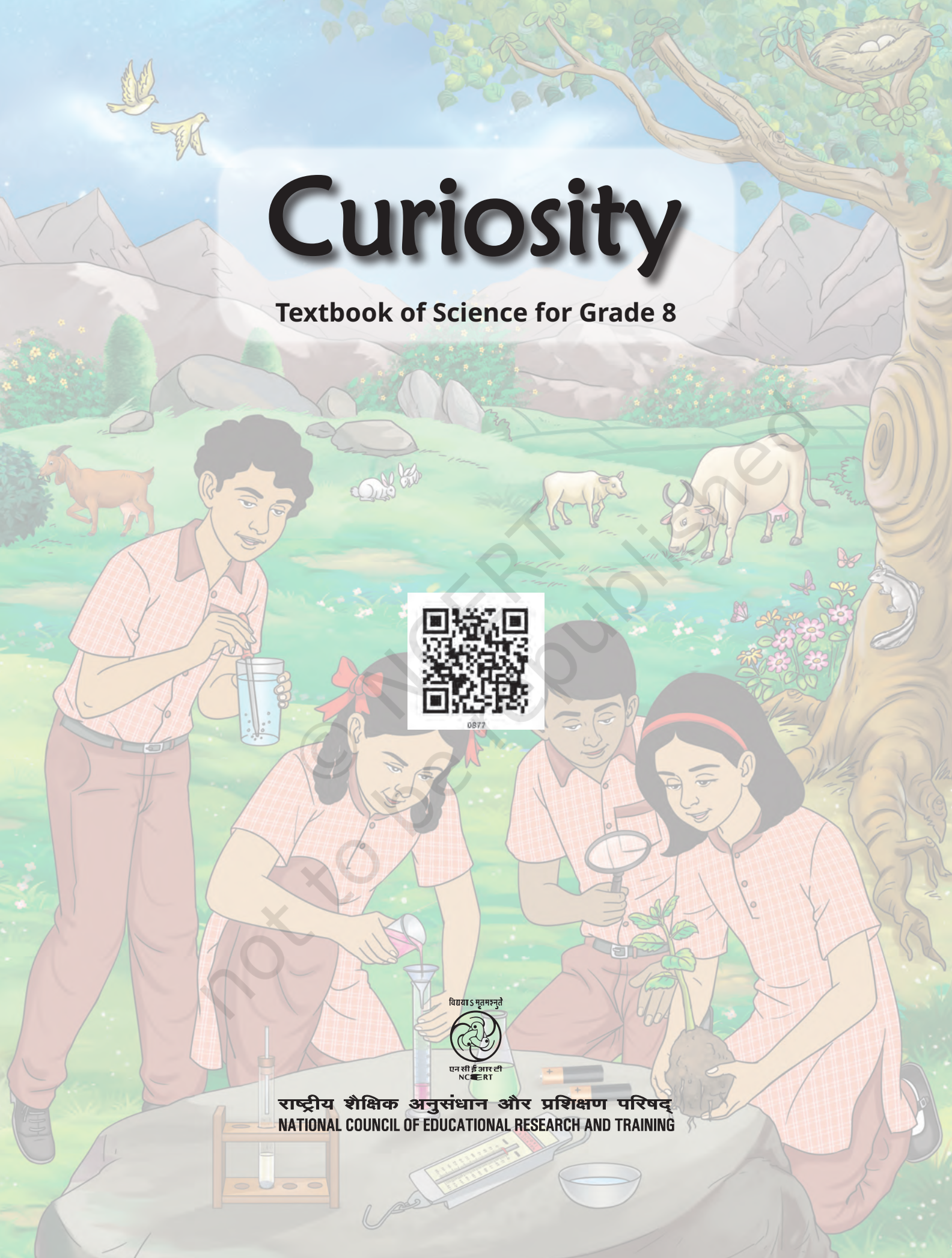
Curiosity

Textbook of Science for Grade 8



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NCERT

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

0877 – CURIOSITY
Textbook of Science for Grade 8

ISBN 978-93-5729-772-1

First Edition
June 2025 Jyeshtha 1947

PD 1500T SM

₹ 65.00

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 Laxmi Offset Printers, G–114-115, Heerawala Industrial Area, Kanota, Agra Road, Jaipur.

