

PENANG SANGAM HIGH SCHOOL
P.O.BOX 44, RAKIRAKI
LESSON NOTES

Year/Level: 12C/D

week 22

Subject: Biology

Strand	1 structure & life processes
Sub Strand	1.4 comparative form and function in plants and animals
Content Learning Outcome	describe the different methods of transport in invertebrates

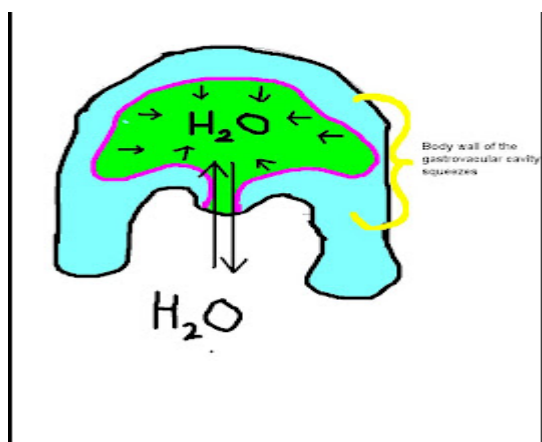
Transport in Animals

- Small or sessile organisms do not actually need a transport system.
- They can often get the materials they need by diffusion alone.
- Larger, more active organisms must have a specialised organ system for bringing food and oxygen to and waste away from their cells.
- All organisms, including those with specialised transport systems, depend upon *diffusion* to move materials *in* and *out* of body cells.

Transport in Invertebrates

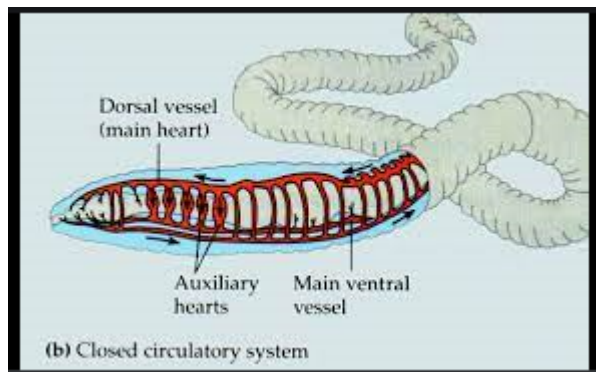
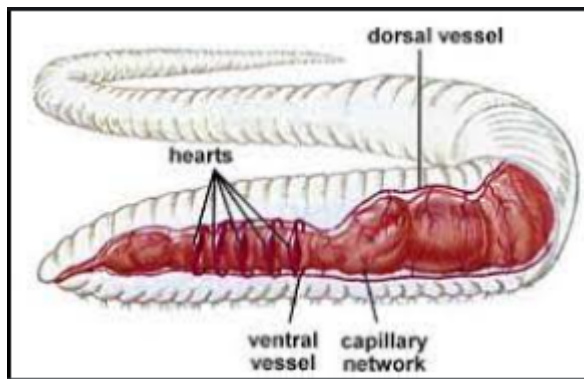
Transport in Cnidarians – direct diffusion

- Cnidarians rely on **direct diffusion** to supply their cells with nutrients from their gut obtained from the surrounding water.
- Since cnidarians are sessile and diffusion is a slow process, they do not require an efficient transport system.
- They do not use up nutrients and gases or produce wastes very quickly like other larger animals



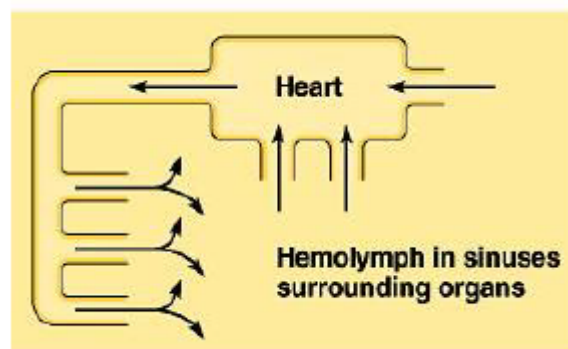
Transport in Annelids (earthworm)

