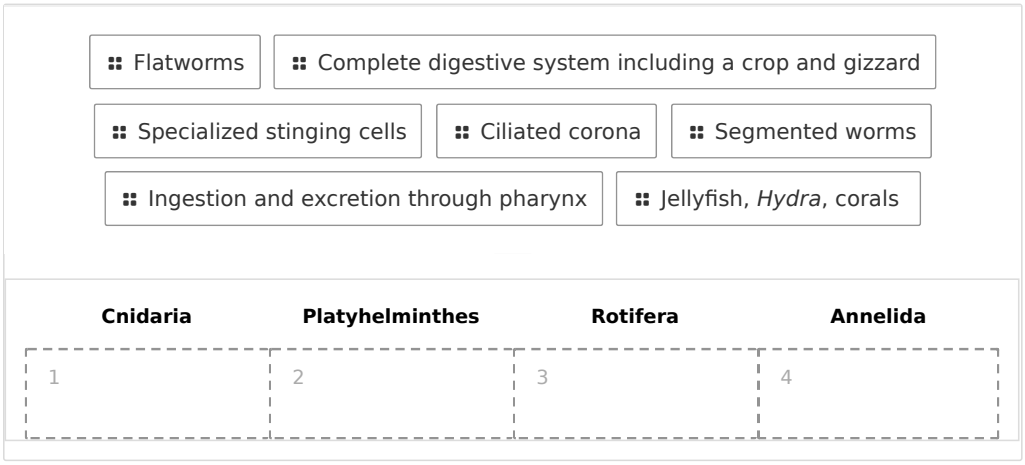
SI Biology - Full Discipline Demo

Invertebrates: Cnidaria, Platyhelminthes, Rotifera, and Annelida - Digital Final Report - Answer Guide

Institution	Science Interactive University
Session	SI Biology - Full Discipline Demo
Course	SI Biology - Full Discipline Demo
Instructor	Sales SI Demo

Test Your Knowledge

Categorize each phrase as belonging to Phylum Cnidaria, Platyhelminthes, Rotifera, or Annelida.



Correct answers:

1 Specialized stinging cells Jellyfish, *Hydra*, corals

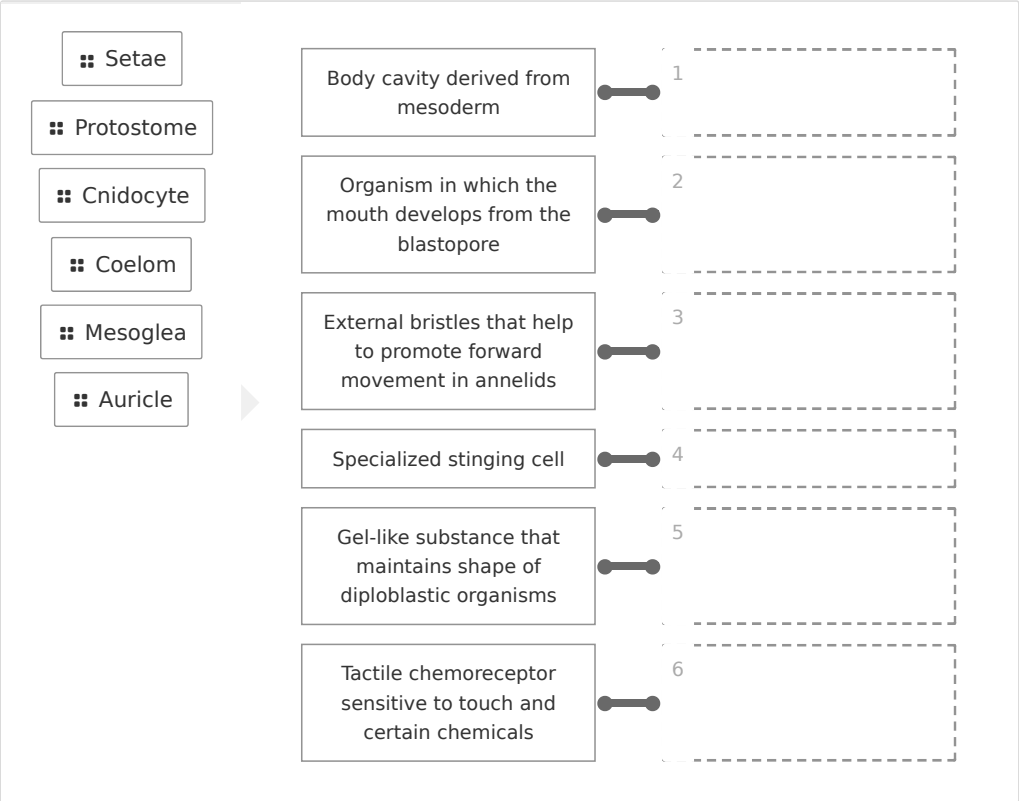
2 Flatworms Ingestion and excretion through pharynx

