भारतीय शिक्षा बोर्ड
BHARTIYA SHIKSHA BOARD
आ नो भद्राः क्रतवो यन्तु विश्वतः

“आ नो भद्राः
क्रतवो यन्तु विश्वतः

Let the noble thoughts
come from all directions”

MATHEMATICS

Class-6 ★ Class-7 ★ Class-8

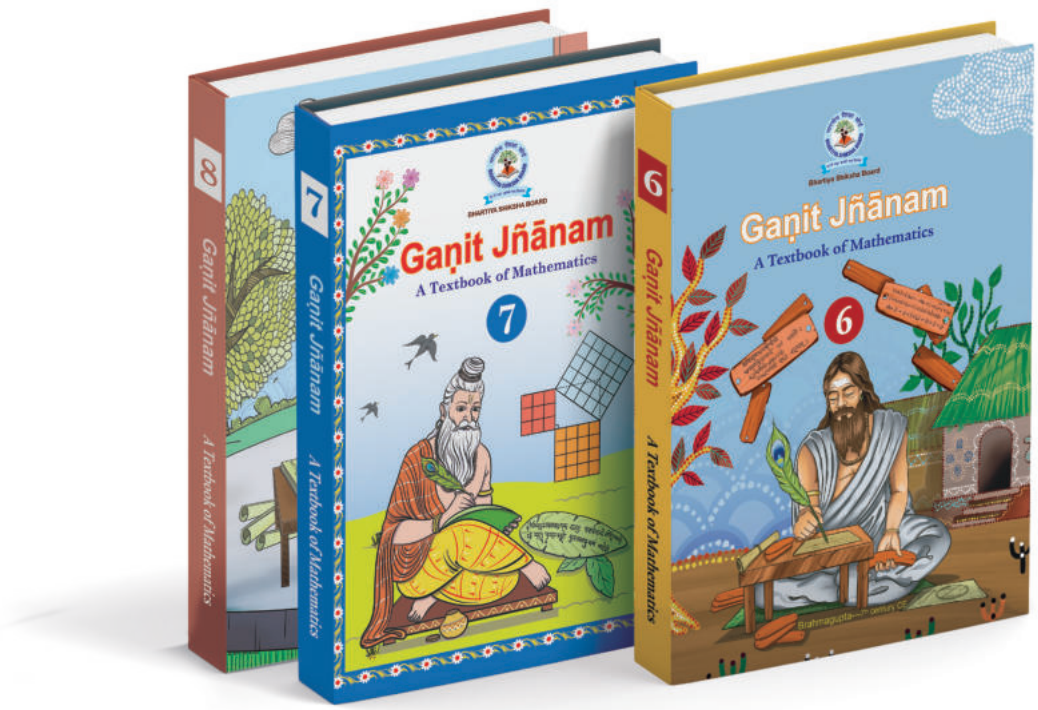
Our Vision

Bhartiya Shiksha Board (BSB) has developed a national education system that seamlessly integrates cutting-edge scientific research in brain development, child psychology, and learner-centric pedagogical approaches with the venerable traditions of our indigenous schooling model — the Guru Shishya Parampara. In doing so, the BSB curriculum embodies a balanced synthesis of wisdom from ancient Indian knowledge systems (IKS), and contemporary scientific advancements and technology.

Aligned with the guidelines of the National Curriculum Framework (NCF 2023), the Board lays significant emphasis on Competency Based Learning, and the cultivation of 21st-century skills among students, right from the Foundational Stage up to the Secondary Stage. This approach aims to nurture critical thinking and problem-solving abilities, essential for lifelong learning and success in a dynamic world. Moreover, the Board acknowledges the pivotal role of continuous professional development of educators, to ensure that they are equipped to transact the curriculum effectively and maximize student learning outcomes.

Gaṇit Jñānam

A Series of Mathematics Textbooks for Classes VI to VIII



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ISBN : 978-81-982230-9-8

The Mathematics learning resources for classes VI to VIII include the following:

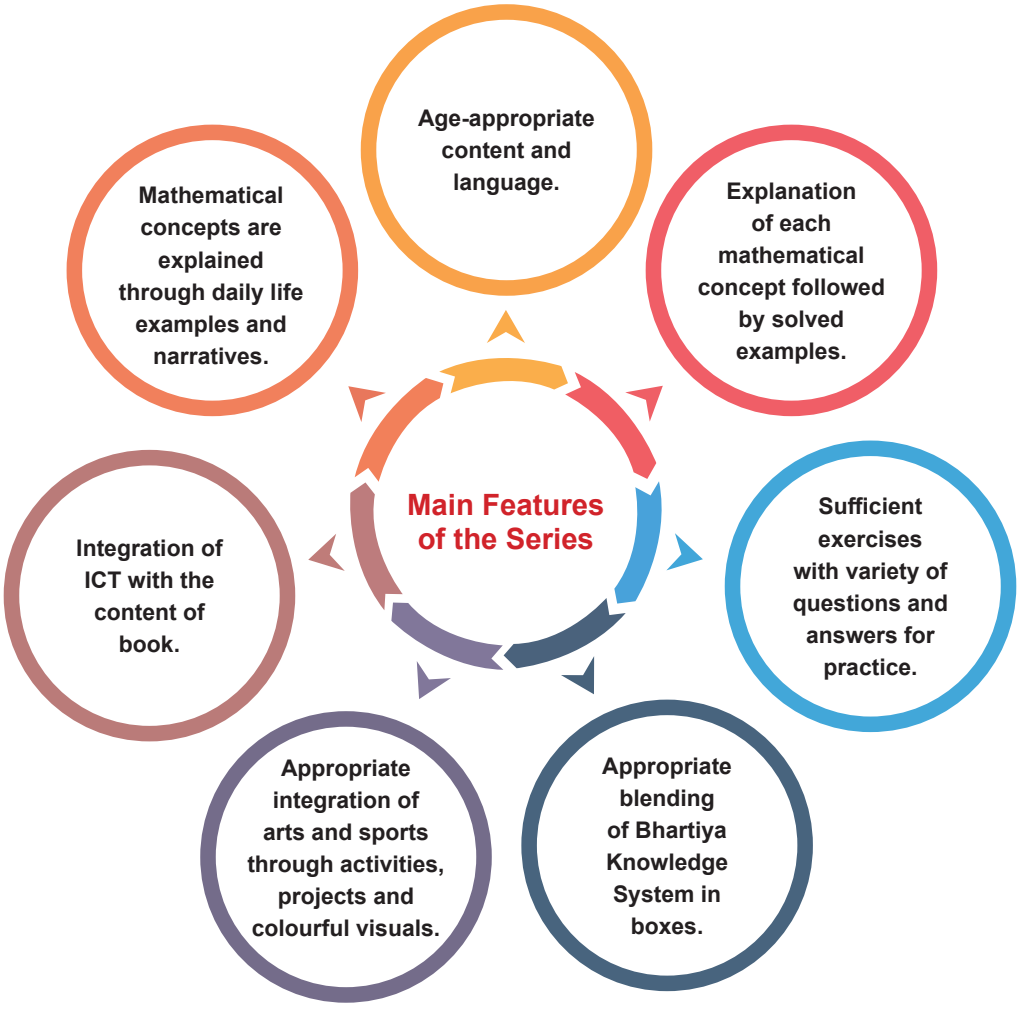
- The textbooks titled Gaṇit Jñānam.

  Gaṇit Jñānam is the name of the Series of Mathematics textbooks for classes VI to VIII. True to its name, the content of this book fosters a deeper understanding of the subject, encourages critical thinking, and connects learning with the real life context.

