**Invertebrate Lab II**

**Learning Objectives**

* State the phyla of the organisms discussed in the lab activities
* Use the characteristics of symmetry, coelom, embryo tissue layers, and patterns of development to differentiate between the different invertebrate groups
* Recognize and identify the platehelminthes specimens viewed in the lab
* Describe the lifecycle of the tapeworm, *Taenia pisiformes*
* Recognize the planeria structures eyespot, flame cell, pharynx, scolex
* Recognize and identify the mollusca specimens viewed in lab
* Identify identify foot, visceral, mantle, exoskeleton and radula
* Recognize and identify the annelidia examples viewed in the lab
* Identify setae and clitellum
* Design and perform a set of experiments to evaluate whether female bean beetles (*Callosobruchus maculatus*) discriminate between suitable species of beans.
* Perform a chi square analysis and determine if the results from the bean beetle experiment are statistically significant by using the degrees of freedom and the p value

**Flatworms (phylum platyhelminthes)**

**Procedure**

Access the page “Reading: Flatworms”

**Questions**

1. Observe the live planaria, if present, under the dissecting. If there are no live specimens, view this video: <https://www.youtube.com/watch?v=w0QzSYQGsnA>
	1. What type of symmetry does the planaria display?
	2. Does the planaria exhibit cephalization?
	3. Can you locate the planaria eyespots? What do the eyespots sense?
2. View the large planaria model. Make sure you can identify the pharynx, the eyespots, and the flame cells.
	1. Does the planaria have a complete or incomplete digestive system?
	2. What is the function of the flame cell?
	3. Are planaria hermaphrodites?
	4. Scientists say planaria have ladder like organs. Why?

**Liver Flukes**

**Procedure**

View the preserved liver fluke specimens. Liver flukes are an example of a parasitic flatworm. Also, access this website to learn more about the liver fluke life cycle: <http://www.cdc.gov/parasites/fasciola/biology.html>

**Questions**

1. Where does the adult liver fluke live?
2. When the liver fluke egg hatches, what organism does it infect first?
3. Can humans become infected?

View the preserved tapeworm and the slides of the tapeworm scolex (head) and proglottids (reproductive bodies). This is another example of a parasitic flatworm. Also, access this website to learn more about the tapeworm life cycle: <http://www.cdc.gov/parasites/taeniasis/biology.html>

1. What structures are located on the scolex to help the tapeworm attach to the host?
2. Are tapeworms hermaphrodites?
3. Name two livestock that can be infected by tapeworms.
4. If a human is infected, where does the tapeworm live?

**Mollusks**

**Procedure**

Access the page “Reading: Mollusks”

The preserved mollusca specimens will be on display, but may differ from the ones directly mentioned in the lab handout. Please make observations on the available specimens and fill in the chart below.

|  |  |  |
| --- | --- | --- |
| Name of specimen | Physical description | Gastropod, chiton, bi-valve or cephalopod |
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Dissect a clam following the directions on the website. Make sure you can identify the mantle, the foot, the gills, and the visceral mass.

**Questions**

1. What is the function of the foot?
2. What is the function of the gills?
3. What does the mantle secrete for the clam?
4. What is contained within the visceral mass?

**Mollusks**

Dissect a squid following the procedure below

**External anatomy**

1. Place the squid in the dissection pan with the **mantle** (major body part) facing away from you and the **tentacles** and **arms** towards you.
2. Turn the squid so that the **siphon** faces you. It is located between the eyes. By expelling water through the siphon the squid can effectively move through the water.
3. Notice the **chromatophores** on the mantle. They allow the squid to change color and blend into the environment.
4. At the pointed tip of the mantle there are two **fins** that help stabilize and propel the squid
5. Notice the **eyes** on either side-they are well developed and allow the squid to have excellent vision
6. Distinguish between the tentacles and the arms. The tentacles are longer and are used to pass food to the arms.
7. Count the number of arms. How many are there? \_\_\_\_\_\_\_\_\_\_\_
8. Notice the **suction cups** on both the tentacles and the arms. How does the distribution of the suction cups differ between these two structures?
9. Pull back the arms and locate the **beak** or mouth in the middle.

**Internal Anatomy**

1. Use a pair of scissors and starting at the bottom of the mantle above the siphon cut one long incision up to the tip of the mantle. Be careful to lift up with the scissors while cutting to avoid cutting the internal organs.
2. Spread the mantle open and try to indentify the following internal structures
	1. Feathery gills
	2. Heart, located at the base of each gill. Squid actually have three hearts!
	3. Liver, probably yellowish in color and long in shape running down the middle
	4. Ink sack, which looks like a small silver fish. If you find it, cut it out at both ends and you can extract some of the ink and try to write with it!
	5. The pen, which is all that remains of the shell. To try and find the pen, lift the head of the squid and place it down over the organs. You should notice a pointy area along the midline of the body, the tip of the pen. If you grasp the tip and pull the pen will release from the mantle. It resembles a transparent feather.

**Annelidia**

**Procedure**

Access the page “Reading: Annelidia”

Skip the earthworm dissection indicated on the lab website. Rather, view the earthworm model. Make sure you can identify the setae and the clitellum.

**Questions**

1. What type of symmetry does the earthworm display?
2. Does the earthworm exhibit cephalization?
3. Does the earthworm exhibit segmentation?

The preserved annelida specimens will be on display, but may differ from the ones directly mentioned in the lab handout. Please make observations on the available specimens and fill in the table below.

|  |  |  |
| --- | --- | --- |
| Name of specimen | Physical description | Leech, earthworm or marine worm |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Review Questions**

Answer the review questions below. The phyla we viewed today were the platyhelminthes, mollusca, and annelida.

1. Which phyla exhibited bilateral symmetry?
2. Which phyla contained parasitic organisms?
3. Which phyla were coelomates?
4. Which phyla exhibited cephaliziation?
5. Which phyla that you viewed today contained specialized appendages?
6. Which phyla were aceolomates?
7. Which phyla had an incomplete digestive system?
8. Which phyla contained a shell?
9. Which phyla contained hermaphrodite organisms?

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