3 Ciliated corona

4 Complete digestive system including a crop and gizzard

Segmented worms

Match each term with the best description.



Correct answers:

1 Coelom 2 Protostome 3 Setae 4 Cnidocyte 5 Mesoglea

6 Auricle

Exploration

Most animals are invertebrates, organisms that lack a vertebral column.

- True ✔
- False

____ invertebrates possess only two cell layers, the ectoderm and endoderm.

- Coelomate
- Diploblastic ✔
- Deuterostome
- Triploblastic

Hydra have an incomplete digestive system with only one opening.

- True ✔
- False

Planarians use _____ for movement.

- ciliated epidermal cells ✔
- auricles
- pharynx
- cnidocytes

Rotifers use the _____ to grind ingested food.

- corona
- ganglion
- mastax ✔
- foot

Earthworms use the _____ to create suction during feeding.

- crop
- gizzard
- aortic arches
- pharynx ✔

Exercise 1

Which of the examined invertebrates in this exercise are diploblastic and which are triploblastic? Explain your answer by describing the cell layer structure of each organism.

The *Hydra* is diploblastic, while the planarian and rotifer are triploblastic. The body of the *Hydra* consists of only cell layers: an outer epidermis formed by ectoderm and an inner gastrodermis formed from endoderm. The bodies of both planarian and rotifer are many cell layers thick and contain tissues arising from ectoderm, mesoderm, and endodermic embryonic cells.

What is the function of cnidocytes? Which of the examined invertebrates possessed these cells?

Cnidocytes are stinging cells located in the epidermal cell layer of the tentacles of cnidarians that are used for prey capture and defense. *Hydra* possessed cnidocytes.

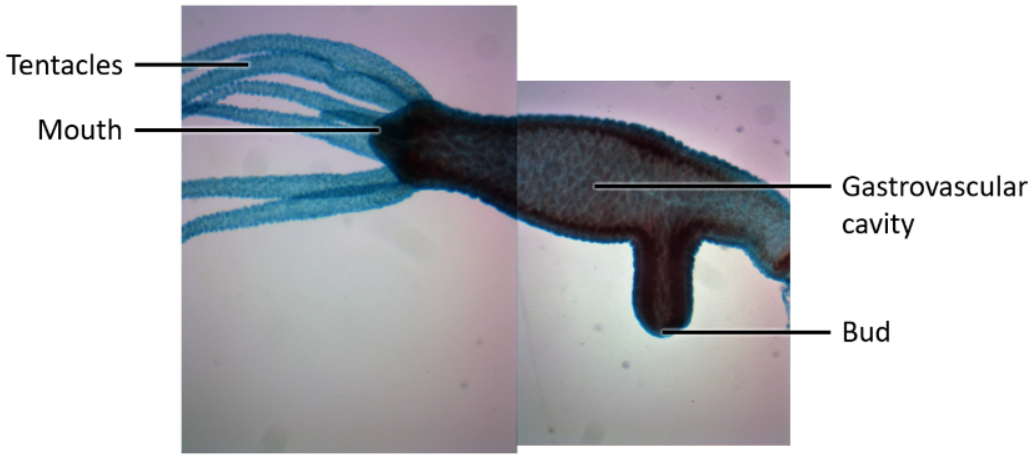
Which of the examined invertebrates possessed cilia? Reference Photos 1-3 and describe the function of the cilia in each of these organisms in your answer.

Cilia were present and labeled in Photos 2-3 for rotifer and planarian. In rotifer, cilia are located on the corona and are used to sweep food into the mouth. In planarian, ciliated epidermal cells are present on the underside of the body and used for movement.

