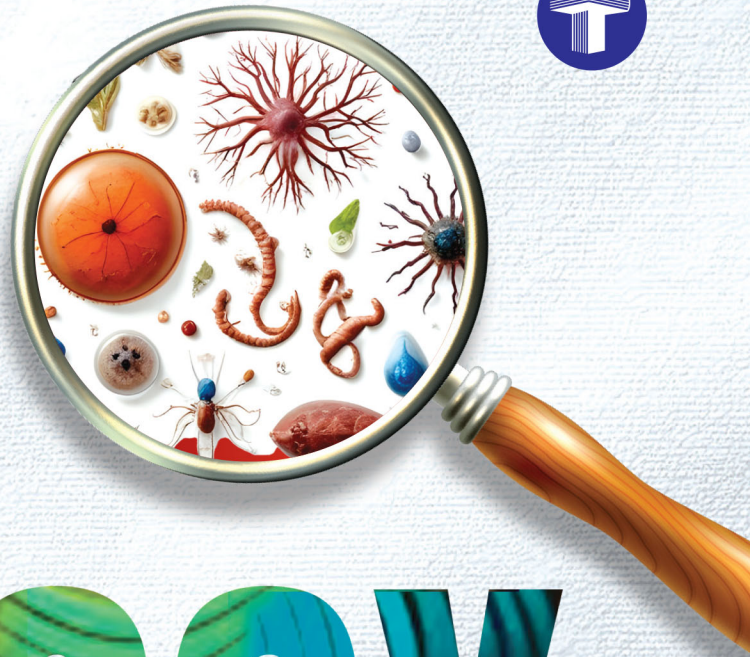


SAMPLE CONTENT



FOCUS

BIOLOGY

BASED ON THE LATEST TEXTBOOK OF MAHARASHTRA STATE BOARD

Build Powerful Concepts

- Quick Review
- Complete Coverage of Textual and Intext Questions
- Aligned with the latest paper pattern

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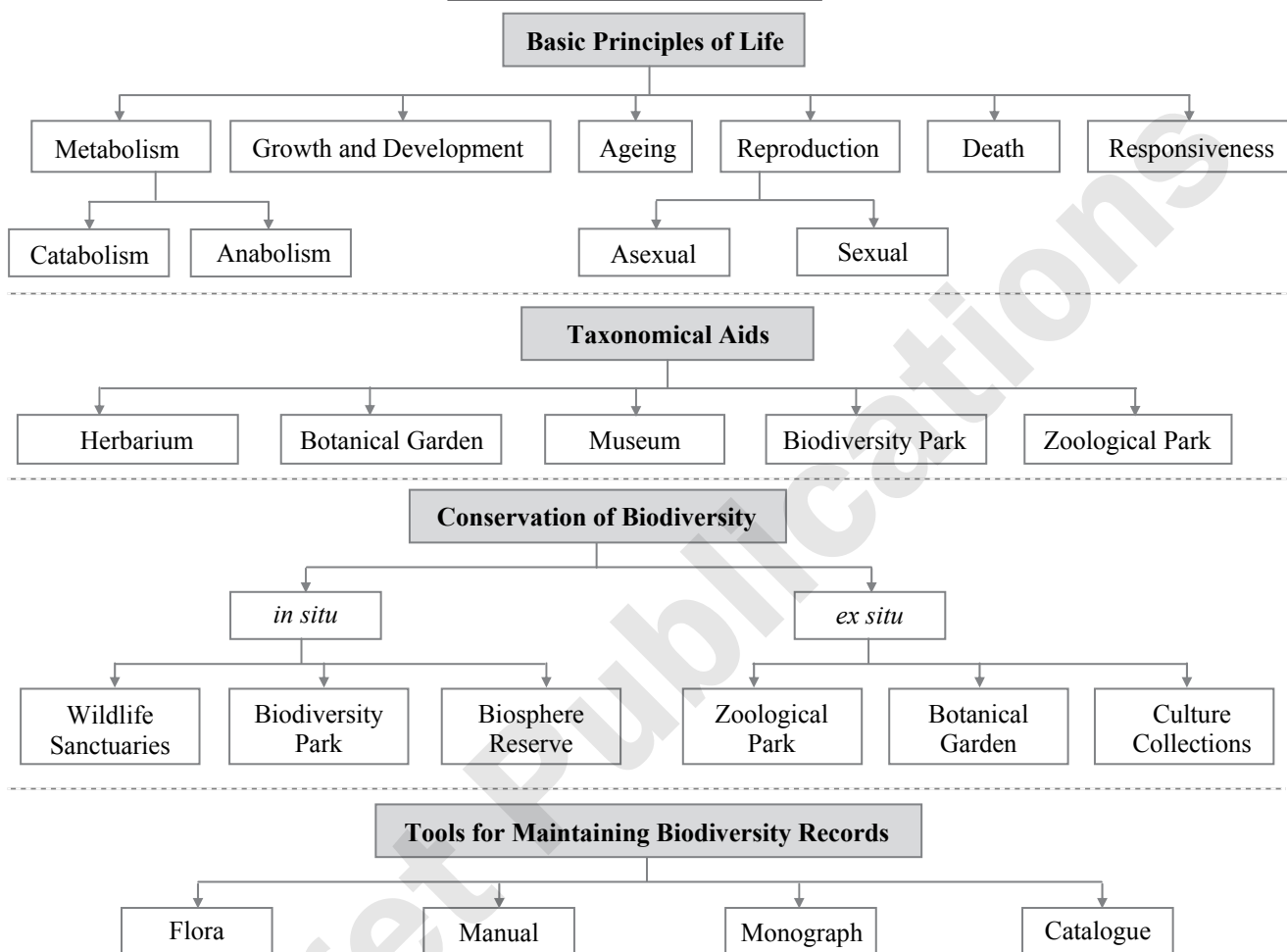
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[Reference: Maharashtra State Board of Secondary and Higher Secondary Education, Pune - 04]

