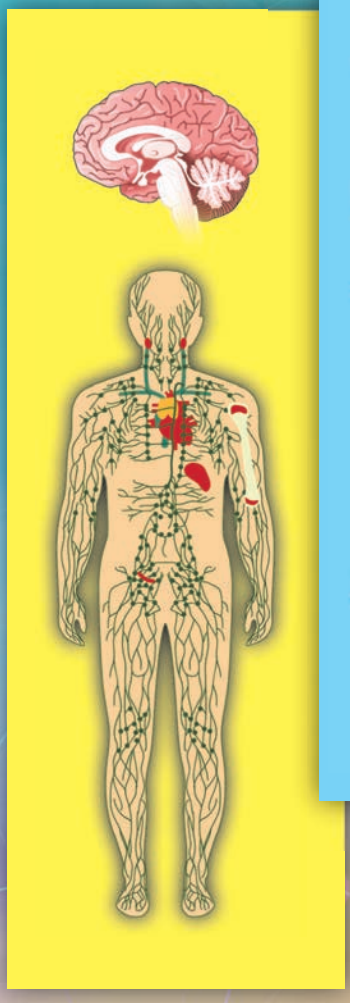
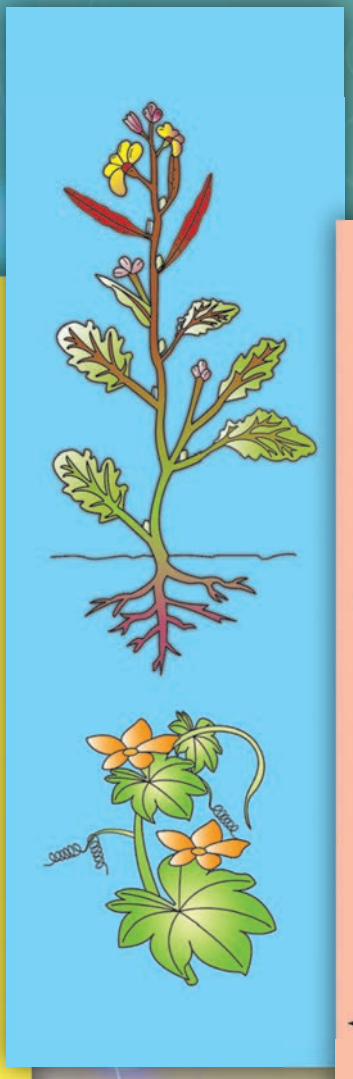
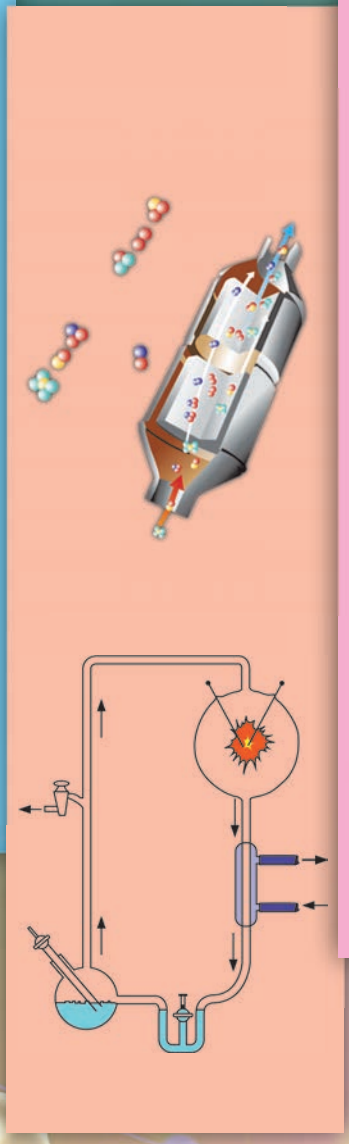
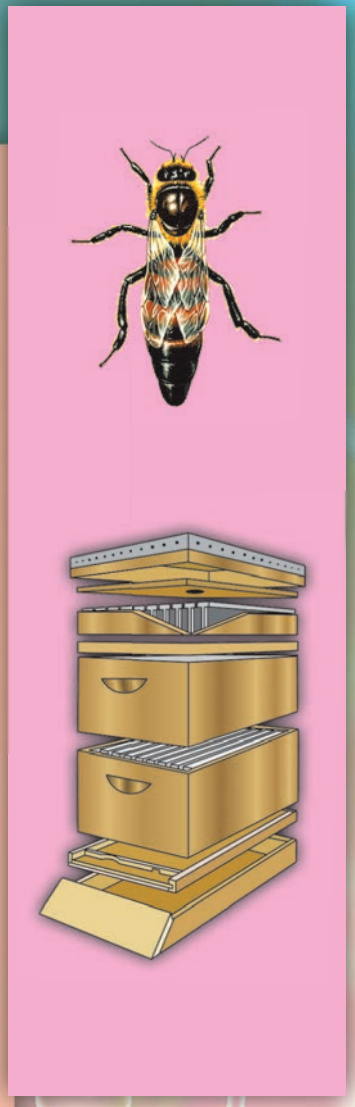
BIOLOGY

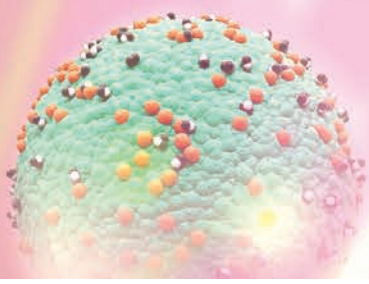
Standard XII











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BIOLOGY

STANDARD TWELVE

J2G3S8

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 and the audio-visual study material relevant to each lesson provided as teaching and learning aids.