Describe reproduction in each the invertebrates examined in this exercise. Reference any reproductive structures labeled in Photos 1-3 in your answer.

Hydra reproduce asexually by budding and sexually by releasing eggs and sperm. The bud, labeled on the *Hydra* in Photo 1, represents the asexual formation of a new organism that will break off when mature. Planarians reproduce sexually by mating to exchange sperm and asexually by the regeneration of body parts. No sexual organs were labeled in Photo 2. Rotifers reproduce sexually by mating between males and females and asexually by females producing unfertilized eggs that hatch into new organisms. Neither sex organs nor eggs were labeled in Photo 3.

Photo 1: Hydra labeled
(SAMPLE ANSWER BELOW)



Data Table 1: Image Magnification

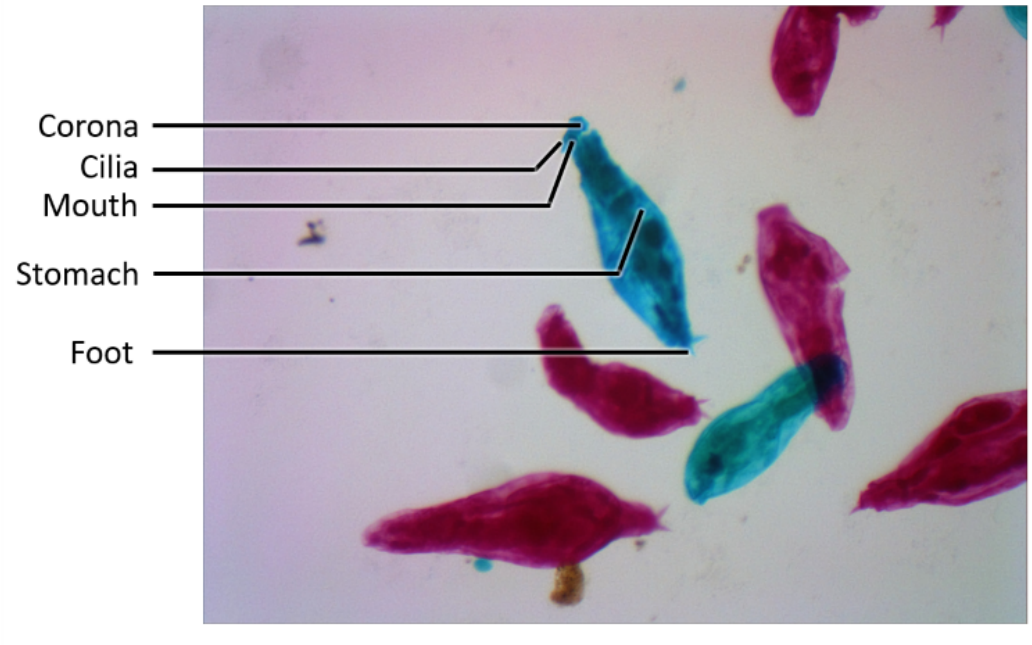
(SAMPLE ANSWER BELOW)

Slide	Magnification	Comments
Hydra	60x	Students will answer here if they were unable to identify and label a required structure.
Planarian	150x	
Rotifer	150x	

Photo 2: Planarian labeled

(SAMPLE ANSWER BELOW)

Photo 3: Rotifer labeled
(SAMPLE ANSWER BELOW)



Exercise 2

Is the earthworm dissected in this exercise a protostome or deuterostome? Describe the embryonic development of the organism in your answer.

The earthworm is a member of Kingdom Annelida of which all members are protostomes. During embryonic development, the blastopore first forms the mouth of the earthworm.

Describe the function of each digestive system organ labeled in Photo 5.

Food enters the body into the buccal cavity. The pharynx creates suction to pump the food from the buccal cavity into the crop where it is temporarily stored before entering the gizzard. In the gizzard, muscular contractions cause the food to be ground down by mineral particles present in the diet. Food then enters the intestine where digestion and absorption occur.

Describe reproduction in the earthworm. Reference the associated structure labeled in Photo 4 in your answer.

Earthworms are hermaphrodites containing both male and female reproductive organs. Sexual reproduction occurs between individual exchanging sperm. After mating, earthworms lay fertilized eggs in cocoons formed by mucus secreted by the clitellum labeled in Photo 4.

