

# SCIENCE

TEXTBOOK FOR CLASS IX



0964



एन सी ई आर टी  
NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्  
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

**0964 – SCIENCE**

Textbook for Class IX

ISBN 81-7450-492-3

**First Edition**

February 2006 Phalguna 1927

**Reprinted**

November 2006, November 2007,  
January 2009, December 2009,  
November 2010, December 2011,  
October 2012, October 2013,  
December 2014, December 2015,  
February 2017, December 2017,  
December 2018, October 2019,  
January 2021 and November 2021

**Revised Edition**

October 2022 Ashwina 1944

**Reprinted**

March 2024 Chaitra 1946

PD 520T SU

© National Council of Educational  
Research and Training, 2006, 2022

₹ 155.00

Printed on 80 GSM paper with NCERT  
watermark

Published at the Publication Division  
by the Secretary, National Council of  
Educational Research and Training,  
Sri Aurobindo Marg, New Delhi 110 016  
and printed at SDA Print 'N' Pack, D-19,  
Sector-B1, Tronica City Industrial Area,  
Loni, District Ghaziabad- 201 102 (U.P.)

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## FOREWORD

The National Curriculum Framework (NCF) 2005, recommends that children's life at school must be linked to their life outside the school. This principle marks a departure from the legacy of bookish learning which continues to shape our system and causes a gap between the school, home and community. The syllabi and textbooks developed on the basis of NCF signify an attempt to implement this basic idea. They also attempt to discourage rote learning and the maintenance of sharp boundaries between different subject areas. We hope these measures will take us significantly further in the direction of a child-centred system of education outlined in the National Policy on Education (1986).

The success of this effort depends on the steps that school principals and teachers will take to encourage children to reflect on their own learning and to pursue imaginative activities and questions. We must recognise that, given space, time and freedom, children generate new knowledge by engaging with the information passed on to them by adults. Treating the prescribed textbook as the sole basis of examination is one of the key reasons why other resources and sites of learning are ignored. Inculcating creativity and initiative is possible if we perceive and treat children as participants in learning, not as receivers of a fixed body of knowledge.

These aims imply considerable change in school routines and mode of functioning. Flexibility in the daily time-table is as necessary as rigour in implementing the annual calendar so that the required number of teaching days are actually devoted to teaching. The methods used for teaching and evaluation will also determine how effective this textbook proves for making children's life at school a happy experience, rather than a source of stress or boredom. Syllabus designers have tried to address the problem of curricular burden by restructuring and reorienting knowledge at different stages with greater consideration for child psychology and the time available for teaching. The textbook attempts to enhance this endeavour by giving higher priority and

space to opportunities for contemplation and wondering, discussion in small groups, and activities requiring hands-on experience.

The National Council of Educational Research and Training (NCERT) appreciates the hard work done by the textbook development team responsible for this book. We wish to thank the Chairman of the advisory group in science and mathematics, Professor J.V. Narlikar and the Chief Advisor for this book, Professor Rupamanjari Ghosh, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, for guiding the work of this committee. Several teachers contributed to the development of this textbook; we are grateful to them and their principals for making this possible. We are indebted to the institutions and organisations which have generously permitted us to draw upon their resources, material and personnel. We are especially grateful to the members of the National Monitoring Committee, appointed by the Department of Secondary and Higher Education, Ministry of Human Resource Development under the Chairmanship of Professor Mrinal Miri and Professor G.P. Deshpande, for their valuable time and contribution. As an organisation committed to systemic reform and continuous improvement in the quality of its products, NCERT welcomes comments and suggestions which will enable us to undertake further revision and refinement.

New Delhi  
20 December 2005

*Director*  
National Council of Educational  
Research and Training

## RATIONALISATION OF CONTENT IN THE TEXTBOOK

In view of the COVID-19 pandemic, it is imperative to reduce content load on students. The National Education Policy 2020, also emphasises reducing the content load and providing opportunities for experiential learning with creative mindset. In this backdrop, the NCERT has undertaken the exercise to rationalise the textbooks across all classes. Learning Outcomes already developed by the NCERT across classes have been taken into consideration in this exercise.