OFFICES OF THE PUBLICATION
DIVISION, NCERT

NCERT Campus
Sri Aurobindo Marg
New Delhi 110 016 **Phone : 011-26562708**

108, 100 Feet Road
Hosdakere Halli Extension
Banashankari III Stage
Bengaluru 560 085 **Phone : 080-26725740**

Navjivan Trust Building
P.O.Navjivan
Ahmedabad 380 014 **Phone : 079-27541446**

CWC Campus
Opp. Dhankal Bus Stop
Panihati
Kolkata 700 114 **Phone : 033-25530454**

CWC Complex
Maligaon
Guwahati 781 021 **Phone : 0361-2674869**

Publication Team

Head, Publication Division	:	*M.V. Srinivasan*
Chief Editor	:	*Bijnan Sutar*
Chief Production Officer (In charge)	:	*Jahan Lal*
Chief Business Manager	:	*Amitabh Kumar*
Editor	:	*Shilpa Mohan*
Production Officer	:	*Deepak Jaiswal*

Cover, Layout, and Illustrations
Fajruddin
Junaid Digital Arts

Foreword

The National Education Policy (NEP) 2020 envisages a system of education in the country that is rooted in an Indian ethos and its civilisational accomplishments in all fields of knowledge and human endeavour. At the same time, it aims to prepare students to engage constructively with the opportunities and challenges of the twenty-first century. The basis for this aspirational vision has been well laid out by the National Curriculum Framework for School Education (NCF-SE) 2023 across curricular areas at all stages. By nurturing students' inherent abilities across all five planes of human existence (*pañchakośhas*), the Foundational and Preparatory Stages set the Stage for further learning at the Middle Stage. Spanning Grades 6 to 8, the Middle Stage serves as a critical three-year bridge between the Preparatory and Secondary Stages.

The NCF-SE 2023, at the Middle Stage, aims to equip students with the skills that are needed to grow, as they advance in their lives. It strives to enhance their analytical, descriptive, and narrative capabilities, and to prepare them for the challenges and opportunities that await them. A diverse curriculum, covering nine subjects ranging from three languages—including at least two languages native to India—to Science, Mathematics, Social Sciences, Art Education, Physical Education and Well-being, and Vocational Education promotes their holistic development.

Such a transformative learning culture requires certain essential conditions. One of them is to have appropriate textbooks in different curricular areas, as these textbooks are intended to play a central role in mediating between content and pedagogy—a role that helps strike a judicious balance between direct instruction and opportunities for exploration and inquiry. Among other conditions, classroom arrangement and teacher preparation are crucial to establish conceptual connections both within and across curricular areas.

The National Council of Educational Research and Training, on its part, is committed to providing students with such high-quality textbooks. Various Curricular Area Groups, which have been constituted for this purpose, comprising notable subject-experts, pedagogues, and practising teachers as their members, have made all possible efforts to develop such textbooks. The *Curiosity*, textbook of science for Grade 8 is designed to make learning fun, engaging, and meaningful. Aligned with the NEP 2020 and the NCF-SE 2023, the textbook promotes experiential and inquiry-based learning. It encourages students to ask questions, think critically,

and understand scientific concepts through real-world contexts. Integrating physics, chemistry, biology, and earth science, the textbook also highlights environmental awareness, ethical values, and insights from India's rich tradition of knowledge. Featuring numerous hands-on activities and relatable examples, the book aims to simplify complex topics and foster deeper understanding. Collaborative learning is encouraged through group work and peer discussions, helping learners develop creativity, logical thinking, and decision-making skills. Rather than simply reading about science, students are guided to explore, question, and experience it actively—making the learning process both enjoyable and impactful.

However, in addition to this textbook, students at this stage should also be encouraged to explore various other learning resources. School libraries play a crucial role in making such resources available. Besides, the role of parents and teachers will also be invaluable in guiding and encouraging students to do so.

