

## IMPORTANCE OF INVERTEBRATES

12 MARCH 2014



### Lesson Description

In this lesson, we:

- Look at the importance of invertebrates within their environment



### Summary

#### Importance of invertebrates

Type of Animal	Body Plan	Importance
Porifera – Sponge	<ul style="list-style-type: none"> <li>• Asymmetrical with two layers (epidermis and an inner layer)</li> <li>• Acoelomate</li> <li>• No cephalisation</li> <li>• No blood system to speak of</li> </ul>	<p>Sponges form part of a habitat for many organisms.</p> <p>Act as filters removing bacteria and minerals from the water in which they are found.</p>
Cnidaria	<ul style="list-style-type: none"> <li>• Acoelomate</li> <li>• Radial symmetry</li> <li>• diploblastic (outer ectoderm and inner mesoderm with jelly-like mesoglea between)</li> <li>• no blood system</li> </ul>	<p>Source of biomedical compounds that have anti-cancer properties.</p> <p>Corals provide habitats for fishes that are commercially consumed.</p>
Platyhelminthes	<ul style="list-style-type: none"> <li>• bilateral symmetry</li> <li>• definite anterior end (cephalisation)</li> <li>• Triploblastic and acoelomate</li> <li>• Parasitic have poorly developed digestive tracts</li> <li>• Free-living have well developed, branched digestive tracts</li> </ul>	<p>Flat worms can be carnivores or scavengers and feed mainly on bacteria, small invertebrates and protozoans. A few species are herbivores.</p> <p>Many flatworms are parasitic and this affects agriculture and human health.</p> <p>Some common human and animal flatworm parasites are liver flukes and tapeworms but bilharzias is a parasite that affects humans only.</p>
Annelida	<ul style="list-style-type: none"> <li>• <b>metameric segmentation</b></li> <li>• bilateral symmetry</li> <li>• Coelomate</li> <li>• Through-gut</li> <li>• coelom lined with mesoderm</li> <li>• Segments formed by partitions in mesoderm</li> <li>• Cephalisation</li> </ul>	<p>Earthworms eat decomposing organic material and dig tunnels in the soil aerating the soil.</p> <p>They act as decomposers and as fertilizers too. Leeches suck blood and are parasitic but this has been used medicinally.</p> <p>The water based annelids biomonitor the marine environment.</p>
Arthropoda	<ul style="list-style-type: none"> <li>• bilateral symmetry</li> <li>• exoskeleton made of chitin</li> <li>• true cephalisation</li> <li>• specialised sense organs</li> </ul>	

	<ul style="list-style-type: none"> <li>• <b>Crustaceans</b> – Marine and Fresh water habitats             <ul style="list-style-type: none"> <li>○ Body plans - jointed exoskeleton</li> <li>○ Not segmented internally</li> </ul> </li> <li>• <b>Arachnida</b> <ul style="list-style-type: none"> <li>○ Body plans – 2 body sections</li> <li>○ Anterior section has head and thorax</li> <li>○ Posterior section has abdomen</li> <li>○ Waterproof cuticle</li> </ul> </li> <li>• <b>Insects</b> – Three-quarters of all known species on land and in air. There are very few marine insects             <ul style="list-style-type: none"> <li>○ Body plans – 3 body sections</li> <li>○ Head, thorax and abdomen</li> <li>○ The head has two antennae, compacted eyes and a series of mouth parts (maxilla, labium and biting mandibles)</li> <li>○ Most have one or two pairs of wings but some are wingless</li> </ul> </li> <li>• <b>Myriapods</b> - two classes Centipedes and Millipedes             <ul style="list-style-type: none"> <li>○ Centipedes – flattened segmented body one pair of legs per segment</li> <li>○ single pair of antenna</li> <li>○ poison claw and strong mouthparts</li> </ul> </li> <li>• <b>Millipedes</b> – flattened segmented body one pair of legs per segment             <ul style="list-style-type: none"> <li>○ single pair of antenna</li> <li>○ strong mouthparts</li> </ul> </li> </ul>	<p>Because there are so many arthropoda on earth, their roles and functions are many and varied. Some are vectors that carry diseases such as ticks, tsetse flies and mosquitoes. Others are pollinators such as bees and still others are pests that affect crops such as locusts, termites, aphids and rose beetles. Finally there are those arthropods that have a positive impact on the environment such as dung beetles and other insects that 'clean up' in nature.</p>
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## Test Yourself

### Question 1

Arthropoda is

- A. bilaterally symmetrical
- B. radial symmetrical
- C. central symmetrical
- D. assymetrical

**Question 2**

The locust breathes by means of

- A. gills
- B. lungs
- C. its skin
- D. trachea and tracheoles

**Question 3**

*Hermaphroditism* is characteristic of .....

- A. Protozoa
- B. Coelenterata
- C. Arthropoda
- D. Insecta

**Question 4**

The hydrostatic skeleton of the earthworm is the

- A. blood in the ventral blood vessel
- B. digestive juices in the gut
- C. blood in the dorsal blood vessel
- D. liquid in the coelom

**Question 5**

Which of the following mouth parts of locust are used for biting and chewing?

- A. maxillae
- B. mandibles
- C. labrum
- D. labium

**Question 6**

Which statement is correct with regard to animals in which cephalisation occurs?

