INVERTEBRATE DIVERSITY LAB **NAME:** _____

**Note—this is a multi-part lab, which will take several classes to complete, and which will encompass all of the invertebrate phyla. It will be collected upon completion of the last section (arthropods), and part of your mark for this lab will be for lab organization. All parts must be complete, and stapled together, IN THE CORRECT SEQUENCE. This assignment will be a major part of your lab mark for this unit.

Part 1 -- PORIFERA AND CNIDARIA

I. **Porifera** Textbook reference pp. 560-563

1. Examine the dried and preserved samples of various sponge species that are on display. ***Sketch*** ONE of these sponges, and label both incurrent pores and oscula.
2. Use a microscope to examine a prepared **slide of sponge spicules**. Make a ***sketch*** of these structures. What is their purpose in a living sponge?_____
3. Briefly describe how sponges obtain, digest and deliver food. (use your text) _____
   _____
4. Briefly describe sexual and asexual reproduction in sponges. _____
   _____

II. **Cnidaria** Textbook reference pp.564-569

1. Examine the samples of various members of Phylum Cnidaria that are on display. ***Sketch*** each of the following, and for each sketch, identify whether the organism is a **polyp** or a **medusa** form. Also describe the type of **body symmetry** displayed by each of these organisms (i.e. asymmetric, radial, or bilateral)
   i. One coral species
   ii. A sea pen
   iii. The Portuguese Man o' War
   iv. A sea anemone
2. ***Sketch*** a **budding hydra** (see demonstration microscope). What type of reproduction would this be?
   _____
3. Name the specialized cells that all cnidarians possess. _____ What is the function of these cells? _____
4. Live Hydra Lab (if available) – Follow the handout sheet provided, answering the applicable procedure questions and doing any required diagrams.

HYDRA

Hydra is a fresh water member of the Cnidarians. Hydra includes many marine species in addition to the fresh water organism Hydra, after which the class is named

Obtain a live hydra in a watch glass and place under low magnification of the stereomicroscope (one with 2 eye pieces). Be sure to use only the culture water in which it came. After a short period, if not disturbed too much, it should attach itself to the glass and extend itself full length

- About how long is it? _____ What kind of symmetry does it have? _____ How many tentacles are present? _____
- Locate the mouth on a raised dome in the centre of the tentacles. Also, touch the body trunk gently. Allow the Hydra to relax and then apply slightly stronger stimulations with the needle probe.
- Does Hydra respond differently to the different stimulations you tested it with? _____Compare its rate of elongation with that of contraction. Is their coordination to hydra's response? That is, does stimulation in one part of the body elicit full response, or just a response by the part touched?
  _____
- To observe feeding, add a small Daphnia to the dish, watch the Daphnia carefully as the first contact with Hydra's tentacles are made. You may observe a slight quivering before it becomes quiet. Also, watch Hydra use its tentacles and try to observe its mouth open before the Daphnia arrives at it.
- How do you account for the change in the movement of Daphnia after it has been caught but before it has been ingested? _____ Describe the events observed leading to the ingestion of food by Hydra. _____
  _____
  _____

Set the Syracuse watch dish aside, and obtain a fresh specimen. Place it in a drop of water on a CLEAN slide. DO NOT COVER. Observe under the compound microscope with low power first. Add a small drop of dilute acetic acid (vinegar) at the edge of the water. Observe the tentacles as the acid diffuses towards them. Note the reaction of the stinging cells (nematocysts). Because of their small size you may not see much more than the thread like extensions after they are discharged.

INVERTEBRATE DIVERSITY LAB – PART TWO

THREE WORM PHYLA

Answer the following questions and make sketches on your own note paper.

1. **Phylum Platyhelminthes (text pp.570-575)**
   a. What does Platyhelminthes mean? _____
   b. Observe the display mount of a liver fluke, and make a ***sketch***.
   c. How do flukes attach to their hosts? _____
   d. Observe the injected planaria demonstration slide under the microscope and the demonstration plastic mount. What feature of more advanced animals do they exhibit? _____
   e. Observe the plastic display mount of a tapeworm (Taenia) and use the demonstration slide to sketch scolex and explain how they help the tapeworm with its parasitic lifestyle. _____
   _____
   f. What are the body sections of tapeworms called? _____Observe these sections on the display mount and prepared slides. What do you notice about the sections that are further away from the scolex? _____
   g. What type of symmetry is seen in flatworms? _____
2. **Phylum Nematoda (Aschelminthes) (text pp.575-578)**

a. Observe the demonstration specimens. What body plan (shape and symmetry) is seen in this phylum?
_____
b. Observe the demonstration slide to see muscle tissue which is infested with Trichinella cysts. ***Sketch*** a cyst to show its appearance. How can humans get trichinosis? _____
c. Observe the large jar of parasitic round worms. Describe their external appearance. How are they well suited for a parasitic lifestyle? _____
d. Observe the photograph of a person who has been severely affected by the filarial worm, causing the disease elephantiasis. How do there worms cause these drastic effects? _____
_____