With this, I express my gratitude to all those who have been involved in the development of this textbook, and hope that it will meet the expectations of all stakeholders. At the same time, I also invite suggestions and feedback from all its users for further improvement in the coming years.

Dinesh Prasad Saklani
Director
National Council of Educational
Research and Training

New Delhi
June 2025

About this Book

After exploring the *Curiosity*, Grade 7 textbook, we hope you discovered new ideas and found yourself wondering even more about the world around you! Our journey of exploration continues in *Curiosity* for Grade 8, where you will learn to ask deeper questions, design investigations, and think like real scientists.

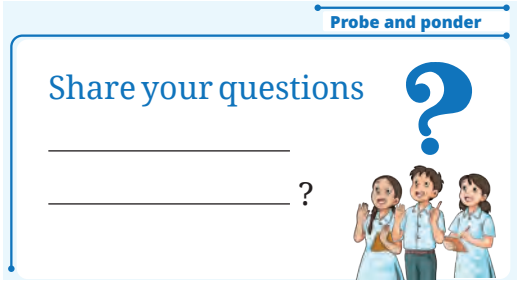
The Grade 8 textbook of science has been developed in alignment with the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023. It is expected that all competencies outlined for the final year of Middle Stage (Grade 8) are achieved. This textbook is designed to help you learn about important topics, such as matter, the physical and living world, health, hygiene, and the connection between science, technology, and society. It also helps you understand how science works and how scientists think and explore. The main aim of *Curiosity* is to help you become a responsible and thoughtful member of society.

The textbook integrates topics from biology, chemistry, physics, and earth science. It also incorporates essential themes, such as environmental care, value education, inclusivity, health, hygiene, and India's traditional knowledge systems. The goal is to help you learn through real experiences rather than by simply memorising facts.

Curiosity, the textbook of science for Grade 8, contains 13 chapters. Each chapter includes engaging activities, thought-provoking questions, and clear illustrations to support your learning. The first chapter is titled **Exploring the Investigative World of Science**. It gives you a quick look at the various topics you will come across in this book and is designed to get you more excited about science! This chapter takes you to the next step—entering the investigative world of science, where curiosity, wonder, and discovery come together. You will learn to ask focused questions, design and try out simple experiments to help answer them, and use your observation, exploration, and investigation skills to understand how things work. This chapter is meant to be a fun and friendly introduction to your science journey.

Each chapter begins with a picture linked to the chapter that is designed to spark curiosity, capture your attention, and connect prior knowledge to new concepts. There are a few **Probe and ponder** questions. These are critical thinking questions that are not for evaluation and do not always have simple answers. Instead, they make you think more deeply and explore new ideas. Some of these

questions are open-ended and thought-provoking because they do not just ask for a fact or a quick answer. Instead, they ask *why* or *how*, encouraging you to think critically and stay curious. You may not always be able to find the answers to these questions even after going through the chapter, but do not worry. They will help you link different concepts and deepen your curiosity, and perhaps help you understand the process of science. Many of these questions will also be explored further in higher grades. In fact, we are sure you may also have such questions, and there is space to add your own!



The activities in the book are designed to reflect how science works, offering both hands-on and minds-on experiences. These activities promote teamwork and are inclusive in nature, ensuring participation from all students. Teachers are expected to pay extra attention while supporting children with special needs, especially during experiments involving light, heating devices, microscopes, etc. Teachers should assist these students in visualising the experimental setup. Additionally, they may encourage peer interactions to help students understand concepts of science better. The text also includes questions to help students assess their understanding and reflect how much they have learnt. Many of these questions are aimed at encouraging students to think deeply, reflect on their own ideas, and analyse concepts critically.

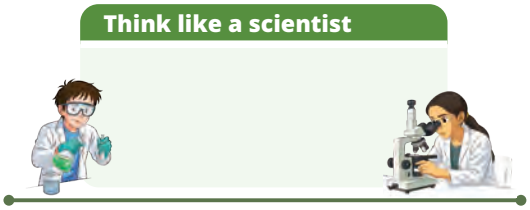
In some activities **Safety first**, has been given to keep students safe, especially when using hot, sharp, or breakable materials. These precautions help prevent accidents and make sure everyone can enjoy the activity while learning safely.

