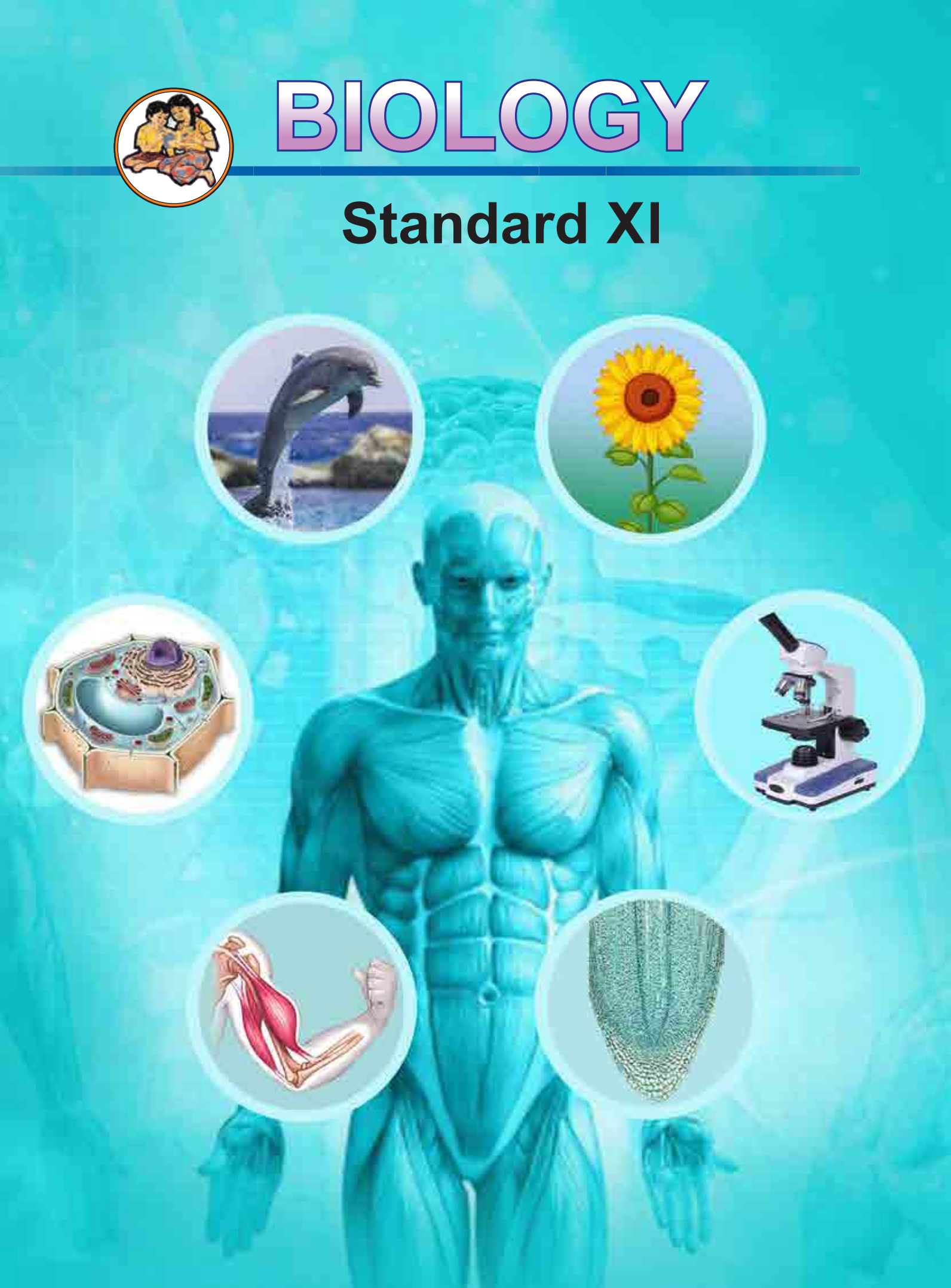
BIOLOGY

Standard XI



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2019

Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune.

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Download DIKSHA App on your smartphone. If you scan the Q.R.Code on this page of your textbook, you will be able to access full text. If you scan the Q.R.Code provided, you will be able to access audio-visual study material relevant to each lesson, provided as teaching and learning aids.

