

Class 9 Science Chapter 12 – Important Questions

Patterns in Life: Diversity and Classification

 **New NCERT *Exploration* | 2026–27**

Chapter 12 covers **biodiversity, classification, classification systems, Whittaker's five kingdoms, plant groups, animal groups, adaptations, hierarchy of classification, binomial nomenclature, the three-domain system, fossils and biodiversity conservation.**

SECTION A – VERY SHORT ANSWER QUESTIONS

- 1. What is biodiversity?**
- 2. Why is biodiversity important?**
- 3. What is classification?**
- 4. Why do scientists classify organisms?**
- 5. What is an endemic species?**
- 6. What is a biodiversity hotspot?**
- 7. Name the major biodiversity hotspots associated with India.**
- 8. What is an ecosystem?**
- 9. What is a producer?**
- 10. What is a consumer?**

- 11. What is a decomposer?**
 - 12. What is a prokaryote?**
 - 13. What is a eukaryote?**
 - 14. What is a unicellular organism?**
 - 15. What is a multicellular organism?**
 - 16. What is autotrophic nutrition?**
 - 17. What is heterotrophic nutrition?**
 - 18. Who proposed the five-kingdom classification?**
 - 19. Name the five kingdoms.**
 - 20. What is binomial nomenclature?**
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SECTION B – BIODIVERSITY

- 21. Define biodiversity.**
- 22. Why is Earth called a biodiverse planet?**
- 23. How does biodiversity help maintain ecosystem stability?**
- 24. How do plants contribute to biodiversity and ecosystem functioning?**
- 25. What role do fungi and bacteria play in ecosystems?**
- 26. How do birds, bees and bats contribute to ecosystems?**
- 27. Why is biodiversity important for humans?**
- 28. What are biodiversity hotspots?**

- 29. What makes a region a biodiversity hotspot?**
- 30. Name the biodiversity hotspots associated with India.**
- 31. Why are biodiversity hotspots important for conservation?**
- 32. What are endemic species?**
- 33. Why are endemic species particularly vulnerable to habitat loss?**
- 34. How can loss of biodiversity affect food chains?**
- 35. How can biodiversity loss affect agriculture?**

The chapter describes biodiversity as the immense variety of life and explains its importance in maintaining ecosystem functions such as oxygen production, decomposition, pollination and food production.



SECTION C – NEED FOR CLASSIFICATION

- 36. What is biological classification?**
- 37. Why is classification necessary?**
- 38. What difficulties would scientists face if organisms were not classified?**
- 39. On what basis can organisms be classified?**
- 40. Why is cell structure an important basis for classification?**
- 41. Why is mode of nutrition important in classification?**
- 42. Why is the number of cells important in classification?**
- 43. Why are reproductive methods useful in classification?**

- 44. Why is habitat alone not sufficient for classification?**
 - 45. Why should organisms be classified using several characteristics rather than only one?**
 - 46. How can genetic information help in classification?**
 - 47. How does classification make the study of millions of organisms easier?**
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SECTION D – HISTORY OF CLASSIFICATION

- 48. Who was Aristotle?**
- 49. How did Aristotle classify animals?**
- 50. What were the limitations of Aristotle's classification?**
- 51. What was the two-kingdom classification?**
- 52. Who proposed the two-kingdom classification?**
- 53. Why was the two-kingdom classification inadequate?**
- 54. Why was Protista introduced?**
- 55. Why was Monera introduced?**
- 56. Why were fungi separated from plants?**
- 57. What is the four-kingdom classification?**
- 58. What is the five-kingdom classification?**
- 59. Arrange the major classification systems in chronological order.**

60. Why have classification systems changed over time?

The textbook traces classification from Aristotle's habitat-based system through two-, three- and four-kingdom systems to Whittaker's five kingdoms.



SECTION E – FIVE-KINGDOM CLASSIFICATION

61. Name the five kingdoms proposed by Robert H. Whittaker.

62. What are the main criteria used in five-kingdom classification?

63. What is Kingdom Monera?

64. What type of organisms are included in Monera?

65. What is Kingdom Protista?

66. What type of organisms are included in Protista?

67. What is Kingdom Fungi?

68. What is the mode of nutrition in fungi?

69. What is Kingdom Plantae?

70. What is Kingdom Animalia?

71. Differentiate between Monera and Protista.

72. Differentiate between Plantae and Fungi.

73. Differentiate between Fungi and Animalia.

74. Why are bacteria placed in Monera?

75. Why is Amoeba placed in Protista?

76. Why are mushrooms placed in Fungi rather than Plantae?

77. Why are plants placed in Plantae?

78. Why are animals placed in Animalia?

The five kingdoms are **Monera, Protista, Fungi, Plantae and Animalia**. The textbook uses cell type, organisation and nutrition as important bases for distinguishing them.