Quick Review



1.1 Basic principles of Life

Q.1. Can you recall? (Textbook page no. 01)

i. What is the difference between living and non-living things?

Ans:

	Parameters	Living Things	Non-living Things
a.	Growth	Living things show growth from within.	Non-living things show growth by accumulation of materials on their surface.
b.	Reproduction	They reproduce asexually or sexually, except mules, sterile worker bees, infertile males.	They do not reproduce.
c.	Metabolism	They perform metabolism in order to obtain energy.	No metabolic changes occur in non-living things.
d.	Irritability	They show irritability and respond to changes in their surroundings.	They do not show irritability.
e.	Ageing	They undergo ageing and eventually die.	Non-living things do not have a finite life span.



ii. **Enlist the characters of living organisms.**

Ans: The characters of living organisms are as follows:

- a. **Metabolism:** Metabolism is breaking of molecules (catabolism) and making of new molecules (anabolism). An organism performs metabolism in order to obtain energy and various chemical molecules essential for survival.
- b. **Growth and development:** Organisms tend to grow and develop in a well-orchestrated process from birth onwards.
- c. **Ageing:** It is the process during which molecules, organs and systems begin to lose their effective working and become old.
- d. **Reproduction:** For continuity of race (species), organisms reproduce (asexually or sexually) to produce young ones like themselves. However, mules and worker bees do not reproduce, yet are living.
- e. **Death:** As the body loses its capacity to perform metabolism, an organism dies.
- f. **Responsiveness:** Living organisms respond to thermal, chemical or biological changes in their surroundings.

#Q.2. **Can we call reproduction as inclusive character of life?** (Textbook page no. 01)

Ans: No, we cannot call reproduction as an inclusive character of life. Certain organisms like mules and worker bees do not reproduce and are still living. Thus, reproduction cannot be considered as an all inclusive defining characteristic of living organisms.

Q.3. **Can you tell?** (Textbook page no.01)

Which feature can be considered as all-inclusive characteristic of life? Why?

Ans: Metabolism can be considered as an all-inclusive (defining) feature of life since it is exhibited by all living organisms and does not take place in non-living things.

Another all-inclusive characteristic of life is responsiveness or irritability. This is a unique property of living beings since all living beings are conscious of their surroundings.