To sustain the students' interest, some challenging ideas, additional information, interesting facts, and other engaging materials are presented in boxes labelled **Ever heard of ...**, which highlight fascinating facts, interesting observations, and curiosity-driven questions.

A step further boxes contain advanced concepts that explore the topic in more depth. The information given in these boxes also brings scientific principles and knowledge into real-life

applications, showing how science has contributed to societal development.

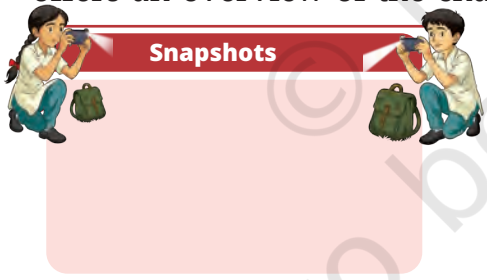
Our scientific heritage offers information about institutions which have contributed to the progress of scientific temper and any personality or their works of 'heritage level repute'.



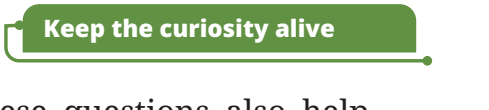
You will find a **Think like a scientist** section in some chapters, where you can explore the experiment further by making modifications or trying different approaches. It will help you to investigate more deeply and allow new questions to emerge in your minds.

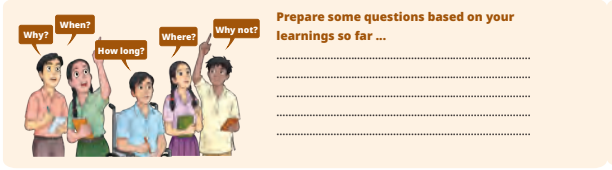
Some chapters also feature a section called **Be a scientist**, where you can learn about the contributions of Indian and international scientists related to the topic. These sections include brief biographies and show how scientists have made a difference. Additionally, an interesting element that has been incorporated in some of the chapters is the introduction of certain verses from various Indian texts to promote rootedness in the learners as envisaged in NEP 2020.

The **Snapshots** section provides the summary of a chapter, which offers an overview of the chapter's main points, reinforcing the key ideas discussed. Each chapter includes **Keywords** in between the text that highlight key concepts and steps in science, helping learners understand ideas and think critically. These keywords also outline the procedures in scientific activities.



Keep the curiosity alive includes a range of exercises, from pictorial questions and puzzles to multiple choice questions, offering a challenging and engaging experience. These questions also help assess the competencies developed by learners in each chapter. We recommend teachers to use questions similar to those found in this section for evaluation.





A key feature of the book is **Discover, design, and debate**, which includes activities/projects designed to encourage interaction with experts, teachers, parents, and the community. Students are encouraged to gather diverse information and draw their own conclusions. These support the development of thoughtful, active, and compassionate learners. It makes science more fun, meaningful, and connected to life—as it no longer remains about reading and memorising, but also about doing. Some projects may require prior preparation.

Friends! Science is full of wonders, and there is always more to discover. That is why the Grade 8 textbook also ends with a page called **It's never the end, my friend!**

The textbook is one way to learn, but learners should also explore and observe their surroundings. Information and Communication Technology (ICT) can further enhance learning when used appropriately. QR codes in the textbook provide access to interactive resources like videos, puzzles, games, quizzes, audio, and additional content, allowing learners to explore at their own pace.

Now, with *Curiosity* in your hands, keep exploring, keep questioning, and never stop being curious.