2020

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

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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. XII. Now you are familiar to the subject of Biology as a separate discipline in standard XI. You have already been acquainted with many concepts of Biological Sciences from Standard six 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 licid 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 surely 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 inheritance and its significance, 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. 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!

(Vivek Gosavi)
Director
Maharashtra State Bureau of Textbook
Production and Curriculum Research, Pune 4

Pune
Date : 21 February 2020
Bharatiya Saur : 2 Phalguna 1941

- For Teachers -

Dear Teachers,

We are happy to introduce the revised textbook of Biology for Std XII in continuation of 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 and teaching as well. The present day education demands for more activity based, experimental 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 being taught and what students learn from the experiences in the outside world. Guidelines provided below will help to enrich the teaching-learning process to achieve the desired learning outcomes.

- To begin with, get familiar with the textbook.
- Always teach with proper planning.
- 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.
- Use teaching aids as required for the proper understanding of the subject.
- Use demonstration, discussion method for teaching.
- 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.
- 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.
- Exercise is given at the end of lesson. In exercise different type of questions/ activities are given.
- Exercises provided after each unit are prepared using different learning parameters like observation, co-relation, critical thinking, analytical reasoning etc.
- Evaluation pattern should be based on the above mentioned parameters. Equal weightage should be assigned to all the topics. Use different combinations of questions. Stereotype questions should be avoided.
- '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.
- 'Internet My Friend' is given 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.
- 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.
- Use Q. R. Code given in the textbook.

Best wishes for a wonderful teaching experience and fruitful welcome!

Competency Statements
Standard XII

Unit	After studying content in the textbook student will….
Unit 1 : Reproduction	1. Know the significance of reproduction in life of species. 2. Explain the difference between asexual and sexual reproduction in plants and animals. 3. Recognize the importance of asexual and sexual reproduction in plants and animals. 4. Compare and analyze different modes of asexual reproduction. 5. Know the reduction in the size of gametophytic generation. 6. Know the different adaptation in the flowers depending upon the agency to accomplish pollination. 7. Describes mechanism of sexual reproduction. 8. Recognize, analyze and compare structural similarities, differences and progressive evolutionary changes in reproduction in lower and higher plants and animals. 9. Explain embryo development both in plants and animals.
Unit 2 : Genetics and Evolution	1. Explain the mechanism of inheritance and variation. 2. Elaborate the role of chromosome, its molecular basis of heredity. 3. Explain the laws of inheritance and further elaborate the reasons of variation. 4. Describe the basis of origin of life, geological time scale, evidences. 5. Explain, describe and compare different theories of evolution. 6. Explains the structure and functions of genetic materials. 7. Use of genetics in studying patterns of sex determination in honey bees, birds and human beings mentioning different genetic disorders. 8. Explain inheritance of sex linked characters in humans. 9. Define concept of genomics, applications of genetic engineering and gene regulation. 10. Explain chromosomal theory of inheritance, linkage and crossing over. 11. Understands evidences for DNA as genetic material, genetic code.
Unit 3 : Physiology	1. Explain the scientific reasons behind various physiological activities based on relationship. 2. Understand the relationship between chemical reactions, structural organization involved and its impact on organism. 3. Analyze and explain the experimental setup. 4. Draw diagrams and give comments on findings and observations. 5. Describe the contribution of different workers or scientists and its significance. 6. Understand and explain role of physiology in biology. 7. Explain and draw mechanisms of different physiological processess. 8. Explain importance, source and methods of absorbtion of water, water as 'elixir of life'. 9. Explain loss of excess water, significance of transpiration, transpiration as 'necessary evil'. 10. Define growth, types of growth, phases of growth, growth curves, growth rates. 11. Explain minerals, their role, sources and methods of absorbtion. 12. Differentiate respiration. 13. Explain circulatory system.

Unit 4 : Applied Biology	1. Explains correlation between diseases and health. 2. Identify and elaborate various types and effects of Addications. 3. Elaborate the role of microbes in food production. 4. Describes, compare, review different techniques developed for betterment of life. 5. Understand applications of technology used to overcome problems in daily life. 6. Suggest remedial measures for improvement of social health. 7. Describe and suggest career opportunities in the fields of dairy, poultry and other field. 8. Explain role of microbes in upcoming fields as Biocontrol agents, Sewage treatment, Nanotechnology. 9. Elaborate the need of bio technology.
Unit 5 : Ecology and Environment	1. Explains the correlation, interaction and effect of environment on organisms. 2. Understand and explain the relationship in ecosystem, role of energy flow. 3. Analyze, understand and explain environmental issues and their impact. 4. Contribute, plan and implement programs about conservation of environment. 5. Use information gathered to save biodiversity, find remedies to solve environmental issues.

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