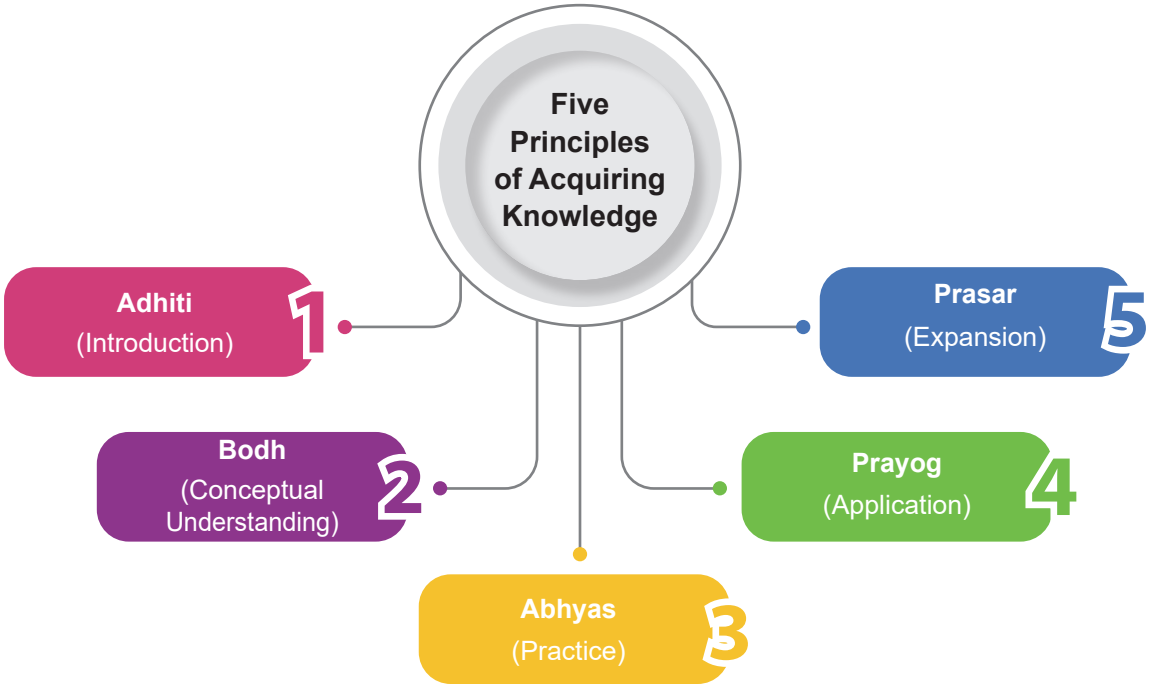
- Teacher's resource book

The series of Mathematics textbooks Gaṇit Jñānam of Bhartiya Shiksha Board (BSB) is developed and designed as per NEP 2020 and NCFSE 2023. It is aimed to impart mathematical knowledge with a blend of ancient Bhartiya approach with 21st century skills. This book of the Mathematics is an endeavour to acquaint children of Middle Stage (aged 11-14 years) with the richness of the Indian Knowledge System (IKS) embedded with the contribution of Bhartiya scholars like Baudhayan, Panini, Pingala, Virahanka, Aryabhata, Brahmagupta, Varahmihir, Mahavir, Sridharacharya, Bhaskara, Madhava, Ramanujan and many more.

Throughout this book, children are provided with appropriate opportunities to develop various capacities such as mathematical thinking, problem solving, reasoning, mathematical intuition, application and integration etc. Children may discover rules, wherever possible through pattern recognition and extending them through logical reasoning to the surroundings and daily life situations with joy, curiosity and wonder. The textbook would also support learners to answer the same problem through different approaches and allow them to explore the reasons. The content of this textbook has been developed and designed for both teachers and children. Most of the concepts are dealt with 'from concrete to abstract'. This book is a unique example of the judicious mix of ancient and modern approach of mathematical concepts, which will promote various skills in our children.



The content of each chapter in the book has been developed in a lucid language with the ancient approach of Panchpadi, i.e., five principles of acquiring knowledge namely, Adhiti (Introduction), Bodh (Conceptual Understanding), Abhyas (Practice), Prayog (Application) and Prasar (Expansion).

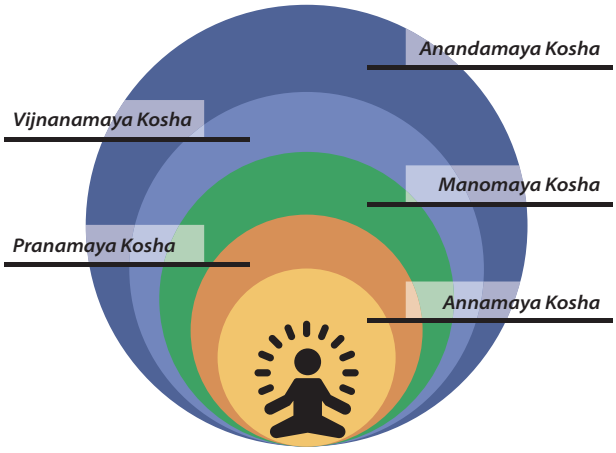


Panchakosha Vikas

Panchakosha Vikas (Five-fold Development) - A keystone in Indian tradition.

A child is a complete being, nurtured through the five koshas or sheaths. The layers are Annamaya Kosha (physical layer), Pranamaya Kosha (life force energy layer), Manomaya Kosha (mind layer), Vijnanamaya Kosha (intellectual layer) and Anandamaya Kosha (inner self). Each layer exhibits certain distinct characteristics. The holistic development of a child takes into account the nurturing and nourishment of these five layers.