Q.4. **Think about it.** (Textbook page no. 01)

i. **Can metabolic reactions demonstrated in a test tube (called 'in vitro' tests) be called living?**

- Ans:**
- a. The sum of all the chemical reactions occurring in the body is known as metabolism.
 - b. However, metabolic reactions demonstrated outside the body in a test tube in cell-free medium lack other essential characteristics of life.
 - c. They replicate some metabolic reactions when provided with necessary substrates and enzymes but lack the highly integrated and coordinated system seen in living beings.
 - d. Thus they cannot be called living.

ii. **Now a days patients are declared 'brain dead' and are on life support. They do not show any sign of self-consciousness. Are they living or non-living?**

Ans: The brain controls all life processes. Hence, when a patient is declared as 'brain dead', he does not carry out any of the inclusive defining characters of living things (e.g. metabolism, consciousness, etc.) and is completely dependent on machines. Such patients do not show any sign of self-consciousness, hence, cannot exactly be categorised as living.

1.2 Herbarium

Q.5. **Can you tell?** (Textbook page no. 03)

What are the essentials of a good herbarium?

Ans: The essentials of a good herbarium are as follows:

- i. It is essential to identify and label the collected specimen correctly.
- ii. Specimens should be stored in a dry place.
- iii. The plants are usually pressed and mounted on the sheet of paper known as herbarium sheets. Some plants are not suitable for pressing or mounting, like succulents, seeds, cones, etc. They need to be preserved in suitable liquid like formalin, acetic alcohol, etc.
- iv. In order to preserve the specimen for longer durations, acid-free paper, special glues and inks must be used to mount the specimen so that the specimen does not deteriorate.
- v. This following information is given at lower right corner of sheet and is called 'label';
 - a. Date, place of collection along with detailed classification
 - b. Ecological peculiarities
 - c. Characters of the plant
 - d. Local names of plant specimens
 - e. Name of the collector



Q.6. Riya found a peculiar plant on her visit to Himachal Pradesh. What are the ways she can show it to her biology teacher and get information about it?

Ans:

- Riya can press and mount the plant specimen on a herbarium sheet and preserve the dried plant material, until she returns back from her visit.
- She can also write any available information regarding the collected specimen on the herbarium sheet, which can be useful for further studies with her biology teacher.
- Various taxonomical aids can be useful to get information about this peculiar plant.

[Note: In order to conserve the local flora, Riya can collect photographs of plant and describe it's structure to her teacher.]

1.3 Botanical Gardens

Q.7. Why do we have green house in botanical gardens?

Ans:

- Greenhouse is a structure with suitable walls and a roof in which plants are grown under regulated climatic conditions.
- Most botanical gardens exhibit ornamental plants which require stringent/ optimum climatic conditions for their growth and/or flowering.
- The greenhouse associated with botanical gardens are also used to grow and propagate those plants that may not survive seasonal changes.

Hence, in order to provide optimum temperature for better growth and flowering and also to protect the plants from certain diseases, there are greenhouses in botanical gardens.

Q.8. Write short note: Importance of botanical garden

Ans: The importance of botanical gardens is as follows:

- They serve as a museum with collection of living plants maintained for botanical teaching and research purpose.
- Botanical gardens are important for their records of local flora.
- Botanical gardens also supply seeds and material for botanical investigations.
- Botanical gardens also supply seeds and material for botanical investigations.
- The development of botanical gardens in any country is associated with its history of civilization, culture, heritage, science, art, literature and various other social and religious expressions.
- Botanical gardens besides possessing an outdoor garden may contain herbaria, research laboratory, greenhouses and library.
- Botanical gardens are not only important for botanical studies, but also to develop tourism in the country.

Q.9. Why does the loss of biodiversity matter? (Textbook page no. 03)

Ans:

- The loss of biodiversity is a moral and ethical issue.
- The extent of complexity and density of biodiversity can be regarded as health of an ecosystem.
- The loss of even one variety of organisms can affect the entire ecosystem.

Hence, due to all these reasons, loss of biodiversity matters.

Q.10. Write a short note on role of human beings in biodiversity conservation.