SECTION F – KINGDOM MONERA

79. What are the main characteristics of Monera?

80. Are organisms in Monera prokaryotic or eukaryotic?

81. Are organisms in Monera unicellular or multicellular?

82. Give examples of organisms belonging to Monera.

83. Why do bacteria lack a true nucleus?

84. How do bacteria obtain nutrition?

85. Why are cyanobacteria important?

86. How are bacteria useful to humans?

87. How can bacteria be harmful?



SECTION G – KINGDOM PROTISTA

88. What are the main characteristics of Protista?

89. Are protists prokaryotic or eukaryotic?

90. Are protists generally unicellular or multicellular?

- 91. Give examples of protists.
 - 92. Why is Amoeba placed in Protista?
 - 93. Why is Paramecium placed in Protista?
 - 94. How do protists obtain nutrition?
 - 95. How are protists different from bacteria?
 - 96. Why was Protista introduced as a separate kingdom?
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SECTION H – KINGDOM FUNGI

- 97. What are the main characteristics of fungi?
 - 98. Are fungi autotrophic or heterotrophic?
 - 99. How do fungi obtain food?
 - 100. What is the role of chitin in fungal cells?
 - 101. Give examples of fungi.
 - 102. Why are mushrooms not classified as plants?
 - 103. What is the importance of fungi as decomposers?
 - 104. How are fungi useful to humans?
 - 105. How can fungi be harmful?
 - 106. Why are fungi placed in a separate kingdom?
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SECTION I – KINGDOM PLANTAE

- 107. What are the main characteristics of Plantae?**
 - 108. Are plants autotrophic or heterotrophic?**
 - 109. Why are chlorophyll and photosynthesis important in plants?**
 - 110. What are the major plant groups discussed in the chapter?**
 - 111. What is Thallophyta?**
 - 112. What is Bryophyta?**
 - 113. What is Pteridophyta?**
 - 114. What are Gymnosperms?**
 - 115. What are Angiosperms?**
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SECTION J – PLANT GROUPS

- 116. What are the characteristics of Thallophyta?**
- 117. What are the characteristics of Bryophyta?**
- 118. Why are bryophytes called the amphibians of the plant kingdom?**
- 119. What are the characteristics of Pteridophyta?**
- 120. Give an example of a pteridophyte.**
- 121. What are Gymnosperms?**
- 122. Why are gymnosperm seeds called naked seeds?**
- 123. Give examples of gymnosperms.**
- 124. What are Angiosperms?**

- 125. Why are angiosperm seeds called enclosed seeds?
- 126. What is the difference between gymnosperms and angiosperms?
- 127. Differentiate between bryophytes and pteridophytes.
- 128. Why are bryophytes dependent on water for reproduction?
- 129. What is the role of xylem?
- 130. What is the role of phloem?
- 131. Why are vascular tissues important in plants?

The chapter distinguishes major plant groups using features such as **vascular tissues**, **seeds** and **flowers**, and specifically notes that bryophytes require water for reproduction.



SECTION K – KINGDOM ANIMALIA

- 132. What are the main characteristics of Animalia?
 - 133. Are animals autotrophic or heterotrophic?
 - 134. What is an invertebrate?
 - 135. What is a vertebrate?
 - 136. What is a notochord?
 - 137. What is a backbone or vertebral column?
 - 138. Name the major invertebrate phyla discussed in the chapter.
 - 139. What are protochordates?
 - 140. What are vertebrates?
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SECTION L – INVERTEBRATE GROUPS

- 141. What are Porifera?
 - 142. Give an example of Porifera.
 - 143. What are Cnidaria?
 - 144. Give an example of Cnidaria.
 - 145. What are Platyhelminthes?
 - 146. What are Nematoda?
 - 147. What are Annelida?
 - 148. What are Arthropoda?
 - 149. Give examples of arthropods.
 - 150. What are Mollusca?
 - 151. What are Echinodermata?
 - 152. Give examples of echinoderms.
 - 153. Differentiate between Annelida and Arthropoda.
 - 154. Why are arthropods the most diverse animal group?
 - 155. Differentiate between vertebrates and invertebrates.
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SECTION M – VERTEBRATES

- 156. What are vertebrates?
- 157. Name the major groups of vertebrates.

