

## **6. Animal Classification**

### **Question 1.**

a. I am diploblastic and acoelomate. Which phylum do I belong to ?

Answer:

I am from phylum Cnidaria or Coelenterata.

b. My body is radially symmetrical. Water vascular system is present in my body. I am referred as fish though I am not. What is my name?

Answer:

Starfish. I am from Echinodermata phylum.

c. I live in your small intestine. Pseudocoelom is present in my thread like body. In which phylum will you include me?

Answer:

I am Ascaris. I am included in Aschelminthes.

d. Though I am multicellular, there are no tissues in my body. What is the name of my phylum?

Answer:

Sponge, Porifera.

### **Question 2.**

Write the characters of each of the following animals with the help of classification chart:

#### **a. Bath sponge.**

Answer:

Classification:

Kingdom: Animalia

Sub-kingdom: Non-chordata

Phylum: Porifera

Characters:

- Multicellular organisms without cell wall
- Cellular grade organization.
- Asymmetrical body
- Acoelomate

Bath sponge is a marine animal. Blackish in colour and round in shape having porous body. It has spongin fibres and spicules which serve as skeleton. Bath sponges have good water-holding capacity. It is sedentary animal which is fixed to some substratum in the aquatic environment. Reproduction is by budding. It also has a good regeneration capacity.

**b. Grasshopper.**

Answer:

Classification:

Kingdom: Animalia

Sub-kingdom: Non-chordata

Phylum: Arthropoda

Class: Insecta

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

Grasshopper is an insect included under class insecta of phylum arthropoda because it has jointed appendages. There are three pairs of legs and two pairs of wings. It is a terrestrial insect which is well adapted to the surrounding environment by showing camouflage. It has chitinous exoskeleton. The respiration by tracheae.

**c. Rohu.**

Answer:

Classification:

Kingdom: Animalia

Phylum: Chordata

Class: Pisces

Subclass: Teleostei (Bony fish)

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

Rohu is a fresh water bony fish. It is a chordate having a vertebral column, hence included under subphylum vertebrata. The body is well adapted for aquatic mode of life. The shape of the body is streamlined. The exoskeleton is of scales. The gills are present which are used for respiration. The endoskeleton is of bones, hence called bony fish. There are paired fins and an unpaired caudal fin which is used in steering and changing the direction during swimming.

**d. Penguin.**

Answer:

Classification:

Kingdom: Animalia

Phylum: Chordata

Class: Aves

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

Penguin is a flightless bird inhabitant of cold snow-clad regions. It has exoskeleton of feathers. The body is well adapted to survive in cold regions.

It is a warm-blooded bird. The forelimbs are modified into wings. But due to excessive body weight, the penguins are not seen flying. It can wade in the water with modified hind limbs.

#### **e. Frog.**

Answer:

Classification:

Kingdom: Animalia

Phylum: Chordata

Class: Amphibia

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

The frog is a true amphibian that can live in water as well as on land. When on land it respire with the help of lungs while in water it uses its skin for breathing. It does not have exoskeleton. The skin is soft, slimy and moist. It is suitably coloured and hence the frog can camouflage in the surroundings. Body is divisible into head and trunk. Two pairs of limbs are seen. The forelimbs are short and used for support during locomotion. The hind limbs are long and strong, used for jumping when on land and for swimming when in water.

The eyes are large and protruding. Since the neck is absent, such eyes help in looking around. The tympanum is present.

#### **f. Lizard.**

Answer:

Classification:

Kingdom: Animalia

Phylum: Chordata

Class: Reptilia

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

The lizard is a cold-blooded reptile. The limbs are weak and do not support the body weight, hence lizard is seen creeping. But the feet are provided with pads and suckers due to which lizards are well- adapted to climb on the vertical walls. The exoskeleton has fine scales. The body is divisible into head, neck and trunk. The capacity to regenerate is developed in lizards, hence it can produce the lost tail or limbs. The mode of reproduction is egg laying. It feeds on insects with the help of long and sticky tongue.

### **g. Elephant.**

Answer:

Classification:

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Characters:

- Multicellular organisms without cell wall
- Organ-system grade organization
- Bilaterally symmetrical
- Triploblastic and Eucoelomate.

Elephant is the terrestrial, herbivorous mammal adapted to survive in hot and humid tropical forests.

It is a mammal and hence shows viviparity and milk secretion. The body is divisible into head, neck, trunk, and tail. The proboscis is a characteristic feature of the elephant which is actually modified nose.