Photo 4: External Anatomy of the Earthworm
(SAMPLE ANSWER BELOW)

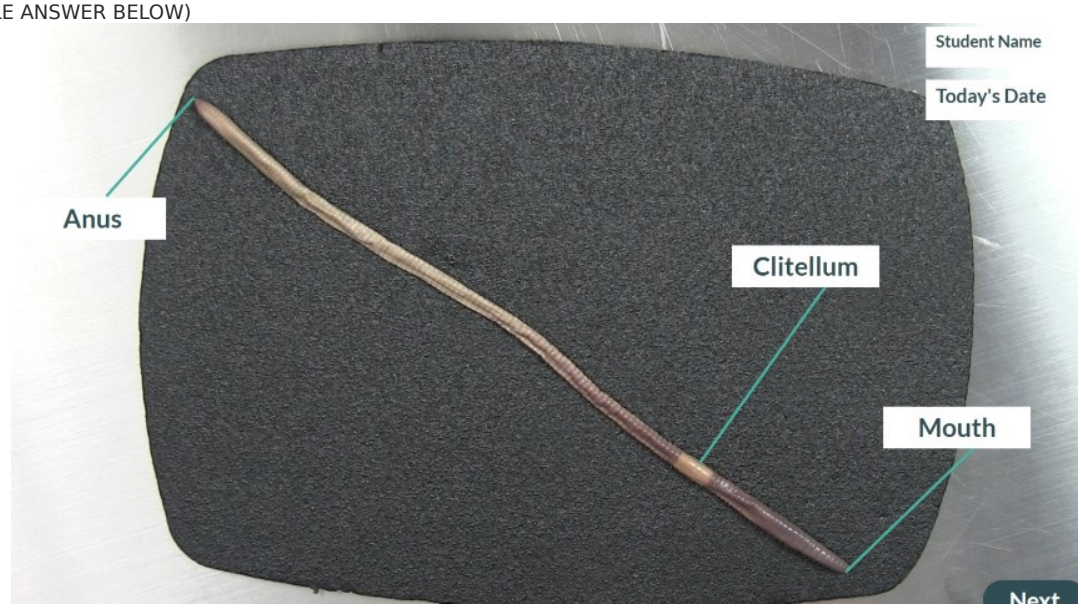
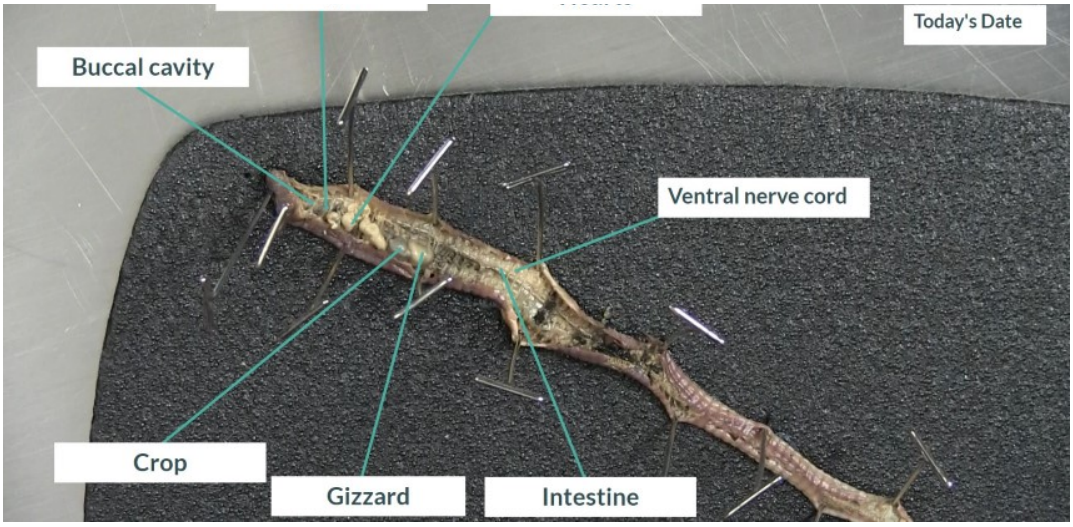


Photo 5: Internal Anatomy of the Earthworm
(SAMPLE ANSWER BELOW)



Competency Review

More than 97% of all described animal species are invertebrates.