- 158. What are the characteristics of fishes?**
 - 159. What are the characteristics of amphibians?**
 - 160. What are the characteristics of reptiles?**
 - 161. What are the characteristics of birds?**
 - 162. What are the characteristics of mammals?**
 - 163. Give one example of each major vertebrate group.**
 - 164. Differentiate between amphibians and reptiles.**
 - 165. Differentiate between reptiles and birds.**
 - 166. Differentiate between birds and mammals.**
 - 167. Why are mammals considered highly adapted to different environments?**
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SECTION N – ADAPTATIONS

- 168. What is an adaptation?**
- 169. Why are adaptations important for survival?**
- 170. Give examples of adaptations in aquatic animals.**
- 171. Give examples of adaptations in desert plants.**
- 172. How do adaptations help organisms survive changing environments?**
- 173. Why can organisms living in the same habitat still belong to different groups?**
- 174. Why is habitat alone not a reliable basis for classification?**

175. A fish, dolphin and whale all live in water. Why should they not necessarily be placed in the same biological group?

This is directly aligned with the chapter's application question about the scientific problems of grouping organisms solely by habitat.



SECTION O – HIERARCHICAL CLASSIFICATION

176. What is hierarchical classification?

177. Name the major taxonomic categories in order.

178. What is a species?

179. What is a genus?

180. What is a family?

181. What is an order?

182. What is a class?

183. What is a phylum?

184. What is a kingdom?

185. Which is the smallest major taxonomic category?

186. Which is the broadest category among the traditional hierarchy?

187. Why is species considered the most specific basic category?

188. Why can a genus contain several species?

189. How does hierarchical classification show relationships between organisms?



SECTION P – BINOMIAL NOMENCLATURE

- 190. What is binomial nomenclature?**
- 191. Who introduced binomial nomenclature?**
- 192. Why is scientific naming necessary?**
- 193. What are the two parts of a scientific name?**
- 194. How is the genus name written?**
- 195. How is the species name written?**
- 196. Why does the genus name begin with a capital letter?**
- 197. Why does the species name begin with a small letter?**
- 198. Write the scientific name of a familiar organism correctly.**
- 199. What are the advantages of using scientific names?**
- 200. Why can common names cause confusion?**

The chapter stresses that scientific classification provides a common system that allows scientists around the world to communicate about organisms.



SECTION Q – THREE-DOMAIN SYSTEM

- 201. What is the three-domain system?**
- 202. Name the three domains.**

- 203. What is the difference between Bacteria and Archaea?**
- 204. What organisms are included in Eukarya?**
- 205. Why was the three-domain system proposed?**
- 206. How does the three-domain system differ from the five-kingdom system?**
- 207. Why is genetic information useful in modern classification?**
- 208. How can DNA evidence reveal evolutionary relationships?**
- 209. Why do classification systems continue to change?**
- 210. What does the changing classification system tell us about science?**

The chapter explains that improved technology and genetic evidence have led to changes in classification, making biological classification an ongoing process.



SECTION R – FOSSILS & EVOLUTION

- 211. What is a fossil?**
- 212. Where are fossils generally found?**
- 213. How do fossils provide evidence about the history of life?**
- 214. What can scientists learn from fossils?**
- 215. Why are older rock layers important in studying evolution?**
- 216. How can fossils help us understand extinct organisms?**
- 217. How can fossils, comparative structures and genetic evidence together help explain evolution?**
- 218. Who was Birbal Sahni?**

219. What was Birbal Sahni's contribution to palaeobotany?

220. Why are fossils called natural records of past life?

Fossils are described in the chapter as preserved remains in layers of rocks, sand or mud that help scientists understand how life changed over millions of years.