### **h. Jellyfish.**

Answer:

Classification:

Kingdom: Animalia

Sub-kingdom: Non-chordata

Phylum: Cnidaria or Coelenterata

Characters:

- Multicellular organisms without cell wall
- Tissue grade organization

- Radially symmetrical
- Diploplastic

Jellyfish or Aurelia is a coelenterate. Its body is medusa. It appears as a transparent balloon seen floating in the marine waters. Since it has appearance like a jelly, it is known commonly as jellyfish. There are tentacles provided with cnidoblasts or stinging cells. Tentacles are used for catching the prey. Cnidoblasts are used to secrete a toxin which paralyses the prey.

### **Question 3.**

Write in brief about progressive changes in animal classification.

Answer:

There were different methods of classification of animals.

1. The first classification method was given by the Greek philosopher Aristotle. He took into account the criteria like body size, habits and habitats of the animals. This method was called artificial method of classification.
2. The same artificial method was used by other scientists such as Theophrastus, Pliny, John Ray, Linnaeus, etc.
3. Further due to advances in science the references were changed and there were some new methods of classification proposed.
4. The system of classification called 'Natural system of classification' was then proposed. This system of classification was based on criteria such as body organization, types of cells, chromosomes, bio-chemical properties, etc.
5. Later, Dobzhansky and Meyer gave the system of classification based on evolution.
6. In 1977, Carl Woese has also proposed the three domain system of animal classification.

### **Question 4.**

What is the exact difference between grades of organization and symmetry? Explain with examples.

Answer:

#### **I. Grades of organization:**

- (1) The grades of organization mean the way an organism has different body formation.
- (2) Unicellular organisms like amoeba have a single cell in the body and hence the organization in its body is called protoplasmic grade of organization.
- (3) Some organisms have only cells in their body which is called cellular grade of organization, e.g. Poriferans.
- (4) Some have tissues e.g. Coelenterates. They are said to have tissue grade organization. Some have organs, they are said to have organization-organ grade, e.g. Platyhelminthes. All other higher animals have organ-system grade organization.

## **II. Symmetry:**

- (1) Symmetry on the other hand shows the base of the body formation.
  - (2) The symmetry can be understood by taking an imaginary cut through the animal body.
  - (3) Based on the symmetry there can be three types.
  - (4) In asymmetric animals, there is no symmetry in any plane, e.g. Amoeba.
  - (5) The bilateral symmetry is the one in which an imaginary axis can pass through only one median plane to divide the body into two equal halves. Most of the animals have bilateral symmetry and hence their organs are arranged in symmetric way on both the sides.
  - (6) The imaginary cut passing through the central axis but any plane of body can give more than one equal half. The organs of such animals are arranged in a radius of an imaginary circle, e.g. Cnidarians and some echinoderms.
- Both grades of organization and symmetry are the bases for classifying animals into different phyla.

### **Question 5.**

Answer in brief.

#### **a. Give scientific classification of shark upto class.**

Answer:

Kingdom: Animalia

Phylum: Chordata

Subphylum: Vertebrata

Class: Pisces

Subclass: Elasmobranchii (Cartilaginous)

Example: Scientific name: *Scoliodon sorrakowah*.

Common name: Shark

#### **b. Write four distinguishing characters of phylum – Echinodermata.**

Answer:

Distinguishing characters of Echinodermata:

1. Marine organisms with skeleton made up of calcareous spines. Calcareous material on the body hence the name is Echinodermata. Some are sedentary while some are free swimming.
2. Body is triploblastic, eucoelomate and radially symmetrical when adult. The larvae are bilateral symmetrical.
3. Locomotion with the help of tube-feet which are also used for capturing the prey.
4. Echinoderms have regeneration capability. Hence they can restore their lost parts.
5. Most of them are unisexual.

6. Examples; Starfish, sea-urchin, brittle star, sea cucumber, etc.

**c. Distinguish between butterfly and bat with the help of four distinguish properties.**

Answer:

**Butterfly:**

1. Butterfly is classified as Non-chordate.
2. It is included in class Insecta of phylum Arthropoda.
3. Butterfly has three pairs of legs and two pairs of chitinous wings.
4. Butterfly is a diurnal (active during day) insect.
5. Butterfly lays eggs which hatch into larva. Larva develops into pupa and pupa metamorphoses into an adult.

**Bat:**

1. Bat is classified as a Chordate.
2. It is included in class Mammalia of subphylum Vertebrata.
3. Bat has one pair of legs and a pair of patagium which are used for flying. Patagium has bones.
4. Bat is a nocturnal (active at night) mammal.
5. Bat is a viviparous animal that gives birth to live young ones. Young ones are fed by milk secreted by mammary glands.

