

1. Which of the following taxonomic ranks represents the broadest rank?

Options:

- a) Species
- b) Genus
- c) Kingdom
- ✓ d) Domain

Explanation:

Domain is the highest and broadest taxonomic rank in the biological classification system. It includes all life forms grouped into three domains: Archaea, Bacteria, and Eukarya.

2. Which characteristic is unique to organisms in the domain Archaea?

Options:

- a) Cell walls made of peptidoglycan
- b) Presence of a nucleus
- ✓ c) Ability to live in extreme environments

Explanation:

Organisms in the domain *Archaea* are known for surviving in extreme environments, such as hot springs, salt lakes, and acidic or anaerobic conditions. Their cell walls lack peptidoglycan, and they do not have a nucleus (they are prokaryotes).

3. Which of these statements is NOT related to bacteria?

Options:

- a) Do not have a nucleus
- b) Cell wall made of peptidoglycan
- c) Most are heterotrophic
- ✓ d) Have chlorophyll in their chloroplast

Explanation:

Bacteria do not have **chloroplasts**; some can perform photosynthesis, but not with chloroplasts. They also lack a nucleus and most are heterotrophic.

4. Which of these organisms belongs to the domain Eukarya?

Options:

- a) *Escherichia coli*
- ✓ b) Yeast

- c) Coronavirus
- d) None of the above

Explanation:

Yeast is a unicellular fungus and belongs to **Eukarya** because it has a true nucleus. *E. coli* is a bacterium (prokaryote) and coronavirus is a virus (not even a cell).

5. Which of the following is a key characteristic that distinguishes eukaryotic cells from prokaryotic cells?

Options:

- a) Lack of a cell wall
- ✓ **b) Presence of a nucleus**
- c) Absence of ribosomes
- d) Small size

Explanation:

Eukaryotic cells have a well-defined **nucleus** and membrane-bound organelles. Prokaryotes lack a nucleus.

6. Which kingdom includes organisms that are primarily unicellular, eukaryotic, and often heterotrophic?

Options:

- a) Archaea
- ✓ **b) Protista**
- c) Fungi
- d) Plantae

Explanation:

The **Kingdom Protista** includes mostly **unicellular eukaryotic** organisms. Many of them are heterotrophic, though some can perform photosynthesis.

7. Why are fungi included in heterotrophic organisms?

Options:

- a) Have chitin in cell wall
- ✓ **b) Absorb nutrients**

- c) Reproduce by spores
- d) Cannot prepare food

Explanation:

Fungi are **heterotrophs** because they **absorb nutrients** from their surroundings. They don't perform photosynthesis.

8. Why is it impossible to classify viruses within traditional biological kingdoms?

Options:

- ✓ a) **They lack cell structure and organelles**
- b) They can perform photosynthesis
- c) They are smaller in size than bacteria
- d) They are parasites

Explanation:

Viruses do not have **cell structure**, organelles, or metabolism. Therefore, they don't fit into any traditional kingdom like plants, animals, or bacteria.

9. Which of the following is the correct way for writing the scientific name of humans?

Options:

- ✓ a) ***Homo sapiens***
- b) Homo sapiens
- c) Homo Sapiens
- d) homo sapiens

Explanation:

In binomial nomenclature, the **first word (genus)** is capitalized and the **second word (species)** is in lowercase. The name should also be italicized or underlined when handwritten.

10. Which information can you get if you know the scientific name of an organism?

Options:

- a) Kingdom and phylum
- b) Phylum and genus

✓ c) **Genus and species**

d) Class and species

Explanation:

A scientific name includes the **Genus** and **Species** of the organism, e.g., *Homo sapiens* — where *Homo* is genus and *sapiens* is species.

1. What is the term used to describe the variety of organisms in ecosystems?

Answer:

The term is **biodiversity**, which refers to the variety of life forms including plants, animals, fungi, and microorganisms in an ecosystem.

2. How is biodiversity crucial for humans and for the planet Earth?

Answer:

Biodiversity provides food, medicine, clean air, water purification, and ecosystem stability. It ensures survival of life by maintaining natural balance.

3. What are the seven taxonomic ranks used in the Linnaean system?

Answer:

1. Kingdom
 2. Phylum
 3. Class
 4. Order
 5. Family
 6. Genus
 7. Species
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4. Write the taxonomic ranks of lion and corn.

Answer:

Lion (*Panthera leo*):

- Kingdom: Animalia
- Phylum: Chordata
- Class: Mammalia
- Order: Carnivora
- Family: Felidae
- Genus: *Panthera*
- Species: *leo*

Corn (Zea mays):

- Kingdom: Plantae
 - Phylum: Angiosperms
 - Class: Monocots
 - Order: Poales
 - Family: Poaceae
 - Genus: Zea
 - Species: mays
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5. What are the basic differences between Archaea and Bacteria?