### **Contents of the textbooks have been rationalised in view of the following:**

- Overlapping with similar content included in other subject areas in the same class
- Similar content included in the lower or higher class in the same subject
- Difficulty level
- Content, which is easily accessible to students without much interventions from teachers and can be learned by children through self-learning or peer-learning
- Content, which is irrelevant in the present context

This present edition, is a reformatted version after carrying out the changes given above.

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## ACKNOWLEDGEMENTS

The National Council of Educational Research and Training is grateful to the members of the Textbook Development Team, whose names are given separately, for their contribution in the development of the Science textbook for Class IX. The Council also gratefully acknowledges the contribution of the participating members of the Review Workshop in the finalisation of the book: P.K. Bhattacharya, *Professor*, DESM, NCERT; Anita Julka, *Reader*, DEGSN, NCERT; Tausif Ahmad, *PGT*, New Era Sr. Sec. School, New Delhi; Samarketu, *PGT* in Physics, JNV, MESRA, Ranchi; Meenakshi Sharma, *PGT* in Biology, SVEM, Ankleshwar, Gujarat; Raji Kamlasanan, *PGT* in Biology, DTEA SNSU School, R.K. Puram, New Delhi; Meenambika Menon, *TGT* in Science, Cambridge School, Noida; Lalit Gupta, *TGT* in Science, Govt. Boys Sr. Sec. School No. 2, Uttam Nagar, New Delhi; Manoj Kumar Gupta, *Lecturer* in Chemistry, Mukherji Memorial Sr. Sec. School, Shahdara, Delhi; Vijay Kumar, *Vice-Principal*, Govt. Sarvodaya, Co. Edu. Sr. Sec. School, Anand Vihar, Delhi; Kanhaya Lal, *Principal* (Retd.), Deptt. of Education, GNCT of Delhi, Delhi; K.B. Gupta, *Professor* (Retd.), NCERT, New Delhi; Kuldeep Singh, *TGT* in Science, JNV, Meerut; R.A. Goel, *Principal* (Retd.), Delhi; Sumit Kumar Bhatnagar, Department of Education, GNCT of Delhi, Delhi.

Acknowledgements are due to M. Chandra, *Professor* and *Head*, Department of Education in Science and Mathematics, NCERT, New Delhi for providing all academic and administrative support.

The Council also gratefully acknowledges the support provided by the APC Office of DESM, administrative staff of DESM; Deepak Kapoor, *Incharge* Computer Centre, DESM; Saima, *DTP Operator*; Mohd. Qamar Tabrez, *Copy Editor*; Mathew John and Randhir Thakur, *Proofreaders*. The efforts of the Publication Department, NCERT are also highly appreciated.

# CONTENTS

	<i>FOREWORD</i>	<i>iii</i>
	<i>RATIONALISATION OF CONTENT IN THE TEXTBOOK</i>	<i>v</i>
Chapter 1	MATTER IN OUR SURROUNDINGS	1
Chapter 2	IS MATTER AROUND US PURE?	14
Chapter 3	ATOMS AND MOLECULES	26
Chapter 4	STRUCTURE OF THE ATOM	38
Chapter 5	THE FUNDAMENTAL UNIT OF LIFE	49
Chapter 6	TISSUES	60
Chapter 7	MOTION	72
Chapter 8	FORCE AND LAWS OF MOTION	87
Chapter 9	GRAVITATION	100
Chapter 10	WORK AND ENERGY	113
Chapter 11	SOUND	127
Chapter 12	IMPROVEMENT IN FOOD RESOURCES	140
	ANSWERS	152– 154

# THE CONSTITUTION OF INDIA

## PREAMBLE

**WE, THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a <sup>1</sup>**[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 <sup>2</sup>[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.**

1. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Sovereign Democratic Republic" (w.e.f. 3.1.1977)
2. Subs. by the Constitution (Forty-second Amendment) Act, 1976, Sec.2, for "Unity of the Nation" (w.e.f. 3.1.1977)