Specific types of practices are designed to enable the development of each of these koshas. However, the practices are designed keeping in mind that the koshas are interconnected; therefore, activities focusing on one aspect also contribute to the development of the others.



Panchakosha Vikas

Mathematics in Middle Stage and Curricular Goals

The textbook design has incorporated curricular goals mentioned in the NCFSE 2023 for the Middle Stage. The content is presented to ensure a progressive learning journey and it evolves from concepts of preparatory stage to more complex topics, aligning with students' cognitive development. The progression is gradual, fostering critical thinking, problem-solving, and subject mastery, while integrating interdisciplinary approaches for a well-rounded education. Following curricular goals have shaped the development of the textbooks.

1. Understands numbers and collection of numbers (Whole numbers, Fractions, Integers, and Rational numbers) looks for patterns, and appreciates relationships between numbers.
2. Understands the concepts of variable, constant, coefficient, expression, and equation in one variable and uses these concepts to solve meaningful daily life problems with procedural fluency.
3. Understands, formulates, and applies properties and theorems regarding simple geometric shapes (2D and 3D).
4. Develops understanding of perimeter and area for 2-D shapes and uses them to solve day-to-day life problems.
5. Collects, organises, represents (graphically and in tables), and interprets data/ information from daily life experiences.
6. Develops mathematical thinking and the ability to communicate mathematical ideas logically and precisely.
7. Engages with puzzles and mathematical problems and develops own creative methods and strategies to solve them.
8. Knows and appreciates the development of mathematical ideas over human history, and the contributions of past and modern mathematicians from Bharat and across the world.
9. Experiences the beauty of mathematics in the surroundings and learning by doing.
10. Knows about and appreciates the interaction of Mathematics with each of their other school subjects.

Content for Class VI

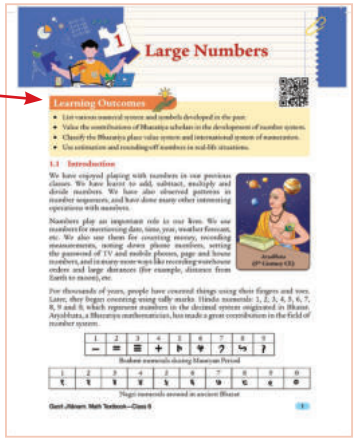
Content for Class VII

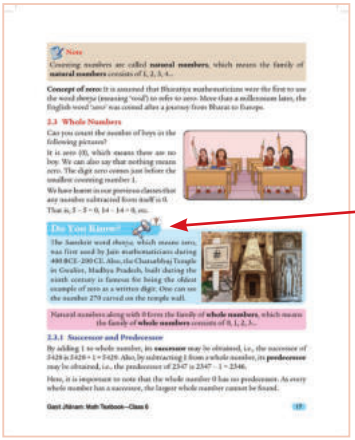
Content for Class VIII

Highlights of the Textbook

Learning Outcomes

Define what learners are able to know, to do or to demonstrate at the end of each chapter helping them to understand the purpose of educational activities.



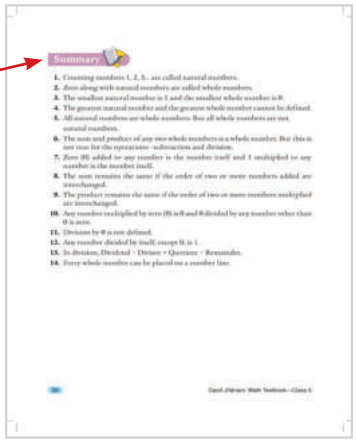


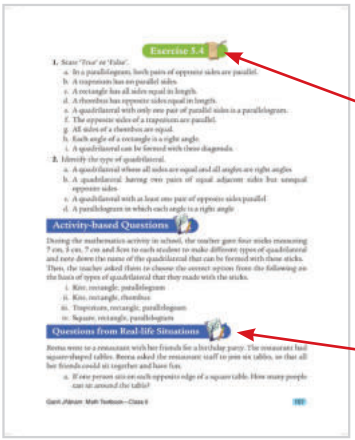
Do You Know

To help students explore and appreciate our cultural roots and knowledge in our ancient texts.

Summary

Summarise all the concepts and formulae learnt in the chapter at one place.





