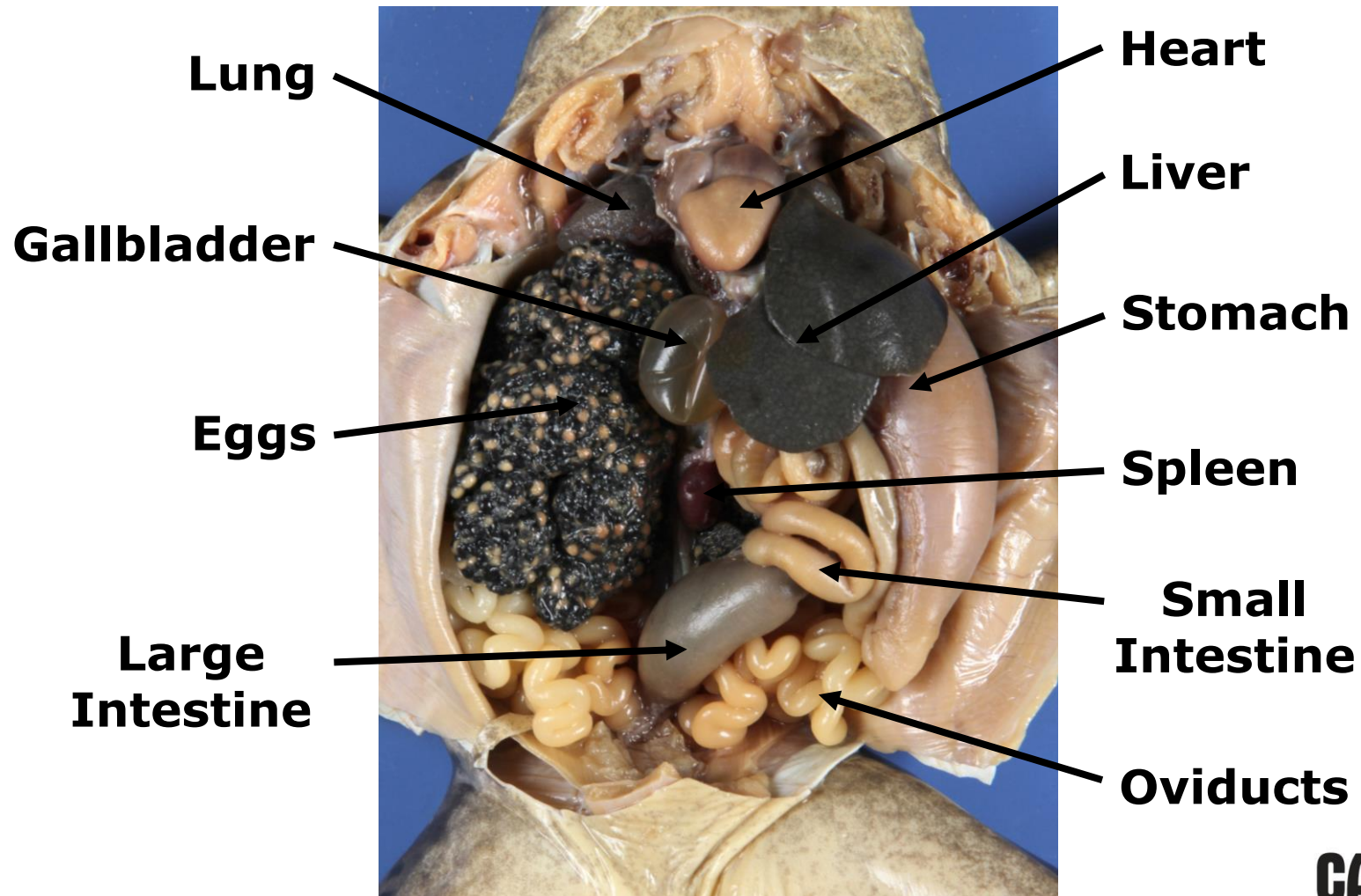
Pull back the flaps of skin.

Make cuts through the muscle using the same pattern.

Internal Anatomy



Internal Anatomy



Same Function, Different Structure

Student Artifact

<i>Function</i>	Squid	Frog
Support	Pen	Vertebral column
Camouflage	Chromatophores	Difference in dorsal and ventral pigmentation
Movement	Jet propulsion by siphon; fins used for steering and stability	Muscular hind legs for jumping and swimming
Catching Prey	Tentacles and arms with sucker cups	Forked, muscular tongue attached at front
Ingestion	Beak and radula with tiny teeth	Tongue attached at front; 2 types of teeth
Circulation	Three 1-chambered hearts (1 systemic, 2 branchial)	One 3-chambered heart

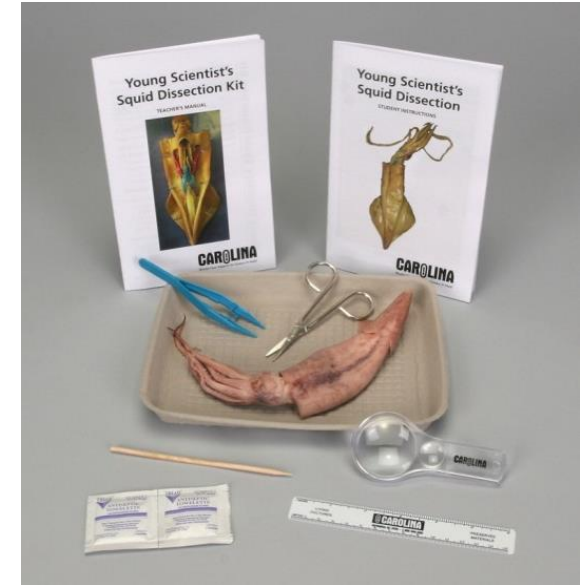
Can you think of more?