**d. To which phylum does Cockroach belong? Justify your answer with scientific reasons.**

Answer:

- (1) Cockroach belongs to the phylum Arthropoda and class Insecta.
- (2) Scientific reasons for placement of Cockroach in the phylum Arthropoda:
- The body is covered by chitinous exoskeleton.
  - Jointed appendages present, three pairs of walking legs and two pairs of membranous wings.
  - Body is eucoelomate, triploblastic, bilaterally segmented and segmented.
  - Respiration by spiracles and tracheal tubes.

**Question 6.**

Give scientific reasons.

**a. Though tortoise lives on land as well as in water, it cannot be included in class-Amphibia.**

Answer:

- When tortoise lives on the land, it respire with the help of lungs.
- When in water, it puts out its nares (nasal openings) out of the water and breathes air.

- It cannot take up oxygen dissolved in water. In both the habitats it respire with the help of lungs. In case of true amphibians, this is not the case.
- They can breathe in water with the help of skin and on land with the help of lungs.
- Tortoise also has exo-skeleton which is lacking in Amphibia. Therefore, tortoise cannot be included in class Amphibia.

**b. Our body irritates if it comes in contact with jellyfish.**

Answer:

- Jellyfish is a coelenterate that has cnidoblasts bearing tentacles.
- These cnidoblasts inject toxins to paralyse the prey at the time of feeding.
- When jellyfish comes in contact with our body, this toxin is released causing reaction to our skin.
- Therefore, our body gets irritation when we come in contact with jellyfish.

**c. All vertebrates are chordates but all chordates are not vertebrates.**

Answer:

- All chordates possess notochord in some period of their development.
- All vertebrates also have notochord during embryonic life, which is later replaced by vertebral column.
- Therefore all vertebrates are chordates.
- But some chordates like Urochordata and cephalochordata do not possess vertebral column and hence they are not vertebrates.

**d. Balanoglossus is connecting link between non-chordates and chordates.**

Answer:

- Balanoglossus shows some characters of non-chordates.
- It also has notochord as in case of chordates.
- Since it shares the characters of non-chordates and chordates, from the view point of evolution, it is called connecting link between them.

**e. Body temperature of reptiles is not constant. (Board's Model Activity Sheet)**

Answer:

1. Reptiles are cold-blooded animals.
2. The thermoregulatory system is not there in their bodies.
3. Their body temperatures, fluctuate as per the environmental temperatures.
4. Therefore, the body temperature is not maintained at constant level in reptiles.

**Question 7.**

Answer the following questions by choosing correct option.



**a. Which special cells are present in the body of sponges (Porifera)?**

- 1. Collar cells**
- 2. Cnidoblasts**
- 3. Germ cells**
- 4. Ectodermal cells**

Answer:

1. Collar cells

Explanation: Porifera animals are attached to the substratum. They do not show locomotion. For gathering and catching the food, they need to produce a current in the water. For this purpose, they have characteristic collar cells in their body. Germ cells and ectodermal cells are seen in all other phyla. Cnidoblasts are characteristic feature of coelenterates.

**b. Which of the following animals' body shows bilateral symmetry?**

- 1. Starfish**
- 2. Jellyfish**
- 3. Earthworm**
- 4. Sponge**

Answer:

3. Earthworm

Explanation: When an imaginary plane passing through only one axis can divide the body into two equal halves, then it is called bilateral symmetry. Such symmetry is shown only by earthworm. Sponge body is asymmetrical while starfish and jellyfish are radially symmetrical.

**c. Which of the following animals can regenerate its broken body part?**

- 1. Cockroach**
- 2. Frog**
- 3. Sparrow**
- 4. Starfish**

Answer:

4. Starfish

Explanation: Cockroach, sparrow and frog cannot perform regeneration. Only echinoderms show power of regeneration. So only starfish can regenerate its broken part.

**d. Bat is included in which class?**

- 1. Amphibia**
- 2. Reptilia**
- 3. Aves**
- 4. Mammalia**

Answer:

4. Mammalia

Explanation: Bat gives birth to young ones and they also possess mammary glands.

Amphibia, Reptilia and Aves do not show such features. Therefore, bat is included in Mammalia.