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The Constitution of India

Preamble

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of opportunity; and to promote among them all

FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, do HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

NATIONAL ANTHEM

Jana-gana-mana-adhināyaka jaya hē
Bhārata-bhāgya-vidhātā,

Panjāba-Sindhu-Gujarāta-Marāthā
Drāvida-Utkala-Banga

Vindhya-Himāchala-Yamunā-Gangā
uchchala-jaladhi-taranga

Tava subha nāmē jāgē, tava subha āsisa māgē,
gāhē tava jaya-gāthā,

Jana-gana-mangala-dāyaka jaya hē
Bhārata-bhāgya-vidhātā,

Jaya hē, Jaya hē, Jaya hē,
Jaya jaya jaya, jaya hē.

PLEDGE

India is my country. All Indians are my brothers and sisters.

I love my country, and I am proud of its rich and varied heritage. I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect, and treat everyone with courtesy.

To my country and my people, I pledge my devotion. In their well-being and prosperity alone lies my happiness.

Preface

Dear Students,

We welcome you all to Std. XI. For the first time, you are being introduced to the subject of Biology as a separate discipline. You have already been acquainted with some of the concepts of Biological Sciences from Standard five onwards, especially in the subject of General Science up to standard Eight and Science and Technology for standard Nine and Ten.

This textbook aims to create awareness about the biological sciences specially Botany, Zoology and allied aspects of biological sciences. The National Curriculum Framework (NCF) was formulated in 2005, followed by the State Curriculum Framework (SCF) in 2010. Based on the given these two frameworks, reconstruction of the curriculum and preparation of a revised syllabus has been undertaken which will be introduced from the academic year 2019-20. The textbook incorporating the revised syllabus has been prepared and designed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, (Balbharati), Pune.

The subject biology intends to give students understanding, and appreciation of the vast diversity of living beings, their special adaptations to their environments and evolutionary relationships. No compromise is made in any manner over the use of language in the Biology context, but at the same time, the textbook is presented in a simple language. In addition, relevant diagrams, graphs, tables used in the textbook will bring about more clarity in the understanding of various terminologies and biological concepts. All the illustrations are in colour form. This will enable students to understand various concepts of botany and zoology thoroughly and correlate this with their day-to-day practical life. The new syllabus focuses on the conceptual principles of overall life processes, its understanding, and application in day-to-day life and ability to solve different upcoming problems and issues like conservation; different diseases and remedies, the application of technology, etc. The general teaching-learning objectives of the revised syllabus are further determined based on the 'principle of constructivism' i.e. self-learning.

The curriculum and syllabus confirms to the maxims of teaching such as moving from concrete to abstract, known to unknown and from part to whole. For the first time, in the syllabus of biology various independent activities have been introduced. These activities will not only help to understand the content knowledge but also provide scope for gaining relevant and additional application based knowledge on your own efforts. The detailed information of all concepts is also provided for the better understanding of the subject. Q. R. Code have been introduced for gaining the additional information, abstracts of chapters and practice questions/ activities.

The efforts taken to prepare the textbook will not only enrich the meaningful learning experience of the students, but also benefit other stakeholders such as teachers, parents as well as those aspiring candidates preparing for the competitive examinations.

We look forward to a positive response from the teachers and students.
Our best wishes to all!

(Dr. Sunil Magar)
Director
Maharashtra State Bureau of Textbook
Production and Curriculum Research,
Pune, 411004

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- For Teachers -

Dear Teachers,

We are happy to introduce the revised textbook of Biology for Std XI. This book is a sincere attempt to follow the maxims of teaching as well as develop a 'constructive' approach to enhance the quality of learning. The demand for more activity based, experiential and innovative learning opportunities is the need of the hour. The present curriculum has been restructured so as to bridge the credibility gap that exists between what is taught and what students learn from direct experience in the outside world. Guidelines provided below will help to enrich the teaching-learning process and achieve the desired learning outcomes.

