



# Animal Science and Technology

STANDARD XII



The Coordination Committee formed by GR No. Abhyas - 2116/(Pra.Kra.43/16) SD - 4 Dated 25.4.2016 has given approval to prescribe this textbook in its meeting held on 30.1.2020 and it has been decided to implement it from academic year 2020-21.

# Animal Science and Technology

## STANDARD XII



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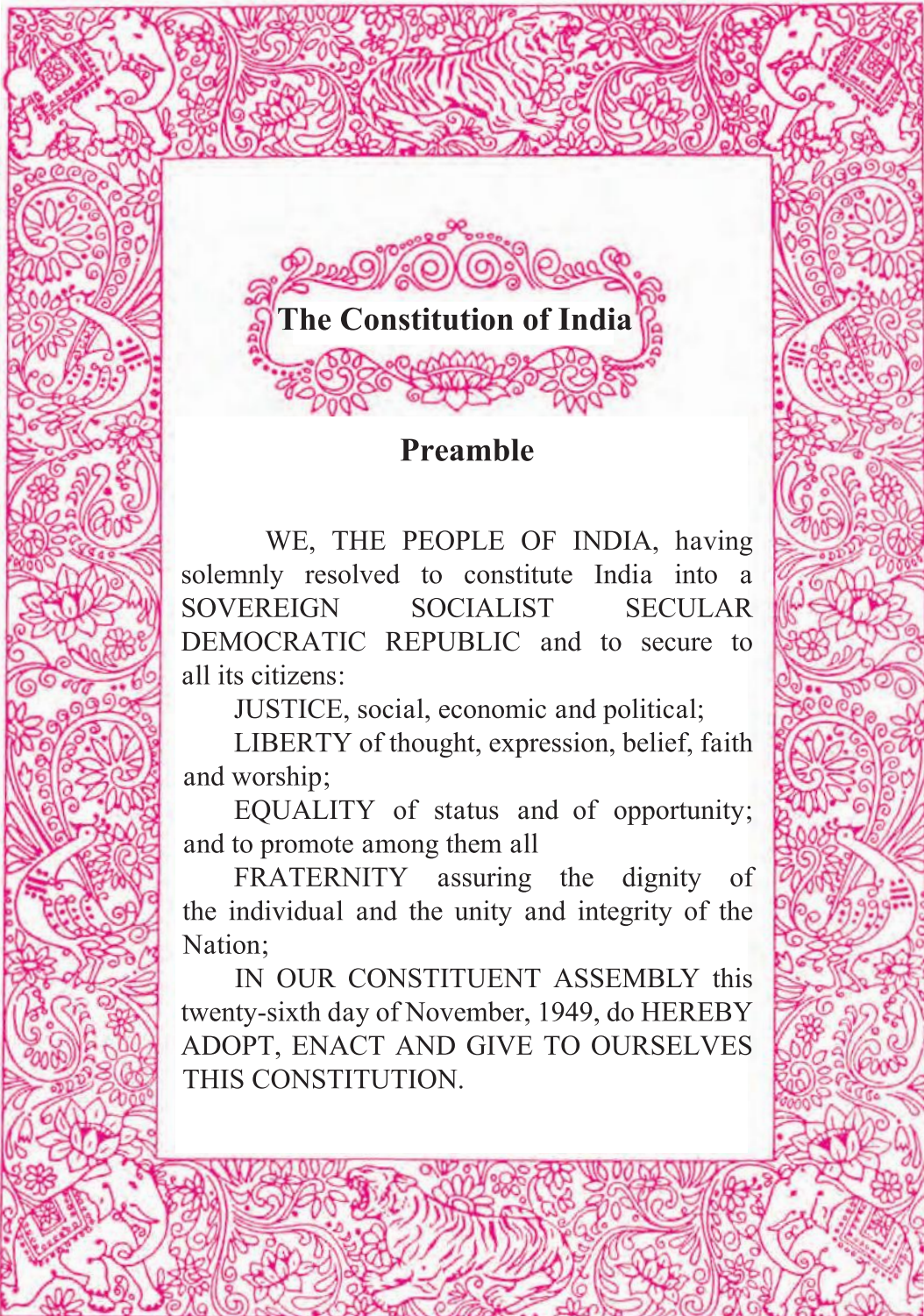
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WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC and to secure to all its citizens:

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,

Welcome to Std.XII. It is our great pleasure to hand over the Textbook of Animal Science and Technology based on the new syllabi. There was a standing demand from the students' community to have a Textbook of Animal Science and Technology besides the basic subjects of Physics, Chemistry, Biology and Mathematics so as to meet the demands and challenges of the present educational system. Therefore, Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune has spearheaded the idea of constructive approach while designing the textbooks to bring a change at +2 standard of education to provide the students with the basic concepts and their applications in the daily life.

