NCERT Solutions for Class 11 Biology Chapter 7: Chapter 7 of NCERT Class 11 Biology, "Structural Organisation in Animals," explores the structural details and functional organization of animal tissues and organs. It begins by explaining animal tissues—epithelial, connective, muscular, and nervous tissues—their types, structure, and functions.

The chapter also discusses the anatomy and physiology of select organisms like earthworms, cockroaches, and frogs, providing insights into their systems, such as circulatory, digestive, and nervous systems. This chapter emphasizes the relationship between structure and function, offering foundational knowledge crucial for understanding advanced biological concepts in zoology. It is key for students preparing for board exams and competitive tests.

NCERT Solutions for Class 11 Biology Chapter 7 Overview

Chapter 7 of NCERT Class 11 Biology, "Structural Organisation in Animals," delves into the study of tissues epithelial, connective, muscular, and nervous and their role in forming organs and organ systems. It explains the anatomy and physiology of animals like earthworms, cockroaches, and frogs, providing a deeper understanding of their structural and functional adaptations.

This chapter is crucial as it lays the foundation for understanding the interdependence of structure and function in biology, a concept vital for advanced studies in zoology and medicine. Mastering this topic is essential for excelling in board exams and competitive exams.

NCERT Solutions for Class 11 Biology Chapter 7 Structural Organisation in Animals

Below is the NCERT Solutions for Class 11 Biology Chapter 7 Structural Organisation in Animals -

1. Answer in one word or one line.

(i) Give the common name of Periplanata americana.

(ii) How many spermathecae are found in earthworms?

(iii) What is the position of ovaries in cockroaches?

(iv) How many segments are present in the abdomen of cockroaches?

(v) Where do you find Malpighian tubules?

Solution:

i) American cockroach

ii) 4 pairs of spermathecae are found in earthworms.

iii) Two ovaries are found lying laterally around the 2^{nd} to the 6^{th} abdominal segments.

iv) 10 segments

v) Malpighian tubules are found at the junction of the midgut and the hindgut of the alimentary canals of insects.

2. Answer the following.

(i) What is the function of nephridia?

(ii) How many types of nephridia are found in earthworms based on their location?

Solution:

i) Nephridia in earthworms carry out the roles of osmoregulation and excretion.

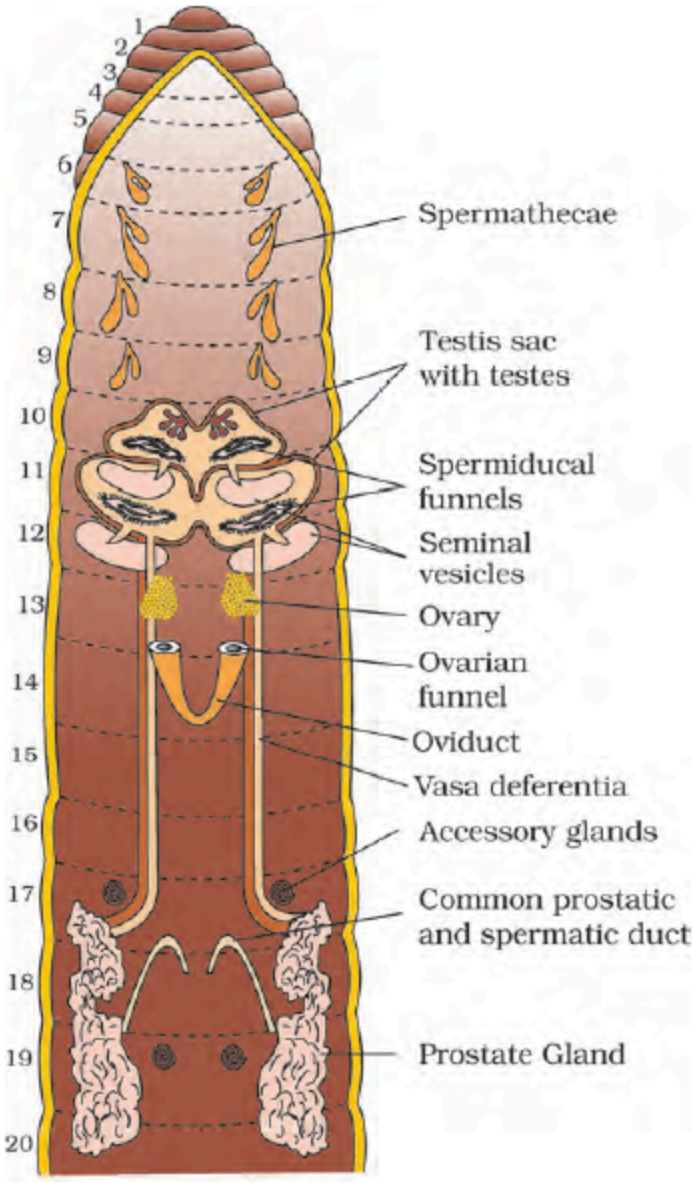
ii) The earthworm contains three different kinds of nephridia depending on where they are found, and they are