### Question 8.

Body cavity	Germ Layer	Phylum
Absent	<u>Diploblastic</u>	Porifera
Absent	Triploblastic	<u>Platyhelminthes</u>
Pseudocoelom	<u>Triploblastic</u>	Aschelminthes
Present	<u>Triploblastic</u>	Arthropoda

### Question 9.

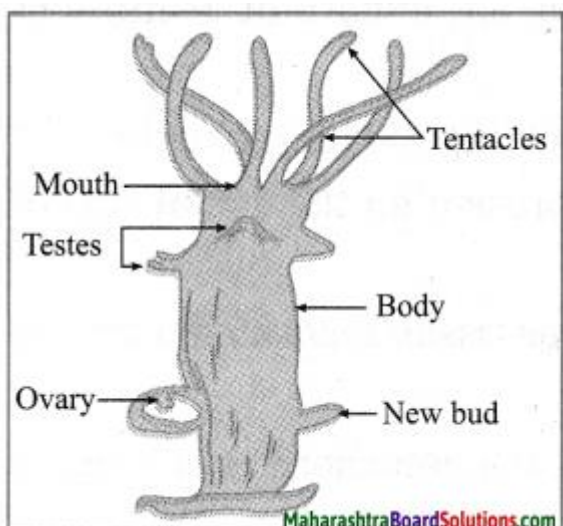
Type	Character	Examples
Cyclostomata	<u>Jawless mouth with suckers</u>	<u>Petromyzon, Myxine</u>
<u>Pisces</u>	Gill respiration	<u>Pomfret, Sea horse, Shark</u>
Amphibia	<u>Moist skin without exoskeleton</u>	Frog, Toad, Salamander
<u>Mammalia</u>	<u>Mammary glands</u>	Whale, Cat, Man
<u>Reptilia</u>	Poikilotherms	<u>Tortoise, Lizard, Snake</u>

### Question 10.

**Sketch, labell and classify.**

#### 1. Hydra.

Answer:



Classification:

Kingdom: Animalia

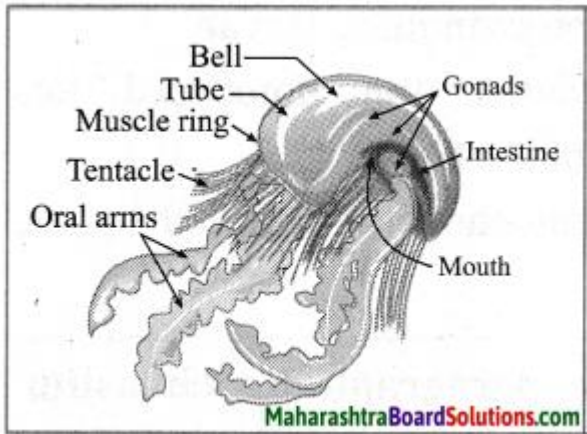
Division: Non-chordata

Phylum: Coelenterata

Example: Hydra

## 2. Jellyfish

Answer:



Classification:

Kingdom: Animalia

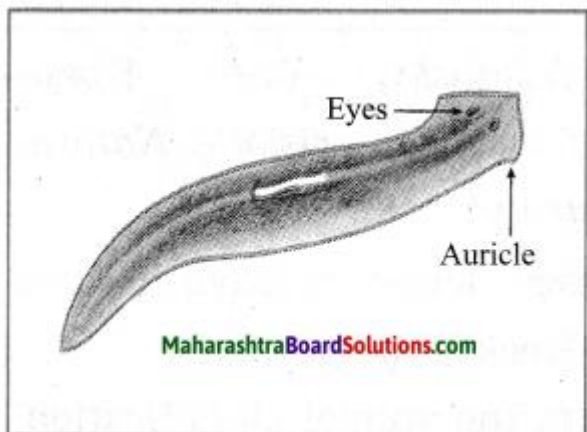
Division: Non-chordata

Phylum: Coelenterata

Example: Jellyfish

## 3. Planaria

Answer:



Classification:

Kingdom: Animalia

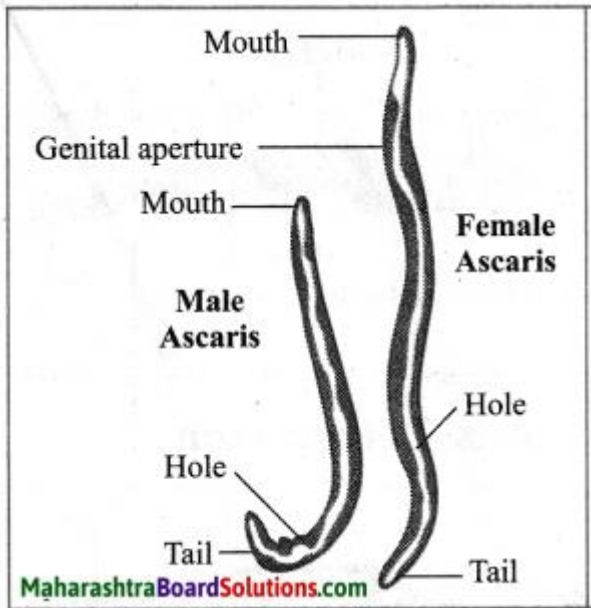
Division: Non-chordata

Phylum: Platyhelminthes

Example: Planaria

#### 4. Roundworm

Answer:



Classification:

Kingdom: Animalia

Division: Non-Chordata

Phylum: Aschelminthes

Example: Ascaris (Roundworm)

#### 5. Butterfly

Answer:



Classification:

Kingdom: Animalia

Division: Non-chordata

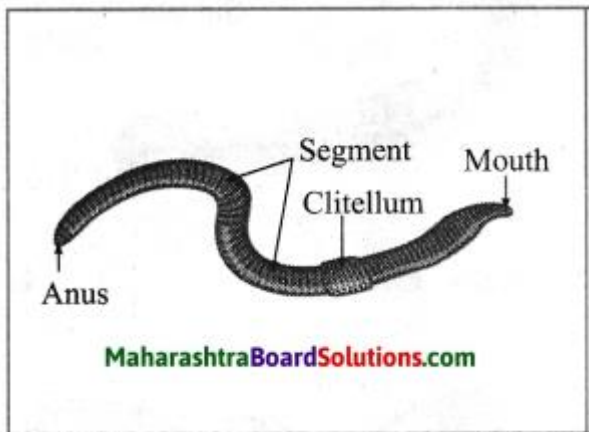
Phylum: Arthropoda

Class: Insecta

Example: Butterfly

## 6. Earthworm

Answer:



Classification:

Kingdom: Animalia

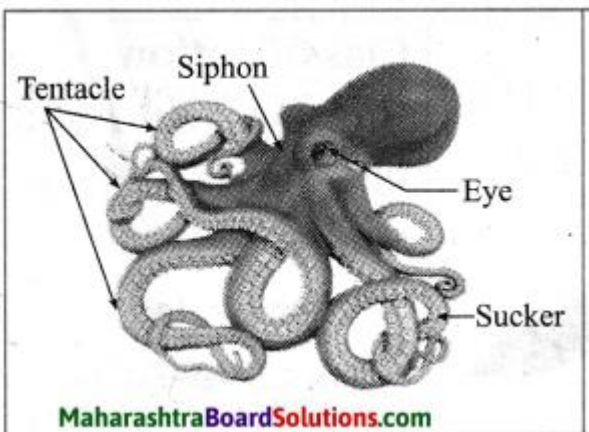
Division: Non-chordata

Phylum: Annelida

Example: Earthworm

## 7. Octopus

Answer:



Classification:

Kingdom: Animalia

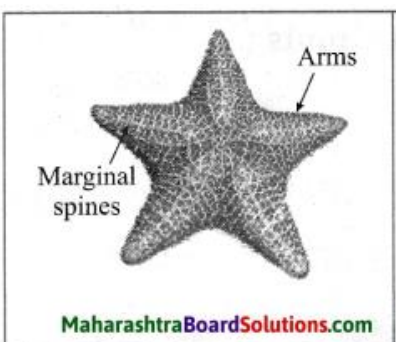
Division: Non-chordata

Phylum: Mollusca

Example: Octopus

## 8. Star fish

Answer:



Classification:

Kingdom: Animalia

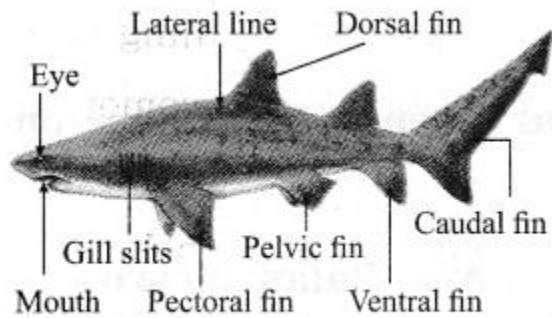
Division: Non-chordata

Phylum: Echinodermata

Example: Star fish

## 9. Shark

Answer:



Classification:

Kingdom: Animalia

Phylum: Chordata

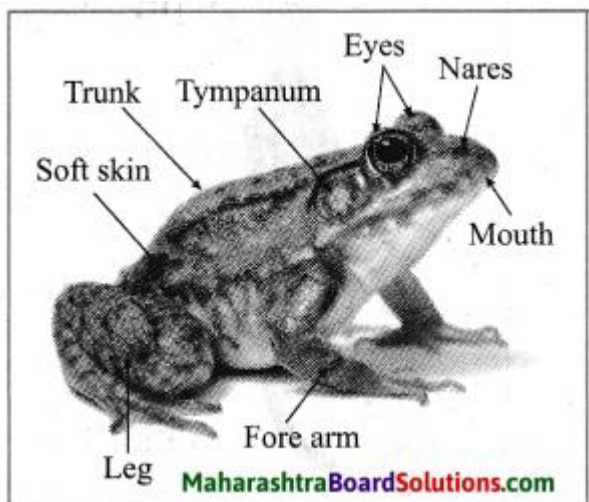
Sub Phylum: Vertebrata

Class: Pisces

Example: Scoliodon (Shark)

## 10. Frog

Answer:



Classification:

Kingdom: Animalia

Phylum: Chordata

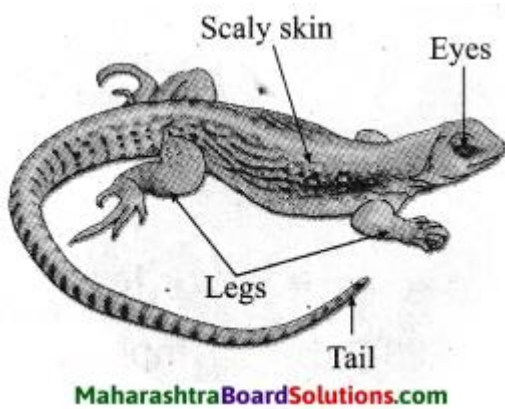
Sub Phylum: Vertebrata

Class: Amphibia

Example: Frog

## 11. Wall Lizard

Answer:



Classification:

Kingdom: Animalia

Phylum: Chordata

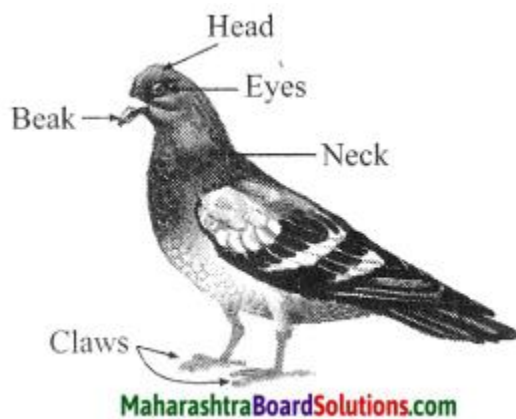
Sub Phylum: Vertebrata

Class: Reptilia

Example: Wall Lizard

## 12. Pigeon.

Answer:



Classification:

Kingdom: Animalia

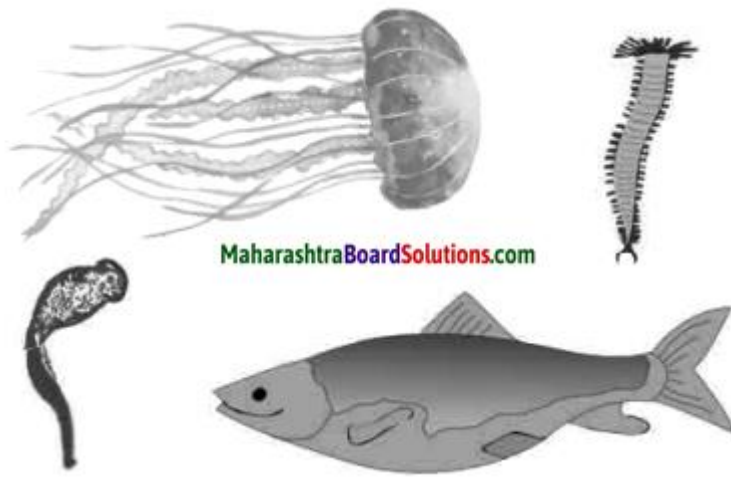
Phylum: Chordata

Sub-Phylum: Vertebrata

Class: Aves

Example: Pigeon

**Question 11.**



Answer:

- (1) Jellyfish
- (2) Nereis
- (3) Flatworm/Planaria
- (4) Bony fish.