Exercise

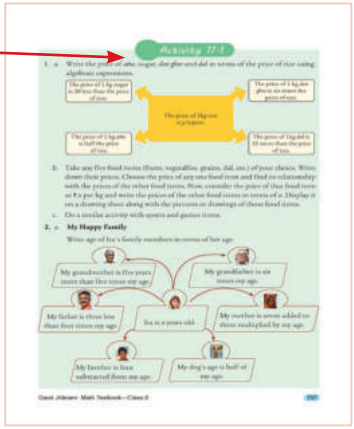
Engage students with ample problems to master the relevant mathematical concepts.

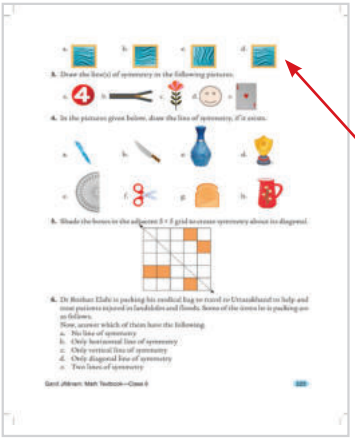
Questions from Real-life Situations

Helps students to relate and apply mathematical concept to daily life situations.

Activity

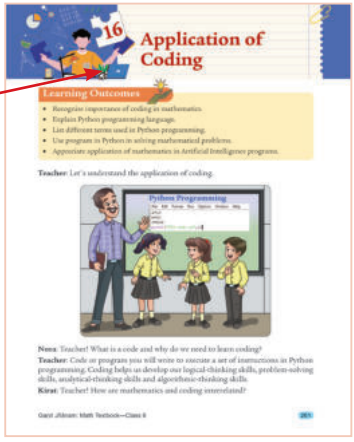
Hands on activities to strengthen the experiential learning, foster collaborative and problem solving skills.





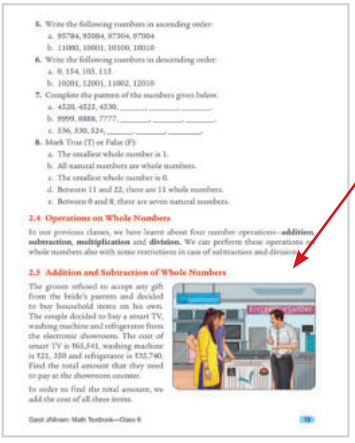
Art Integration

It enhances the aesthetic sense, encourage creativity, and connection of mathematics with the surroundings.



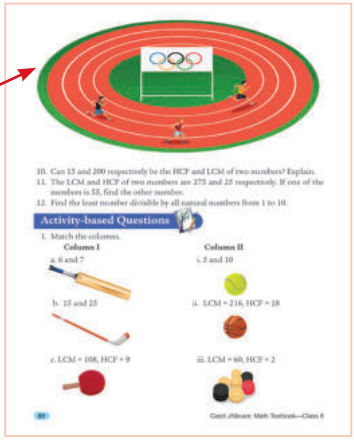
Computation and Coding

Focus on computational skills and coding to provide students an opportunity to connect mathematical concepts with key contemporary digital skills.



Value-based Questions

Real life situations to foster the core human values to strengthen the social emotional learning of the students.



Sports Integration

Integrating mathematics with sports for fun and joy in real life applications.

Our Glorious Heritage

9 Decimals

Learning Outcomes

- Understand different types of fraction.
- Identify the numerator and denominator of a fractional number.
- Appreciate the existence of the decimal system in ancient Bharat.
- Represent 10^{th}, 100^{th} and 1000^{th} in the decimal form.
- Locate a decimal number on a number line.
- Compare various decimal numbers.
- Use addition and subtraction of decimals in real-life situations.

9.1 Introduction

In the previous chapter, we have studied that fractions are numbers that represent a part of the whole. When an object or a group of objects is divided into equal parts, then each part is a fraction. A fraction is usually written as $\frac{1}{2}$, or $\frac{5}{12}$, or, $\frac{7}{18}$, and so on. It has a numerator and a denominator, where the denominator represents the total number of equal parts into which the whole is divided. The numerator is the number of equal parts that is taken out. For example, in the fraction $\frac{5}{7}$, 5 is the numerator and 7 is the denominator.

In this chapter, we will discuss fractions in decimal numbers, their representation on a number line, place value and expanded form of decimal numbers, and their addition and subtraction.

9.2 Development of Decimal System in Ancient Bharat

Many Bharatiyas have contributed in the field of mathematics, particularly Aryabhata, who lived during the fifth century. The concept of the decimal number system in Bharat can be traced back to the Vedic period, where th... numbers and place value notation was prevalent.

The decimal system in ancient Bharat was based on the concept of place value, which means the value of a digit depends on its position in a number. The decimal system used in Bharat was a positional notation system with the base 10, similar to the one used today.