Both sides of the intersegmental septa from segment 15 to the final one that exits into the gut include septal nephridia.
From segment 3 to the final opening on the body surface, integumentary nephridia are connected to the lining of the body wall.
In the fourth, fifth, and sixth segments, there are three paired tufts of pharyngeal nephridia.

3. Draw a labelled diagram of the reproductive organs of an earthworm.

Solution:

The diagram of the reproductive organs of an earthworm is as follows:

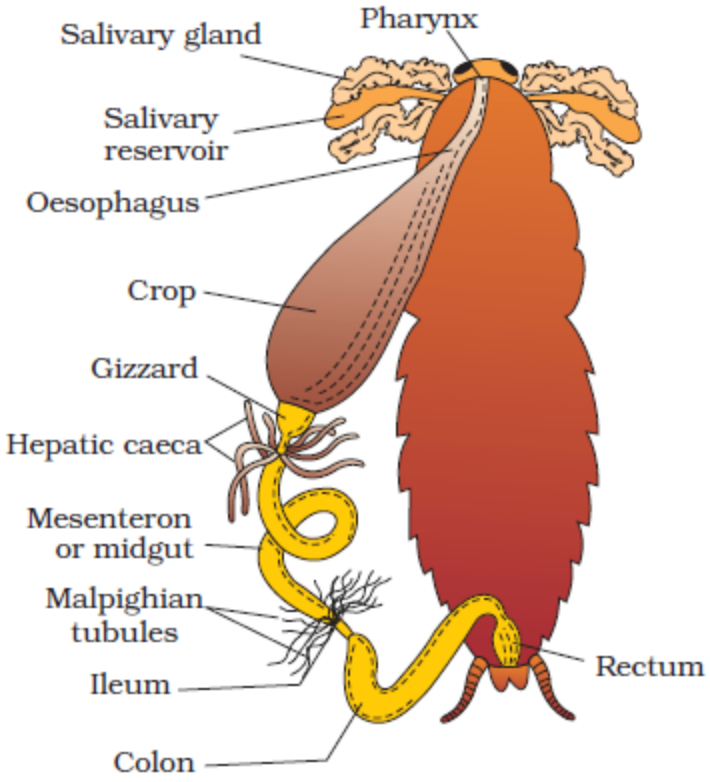


Reproductive system of earthworm

4. Draw a labelled diagram of the alimentary canal of a cockroach.

Solution:

The diagram of the alimentary canal of a cockroach is as follows:



Alimentary canal of cockroach

5. Distinguish between the following.

(a) Prostomium and peristomium

(b) Septal nephridium and pharyngeal nephridium

Solution:

a) Prostomium and peristomium

The differences are as follows:

Prostomium	**Peristomium**
The small, fleshy lobe serves as a covering for the mouth and as a wedge to force open cracks in the soil in the earthworm crawls.	It is the crescentic aperture at the anterior end of the first segment of the earthworm comprising the mouth

b) Septal nephridium and pharyngeal nephridium

Septal nephridium	Pharyngeal nephridium
Found at the anterior and posterior surface of septa occurring after segment 15 in earthworm	Found in three pairs in the 4^{th}, 5^{th} and 6^{th} segments located on either side of the alimentary canal
The excretory matter is discharged into the lumen of the alimentary canal	The excretory matter is discharged into the gut, in the pharynx or buccal cavity

6. What are the cellular components of blood?

Solution:

The cellular components of blood are Red blood cells (RBC), white blood cells (WBC) and platelets.