- True ✔
- False

_____ invertebrates have a true body cavity that develops within the mesoderm tissues.

- Acoelomate
- Coelomate ✔
- Diploblastic
- Pseudocoelomate

Phylum _____ is represented by organisms with a body composed of only two cell layers: the epidermis and the gastrodermis.

- Annelida
- Rotifera
- Platyhelminthes
- Cnidaria ✔

Phylum Platyhelminthes is represented by organisms with complete circulatory and respiratory systems.

- True
- False ✔

The body of a_____ consists of a head, trunk, and foot.

- rotifer ✔
- hydra
- flatworm
- roundworm

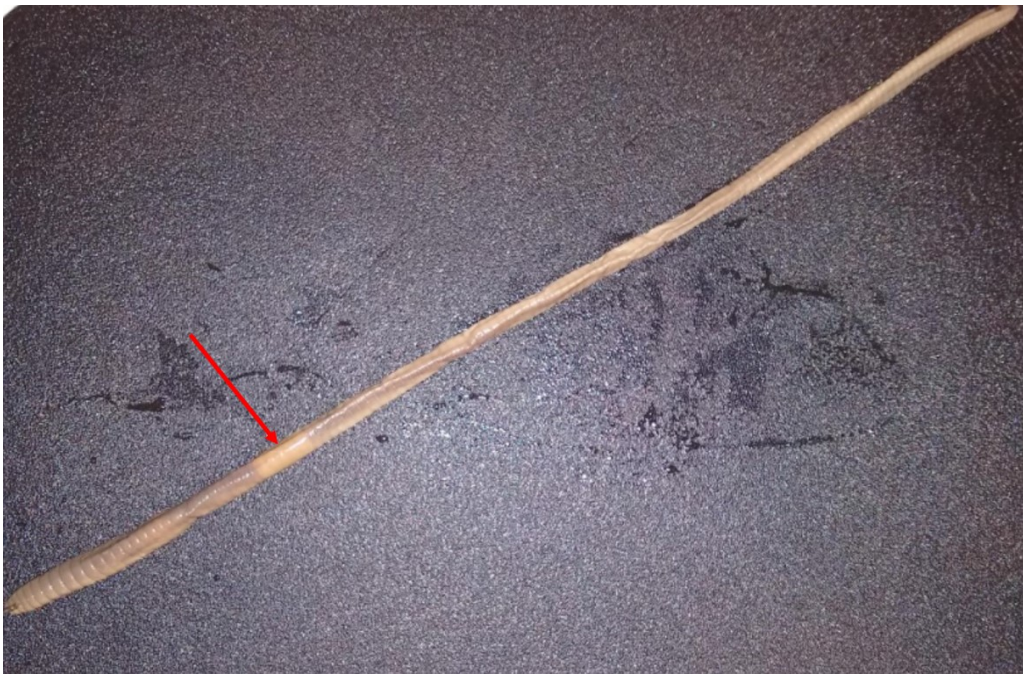
Earthworms use ____ for movement.

- auricles
- setae ✔
- nephridia
- cilia

The slide image depicts a ____.

- hydra
- earthworm
- planarian ✔
- rotifer

The structure indicated by the arrow in the image below is the _____.



- clitellum ✔
- mouth
- anus
- crop

The tentacles of the *Hydra* contain ____ that function for prey capture and defense.

- auricles
- cnidocytes ✔
- buds
- corona

Extension Questions

Invertebrate phylum Nematoda contains triploblastic, pseudocoelomate, free-living and parasitic roundworms with complete digestive systems but lacking excretory and circulatory systems**. Apply your knowledge of invertebrate morphology to compare members of Nematoda to planarians and earthworms.** (SAMPLE ANSWER BELOW)

Phylum Nematoda appears intermediate to planarians (Platyhelminthes) and earthworms (Annelida). Planarians are acoelomate flatworms that have and incomplete digestive system.

However, like Nematoda, planarians also lack a circulatory and excretory system. Earthworms have a true coelom and an excretory system and circulatory system. Earthworms share a complete digestive system with Nematoda.