

Curiosity

Textbook of Science for Grade 6



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
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FOREWORD

The National Education Policy 2020, envisages a system of education in the country that is rooted in Indian ethos and its civilisational accomplishments in all domains of human endeavour and knowledge while at the same time preparing the students to constructively engage with the prospects 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. Having nurtured the students' inherent abilities touching upon all the five planes of human existence, the *pañchakoshas*, in the Foundational and the Preparatory Stages have paved the way for the progression of their learning further at the Middle Stage. Thus, the Middle Stage acts as a bridge between the Preparatory and the Secondary Stages, spanning three years from Grades 6 to 8.

This framework, at the Middle Stage, aims to equip students with the skills that are needed to grow, as they advance in their lives. It endeavours 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 will play a central role in mediating between content and pedagogy—a role that will strike a judicious balance between direct instruction and opportunities for exploration and inquiry. Among the 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. *Curiosity*, Textbook of Science for Grade 6, is one of these. It has been developed in consonance with the recommendations of NEP 2020 and the NCF-SE 2023 to take students on a journey of experiential learning by citing examples from the world of the learners. The content stimulates curiosity, a sense of exploration, questioning, and critical thinking. The content seamlessly weaves together concepts from physics, chemistry, biology, and earth science, along with cross-cutting themes like environmental education, value education, inclusive education, and Indian Knowledge Systems (IKS). The textbook aims to engage learners through an integrated approach by including multiple activities and thoughtful use of technology. The textbook offers ample opportunities for reflection and group discussions.

To encourage creativity and innovation, it is feasible to regard students as active participants in the learning process, rather than mere recipients of a predetermined set of knowledge. This can only be achieved if the necessary number of hours are dedicated to science teaching–learning annually as outlined in NCF-SE 2023. The pedagogical approach of the textbook also considers how important it is for students to think critically, reason well and make decisions. It also provides students with numerous opportunities to learn from each other, making the learning experience more engaging for both teachers and students.

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.

New Delhi
30 June 2024

DINESH PRASAD SAKLANI
Director
National Council of Educational
Research and Training

ABOUT THE BOOK

Curiosity, Textbook of Science for Grade 6 learners has been crafted in alignment with the recommendations of the National Education Policy (NEP) 2020 and the National Curriculum Framework for School Education (NCF-SE) 2023. The policy advocates a radical shift from a content-based education to a competency-based education, particularly in the realm of science. Therefore, the formulation of curricular goals for Science, subsequent competencies and learning outcomes are tailored towards competency-based learning. These curricular goals encompass various scientific concepts, including matter, the physical and living world, health, hygiene, and the exploration of the interface between science, society and technology. Additionally, the goals focus on the nature of science, its processes, historical and contemporary aspects of the development of science and science communication. While these goals are explicitly articulated, they are interdependent and collectively contribute to a better understanding of the world around us. Accordingly, the chapters of this textbook are structured around creative activities, reflective questions, processes and illustrations. The integration of the concepts from biology, chemistry, physics and earth science, and cross-cutting themes, such as value education, inclusive education, Indian Knowledge Systems (IKS) and environmental education have been interwoven in the content. Thus, the textbook aims to provide experience-based learning, rather than simply reading and memorising the concepts.

In the Middle Stage, science teaching-learning adopts an integrated approach. This integrated approach develops fundamental capacities across biology, chemistry, physics and earth science. The use of an integrated approach helps the learners to appreciate the interrelations between subjects and make sense of their observations and experiences.

Curiosity, Textbook of Science for Grade 6, comprises twelve chapters. As the name of the textbook suggests, there are numerous opportunities for the learners to explore the world of science and its nature. Through the chapters, learners will embark on a journey that will connect them to the world around and spark curiosity for further exploration. The hands-on activities embedded within each chapter engages the learners and provide them an opportunity to

reflect on learning. These activities are inclusive in nature. Some activities require both the teacher and learners to prepare in advance.