Ans:

- Due to rapid increase in human population and industrialization, humans have over utilized natural resources; leading to degradation of the environment.
- In order to conserve biodiversity and its environmental resources, humans must use the resources rationally.
- Human beings are stakeholders of the environment and need to come together to overcome pollution and improve the environment quality. E.g. Ban or limit on use of harmful products (plastic, chemicals, etc.) that are toxic to various birds, animals, etc.
- Humans can further contribute by establishment of various sites for *in situ* (national parks, wildlife sanctuaries and biosphere reserves) and *ex situ* (botanical gardens, culture collections and zoological parks) conservation.



Q.11. How can you, as an individual, prevent the loss of biodiversity?

Ans: As individuals, we can prevent loss of biodiversity in the following ways:

- i. Increasing awareness about environmental issues. Making posters that provide more information about biodiversity conservation, to raise public awareness.
- ii. Increased support and/ or active participation in government policies and actions laid down for conservation of biodiversity.
- iii. Protect various plant and animal species in our surrounding.
- iv. Set up bird and bat houses wherever possible.
- v. Prevent felling of trees especially native plants or trees in a particular area.
- vi. Reduce, recycle and reuse resources. Especially, reduce pollution and use of plastic bags and other materials that are potential threats for the environment.
- vii. Use environment friendly products, segregate and dispose garbage correctly.
- viii. Convince people about the importance of trees and the need to participate in tree plantation campaign.
- ix. Obey the rules that fall under Biodiversity Act.

[Students can use the given points as reference and mention additional preventive measures on their own.]

Q.12. Find out. (Textbook page no. 04)

Human being is at key position in maintaining biodiversity of earth. Find out more information about the following.

i. Laws to protect and conserve biodiversity in India.

- Ans:**
- | | |
|------------------------------------|-------------------------------------|
| a. Forest (Conservation) Act, 1980 | b. Biological Diversity Act, 2002 |
| c. Wildlife (Protection) Act, 1972 | d. Environment Protection Act, 1986 |

[Students can find out more laws to protect and conserve Biodiversity in India.]

ii. Environmental effects of ambitious projects like connecting rivers or connecting cities by constructing roads.

Ans: Connecting rivers or connecting cities by constructing roads have the following environmental effects:

- a. They form barriers to movement of animals.
- b. Construction of roads requires cutting down of trees and results in large scale deforestation.
- c. They occupy large land resources resulting in loss of habitat of various species.
- d. It can alter the water flow pattern and damage many ecosystems.
- e. Increase in air, water, soil and noise pollution can disturb various animals and birds, thus affecting their behavioural pattern.

iii. Did bauxite mining in Western Ghats affect critically endangered species like – Black panther, different *Ceropegia spp.*, *Eriocaulon spp.*?

Ans: It is most likely that bauxite mining in Western Ghats has adversely affected the critically endangered species like – Black panther, different *Ceropegia spp.*, *Eriocaulon spp.* as their numbers have considerably declined in recent times.

[Students are expected to find more information on their own.]

Q.13. At Andaman, authorities do not allow tourists to collect shells from beaches. Why must it be so?

Ans:

- i. Seashells are an important part of the coastal ecosystem and are crucial for the survival of various marine creatures.
- ii. They provide material for building nests of birds and also act as a substratum for attachment of algae, sea grass, sponges and various microbes.
- iii. Fishes use shells for hiding from predators, whereas hermit crabs use shells as temporary shelters.
- iv. Removal of seashells from seashores may also indirectly affect the rate of shoreline erosion.

Hence, in an attempt to protect the ecosystem, authorities in Andaman do not allow tourists to collect shells from beaches.

1.5 Zoological Parks

Q.14. Jijamata Udyan, the famous zoo in Mumbai has acclimatised the Humboldt penguins. Why should penguins be acclimatised when kept at a place away from their natural habitat?

Ans:

- i. Zoological park (zoo) is a type of *ex situ* conservation in which wild animals are kept in captivity.
- ii. Humboldt penguins are native to South America and the surrounding environment differs significantly at Jijamata Udyan (zoo) in Mumbai.