SECTION S – BIODIVERSITY UNDER THREAT

221. What are the major threats to biodiversity?

222. How does deforestation affect biodiversity?

223. How does pollution affect biodiversity?

224. How does overuse of natural resources affect biodiversity?

225. How can climate change affect biodiversity?

226. What happens when one species disappears from an ecosystem?

227. Why is biodiversity conservation important?

228. What is conservation?

229. Suggest ways to conserve biodiversity.

230. Why should biodiversity hotspots receive special protection?

231. How can local communities help conserve biodiversity?

232. Why is protecting habitats often more effective than protecting individual species alone?

The chapter identifies **pollution, deforestation, overuse of resources and climate change** as major pressures reducing biodiversity.

SECTION T – APPLICATION-BASED QUESTIONS

233.  An organism is single-celled and has a well-defined nucleus and several cilia.

- a) Is it prokaryotic or eukaryotic?
- b) Which kingdom would it most likely belong to?
- c) Give a reason.

This type of identification is directly included in the chapter's end questions.

234.  An animal has jointed legs and a segmented body.

- a) Which major animal group is it likely to belong to?
 - b) Give one example.
 - c) What feature supports your answer?
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235.  A plant has vascular tissues but does not produce seeds.

- a) Which plant group is it likely to belong to?
 - b) Give an example.
 - c) How is it different from a bryophyte?
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236.  A plant produces seeds that are not enclosed inside fruits.

- a) Which group does it belong to?
 - b) What are such seeds called?
 - c) Give an example.
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237.  An organism is multicellular, lacks chlorophyll and obtains nutrients by absorption.

- a) Which kingdom does it belong to?
 - b) Why is it not classified under Plantae?
 - c) Give an example.
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238. 🐬 A dolphin and a fish both live in water.

- a) Why should habitat not be the only basis for classifying them?
 - b) Mention one major structural difference.
 - c) Which broad animal groups do they belong to?
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SECTION U – COMPETENCY-BASED QUESTIONS

239. 🌍 Case Study – Biodiversity

A forest contains hundreds of plant species, insects, birds, fungi and microorganisms.

- a) What is this variety of life called?
 - b) How does this diversity help maintain the ecosystem?
 - c) What could happen if several species disappear?
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240. 🔬 Case Study – Classification

A newly discovered organism is unicellular, prokaryotic and obtains nutrition from its surroundings.

- a) Which kingdom would it most likely belong to under the five-kingdom system?
 - b) Why?
 - c) How would its classification differ under the three-domain system?
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241. 🌿 Case Study – Plant Classification

A plant has vascular tissues, reproduces through spores and does not produce flowers or seeds.

- a) Identify the likely plant group.
 - b) Give one example.
 - c) How is it different from a bryophyte?
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242. Case Study – Animal Classification

An animal has a backbone, breathes using lungs and has hair on its body.

- a) Which vertebrate group does it belong to?
 - b) Give two characteristics supporting your answer.
 - c) Give one example.
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243. Case Study – Fossils

Scientists find fossils of organisms in different layers of rock.

- a) What can the fossils tell scientists?
 - b) Why are deeper layers generally associated with older fossils?
 - c) How can fossils help explain evolutionary history?
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244. Case Study – Conservation

A biodiversity hotspot experiences large-scale deforestation.

- a) What could happen to endemic species?
- b) How could food chains be affected?
- c) Suggest two conservation measures.

The chapter specifically asks students to predict ecological consequences when a biodiversity hotspot loses a large portion of its habitat.



SECTION V – HIGHER-ORDER THINKING QUESTIONS

245. Why is biodiversity essential for ecosystem stability?

246. Why is habitat alone an inadequate basis for classification?

247. Why are cellular organisation and mode of nutrition important criteria for classification?

248. Why was the two-kingdom system insufficient?

249. Why was fungi separated from Plantae?

250. Why can two organisms living in the same habitat belong to completely different groups?

251. Why are viruses not placed in the five-kingdom classification?

252. Why do classification systems keep changing?

253. Why can DNA evidence provide stronger evidence of relationships than appearance alone?

254. Why can organisms that look similar sometimes be distantly related?

255. Why can a genus contain several species?

256. Why are fossils important even though the organisms represented by them may be extinct?

257. Why is conservation of biodiversity important for humans?

258. What problems would arise if all unicellular organisms were placed in one kingdom?

259. Why are bryophytes and pteridophytes placed in different groups even though neither produces flowers and seeds?

260. Why should classification be considered an ongoing scientific process?

The textbook directly explores the limitations of classifying all unicellular organisms together, the status of viruses, and the difference between bryophytes and pteridophytes.