Livestock sector plays an important role in Indian economy and is an important sub-sector of Indian Agriculture. Growing population, changing lifestyles, expanding urbanization and hastened climatic changes created new challenges to sustain in the situation. Livestock provides stability to family income especially in the arid and semi-arid regions of the country. Animals are the part of our day-to-day life and contribute for stabilizing the agriculture income particularly when monsoon shows its vagaries. The study of their management from scientific views pays us valuable foods viz. milk, meat and eggs, manures and draft power for our agriculture, hides and bones for the country's economy. Hence, all such concepts of livestock are explained in this book. Further, the diseases of zoonotic importance and their prevention is also incorporated in this textbook from public health point of view to facilitate the learning of the students in a constructive manner.

The important feature of this textbook is that, it contains highly technical information and being presented in simple understandable and presentable form supplemented with emoji like 'Remember', 'Can you recall', 'Can you tell' 'Internet my friend' etc. Many other activities under the title like 'observe', 'try this', 'think about it' 'use your brain power' etc so as to stimulate the thinking power of students.

You can get additional information, knowledge and audio-visual information by using QR code as a supporting. The students from rural area choosing this subject will certainly get the advance knowledge regarding livestock and poultry management and thereby can educate their parents and farmers in the villages about scientific livestock farming so as to uplift their economic status. Moreover, some students in future may decide to opt for the entrepreneurship through livestock keeping.

The Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune has restructured and upgraded the syllabi for Std. XII considering the need of recent and updated knowledge. The content of the book has been reviewed by the teachers and experts working in this field. The matter of the textbook has undergone stringent quality review by the eminent educationalists. This textbook will be beneficial to all the stakeholders such as teacher, parents and candidates appearing for various competitive examinations. The Bureau is grateful to the members of Board of Studies and also to authors without which this textbook would have not taken its present shape. The Bureau is also thankful to the Maharashtra State Bureau of Textbook Publication and Curriculum Research for the co-operation in bringing out this textbook.



(Vivek Gosavi)

**Director**

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Pune

Date : 21 February 2020

Bharatiya Sour : 2 Phalgun 1941



## - For Teachers -

### Dear Teachers,

We are happy, to introduce the revised Textbook of Animal Science and Technology for std. XII. This book is a sincere attempt to follow the maxims of teaching as well as develop a 'constructivist' approach to enhance the quality of learning. The demand for more activity based, experiential and innovative learning opportunities is the need of the time. The present curriculum has been restructured so as to bridge the credibility gap that exists in the 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 constructivism and activity based learning.
- 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.
- Each unit is structured in a definite manner. It starts from the basic concepts of Animal Science required for each component comes under the subject. Application of technology is given in content. This knowledge will help students to understand further chapters in each unit.
- Each chapter provides various charts, pictures, diagrams for better understanding, so you can use this for effective teaching.
- Ask the students about the related information, background about the chapter. You are provided, for this with the different boxes like 'Can You Recall', 'Do you know?', 'Try this' etc.
- Encourage the students to collect related information by providing them the websites.
- Teaching - learning interactions, processes and participation of all students are necessary and so is your active guidance.
- Do not use the content of the boxes titles 'Do you know'? for evaluation.
- Exercises include parameters such as correlation, critical thinking, analytical reasoning etc. Evaluation pattern should be based on the given parameters. Equal weightage should be assigned to all the topics. Use different combinations of questions.

### Components of chapter :



**Can you tell?**



**Can you think**



**Just do it**



**Try this**



**Can you recall?**



**Do you know ?**



**Remember**



**Internet my friend**



**Think about**



**Observe that**



**Use your brain power**



**Can you imagine ?**

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## Competency Statements - Standard XII

