

Analysis & Design: Textbook for Primary & Middle Classes

1. Foreword

Before designing any textbook, it is important to understand the principles for textbook design, and the national curriculum framework which serves as the foundation for textbooks used in schools.

General Textbook Attributes

The audience for any textbook is the student and the teacher. A good textbook should, therefore help students learn as well as provide support to teachers. It should serve both as a guide to basic principles and also provide extra information for those who want to learn more. Not all students are alike - some may be inquisitive, some apprehensive, and others - impatient. Therefore, a textbook should cater to different student profiles. Last, but not the least it should link facts and concepts with our day to day lives, so that students can see a visible practical connect.

Student Profile	Description	Textbook Attributes
Inquisitive	Need to know more about a topic, and is intrinsically motivated.	The textbook should have a <i>Reference Value</i> . Therefore, it should include extra information in the form of: <ul style="list-style-type: none">➤ Did you know?➤ Interesting Facts and Trivia➤ Exploratory activities➤ Reflection Activities
Apprehensive	Need to be guided through a topic, and require information to be presented as small achievable tasks.	The textbook should have a <i>Tutorial Value</i> . Therefore, it should include guidance and support in the form of: <ul style="list-style-type: none">➤ Clear Explanation➤ Lucid Examples
Impatient	Need to get the key content points without having to read through the entire topic.	The textbook should have a <i>Look Up Value</i> . Therefore, it should include learning aids in the form of: <ul style="list-style-type: none">➤ Highlight on key information,➤ Definition of new key terms - vocabulary,➤ Visual Representation of detailed information using tables, charts, process-flow diagrams, concept maps etc.

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National Curriculum Framework (India)

The current changes in the NCF in general, and the science curriculum in particular emphasizes on the need to develop observational, exploratory, inquiry and critical thinking skills. To quote from the NCF, the mantra is *“Ask questions. You may not find all the answers but you will learn more.”*

“The main **objectives** at this stage (primary) are to arouse curiosity about the world (natural environment, artifacts and people) and have the child engage in exploratory and hands-on activities that lead to the development of basic cognitive and psychomotor skills through language, observation, recording, differentiation, classification, inference, drawing, illustrations, design and fabrication, estimation and measurement.”

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The content should provide opportunities to deal with the real and concrete world of the children, rather than a formal abstract world
The pedagogy should essentially be based on activities in and out of classroom, as well as other methods such as stories, poems, plays and other kinds of group activities. Activities should allow free exploration, seeing patterns, making comparisons and understanding the web of relationships.”

POSITION PAPER, NATIONAL FOCUS GROUP ON TEACHING OF SCIENCE

2. Analysis

In an analysis of a sample of textbooks, the following emerge as main design parameters:

- **Pre-assessment:** Checking what the child already knows about the topic.
- **Relevance:** Connecting the topic with the day-to-day life of the child - something that the child can see/feel/hear.
- **Engagement:** Some form of learning, which is “by the way” - stories, activities, case -study (senior classes), poem etc.
- **Reflection:** Exercises that call upon students to observe and think (as against recall and memorize)
- **Exploration:** Suggestions and exercises that encourage the child to go beyond the curriculum content
- **Exercises:** End of chapter questions
- **Learning Extensions:** Did You Know, Interesting trivia or facts that will appeal to the children; information with a high recall value and new vocabulary
- **Learning Aids:** Mind-maps, mnemonics, tables, charts etc.

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	Design element	Example
1.	Relevance & Reflection	Read: An Anecdote
		Reflection Activity: Questions based on the anecdote
		Think & Discuss
2.	Engagement	Activity: Just for Fun
		Suggestions in Teacher Toolbox
3.	Exploration	Explore
		Suggestions in Teacher Toolbox
4.	Learning Extensions	Vocabulary
		Interesting Facts
5.	Learning Aids	Chapter Map & Objectives
		Let's Summarize (Complete the concept map)
6.	Exercise	Open-ended and close-ended questions

Note: These design elements can work for primary and the middle school, with minor modifications for the middle school.

In higher classes, students perceive knowledge to be contextual, participate in the construction of knowledge and become independent and lifelong learners. Therefore, the textbooks designed for higher classes should help students develop an in-depth understanding of the subjects that they study, and help them to develop problem solving, critical thinking and decision-making skills, and in addition prepare them for the realities of the workplace.