TEXTBOOK DEVELOPMENT TEAM

National Syllabus and Teaching Learning Material Committee (NSTC)

1. M.C. Pant, *Chancellor*, National Institute of Educational Planning and Administration (NIEPA), ***(Chairperson)***
2. Manjul Bhargava, *Professor*, Princeton University, ***(Co-Chairperson)***
3. Sudha Murty, Acclaimed *Writer* and *Educationist*
4. Bibek Debroy, *Chairperson*, Economic Advisory Council to the Prime Minister (EAC–PM)
5. Shekhar Mande, Former *Director General*, CSIR; *Distinguished Professor*, Savitribai Phule Pune University, Pune
6. Sujatha Ramdorai, *Professor*, University of British Columbia, Canada
7. Shankar Mahadevan, Music Maestro, Mumbai
8. U. Vimal Kumar, *Director*, Prakash Padukone Badminton Academy, Bengaluru
9. Michel Danino, Visiting *Professor*, IIT–Gandhinagar
10. Surina Rajan, *IAS* (Retd.), Haryana, Former *Director General*, HIPA
11. Chamu Krishna Shastri, *Chairperson*, Bharatiya Bhasha Samiti, Ministry of Education
12. Sanjeev Sanyal, *Member*, Economic Advisory Council to the Prime Minister (EAC–PM)
13. M.D. Srinivas, *Chairperson,* Centre for Policy Studies, Chennai
14. Gajanan Londhe, *Head*, Programme Office, NSTC
15. Rabin Chhetri, *Director*, SCERT, Sikkim
16. Pratyusha Kumar Mandal, *Professor*, Department of Education in Social Sciences, NCERT, New Delhi
17. Dinesh Kumar, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi
18. Kirti Kapur, *Professor*, Department of Education in Languages, NCERT, New Delhi
19. Ranjana Arora, *Professor* and *Head*, Department of Curriculum Studies and Development, NCERT, ***(Member-Secretary)***

THE CONSTITUTION OF INDIA

PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a [1]**[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 [2][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.**

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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)

Textbook Development Team

CONTRIBUTORS

Arnab Bhattacharya, Centre *Director*, Homi Bhabha Centre for Science Education (HBCSE), Tata Institute of Fundamental Research (TIFR), Mumbai; *Professor*, Department of Condensed Matter Physics and Material Science, TIFR, Mumbai **(*Team Leader* and *Leader*, Physics Sub-group)**

Saroj Ghaskadbi, Former *Senior Professor*, Savitribai Phule Pune University, Pune **(*Leader*, Biology Sub-group)**

Uday Maitra, *Honorary Professor* and *INSA Senior Scientist*, Indian Institute of Science, Bengaluru **(*Leader*, Chemistry Sub-group)**

R. Shankar, *Adviser*, International Geoscience Education Organisation, *Coordinator*, International Earth Science Olympiad and Former *Professor*, Mangalore University, Mangaluru **(*Leader*, Earth Science Sub-group)**

Abhay Kumar, *Associate Professor*, Central Institute of Educational Technology, NCERT, New Delhi

Adithi Muralidhar, *Scientific Officer*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

A.K. Mohapatra, Former *Professor*, Department of Education in Science and Mathematics, RIE, Bhubaneswar

Anand Arya, *Associate Professor*, Regional Institute of Education, NCERT, Ajmer

Arun Pratap Sikarwar, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Ashish Kumar Srivastava, *Assistant Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

B.K. Tripathi, Former *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Charu Maini, *Principal*, DAV Public School, Sector 7, Gurugram, Haryana

C.V. Shimray, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Dinesh Kumar, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Fanindra Sharma, *Educator* and *Consultant*, Programme Office, NSTC, NCERT, New Delhi

Gagan Gupta, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Gauri Roy, *PGT* (Physics), Demonstration Multipurpose School, Regional Institute of Education, Mysuru

Indrani Das Sen, *Scientific Officer*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

Jaya P. Swaminathan, *Teacher Developer*, Royal Society of Chemistry, Bengaluru

Karthick Balasubramanian, *Scientist E*, Agharkar Research Institute, Pune

Lalminthang Kipgen, *Assistant Professor*, Division of Educational Kits, NCERT, New Delhi

Linto Alappat, *Assistant Professor*, Christ College Autonomous, Irinjalakuda, Thrissur, Kerala

L.K. Tiwary, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Manasi Goswami, *Professor*, Regional Institute of Education, NCERT, Bhubaneswar