- iii. In order to ensure that these penguins survive longer and are healthy they need to be acclimatised (adjust) to their new environment slowly, otherwise they may develop abnormal stress and exhibit unusual behaviours.
- iv. These penguins may also be more prone to contracting certain diseases, since they are suited to living in a particular climatic condition.
- v. The enclosure of these penguins consists of water pool, air handling units and a chiller system to maintain temperatures between 12 – 14°C, where the penguins were kept for around 8 to 10 days to get acclimatised to their new environment before allowing any visitors inside the zoo.

Hence, Humboldt penguins need to be acclimatised to their new surroundings, when kept at a place away from their natural habitat.

Q.15. Can you tell? (Textbook page no. 03)

Why should we visit botanical gardens, museums and zoo?

Ans: Botanical gardens, museums and zoos are taxonomical aids which can be used to study biodiversity.
[Students are expected to find more information on their own.]

1.6 Biodiversity Parks

Q.16. What do you understand from terms like *in situ* and *ex situ* conservation?

OR

Can you tell? (Textbook page no. 03)

What is 'ex-situ' and 'in-situ' conservation?

Ans:

- i. ***In situ* conservation:** It includes conservation of species in their natural habitats. Grazing, cultivation and collection of products from the forests is banned in such areas. Legally protected areas include national parks, wildlife sanctuaries and biosphere reserves.
- ii. ***Ex situ* conservation:** It includes conservation of species outside their natural habitats. Species are conserved in botanical gardens, culture collections and zoological parks.

***Q.17. Distinguish between botanical gardens, zoological parks and biodiversity parks with reference to their characteristics.**

Ans:

	Botanical Gardens	Zoological Parks	Biodiversity Parks
i.	Plants of different varieties collected from different parts of the world are grown <i>in vivo</i> in a scientific and systematic manner in a botanical garden.	Zoological parks are places where wild animals are kept in captivity.	It is an assemblage of species that form self-sustaining communities on degraded/ barren landscape.
ii.	It is a type of <i>ex situ</i> conservation.	It is a type of <i>ex situ</i> conservation.	It is a type of <i>in situ</i> conservation.
iii.	It is related to conservation of various flora.	It is related to conservation of various fauna.	It is related to conservation of all biodiversity.

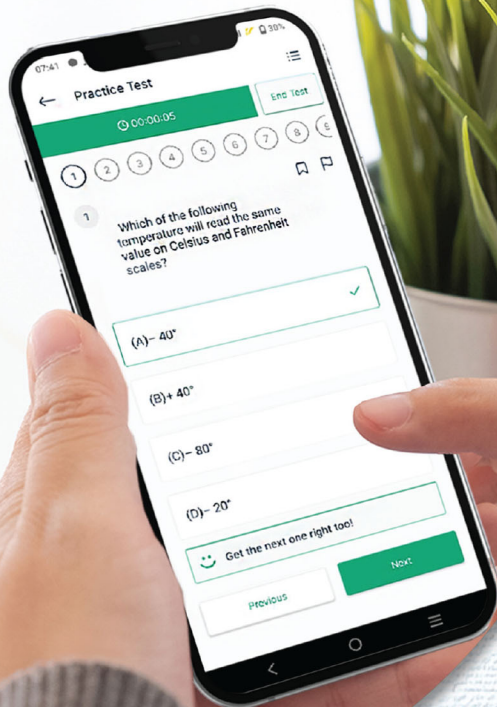
Multiple Choice Questions

- *1. Which is NOT a property of living beings?
(A) Metabolism (B) Decay
(C) Growth (D) Reproduction
- *2. A group of students found two cockroaches in the classroom. They had a debate whether they are alive or dead. Which life property will help them to do so?
(A) Metabolism (B) Growth
(C) Irritability (D) Reproduction
- *3. A particular plant is strictly a seasonal plant. Which one of the following is best suited if it is to be studied in the laboratory?

- (A) Herbarium
- (B) Museum
- (C) Botanical garden
- (D) Flower exhibition

Answers to Multiple Choice Questions

1. (B) 2. (C) 3. (A)



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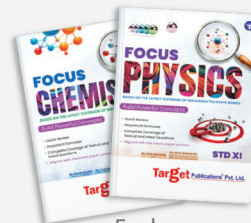
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