3. **Phylum Annelida (text pp.594-601)**

a. Observe the demonstration specimens. Describe the type of symmetry seen in all annelids.
_____
b. Observe the demonstration mount of large leech. What feature does it have for attaching to its host? _____Why are leeches described as external parasites? _____
c. Observe the sea mouse on display. Look at its underside and explain why it is classified as an annelid.
_____
d. Study the demonstration plume (or tube) worm. Where are its setae located? _____
These setae are modified for a special function, what do you think it is?
_____

PLANARIA: PHYLUM PLATYHELMINTHES

The phylum Platyhelminthes includes worm-like animals with flattened bodies. Many members are parasitic, with complex life cycles involving intermediate hosts.

(a) Free living flatworms

Free living flatworms are found in fresh water and marine habitats and a small number are terrestrial. The most well known of this group are fresh water planaria worms. Planaria can sometimes be captured in streams by sinking open jars with a bit of meat or liver in them overnight. We use the common planaria, Dugesia. Obtain a specimen in a Syracuse dish and place on the dissecting microscope.

Observe the body shape and locomotion of the specimen

1. Make an outline ***drawing*** of the animal's shape. What kind of symmetry has it? _____Label: anterior and posterior

2. What evidence is there of the development of the definite head? _____

As you observe locomotion, watch for any changes in body shape or evidence of muscular activity.

What changes in body shape occur from muscular activity? _____

Does locomotion ever occur without apparent muscular contractions? If so, try to suggest a method the flatworm may be using. _____

Test the sensitivity of Dugesia to touch by gently prodding it with a clean needle probe.

Does Dugesia respond equally to touch stimuli over all of its body. Indicate in your drawing the areas of particular high sensitivity if such occurs.

Obtain a small piece of liver with which to feed Dugesia. Place it at some distance from the worm and wait a few minutes to see if it is attracted. If not, try causing currents with a needle to carry the scent to the worm.

Note any reaction that may indicate a sense of smell. _____

If the planaria chooses to eat, describe its "attack" on the food. _____

Where does its mouth seem to be? _____

INVERTEBRATE DIVERSITY LAB – PART 3

MOLLUSCS AND ECHINODERMS

Answer the following questions in your notebook paper, and make the required sketches on blank paper. For some questions you will have refer to the textbook, others require examination of the species. Please hand lab sheet back in for reuse upon completion.

1. <u>Phylum Mollusca</u> Text reference, pp. 584-593

1. What is the function of the mantle in most molluscs?
2. Observe the octopus and squid on display. What are some of the unique features these cephalopods display in a comparison with other mollusc classes
3. Read the short clipping: "eight-armed killer stalks store". What does this suggest about the intelligence of octopi?
4. How do octopi catch and kill their prey?
5. Sketch each of the following shells to show the diversity seen in this phylum:
    - Limpet
    - Abalone
    - Moon snail
    - Oyster
    - Scallop
6. Observe the chiton display. What is unique about their shell?
7. Observe the Toredo (ship worm) on display. What damage do they cause from their actions?
8. What type of symmetry is seen in most molluscs?

2. <u>Phylum Echinodermata</u> Text reference pp. 636-644

1. What does the name Echinodermata mean?
2. Observe the specimens on display what are the common names of the different classes of these organisms?
3. Observe the specimens on display and answer the following
    - Which echinoderm has a soft body
    - Which echinoderm has a flattened, disc shaped body?
    - Which echinoderm has a dome shaped body?
4. What structure do most echinoderms use for locomotion? (only visible in a living organism)
5. How do sea stars:
    - Open the shells of clams?
    - Digest the clam?
6. Observe the beautiful sea urchin shells, and the 5-part jaw known as "Aristotle's Lantern. What is the main diet of sea urchins? How does its jaw help them obtain food?
7. What type of symmetry is seen in echinoderms?