### Animal Science and Technology

| Area/ Unit/<br>Lesson                                                                                                                                                  | After studying the contents in textbook students will .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <p style="text-align: center;"><b><i>Routine<br/>Livestock Farm<br/>Management<br/>Practices,<br/>Housing and<br/>Dairy Cattle,<br/>Buffalo<br/>Management</i></b></p> | <ul style="list-style-type: none"> <li>• Understand the routine management practices followed on livestock farm</li> <li>• Know the importance of animal identification</li> <li>• Understand the new technologies in livestock identification</li> <li>• Determine the weight of cattle without weighing balance</li> <li>• Determine the age of cattle by dentition methods</li> <li>• Know various methods of disbudding and dehorning the cattle</li> <li>• Understand how to handle livestock safely as well as restraining and casting of animals for different purposes</li> <li>• Explain the process of body condition score (BCS) in cattle</li> <li>• Understand the body condition score in cattle</li> <li>• Understand the different methods of milking and process of clean milk production.</li> <li>• Understand the importance of vaccination, methods to control ecto- parasites and endo – parasites</li> <li>• Get acquainted with different types of records maintained on livestock farm and modern livestock management software</li> <li>• Understand the different methods of carcass disposal</li> <li>• Know the importance of housing for livestock</li> <li>• Know the different components required for dairy farm building</li> <li>• Built their own livestock house</li> <li>• Understand various housing systems with their pros. and cons</li> <li>• Able to start their own dairy farm</li> <li>• Know the methods of rearing of calves and heifers under different managerial conditions</li> <li>• Understand how to take general care and management in case of pregnant cows and buffaloes</li> <li>• Able to take care and also manage freshly calved cows and buffaloes</li> <li>• Get knowledge about nutritional requirements of lactating, dry and pregnant cows and buffalos</li> <li>• Able to select breeding bull for breeding purpose</li> <li>• Understand the general management of breeding bull</li> <li>• Know, how to manage livestock in different season</li> <li>• Know the effects of climate change on livestock</li> </ul> |
| <p style="text-align: center;"><b><i>Sheep and Goat<br/>Management</i></b></p>                                                                                         | <ul style="list-style-type: none"> <li>• Understands the importance of small ruminants in Indian farming</li> <li>• Know the different systems of goat rearing</li> <li>• Understand the management of breeding buck, doe, kids etc.</li> <li>• Understand the management of lambs, pregnant ewes, lactating ewes and breeding rams</li> <li>• Understand the health cover practices followed in goat and sheep rearing under different systems</li> <li>• Able to create housing for sheep and goat with scientific touch</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p style="text-align: center;"><b><i>Livestock<br/>Diseases and<br/>Public Health</i></b></p>                                                                          | <ul style="list-style-type: none"> <li>• Explain livestock diseases in general</li> <li>• Able to classify the diseases on the basis of cause, way of spread and their duration and severity</li> <li>• Understand the signs of health and disease</li> <li>• Suggest general measures for prevention of contagious diseases</li> <li>• Explains the common livestock diseases caused by bacteria, viruses, protozoa and parasites</li> <li>• Explains the common poultry diseases caused by bacteria, viruses and parasites</li> <li>• Explains the causes, mode of transmission and common symptoms of important zoonotic diseases</li> <li>• Understand the special and general preventive measures and importance of personal hygiene and hand washing in prevention of zoonotic diseases</li> <li>• Explains the contingency planning for livestock so as to prevent the huge economic losses during natural disasters</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



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|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><i>Poultry Housing, Feeding and Management</i></b></p>             | <ul style="list-style-type: none"> <li>• Explain importance of poultry housing</li> <li>• Understand the principles of poultry housing</li> <li>• Draw design for construction of poultry house</li> <li>• Explain systems of poultry keeping</li> <li>• Explain role of backyard poultry farming</li> <li>• Understand importance of Environment control housing</li> <li>• Identify different poultry equipments, with their importance and functions</li> <li>• Enlist factors considered while computing and feeding of poultry</li> <li>• Identify and classify poultry feed ingredients</li> <li>• Understand types of feeds and feed requirement</li> <li>• Explain method of poultry feeding</li> <li>• Explain selection and storage of hatching eggs</li> <li>• Understand incubation of eggs</li> <li>• Understand importance of brooding in poultry management</li> <li>• Explain layer management</li> <li>• Understand disease control and vaccination in poultry</li> <li>• Understand broiler growing programme</li> <li>• Discuss the role of contract broiler farming</li> <li>• Explain management of poultry according to season</li> </ul> |
| <p><b><i>Milk, Meat, Eggs and Value added livestock products</i></b></p> | <ul style="list-style-type: none"> <li>• Understand the importance of milk, meat and eggs in Indian economy</li> <li>• Know the composition and properties of milk</li> <li>• Understand the different methods of pasteurization of milk to make it safe for human consumption</li> <li>• Understand the importance and production of hygienic milk production</li> <li>• Understand the concept of organic milk production</li> <li>• Understand the methods for production of commercial milk and meat products</li> <li>• Understand the advanced technique in packaging of milk and meat products</li> <li>• Know the different types milk and meat products</li> <li>• Know the classification of Indigenous milk products</li> <li>• Able to prepare various milk products by scientific way</li> <li>• Able to start their own business by preparing various milk products like khoa, pedha, lassi, ghee, etc.</li> <li>• Able to prepare various commercial meat and eggs products</li> </ul>                                                                                                                                                           |

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