7. What are the following, and where do you find them in an animal body?

(a) Chondrocytes

(b) Axons

(c) Ciliated epithelium

Solution:

a) The cartilage cells are called chondrocytes. In adults, cartilage can be found between neighbouring bones of the hands, limbs, and vertebral column, as well as in the tip of the nose and outer ear joints. They are huge, mature, rounded cells that are located in clusters within the cartilage matrix.

b) A long, thin projection of a neurone or nerve cell is called an axon. They can be found all over the body. They are in charge of carrying nerve impulses out of the cell body after emerging from the cyton. They come to an end in terminal arborisations, which are collections of branches.

c) Columnar or cuboidal cells are referred to as ciliated epithelium if they have cilia on their free surface. They are found on the inside of hollow organs such as the fallopian tubes and bronchioles. Its free surface is made up of tiny, vibratile cytoplasmic structures known as cilia. The purpose of this cilium is to capture dust and other foreign objects.

8. Describe various types of epithelial tissues with the help of labelled diagrams.

Solution:

Epithelial tissues are found lining the body surface forming a protective surface. These cells are densely packed with a very little intercellular matrix.

Various types of epithelial tissues are

i) Simple epithelium:

It is a single layer of cells which functions as a lining for body cavities, ducts, and tubes.

Based on the structural modifications of the cells, Simple epithelial cells are further divided into 4 types.

- Squamous epithelium

A single layer of a flattened cell with asymmetrical borders makes up simple epithelium. They are also known as pavement epithelium because their cells resemble floor tiles. They are present in the lungs' air sacs and blood vessel walls. They have a role in gas exchange, excretion, protection, coelomic fluid secretion, and more.

- Cuboidal epithelium

Cuboidal epithelium is made up of a single layer of cube-like cells. They are commonly found in ducts of glands and tubular parts of nephrons in kidneys, and their primary functions are secretion and absorption of gamete formation.

- Columnar epithelium

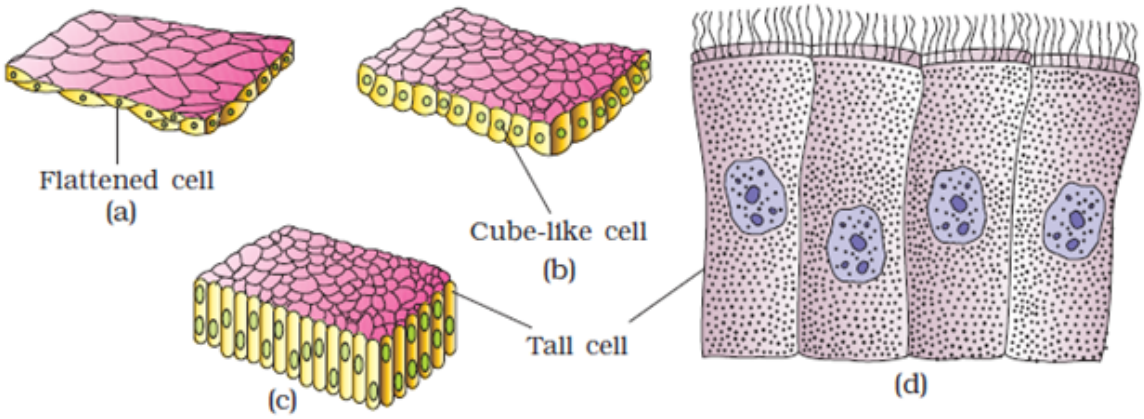
A single layer of tall, thin cells makes up the columnar epithelium. They aid in secretion and absorption and are present in the lining of the stomach and intestine. These cells have elongated nuclei that are located in various locations. It facilitates secretion and absorption.

- Ciliated epithelium

If cuboidal or columnar epithelium has cilia, they are called ciliated epithelium. They are present in the inner surface of hollow organs like fallopian tubes and bronchioles. Their function is to move particles in a specific direction.

ii) Compound epithelium

As in human skin, the compound epithelium is a layer of two or more cells that serves a protective purpose. Because they are made up of two or more cell layers, they are stronger and thicker than the ordinary epithelium; they provide protection. They cover the inner lining of the pancreatic and salivary ducts, the moist surface of the buccal cavity, and the dry skin surface.