Answer:

- **Archaea:** Live in extreme environments, lack peptidoglycan in cell wall, have unique enzymes and RNA.
 - **Bacteria:** Live in common environments, have peptidoglycan in cell wall, differ in genetic structure.
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6. What are the shortcomings of the three-kingdom classification system?

Answer:

- It did not account for microorganisms.
 - Grouped unrelated organisms together.
 - Couldn't classify unicellular and prokaryotic organisms accurately.
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7. Which kingdom includes organisms that are multicellular and heterotrophic, and lack cell walls?

Answer:

Kingdom Animalia

8. Enlist the distinguishing characteristics of fungi.

Answer:

- Eukaryotic
- Cell walls made of chitin
- Heterotrophic (absorb nutrients)
- Reproduce via spores
- Mostly multicellular (except yeast)

9. List the three domains that encompass all living organisms.

Answer:

1. Archaea
 2. Bacteria
 3. Eukarya
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10. Why can't we classify viruses in any kingdom?

Answer:

Viruses lack cellular structure, do not perform metabolism, and can't reproduce on their own. Therefore, they don't fit into any traditional kingdom.

11. How does binomial nomenclature facilitate communication about organisms across different languages?

Answer:

It provides a **universal scientific name** (Genus + species) that is understood globally, regardless of local language differences, reducing confusion.

C. Write Answers in Detail:

1. Discuss biodiversity and its significance in maintaining the health of ecosystems.

Answer:

Biodiversity refers to the variety of living organisms. It ensures food chains are stable, helps pollination, improves soil fertility, purifies air/water, and provides resilience to climate change. Ecosystems with high biodiversity are more productive and sustainable.

2. Explain the importance of classification in biology and how it helps us understand the relationships between different organisms.

Answer:

Classification organizes organisms into groups based on similarities. It helps scientists study evolutionary relationships, identify organisms easily, and predict characteristics of unknown organisms.

3. Describe the Linnaean system of classification in detail, stating the seven taxonomic ranks and their relationships.

Answer:

The Linnaean system uses a hierarchy:

- **Kingdom** → broadest
- **Phylum**
- **Class**
- **Order**
- **Family**
- **Genus**
- **Species** → most specific

Each level shares common traits. This system allows logical grouping and scientific naming.

4. Compare and contrast the domains Archaea and Bacteria, focusing on their key characteristics.

Answer:

Feature	Archaea	Bacteria
Cell Wall	No peptidoglycan	Peptidoglycan present
Habitat	Extreme environments	Common environments
Membrane Lipids	Unique, branched	Unbranched, typical
Genetic Material	Closer to Eukarya	Distinct from Eukarya
Sensitivity to antibiotics	Usually resistant	Usually sensitive

5. Describe the diagnostic characteristics of the four kingdoms within the domain Eukarya.

Answer:

1. **Protista:** Mostly unicellular, aquatic, eukaryotic.
2. **Fungi:** Heterotrophic, cell walls with chitin, spore reproduction.

3. **Plantae:** Multicellular, autotrophic, cell walls with cellulose.
 4. **Animalia:** Multicellular, heterotrophic, no cell wall.
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6. Discuss the challenges of classifying viruses within the traditional three-domain system of life.

Answer:

Viruses are non-cellular, lack metabolism, and cannot reproduce independently. They use host cells for replication. Due to these differences, they do not fit into Archaea, Bacteria, or Eukarya, and hence remain unclassified in domain systems.

7. Explain the rules and guidelines for suggesting scientific names to organisms.

Answer:

- Binomial nomenclature is used.
 - **Genus** is capitalized; **species** is lowercase.
 - Name is italicized or underlined.
 - Latin or Greek language is used.
 - Proposed name must be unique and approved by international committees.
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D. Inquisitive Questions:

1. How might placing an organism in the incorrect taxonomic group affect conservation or scientific studies?

Answer:

Incorrect classification can lead to wrong conservation priorities, misuse of medicines or chemicals, and misinterpretation of biological behavior, reducing research effectiveness and endangering species.

2. Imagine you discover a new organism. What steps would you take to classify and name it according to the principles of binomial nomenclature?

Answer:

- Observe structure, function, and genetics.
- Compare with existing taxa.
- Determine its Kingdom, Domain, etc.
- Suggest a Genus and species name following Latin rules.
- Submit name for approval to taxonomic authorities.

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