Cleanup Instructions

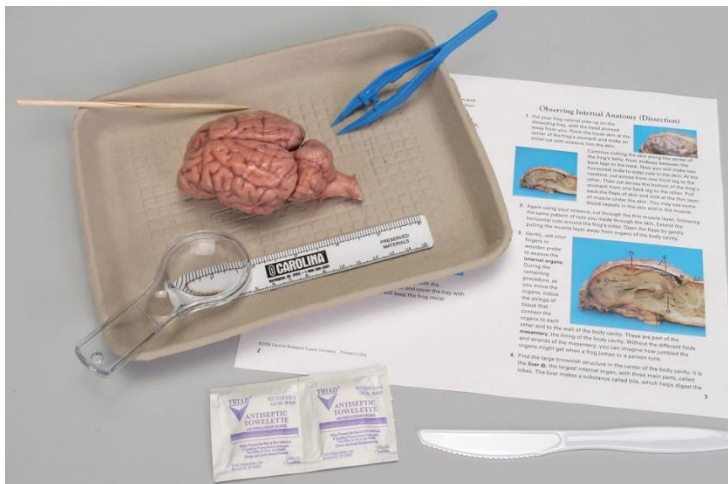
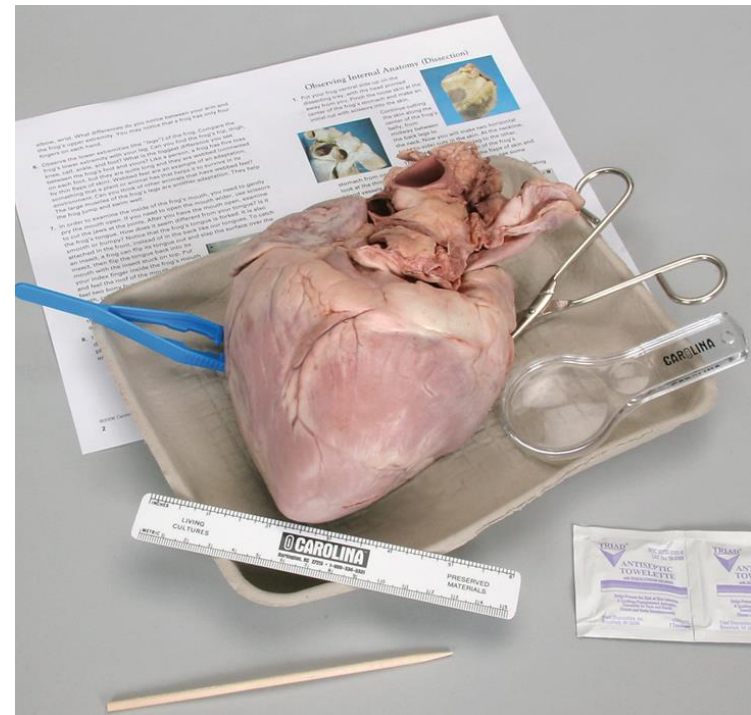
- **KEEP GLOVES ON!**
- **Place ONLY animal waste in buckets.**
- **All other trash goes in trash bags.**
- **Clean tools and wipe off tables.**



Carolina's Young Scientist™ Dissection Kits



Carolina's Young Scientist™ Dissection Kits



We Can Meet Your Dissection Needs



**Top-quality specimens
and supplies**



Carolina Offers Free Resources to Support Teachers

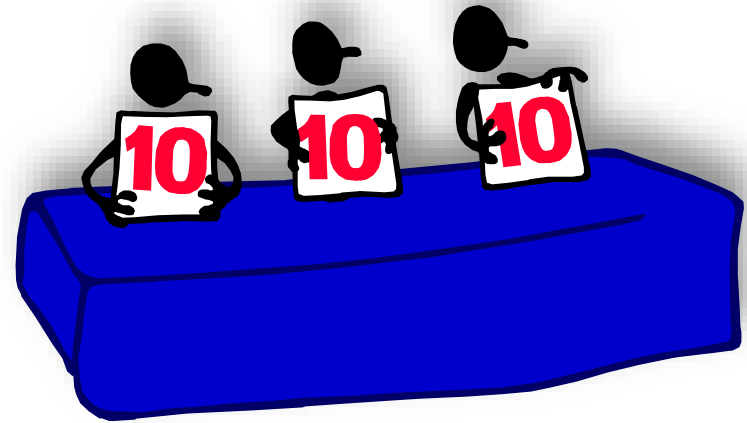


carolina tips®



Evaluations: Share Your Thoughts

**We are striving to
make our workshops
great!**



**Please evaluate this session and presenter
on a scale from 0 to 10 (10 = best).**

**Please help us reset the room
by gathering your belongings
and exiting between sessions.**

THANK YOU!