Simple epithelium: (a) Squamous (b) Cuboidal (c) Columnar (d) Columnar cells bearing cilia

9. Distinguish between

(a) Simple epithelium and compound epithelium

(b) Cardiac muscle and striated muscle

(c) Dense regular and dense irregular connective tissues

(d) Adipose and blood tissue

(e) Simple gland and compound gland

Solution:

a. Simple epithelium and compound epithelium

Simple epithelium	**Compound epithelium**
Composed of one layer of cells	Consist of many layers of cells
They are involved in the function of absorption and secretion	They are involved in the protection
Present in the stomach lining and intestine	Present in the lining of the buccal cavity and pharynx.
Cells rest on the basement membrane	Cells of the lowermost layer rest on the basement membrane

b. Cardiac muscle and striated muscle

Cardiac muscle	Striated muscle
It is involuntary in function and never gets fatigued	It is voluntary in function, hence gets fatigued sooner
It is found in the heart	Found in the triceps, limbs and biceps
Branched fibres	Unbranched fibres
Uninucleated	Multinucleated

c. Dense regular and dense irregular connective tissues

Dense regular connective	Dense irregular connective tissue
Collagen fibres are present in rows between parallel boundless fibres	Consists of Fibroblasts having several fibres that are differently oriented
Regular patterns of fibres observed	Irregular patterns of fibres observed
They are present in tendons and ligaments	They are present in the skin

d. Adipose and blood tissue

Adipose tissue	Blood tissue
It is made of collagen fibres, fibroblasts, macrophages and adipocytes	It consists of RBC, WBC, platelets and plasma
It is a loose connective tissue	It is a fluid connective tissue
Its function is to synthesise, store and metabolise the fats	Its function is to transport food, gases, hormones and waste.
Present beneath the skin	Present in the blood vessels

e. Simple gland and compound gland

Simple gland	Compound gland
It contains isolated glandular cells	Contains cluster of secretory cells
It is unicellular	It is multicellular
Ex: Goblet cells of the alimentary canal	Ex: salivary glands

10. Mark the odd one in each series.

(a) Areolar tissue; blood; neuron; tendon

(b) RBC; WBC; platelets; cartilage

(c) Exocrine; endocrine; salivary gland; ligament

(d) Maxilla; mandible; labrum; antennae

(e) Protonema; mesothorax; metathorax; coxa

Solution:

1. The answer is **neuron** because it is not a connective tissue.
2. The answer is **cartilage** because it is not part of blood.
3. The answer is **ligament** because it is connective tissue, whereas the rest are glands.
4. The answer is **antennae** because the rest are the parts of a cockroach's stomach.
5. The answer is **Protenema** because it is a thread-like chain of cells found in the life cycle of moss, whereas others are the parts of segments of a cockroach's leg.

11. Match the terms in column I with those in column II.

Column I	**Column II**
(a) Compound epithelium	**(i) Alimentary canal**
(b) Compound eye	**(ii) Cockroach**
(c) Septal nephridia	**(iii) Skin**
(d) Open circulatory system	**(iv) Mosaic vision**
(e) Typhlosole	**(v) Earthworm**
(f) Osteocytes	**(vi) Phallomere**
(g) Genitalia	**(vii) Bone**

Solution:

Column I	**Column II**
(a) Compound epithelium	(iii) Skin
(b) Compound eye	(iv) Mosaic vision

(c) Septal nephridia	(v) Earthworm
(d) Open circulatory system	(ii) Cockroach
(e) Typhlosole	(i) Alimentary canal
(f) Osteocytes	(vii) Bone
(g) Genitalia	(vi) Phallomere