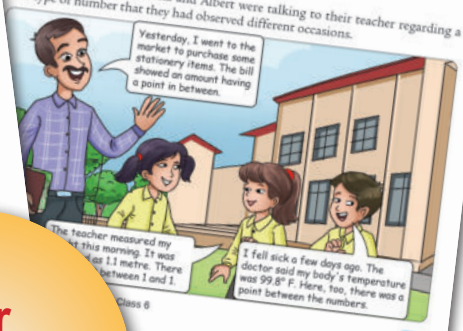
Aryabhata in his work *Aryabhattiya* described the decimal system and its operations in detail. He introduced the use of zero as a placeholder, which was a significant development in the history of mathematics. The use of zero allowed for more complex mathematical calculations and paved way for the development of algebraic concepts.

The decimal system later spread to the other parts of the world, including the Middle East and Europe, through trade and cultural exchanges. It eventually became the dominant numerical system globally.

It is important to note that while the decimal system is associated with ancient Bharat, similar numerical systems were independently developed in other civilisations, such as the Maya Civilisation in Central America. The decimal system's development in ancient Bharat was a significant milestone in the history of mathematics, and had a lasting impact on mathematical and scientific progress worldwide.

9.3 Representing Fractions in Decimal Form

Three friends Sunita, Rehana and Albert were talking to their teacher regarding a new type of number that they had observed different occasions.



8 Fractions

Learning Outcomes

- Relate the concept of fractions to real-life situations.
- Recognise the importance and applications of fractions.
- Value the work of Bharatiya mathematicians.
- Identify proper and improper fractions.
- Compute equivalent fractions and simplify them.
- Identify greater, lesser and equal fractions.

8.1 Introduction

We have learnt about fractions in previous classes. If we observe our daily routine, we can clearly see that there is a particular time for school, play, recreation, sleep, meals, etc. So it may be said that we do different fractions of activities during different times of the day.

Similarly, to make a good meal, all ingredients should be in exact amount or fractions. Thus, it may be said that fractions are connected to our daily life.

A day	24 hours
At school	7 hours
Play	2 hours
Sleep	8 hours
Recreation	1 hour
Meals	1 hour
Miscellaneous	5 hours

Fractions and arithmetic operations: We have clear evidence to show the prevalence of fractions in the Vedas. The writing system in the Vedic age is not well known; however, a variety of words for fractions can be found in the Vedas.

1. The word 'ardha' is frequently used for 1/2. A few compound words with 'ardha' and corresponding Prakrit words were used to denote compound (mixed) fractions, such as:
'saardha' 'sadhe' = 1 + 1/2; 'dvyardha' 'dyodha' = 2 + 1/2

2. Another word, 'paada', primarily used for an animal's feet, later implied 1/4. The word in this meaning became common, leading to many compound words and derivative Prakrit forms to denote compound fractions, for example:
'Sapaad' 'savaya' = 1 + 1/4; 'paadon' 'paunaa' = 3/4

Also denoted by the word 'tripaad' in the Vedas—
—*Yajur Veda*
त्रिपादस्यामृतं दिवि (Three-fourth part)

Additional words for fractions include:
'shaph' (= divided hoofs) = 1/8; 'kushtha' = 1/12

6 Integers

Learning Outcomes

- List natural numbers and whole numbers with basic operations.
- Appreciate the contributions of Bharatiya mathematicians in the development of negative numbers and need of integers.
- Represent integers on the number line.
- Compare integers using the number line.
- Apply addition and subtraction of integers in real-life situations.

6.1 Introduction

In previous classes, we have studied that whole numbers are a collection of all counting numbers and 0. In mathematics, counting numbers are called natural numbers. So, we can define whole numbers as a collection of all natural numbers and 0.

In the Bharatiya context, the concept of negative numbers has been a long journey. Our mathematicians have played a significant role in shaping the understanding and development of negative numbers.


Brahmagupta—7th Century

...e of the earliest references to negative numbers in *Bhaatiya Ganit* can be seen in ...works of Brahmagupta, a seventh century mathematician. He introduced the ... for performing arithmetic operations with positive and negative numbers. ...tated that a negative number subtracted from a positive number gives a ...e result, while subtracting a positive number from a negative number gives ...tive result.

...significant contribution in understanding negative numbers was made ...kara II, a mathematician also known by the name of Bhaskaracharya, ... century CE. Bhaskara II developed the concept of negative numbers ...d provided explanations and examples of their usage in his work called ...explored the application of negative numbers in solving mathematical ...d arithmetic operations.