SECTION W – LONG ANSWER QUESTIONS

261. Define biodiversity and explain its importance.

262. Explain the need for biological classification.

263. Describe the major changes in classification systems from Aristotle to Whittaker.

264. Explain Whittaker's five-kingdom classification.

265. Compare Monera, Protista, Fungi, Plantae and Animalia.

266. Explain the major groups of plants: Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.

267. Explain the major groups of animals and their distinguishing features.

268. Differentiate between vertebrates and invertebrates.

269. Explain hierarchical classification.

270. Explain binomial nomenclature and its advantages.

271. Explain the three-domain system.

272. Explain how fossils provide evidence about the history of life.

273. Explain the major threats to biodiversity and methods of conservation.

274. Explain how modern genetic evidence has changed biological classification.

MOST IMPORTANT QUESTIONS FOR EXAM

If students have limited time, prepare these **first**:

- ★ 1. Define biodiversity and explain its importance.
 - ★ 2. Why is classification necessary? Explain the major criteria used for classification.
 - ★ 3. Explain the development of classification systems from Aristotle to Whittaker.
 - ★ 4. Explain Whittaker's five-kingdom classification.
 - ★ 5. Differentiate between Monera, Protista, Fungi, Plantae and Animalia.
 - ★ 6. Explain the major plant groups with their characteristics.
 - ★ 7. Differentiate between bryophytes and pteridophytes.
 - ★ 8. Differentiate between gymnosperms and angiosperms.
 - ★ 9. Explain the major groups of invertebrates.
 - ★ 10. Differentiate between vertebrates and invertebrates.
 - ★ 11. Explain the five major vertebrate groups.
 - ★ 12. Explain hierarchical classification and binomial nomenclature.
 - ★ 13. Explain the three-domain system.
 - ★ 14. Explain how fossils provide evidence for evolutionary history.
 - ★ 15. Explain the major threats to biodiversity and methods of conservation.
 - ★ 16. Why do classification systems change as scientific knowledge improves?
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QUICK REVISION BOX

-  **Biodiversity** → Variety of living organisms
 -  **Classification** → Systematic grouping of organisms
 -  **Monera** → Unicellular prokaryotes
 -  **Protista** → Mostly unicellular eukaryotes
 -  **Fungi** → Heterotrophic organisms; absorb nutrients
 -  **Plantae** → Mainly multicellular autotrophic organisms
 -  **Animalia** → Multicellular heterotrophic organisms
 -  **Bryophytes** → Non-vascular plants; need water for reproduction
 -  **Pteridophytes** → Vascular plants reproducing by spores
 -  **Gymnosperms** → Naked seeds
 -  **Angiosperms** → Flowering plants with seeds enclosed in fruits
 -  **Vertebrates** → Animals with vertebral column
 -  **Invertebrates** → Animals without vertebral column
 -  **Binomial nomenclature** → Two-part scientific naming system
 -  **Three domains** → Bacteria, Archaea, Eukarya
 -  **Fossils** → Evidence of past life
 -  **Conservation** → Protection and sustainable management of biodiversity
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TOP TABLES / DIAGRAMS TO PRACTISE

1. Five-Kingdom Classification

Kingdom	Cell Type	Organisation	Nutrition
Monera	Prokaryotic	Mostly unicellular	Autotrophic / heterotrophic
Protista	Eukaryotic	Mostly unicellular	Autotrophic / heterotrophic
Fungi	Eukaryotic	Mostly multicellular	Heterotrophic by absorption
Plantae	Eukaryotic	Multicellular	Mainly autotrophic
Animalia	Eukaryotic	Multicellular	Heterotrophic

2. Plant Groups

Thallophyta → Bryophyta → Pteridophyta → Gymnosperms → Angiosperms

Remember the progression of major features:

Simple body → Vascular tissues → Seeds → Flowers/fruits

3. Classification Hierarchy

Kingdom → Phylum → Class → Order → Family → Genus → Species

4. Three-Domain System

Bacteria | Archaea | Eukarya

★ Exam Tip

For classification questions, don't just memorise kingdom names. Learn the **reason for placement**:

Cell type → Number of cells → Nutrition → Body organisation → Reproduction → Other distinguishing features

This is especially important for competency-based questions where you are given an unknown organism and asked to identify its group. The chapter explicitly encourages identifying organisms using characteristics rather than simply relying on appearance or habitat.