12. Mention the circulatory system of earthworms briefly.

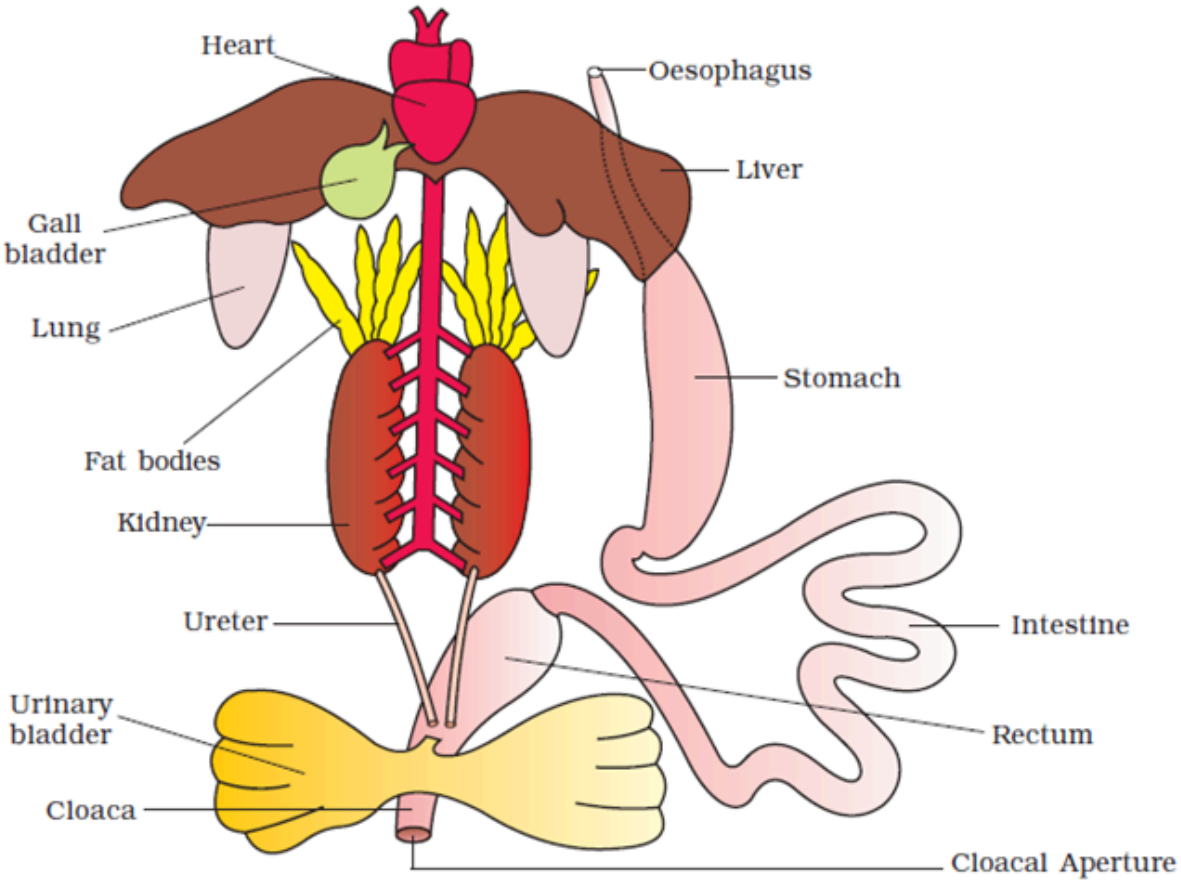
Solution:

- The earthworm's heart, capillaries, and blood arteries make up its closed, circular system.
- Because earthworms have a closed circulatory system, blood is limited to the heart and blood arteries.
- Blood flows in a single path during contraction.
- The fourth, fifth, and sixth segments have blood glands. They create haemoglobin, which is a type of blood cell that dissolves in blood plasma.
- The cells in the blood are phagocytic.
- Because they lack a specific respiratory system, their wet body surface facilitates respiratory exchange with their circulation.

13. Draw a neat diagram of the digestive system of a frog.

Solution:

The diagram is as below.



Diagrammatic representation of internal organs of frog showing complete digestive system

14. Mention the function of the following (a) Ureters in frogs (b) Malpighian tubules (c) Body wall in earthworms

Solution:

1. Ureters in frog **–** Acts as a urinogenital duct which carries urine and sperm in the male frog.
2. Malpighian tubules **–** Malpighian tubules are excretory organs in cockroaches.
3. Body wall in earthworm – Helps in movement and burrowing

Benefits of Using NCERT Solutions for Class 11 Biology Chapter 7

Clear Conceptual Understanding: Simplifies complex topics like animal tissues and organ systems for easy comprehension.

Exam-Oriented Preparation: Solutions align with the NCERT syllabus, ensuring relevance for board exams and competitive tests.

Step-by-Step Explanations: Detailed answers enhance problem-solving skills and analytical thinking.

Saves Time: Pre-prepared solutions reduce time spent searching for accurate answers.

Boosts Confidence: Comprehensive coverage of topics ensures students are well-prepared.

Supports Self-Study: Ideal for independent learning and doubt resolution.

Foundation for Advanced Studies: Builds a strong base for topics in zoology, NEET, and medical entrance exams.