- To begin with, get familiar with the textbook yourself.
- The present book has been prepared for constructive and activity-based teaching.
- Teachers must skillfully plan and organize the activities provided in each chapter to develop interest as well as to stimulate the thought process among the students.
- Always teach with proper planning.
- Use teaching aids as required for the proper understanding of the subject.
- Do not finish the chapter in short.
- Follow the order of the chapters strictly as listed in the contents because the units are introduced in a graded manner to facilitate knowledge building.
- Facilitate peer learning as much as possible by reorganizing the class structure frequently.
- Teaching-learning interactions, processes and participations of all students are very essential and so is your active guidance.
- Ask questions based on previous knowledge of different concepts of lesson.
- Do not use the boxes titled 'Do you know?' for evaluation. However, teachers must ensure that students read this extra information.
- Information provided in boxes with the title 'Can You Tell', 'Always Remember' should be considered for evaluation.
- Exercises provided after each unit are prepared using different parameters like observation, co-relation, critical thinking, analytical reasoning etc.
- Evaluation pattern should be based on the above mentioned parameters. Equal weight age should be assigned to all the topics. Use different combinations of questions. Stereotype questions should be avoided.
- Use demonstration, discussion method for teaching.
- 'Can You Recall' is the first main starting point of lesson which helps for the introduction of topic. This will also helpful for students regarding understanding the content of lesson.
- Use QR Code given in the textbook. Keep checking the QR Code for updated information.
- 'Internet My Friend' is used for collecting extra important information related to topic.
- 'Use Your Brain Power' is used for the application level questions in different lessons.
- 'Do Your Self', 'Find Out', 'Observe and Discuss' and 'Try This' are used for activity based learning.
- 'Know the Scientist' is used for the information of different scientist related to concepts in lesson.
- 'Activity' is used in lesson and exercise for better understanding and application of the content which studied.
- Exercise is given at the end of lesson. In exercise different type of questions/ activities are given.
- Teacher should use their freedom to acquaint the students with flora and fauna of given region.
- Remember that mathematical and statistical tools are also important to understand biology
- List of abbreviations are provided towards the end of the textbook for further clarification.

Best wishes for a wonderful teaching experience and fruitful welcome!

Competency Statements

Standard XI

Unit	**Competency Statements** **After studying the content in Textbook students will …**
Diversity in living world	• Analyse basic characteristics of living and non-living. • Collect and analyse useful data by observing diversity of living organisms using different tools. • Describe plants and animals in the surrounding on scientific basic and classify them using taxonomic hierarchy. • Develop hobbies by watching and collecting the things (livings) and their conservation using databases. • Classify different organisms based on cell structure, body organisation, mode of nutrition etc. • Compare and analyse similarities and differences along with phylogeny amongst different groups of organisms. • Recognize, analyse and compare structural similarities and differences and progressive evolutionary changes in different plants and animals.
Cell structure and functions	• Explain and draw the structure and functions of different cell organelles. • Elaborate the role of nucleus in heredity and controlling characters with structure of chromosome. • Compare cell division process and know their role in life cycle of organisms. • Analyse and specify different biomolecules of cell with their role in structural and functional aspect of cell.
Structural organization in organisms	• Explain basic morphology of dominant plant group of this era i.e. Angiosperms. • Compare morphological features of different plant parts in different plant families. • Draw floral parts and floral diagram. • Identify economic importance of Angiosperms with respect to fruit and seeds. • Compare morphological feature of two major classes of Angiosperms. • Explain different types of tissues in plants and reasons for growth viz. primary and secondary. • Analyse basic differences in anatomy of different plants like dicot and monocots with respect to root, stem and leaf. • Elaborate different animal tissues and their role. • Explain and draw mechanisms of different physiological process like digestion and excretion. • Review the contribution of different scientists in systematics and taxonomy.
Plant physiology	• Explain the scientific reasons behind the various physiological activities based on relationship. • Understand the relationship between chemical reactions of molecules in daily life and analyse them to solve various problems. • Review the contribution made by different workers. • Plan and implement programs about conservation of environment. • Explain the importance of green energy and save energy in daily life.

Animal Physiology	• Explain the need and importance of various physiological processes. • Explain the structural modifications, observed in various living organisms to carry out various physiological processes. • Observe and correlate the histological structure of various organs with their function. • Comprehend mechanisms by which these physiological processes help maintain homeostasis. • Create memory maps, flow charts to depict major events in these processes. • Develop insight about connection between life style/habits and physiological disorders. • Collect information about latest diagnostic tools and treatments for various physiological disorders. • Critically analyse given situational data and come up with rationale of possible physiological disorders/suggest proper remedial measures. • Perform various analytical tests to detect presence of certain components in food materials/waste products.

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