Manjushree Chaudhuri, Former *PGT* (Physics), St. Columba's School, New Delhi and La Grande Boissière Campus of International School of Geneva, Switzerland

Mayuri Rege, *Reader*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

Meher Wan, *Scientist*, CSIR-National Institute of Science Communication and Policy Research, New Delhi

Munindra Ruwali, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Neeraja Dashaputre, *Principal Technical Officer* (Education), Indian Institute of Science Education and Research, Pune

Nicole Ann Fae Sequeira, *Assistant Professor*, Goa University, Goa

Poonam Katyal, Former *TGT*, Zeenat Mahal Sarvodaya Kanya Vidyalaya, Jafrabad, Delhi

Pramila Tanwar, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Praveen Pathak, *Scientific Officer*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

Preeti Khanna, *Rehabilitation Professional* (Visual Impairment), National Association for the Blind, New Delhi

Puneet Sharma, *Assistant Professor*, Division of Educational Kits, NCERT, New Delhi

Pushp Lata Verma, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

P.V. Raghavendra, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Ravijot Sandhu, *PGT* (Chemistry), Navyug School, Laxmibai Nagar, New Delhi

Ravindra Kumar Parashar, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Ravi S. Nanjundiah, *Professor*, Centre for Atmospheric and Oceanic Sciences (CAOS), Indian Institute of Science, Bengaluru

Reena Mohapatra, Former *PGT* (Biology), DAV School, Bhubaneswar

Ritika Anand, *Principal*, St. Mark's Senior Secondary Public School, Meera Bagh, New Delhi

Ruchi Verma, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Sarat Phukan, *Professor*, Department of Geological Sciences, Gauhati University, Guwahati

Sarita Kumar, *Professor,* Acharya Narendra Dev College, University of Delhi, Delhi

Sarita Vig, *Professor*, Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram

Shubha Tole, *Senior Professor*, Department of Biological Sciences, TIFR, Mumbai

Smita Chaturvedi, *Assistant Professor*, Interdisciplinary School of Science, Savitribai Phule Pune University, Pune

Sudesh Kumar, *Associate Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

Surhud More, *Professor*, Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune

Tarun Choubisa, *Senior Consultant*, Programme Office, NSTC, NCERT, New Delhi

T.A. Viswanath, Former *Associate Professor*, Goa University, Goa

Sunita Farkya, *Professor* and *Head*, Department of Education in Science and Mathematics, NCERT, New Delhi **(*Coordinator*, Biology Sub-group)**

Rachna Garg, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi **(*Coordinator,* Physics Sub-group)**

R.R. Koireng, *Associate Professor*, Department of Curriculum Studies and Development, NCERT, New Delhi **(*Coordinator*, Earth Science Sub-group)**

Anjni Koul, *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi **(*Member-Coordinator* and *Coordinator*, Chemistry Sub-group)**

REVIEWERS

Shekhar C. Mande, FNA, FASc, FNASc, Former *Director General*, CSIR, *Distinguished Professor*, Bioinformatics Centre, Savitribai Phule Pune University, *Honorary Distinguished Scientist*, National Centre for Cell Science, Pune **(*Chairperson*, Curricular Area Group: Science)**

Manjul Bhargava, *Professor*, Princeton University and *Co-Chairperson*, NSTC

Anurag Behar, *CEO*, Azim Premji Foundation, Member, National Curriculum Framework Oversight Committee

Gajanan Londhe, *Head*, Programme Office, NSTC

Ankush Gupta, *Associate Professor*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

B.K. Sharma, Former *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

K.K. Arora, Former *Professor*, Zakir Husain Delhi College, University of Delhi, Delhi

K.V. Sridevi, *Associate Professor*, Regional Institute of Education, NCERT, Ajmer

Lakshmy Ravishankar, Former *Professor*, KET's V.G. Vaze College of Arts, Science and Commerce, Mumbai

Manoj Yadav, *Professor*, Government College, Ajmer

Monika Koul, *Professor*, Hansraj College, University of Delhi, Delhi

Mridula Arora, *Principal*, Navyug School, Sarojini Nagar, New Delhi

M.S. Sriram, Former *Professor* and *Head*, Department of Theoretical Physics, University of Madras, Chennai and *President*, K.V. Sarma Research Foundation, Chennai

