Progress Check

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1. **Rearrange the following categories of animal grouping in a sequence starting from the highest downward to the lowest.**
   Class _____ **Phylum _____**
   Species _____ **Genus _____**
   Kingdom _____
   Solution:
   The following is the rearrangement of the categories of animal grouping from the highest to the least:
   - Kingdom
   - Phylum
   - Class
   - Genus
   - Species

2. **Tick-mark the features that characterise vertebrates.**
   (i)Dorsal nerve cord
   (ii)Haemoglobin dissolved
   (iii)Three or more pairs of limbs
   (iv)A tail behind the level of the anus
   (v)Dorsal heart
   Solution:

Features	**Presence of vertebral characteristics**
Dorsal nerve cord	✓
Haemoglobin dissolved	-
Three or more pairs of limbs	-
A tail behind the level of the anus	✓
Dorsal heart	-

Progress Check

1. **Mention the name of the phylum against the following characteristics**
   (i) No single mouth but numerous pores as water inlets _____.
   (ii) Jointed appendages _____.
   (iii) Unsegmented body with a protective calcareous shell _____.
   (iv) Locomotion by tube feet _____
   (v) Long, cylindrical and unsegmented body _____.
   (vi) Small flat unsegmented worms _____.

Solution:

(i) Phylum Porifera
(ii) Phylum Arthropoda
(iii) Phylum Mollusca
(iv) Phylum Echinodermata
(v) Phylum Nematoda
(vi) Phylum Platyhelminthes

2. **Name the phylum of each of the following invertebrates.**

	Animal	**Phylum**
(i)	**Leech**	_____
(ii)	**Hydra**	_____
(iii)	**Tapeworm**	_____
(iv)	**Sea cucumber**	_____
(v)	**Sponge**	_____
(vi)	**Roundworm**	_____
(vii)	**Scorpion**	_____
(viii)	**Slug**	_____
(ix)	**Centipede**	_____
(x)	**Butterfly**	_____

Solution:

	Animal	**Phylum**
(i)	Leech	Annelida
(ii)	Hydra	Cnidaria/Coelenterata
(iii)	Tapeworm	Platyhelminthes
(iv)	Sea cucumber	Echinodermata
(v)	Sponge	Porifera
(vi)	Roundworm	Nematoda
(vii)	Scorpion	Arthropoda
(viii)	Slug	Mollusca
(ix)	Centipede	Arthropoda
(x)	Butterfly	Arthropoda

Progress Check

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1. **Listed below are eleven characteristics (i-xi) in Column I and the five classes (a-e) of Chordata in Column II. Match at least two characteristics with each class.**

Column I (Characteristics)	Column II (Classes)
(i) Three chambered heart	(a) Pisces
(ii) Feathers	_____
(iii)Two-chambered heart	_____
(iv)Eardrum in a pit	(b) Amphibia
(v)Scales	_____
(vi)External ears	_____
(vii) Gills	(c) Reptilia
(viii) Moist skin	_____
(ix) Horny scales on skin	_____
(x) Homeothermal	(d) Aves
(xi)Testes in scrotum	_____
	(e) Mammalia
	_____

Solution:

The following table depicts the classes along with atleast two characteristics:

Class	Characteristic
Pisces	Two chambered heart Scales
Amphibia	Moist skin Gills
Reptilia	Eardrum in a pit Horny scales on skin Three chambered heart
Aves	Feathers Homeothermal
Mammalia	Testes in scrotum External ears

2. **Mention the class of vertebrates against each.**
   - **(i) Crocodile** _____
   - **(ii) Penguin** _____
   - **(iii) Toad** _____
   - **(iv) Shark** _____
   - **(v) Whale** _____

(vi) Bat _____

(vii) House lizard _____

Solution:

(i) Crocodile - Reptilia
(ii) Penguin - Aves
(iii) Toad - Amphibia
(iv) Shark - Pisces
(v) Whale - Mammalia
(vi) Bat – Mammalia
(vii) House lizard – Reptilia

Review Questions

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A. Multiple Choice Type

1. The animals (Kingdom Animalia) are mainly grouped under two categories
(a) Bilaterally symmetrical and radically symmetrical
(b) Coelomate and acoelomate
(c) Aquatic and terrestrial
(d) Vertebrates and invertebrates
Solution:
(d) Vertebrates and invertebrates
Presence of vertebral column in vertebrates sets them apart from invertebrates.

2. Which one of the following examples does not come under the particular group?
(a) Mushroom, yeast, fern - Fungi
(b) Paramecium, Euglena, sponge - Protista
(c) Starfish, Cuttlefish, Dogfish - Pisces
(d) Bat, Parrot, Oyster - Vertebrates
Solution:
(d) Bat, parrot, Oyster – Vertebrates
Oyster falls under Phylum Mollusca, it is an invertebrate.

3. Which one of the following is an example of binomial scientific name?
(a) Green alga
(b) Snow leopard
(c) Rana tigrina
(d) China rose
Solution:
(c) Rana tigrina.
It belongs to the class amphibia.