Chapter 1, titled 'The Wonderful World of Science', provides a holistic view of the new topic of Science introduced in the Middle Stage. It showcases, through examples, the essence of Science—a way of thinking, observing, and finding out by doing, and by asking questions. This chapter weaves together the concepts covered in the rest of the book, and aims to excite the readers as they start their adventures into the world of science. There are no assessment exercises in this chapter and is designed to be **non-evaluative**. Also, every chapter in the book begins with an introduction that makes the learners curious and tries to show different ways with which the goals of the curriculum can be achieved effectively. The chapters begin with the stories related to real-life situations, these are meant to capture learners' interest and connect them with what is already known. The various activities given are based on scientific processes, designed to provide hands and minds-on experiences. Following each activity, there are questions to help learners understand and assess how well they have grasped the information. Questions are significant in the learning process. They help learners to explore and reinforce their understanding. One will also find many thought-provoking questions designed to encourage deep thinking, self-awareness and critical analysis. These questions prompt learners to ponder and delve deeper into their thoughts.

In order to sustain the interest of the readers, some of the challenging ideas, additional information, poems, stories, strange facts and other interesting materials are also presented as add on **non-evaluative** content in the boxes labelled 'Do you know?', 'More to know!', 'Think it over!' and 'More to do!'. The thrill of scientific inquiry comes from pursuing the unknown, giving learners the opportunity to think and explore beyond the syllabus. Some chapters also include a section called 'Know a scientist', which presents the contributions of Indian scientists related to that concept. All these box items, including brief biographies of scientists, are **non-evaluative**. The important ideas and steps in understanding a given concept of science are included as 'Keywords' at the end of each chapter. These 'Keywords' will help learners to acknowledge various

ideas and encourage them to think more deeply about the content. The keywords related to scientific processes depict the steps or procedure involved in the scientific activities. These words guide learners on how scientific knowledge is generated, tested and applied. ‘Summary’ offers an overview of the chapter’s main points, reinforcing the key ideas discussed. It serves to outline the content presented in the chapter. A **non-evaluative** 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 primary aim of *Curiosity* is to prepare the children for becoming the responsible members of the society, and therefore efforts have been made to raise awareness about various issues, such as gender, region, environment, health and hygiene, water scarcity and energy conservation. Activities given in the book endeavour to promote peer-learning and group activities.

The assessment exercises, ‘Let us enhance our learning’, play a vital role in the learning process. They help to reinforce the understanding and identify areas for improvement, making them essential components of effective teaching and learning. Assessment consists of various exercises, from pictorial questions to creating puzzles and multiple-choice questions, to create a challenging and interesting experience for the learners. These questions also facilitate the evaluation of various competencies expected to be developed through a particular chapter. Peer and group activities to explore answers to the questions are also encouraged.

A significant feature of the book is what we termed as ‘Learning further’. In this section, some projects and activities are designed to increase learners’ interaction with experts, teachers, parents and the wider community. Learners are encouraged to gather diverse information and draw their own conclusions.

The textbook is just one way to learn. Learners should enhance their knowledge by exploring and observing their surroundings. Information and Communication Technology (ICT) can also be a valuable tool for learners’ learning and development, when used appropriately. Learners can explore ICT with the help of Quick Response (QR) codes provided in the textbook. QR codes make the reading experiences more interactive and enjoyable. These QR

codes that have additional resources can be accessed by the learners at their own convenience and pace. These additional resources include videos, puzzles, games, quizzes, audio, documentaries and additional content on some topics.

At the end of this book, learners will find a page titled 'It is not the end, my friend!'. This includes words of encouragement, motivating learners to continue their educational journey and ignite their curiosity for further learning. It is meant to be **non-evaluative**.

May the journey of every learner be filled with joy and continue the curiosity in the higher grades as well!

We express our gratitude to all the members of the textbook development committee for their contributions in shaping this textbook. We look forward to the feedback of the readers.

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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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