Answer to Frequently Asked Questions on BSB Textbooks

Q.1. How can a school get Affiliated/Associated with the Bhartiya Shiksha Board (BSB)?

Ans. Detailed instructions including Affiliation Bye-law are provided on our website. For more details, please contact via phone or WhatsApp the BSB Customer Support Number: 8954999000 Email: affiliation@bsb.org.in, BSB Office Hours: Daily from 6:00 AM to 10:00 PM

Q.2. What is the USP of Textbooks developed by Bhartiya Shiksha Board (BSB) and how the BSB Textbooks are distinct from others?

Ans. The BSB Textbooks have been developed meticulously, selecting the base for modern education. Appropriate references are given from ancient Indian Traditional Knowledge scriptures, traditional practices and ethos. The objective is to enable students to grow as global citizens with 'Bharatiya' orientation. The content material in the textbooks is consistent in curriculum and in alignment with national educational standards. The Textbooks reflect the emphasis on the Competency Based Learning - CBL through a balanced synthesis of wisdom from ancient Indian Knowledge Systems -IKS, and the 21st century skills.

Q.3. Where can I obtain a copy or set of the Textbooks?

Ans. Interested people can visit Bhartiya Shiksha Board website: https://bsb.org.in click on the "Availability of Books" section, select books and place an order. There are also local dealers of books to know list of these dealers or for any other assistance, you can contact at following no: Phone / WhatsApp: +91 89549 99000.

Q.4. Provide some details about the team behind the development of the textbooks?

Ans. The Textbooks are developed by experienced subject experts, under the mentorship and guidance of the leading luminaries in Education, i.e.:

- Science Text Books under the guidance of **Dr H C Verma**, (Former Professor, IIT Kanpur and renowned author of many books like 'Concepts of Physics').
- Mathematics Text Books under the guidance of **Dr Hukum Singh** (Former Professor & Dean, Academics & Head DESM, DEK, NCERT).
- Hindi Text Books under the guidance of **Dr Pramod Dube** (Former Professor, NCERT) and **Dr Ram Darash Mishr** (Former Professor, Delhi University and renowned author).
- Social Science Text Books under the guidance of **Prof. Madhav Govind** of JNU and **Prof. S.C. Rai** of DU alongwith **Prof. Dr Shri Prakash Singh**, DU-South Campus.
- Sanskrit Text Books under the guidance of **Prof. Radhavallabh Tripathi** (Ex-Vice Chancellor), **Prof. Shri Nivas Varkhedi** (Vice Chancellor), **Dr. Vijay Pal Shastri** (Ex-Professor) - Central Sanskrit University.
- English Text Books under the guidance of the professors of DU and subject experts working with the Directorate of Education.

Q.5. Can teachers or experts provide feedback or suggest improvements for the Text Books of Bhartiya Shiksha Board?

Ans. Bhartiya Shiksha Board is open to the feedbacks and suggestions for improvements from the experts, which, after deliberations by the "Text Books Development" teams, will be considered for incorporating in future editions.

Q.6. Can schools of other Boards like CBSE, ICSE and State Boards, use the Text Books of Bhartiya Shiksha Board?

Ans. The Text Books developed by Bhartiya Shiksha Board are in consonance with NEP-2020, NCF-FS 2022 and NCF-2023, and follow the national educational standards, hence, can be relevant for other Boards/Institutions, also.

Q. 7. Which curriculum is followed by BSB and how is this different from NCERT pattern?

Ans. The BSB textbooks are distinct due to their core focus on integrating traditional 'Bhartiya Gyan Parampara' with modern learning approaches and synthesize a balanced approach emphasizing Competency Based Learning (CBL) aligned with NEP- 2020 & NCF-2023.

Q.8. Whether BSB textbooks are oriented to prepare students to different competences exam?

Ans. Students studying BSB books will be well-equipped for competitive exams because the BSB curriculum is entirely based on NEP 2020 and NCF 2023. These national frameworks focus on the same conceptual understanding and competency-based learning required performing well in exams like JEE and NEET etc, ensuring students receive the necessary foundation to excel.

Q.9. When are offline/online applications for all categories of affiliation generally permitted to be submitted according to the Bye-Laws.

Ans. Online/Offline applications for all categories within the scope of these Bye-laws shall generally open on 1st January and shall close by 31st December of a particular calendar year. For more details read chapter no.10, clause no. 10.4.3 of Affiliation bye-laws.