4. Which one of the following is the correct statement about the respective animal(s)?
(a) Donkey and horse should be considered one single species because they can successfully mate and produce an offspring.
(b) Donkey and horse are two different genuses
(c) Mule is a separate species
(d) Mule is neither a donkey nor a horse.
Solution:
(d) Mule is neither a donkey nor a horse.

B. Very Short Answer Type

1. Who had introduced the binomial system of naming living beings?
Solution:

The binomial system of naming living beings was introduced by Carolus Linnaeus.

2. **Which two characters out of (a)-(e) given below are common to dog, humans, squirrel, bat, camel and monkey?**
   (a) Scales on the skin.
   (b) wings.
   (c) External ears.
   (d) Give birth to young ones.
   (e) A functional tail.

   Solution:

   Listed below are the two characters that are common to these living entities.
   - External ears
   - Give birth to young ones

   These are the characteristics possessed by mammals.

3. **Match the items in Column I with as many as possible and even repeatedly from Column II**

Column I	**Column II**
1. Pine	(i) Fungi
2. Earthworm	(ii) Monera
3. Bread mould	(iii) Prokaryote
4. Amoeba	(iv) Gymnosperm
5. Moss	(v) Plantae
6. Bacteria	(vi) Animalia
	(vii) Protista
	(viii) Bryophyta

Solution:

Listed below are the matched items:

Column I	**Column II**
Pine	Plantae Gymnosperm
Earthworm	Animalia
Bread mould	Fungi
Amoeba	Protista
Moss	Plantae Bryophyta
Bacteria	Monera Prokaryote

C. Short Answer Type

1. **Rearrange the following categories of classification in their proper sequence starting with**

the highest.
Species, family, genus, class, order, phylum.
Solution:
Listed below is the order starting from the highest:

- Phylum
- Class
- Order
- Family
- Genus
- Species

2. **Give the scientific names of man, domestic cat, and peepal tree.**
Solution:
The scientific names are as follows:
    - Man – *Homo sapien*
    - Domestic cat – *Felis domesticus*
    - Peepal tree – *Ficus religiosa*

3. **Why are scientific names of living beings considered better than their common names?**
Solution:
Science is a field wherein people from different parts of the world having different dialects are required to read about each other's research. It became a necessity to avoid any possible confusion that would be created using local names. Scientific names are particularly given in a scientific language using certain rules that are unique and universally applicable. Hence these names can be used to recognize an entity anywhere in the world. This is the reason why scientific names of living beings are considered better.

4. **Mention any two drawbacks of classifying organisms under the old kingdom classification.**
Solution:
The two drawbacks of classifying organisms under the old kingdom classification are:
    - Bacteria were classified under Kingdom Plantae though they possessed the following features:
        - No chlorophyll
        - Cannot perform photosynthesis
        - No definite nucleus
        - No nuclear membrane
        - No chromosomes
    - Fungi were classified under Kingdom Plantae. Though bread mould are multicellular algae, they do not possess stem, roots or leaves. Chlorophyll is absent and it does not bear flowers, seeds, fruits as seen in plants.

5. **All humans on earth today may differ widely in their facial features, colour, height, etc. Yet, they belong to a single species Homo sapiens. Give one reason why they are not considered belonging to different species.**
Solution:

All humans on the earth today may differ widely in their facial features, colour, height etc. Yet they belong to a single species Homo sapiens as they can interbreed amongst themselves and reproduce offsprings that are similar to the parent, exhibiting parental features and are normal. Species are organisms of a specific kind wherein members can interbreed amongst themselves so as to produce younger ones that are fertile. Consequently, though humans differ in their characteristics, they can still breed to produce fertile offsprings.

6. **Rewrite the following scientific names correctly.**
ficus religiosa(peepal), zea Mays (maize) and Bombyx Mori (silk moth).
Solution:
Listed below are the scientific names written correctly:
- *Ficus religiosa* – Peepal
- *Zea mays* – Maize
- *Bombyx mori* – Silk moth

7. **Name the five kingdoms according to the new classification.**
Solution:
As per the new classification, the five kingdoms are as listed below:
- Kingdom Monera
- Kingdom Protista
- Kingdom Fungi
- Kingdom Plantae
- Kingdom Animalia

8. **What are the group names of the following categories of animals?**
(a) Animals with a backbone _____
(b) Animals with a hairy skin _____
(c) Animals with three pairs of legs _____
(d) Animals with feathers _____
Solution:
The group names of the following categories of animals are as follows:
(a) Animals with a backbone - Vertebrate
(b) Animals with a hairy skin - Mammalia
(c) Animals with three pairs of legs - Insecta
(d) Animals with feathers - Aves

9. **Which ones of the following animals are invertebrates? Housefly, silverfish, trout, jellyfish, whale, penguin, lizard and sponge.**
Solution:
From the above mentioned list, following are the invertebrate animals:
- Housefly
- Silverfish
- Jellyfish
- Sponge

10. Give any one difference between each of the following:

(a) Protozoa and metazoa,

(b) Vertebrate and Invertebrate,

(c) Insect and Arachnida,

(d) Flatworm and Roundworm,

Solution:

Listed below are the differences:

(a) Protozoa and metazoa

Protozoa	Metazoa
They are unicellular	They are multicellular

(b) Vertebrate and Invertebrate

Vertebrate	Invertebrate
Presence of a unique backbone along with a spinal cord	Backbone absent

(c) Insect and Arachnida

Insect	Arachnida
Possess three pair of legs	Possess four pair of legs

(d) Flatworm and Roundworm

Flatworm	Roundworm
Their body is dorso-ventrally flattened	Their body shape is cylindrical and tapered towards both the ends.