- A. They live parasitically because of a poorly developed nervous system
- B. Slow locomotion in the animals as a result of poor co-ordination
- C. The animals have a concentration of nervous tissue in the head
- D. Nervous tissue is mainly concentrated in the abdomen

**Question 7**

The process whereby an organism absorbs digested food and makes it part of its own body is called

- A. assimilation
- B. absorption
- C. ingestion
- D. digestion

**Question 8**

Nephridia are the excretory organs of

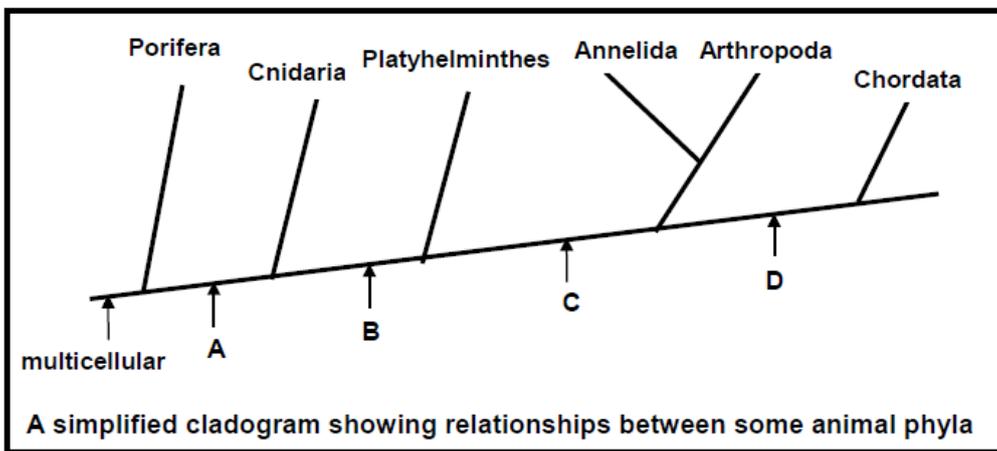
- A. Protozoa
- B. Coelenterata
- C. Platyhelminthes
- D. Annelida



**Improve your Skills**

**Question 1**

The diagram below represents a cladogram (phylogenetic tree) showing relationships between animal phyla. The letters (A to D) indicate the characteristics shared by the different phyla of animals which follow the letter. The point where various phyla differ from each other is indicated by the branching off / split into new phyla.



(Taken from Grade 11 Paper 2 exemplar 2013)

<http://www.education.gov.za/LinkClick.aspx?fileticket=7qK6bDoPfaK%3d&tabid=1009>

- 1.1 Which characteristic is shared by all the organisms in the animal kingdom according to the cladogram? (1)
- 1.2 Which LETTER represents each of the following characteristics with respect to the body plan:
  - a) Cephalisation (1)
  - b) Triploblasty (1)
  - c) Coelom (1)
  - d) Bilateral symmetry (1)
  - e) Segmentation (1)
  - f) Vertebral column (1)
  - g) symmetry (1)
- 1.3 Explain ONE importance of the development of a coelom. (2)
- 1.4 Write down the names of the phyla that display the characteristic represented by **C** but not the characteristic represented by **D**. (2)
- 1.5 Describe ONE way in which the coelom of annelids and arthropods are different. (2)

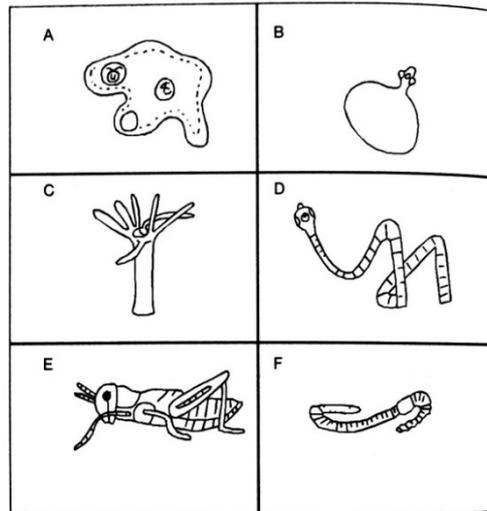
- 1.6 State ONE role of arthropods in agriculture. (1)

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**Question 2**

- 2.1 What are the classes into which the phylum Arthropoda is divided? (3)  
 2.2 What are the main physical features of arthropods? (2)  
 2.3 Which other phylum is metameric? (1)  
 2.4 How do arthropods grow? (2)

**Question 3**



The following questions refer to the above organisms. From this group of animals select (write down the letter of the animal only).

- 3.1 an animal in which blood plays a role in the transport of oxygen (1)  
 3.2 three organisms which are hermaphroditic (1)  
 3.3 one organism where fertilisation occurs externally (1)  
 3.4 one organism which is a stage in a life cycle (1)  
 3.5 one organism which is a parasite in man (1)  
 3.6 one organism which possesses an exoskeleton (1)  
 3.7 an organism found in water (1)



**Links**

- Cnidaria - <http://www.ucmp.berkeley.edu/cnidaria/cnidaria.html>
- Porifera - <http://www.enchantedlearning.com/subjects/invertebrates/sponge/>
- Platyhelminthes - <http://www.ucmp.berkeley.edu/platyhelminthes/platyhelminthes.html>
- Annelida - <http://www.ucmp.berkeley.edu/annelida/annelida.html>
- MindsetLearnXtra - <https://www.mindset.co.za/learn/xtra>