Q.10. What does Affiliation and Association mean?

Ans. **Affiliation means –** Schools that are recognized by the State Government up to Class 8 and wish to get affiliated with Bharatiya Shiksha Board upto Class 10 or 12, or those schools that are already affiliated with any other education board upto Class 10 or 12 and wish to switch over to Bharatiya Shiksha Board.

Association means – Schools that are recognised by the State Government up to Class 8 and are fully committed to ensuring 100% implementation of all textbooks published by Bharatiya Shiksha Board, participation in teacher training programmes organised by the Board, and compliance with the Board's assessment process during examinations — such schools are associated with Bharatiya Shiksha Board up to Class 8.

Q.11. Can the school apply for affiliation even if the land is in two different campus?

Ans. If school is already running upto class 8th in one campus and want to take affiliation from 9th to 12th in other campus. In this scenario the school can still apply for affiliation but the land should be under the same local government authority and in the same revenue areas. However it has to be decided by the Board on case to case basis.

Q.12. Can the school use a common playground of a society or another school?

Ans. Yes the school can use another ground but should have a proper permission from the local authority. If more than one school uses the same play ground then the game period should not be the same. Secondly it has to be nearby so that student can use that particular playground.

Q.13. Are there any special provisions to take affiliation for Tribal area and Hilly area's School?

Ans. Yes, there are some special provision for notified Hilly and Tribal areas on the basis of Regional Characteristics to give impetus to Geo- Economic traditions and Eco-friendly culture of the location and in notified Tribal areas where BSB has also provided 50% fee concession for school affiliation fees.

Q.14. Does BSB conduct teacher training?

Ans. Yes, every Affiliated/Associated school shall organise Annual Training & Triennial Training. For more details read chapter no.16, clause no. 16.1 & 16.2 of Affiliation bye-laws.

Q.15. What are the conditions under which a school's affiliation with Bhartiya Shiksha Board may be revoked (Revocation of Affiliation)?

Ans. If a School is found violating the provisions of the Affiliation Bye Laws/Examinations Bye Laws of the Board or does not abide by the directions of the Board, the Board shall have the authority to revoke affiliation of that school. For more details read chapter no.13, clause no. 13.2 of Affiliation bye-laws.

Swami Ramdev and Acharya Balkrishna envision an educational system that cultivates well-rounded individuals who are not only intellectually proficient, but also morally and spiritually grounded. Their perspective on education seamlessly integrates traditional Indian wisdom with contemporary educational practices, focusing on self-realization and holistic development. They emphasize the importance of instilling values such as discipline, respect, and moral integrity in students. According to them, education should help build the character and foster a sense of responsibility towards society and the nation. True education transcends textbooks and exams, nurturing the mind, body, and soul, and equipping individuals with the necessary 21st-century skills to positively impact society and the nation, in the modern world.

The vision of BSB regarding education aims to create a progressive, inclusive, and dynamic educational ecosystem, that empowers students to become responsible, innovative, and capable leaders of the future. In the contemporary educational landscape, there is a growing recognition of the need to integrate modern competencies with ancient wisdom and cultural heritage. This holistic approach aims to produce well-rounded individuals who are not only adept in contemporary skills, have the knowledge to prioritize economic growth, but also remain grounded in their cultural identity and ethical values. Education should foster scientific and technological advancements with environmental sustainability. It acts as a catalyst for promoting social justice and equality, shaping a society where every individual, regardless of their background, has the opportunity to thrive. Moreover, it encourages student participation and contribution, vital for shaping the economic, cultural, and democratic environment. Together, these elements forge a path towards a prosperous, progressive, and harmonious global community.

Dr N. P. Singh
I. A. S. (Retd)
Executive Chairman
Bhartiya Shiksha Board

Learning is the true imperishable wealth.

—Thiruvalluvar

The main aim of education is to create human awareness so that they can understand the difference between the truth and untruth.

– Maharishi Dayanand Saraswati

Education is the manifestation of perfection already in man.

—Swami Vivekananda

Awake, Arise and Educate.

—Savitribai Phule

The purpose of education is to make good human beings with skill and expertise.

—A.P.J. Abdul Kalam

Bhartiya Shiksha Board

Patanjali Yogpeeth, Phase 1, Delhi–Haridwar National Highway, Haridwar–249405 (Uttarakhand)

+91 7982817158, 9936442616

e-mail : info@bsb.org.in | website : bsb.org.in