- Have **simple closed system**
- Earthworms have simple **tubular** hearts (i.e. 5 pairs contractile arteries)
- Blood is pumped along the ventral vessel by the **hearts**
- Ventral vessels branch out to form capillaries where uptake of nutrients and exchange of gases takes place
- Body segments contract and cause blood to return to the **heart** through the **dorsal vessel**
- Earthworms circulatory system consists of one loop – it's a **single loop** circulation



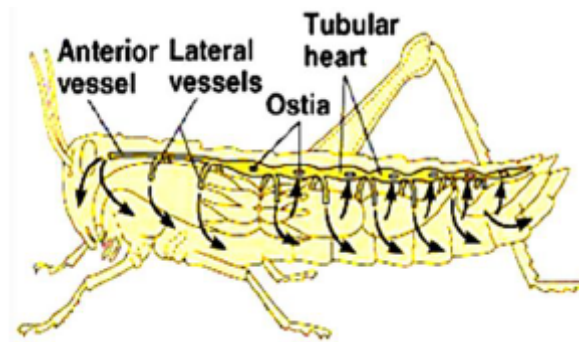
Transport in Arthropods and Molluscs- Open circulation

- Arthropods (such as insects and shrimp) and most molluscs' (such as snails and clams) have open circulation.
- Open circulation means that the blood is not enclosed in vessels, but instead flows in an open body cavity, bathing body cells directly



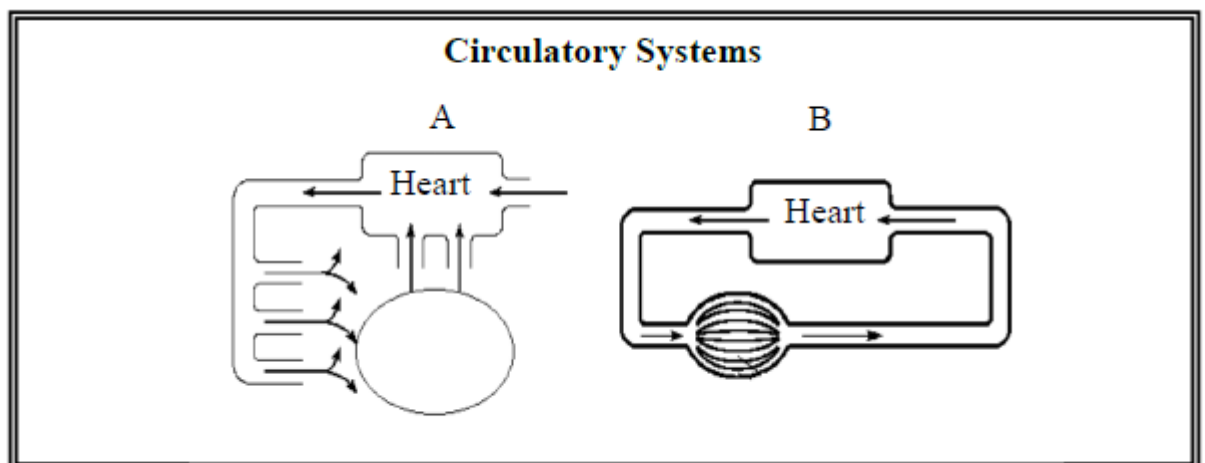
Transport in a Grasshopper

- In a grasshopper, a long heart pumps blood(hemolymph-insects blood) into an open body cavity called a **haemocoel** (hee-mo-seal).
- The blood in the haemocoel bathes the body cells directly.
- It is not enclosed in blood vessels.
- Arthropod blood transports nutrients and cellular wastes.
- Blood in the haemocoel bathes the body cells directly allowing nutrients to enter the cell while wastes diffuse out into the blood
- Blood slowly returns to the heart through valves called **ostia**
- Heart then pushes blood back to the body cavity



Activity

(1) Study the diagram of the two types of blood circulatory systems given below and answer the questions that follow:



Source: <http://www.hangmytran.wordpress.com>

(i) Insects have an open circulation. Which of the above systems represent open circulation?

(ii) Oxygen is not circulated through insect blood. State how insects obtain oxygen for respiration. _____

(iii) Explain why closed blood circulation is more suitable for larger organisms.