Paramananda Barman, *Scientist* and *Associate Editor*, NIScPR, CSIR, New Delhi

Pooja Gokhale Sinha, *Assistant Professor*, Sri Venkateswara College, University of Delhi, New Delhi

Pushpanjali Bhagat, *Principal*, Sarvodaya Kanya Vidyalaya, Pushp Vihar, New Delhi

Pushpa Tyagi, Former *Head of Department* (Physics), Sanskriti School, Chanakyapuri, New Delhi and Former *PGT* (Physics), Kendriya Vidyalaya, Delhi

Saket Bahuguna, *Assistant Professor* (Linguistics), Central Institute of Hindi, Delhi Centre, Ministry of Education, Government of India

Sanjay P. Sane, *Professor*, National Centre for Biological Sciences, TIFR, Bengaluru

Sanjeev Kumar, *Professor*, School of Sciences, Indira Gandhi National Open University, New Delhi

Santosh Gharpure, *Professor*, IIT Bombay, Mumbai

Satyajit Rath, *Visiting Professor*, Indian Institute of Science Education and Research, Pune

Savita Ladage, *Professor*, Homi Bhabha Centre for Science Education, TIFR, Mumbai

Sujata Bhargava, Former *Professor*, Savitribai Phule Pune University, Pune

Surendra Ghaskadbi, Former *Scientist G*, Agharkar Research Institute, Pune

Vijay Sarda, Former *Associate Professor*, Zakir Husain Delhi College, University of Delhi, Delhi

V.P. Srivastava, Former *Professor*, Department of Education in Science and Mathematics, NCERT, New Delhi

V.B. Bhatia, Former *Professor*, Department of Physics and Astrophysics, University of Delhi, Delhi

Viswajanani J Sattigeri, *Head*, CSIR-Traditional Knowledge Digital Library Unit, New Delhi

Yukti Sharma, *Professor*, Department of Education (CIE), University of Delhi, Delhi

Acknowledgements

The National Council of Educational Research and Training (NCERT) acknowledges the guidance and support of the esteemed Chairperson and members of the National Curriculum Framework Oversight Committee for their invaluable contributions in overseeing the translation of NCF-SE 2023 perspectives into the textbook. NCERT is also deeply grateful to the Chairperson, Co-Chairperson, and members of the National Syllabus and Teaching Learning Material Committee for their continuous guidance and thorough review of the textbook. Furthermore, NCERT extends its heartfelt thanks to the Chairperson and members of the Sub-Group: Science, as well as other relevant CAGs, for their support and guidelines on the cross-cutting themes.

The Council gratefully acknowledges Sridhar Srivastava, Former *Joint Director*, NCERT; P.C. Agarwal, *Joint Director*, NCERT; Aman Sharma, *Secretary*, NCERT and *Joint Director*, CIET, NCERT; Amarendra P. Behera, *Professor* and *Head*, PRD, CIET, NCERT; Ranjana Arora, *Professor* and *Head*, DCS&D, NCERT; Sunita Farkya, *Professor* and *Head*, DESM, NCERT; and Ashutosh Kedarnath Wazalwar, *Professor* and *Head*, PMD, NCERT, New Delhi, for their academic, administrative, and technical support.

Special thanks are due to Aniket Sule, *Associate Professor*, HBCSE, TIFR, Mumbai, for his valuable inputs on tribal astronomy; Ruchi Shukla, *Assistant Professor*, Department of Educational Psychology and Foundations of Education, NCERT, New Delhi, for her contribution to Chapter 3; Linto Alappat, *Assistant Professor*, Christ College Autonomous, Irinjalakuda, Thrissur, Kerala, who provided six photographs featured in Chapter 8; Amogh Sahaje, *Researcher*, 100 Suns, whose photograph appears in Chapter 10; and the Indian Space Research Organisation (ISRO), which supplied photographs included in Chapters 11 and 13. The Council also thanks Mohamed Hakif P. and Sai Shetye, HBCSE, TIFR, Mumbai, for preparing some illustrations used in Chapter 11, and Sachin Kishore, *Deputy Director General* (Philately), Postal Directorate, Dak Bhawan, New Delhi, for granting access to high-resolution images of Indian postal stamps related to migratory birds of India.