11. Given below is a list of ten animals each followed by three terms or features. Underline the term which does not match with the animal.

(i) Ameoba – Nucleus, tenacle, food vacuole.

(ii) Hydra – Invertebrata, Cindaria, Crustacea.

(iii) Fish – Gills, paired fins, ear drum

(iv) Earthworm – Invertebrata, Annelida, Insecta.

(v) Grasshopper – Wings, trachea, proboscis.

(vi) Butterfly – Insecta, Invertebrata, Mollusca.

(vii) Whale – Gills, mammary glands, fat under the skin.

(viii) Pigeon – Feathers, wings, hair.

(ix) Monkey – External ear, sweat glands, lateral line.

(x) Bat – Aves, Mammalia, Chordata.

Solution:

The features that do not match with the corresponding animals are underlined:

(i) Ameoba – Nucleus, tenacle, food vacuole.
(ii) Hydra – Invertebrata, Cindaria, Crustacea.
(iii) Fish – Gills, paired fins, ear drum
(iv) Earthworm – Invertebrata, Annelida, Insecta.
(v) Grasshopper – Wings, trachea, proboscis.
(vi) Butterfly – Insecta, Invertebrata, Mollusca.
(vii) Whale – Gills, mammary glands, fat under the skin.
(viii) Pigeon – Feathers, wings, hair.
(ix) Monkey – External ear, sweat glands, lateral line.
(x) Bat – Aves, Mammalia, Chordata.

12. Explain the meaning of the terms cold-blooded and warm-blooded (homeothermal).

Solution:

Cold-blooded – These are the animals that cannot control the temperature of their bodies. The temperature of their bodies is regulated by the external environment. Example – Pisces, reptiles.
Warm-blooded – These are the animals whose body temperature is constant relative to the internal mechanisms and the external surroundings. Example – Whales, Humans.

13. Name three animals (belonging to different classes) which breathe by means of lungs but have no external ears (pinnae).

Solution:

Listed below are the three animals:

- Lizard – Class Reptilia
- Common Myna – Class Aves
- Tree Frog – Class Amphibia

D. Long Answer Type

1. Mention any one major similarity and one major difference in the following pairs of animals:

(a) Insects and birds
(b) Whales and fishes
(c) Snakes and earthworms
(d) Bat and pigeon
(e) Cuttlefish and dogfish
(f) Wall lizard and frog

Solution:

Following are the similarities and differences:

Pair of animals	Similarity	Difference
a) Insects and birds	Both have wings	Insects are invertebrates whereas birds as vertebrates
b) Whales and fishes	Both are aquatic	Whales breathe through lungs wheras fishes breathe through gills. Whales belong to class mammalia whereas

		fishes belong to class Pisces
c) Snakes and earthworms	Both do not have any limbs	Earthworms are invertebrates whereas snakes are vertebrates
d) Bat and pigeon	Both breathe through lungs	Bats have external ears whereas pigeons have internal ears
e) Cuttlefish and dogfish	Both are marine entities	Dogfish is a vertebrate whereas cuttlefish is an invertebrate
f) Wall lizard and frog	Both are cold-blooded	Wall lizards are terrestrial whereas frogs inhabit both on land and water.

2. Match the names of animal groups in Column I with the names of animals in Column II.

Column I (Group)	Column II (Animal)
Annelida	**Pigeon**
Porifera	**Snake**
Mollusca	**Earthworm**
Reptilia	**Sponge**
Amphibia	**Octopus**
Pisces	**Trout**
Mammal	**Rabbit**

Which names are left out that do not match and why?

Solution:

Column I(Group)	Column II(Animal)
Annelida	Earthworm
Porifera	Sponge
Mollusca	Octopus
Reptilia	Snake
Pisces	Trout
Mammal	Rabbit

Amphibia from column I and Pigeon from Column II are left unmatched. Pigeon belongs to class Aves.

E. Structured/Application/Skill Type

1. Tyrannosaurus was about six metres long and it preyed upon other animals. What do you think about its classification – was it an amphibian, a reptile or a mammal?
Can you call it a relative of Kangaroo? Yes/No
Give reason

Solution:

Tyrannosaurus is a reptile while Kangaroo is a mammal, hence they are not related to each other.
Features of Tyrannosaurus:

- Cold-blooded animals

- Presence of scales throughout the body which can be horny
- They are egg-laying animals. The eggs possess a leathery shell
- Possessed three chambered heart as the ventricles were divided partially
- Dinosaurs reigned the earth back then, few were vegetarian while few others were non-vegetarians.