NCERT appreciates the contributions of Suparna Diwakar, *Educator* and *Chief Consultant*, Programme Office, NSTC; M. Pramod Kumar, *Senior Consultant*; Vaishali Sukhija, *Consultant*; Yadunath Deshpande, *Member*; and other members of the Programme Office, NSTC, NCERT, New Delhi, for their valuable inputs.

The Council acknowledges the dedicated efforts of Archana, Dharmendra Kumar, Monika Lamoria, and Preeti Sharma, *Senior Research Associates*; Nitika Rani, *Course Administrator*; Amar Kumar, Neha, and Gaurav Sonare, *Junior Project Fellows*; and Brijesh, Himani, and Nitin, *Graphic Designers*, DESM, NCERT, New Delhi.

Gratitude is also extended to Ankeeta Bezboruah, *Freelance Language Editor*, for her meticulous editing of the textbook manuscript. The Council sincerely appreciates the support provided by the APC office and the administrative staff of DESM.

Finally, the Council gratefully acknowledges Garima Syal, *Assistant Editor*, for her valuable contribution in shaping this book. Thanks are also extended to Pawan Kumar Barriar, *In-charge*, DTP Cell, Publication Division, NCERT; Sachin Tanwar, Sadiq Saeed, and Manoj Kumar, *DTP Operators* (Contractual); and Rajat Subhra Roy, Keshav Kumar, and Jatinder Kumar, *Proofreaders* (Contractual), Publication Division, NCERT, New Delhi, for their meticulous efforts and unwavering commitment throughout the publication process.

Constitution of India

Part IV A (Article 51 A)

Fundamental Duties

It shall be the duty of every citizen of India —

(a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;

(b) to cherish and follow the noble ideals which inspired our national struggle for freedom;

(c) to uphold and protect the sovereignty, unity and integrity of India;

(d) to defend the country and render national service when called upon to do so;

(e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;

(f) to value and preserve the rich heritage of our composite culture;

(g) to protect and improve the natural environment including forests, lakes, rivers, and wildlife, and to have compassion for living creatures;

(h) to develop the scientific temper, humanism and the spirit of inquiry and reform;

(i) to safeguard public property and to abjure violence;

(j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;

*(k) who is a parent or guardian, to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.

Note: The Article 51A containing Fundamental Duties was inserted by the Constitution (42nd Amendment) Act, 1976 S.11 (with effect from 3 January 1977).

*(k) was inserted by the Constitution (86th Amendment) Act, 2002 S.4 (with effect from 1 April 2010).

Contents

CONSTITUTION OF INDIA

Part III (Articles 12 – 35)
(Subject to certain conditions, some exceptions
and reasonable restrictions)
guarantees these

Fundamental Rights

Right to Equality

- before law and equal protection of laws;
- irrespective of religion, race, caste, sex or place of birth;
- of opportunity in public employment;
- by abolition of untouchability and titles.

Right to Freedom

- of expression, assembly, association, movement, residence and profession;
- of certain protections in respect of conviction for offences;
- of protection of life and personal liberty;
- of free and compulsory education for children between the age of six and fourteen years;
- of protection against arrest and detention in certain cases.

Right against Exploitation

- for prohibition of traffic in human beings and forced labour;
- for prohibition of employment of children in hazardous jobs.

Right to Freedom of Religion

- freedom of conscience and free profession, practice and propagation of religion;
- freedom to manage religious affairs;
- freedom as to payment of taxes for promotion of any particular religion;
- freedom as to attendance at religious instruction or religious worship in certain educational institutions.

Cultural and Educational Rights

- for protection of interests of minorities;
- for minorities to establish and administer educational institutions;
- saving of certain Laws 31A–31D.

Right to Constitutional Remedies

- by issuance of directions or orders or writs by the Supreme Court and High Courts for enforcement of these Fundamental Rights.